Corporate financing decisions: Evidence from the Asia Pacific region

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Abstract

This thesis analyses the corporate financing decisions of listed non-financial firms operating in the Asia Pacific countries, namely Thailand, Malaysia, Singapore and Australia, for the period from 1993 to 2001. These four countries have different legal, corporate governance, financial and institutional environments and were affected by the 1997 Asian financial crisis in different ways and to different degrees. Therefore, this thesis aims to shed light on the impact of these differences and the financial crisis on financing policies and practices of firms in this region. The empirical analysis consists of three main parts: (i) the determinants of capital structure (the use of debt versus equity); (ii) the determinants of debt maturity structure (the use of long-term debt versus short-term debt); and (iii) the tests of the extent to which the main capital structure theory (the pecking order theory) accounts for the financing behaviour of firms in this region.

The results suggest that capital structure and debt maturity structure decisions of a firm are not only the product of its own characteristics as identified by the extant literature but also the function of the financial and legal environment in which it operates. The results also show that firms in this region do not behave as strictly as predicted by the pecking order theory. However, they reveal that financial deficit (the key factor in the pecking order theory) challenges the exclusive role of the conventional factors. The financial crisis of 1997 is also found to have had significant but diverse impacts on the firms' financing decisions across the region, especially in Thailand where the crisis originated. In addition, the pecking order behaviour tends to be more pronounced for the post-crisis period.

Declaration

The material contained in this thesis has not been submitted in support of an application for another degree or qualification in this or any other University.

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Chapter 1

Introduction

1.1 Background to the Research

Findings from previous studies of corporate financing decisions remain inconclusive and there is a limited amount of empirical evidence on capital and debt maturity structure choices using international data in different economies. There is a considerable amount of empirical research on the determinants of capital and debt maturity structures in the US, UK and other developed countries but little research has been undertaken in other countries, especially in emerging markets. How far theories formulated for firms in developed countries can be applied to those in other regions, such as the Asia Pacific region, needs to be investigated further. This thesis therefore undertakes a study of corporate financing decisions by firms in the Asia Pacific region.

Corporate financing decisions, such as the effect of capital and debt maturity structures on the valuation of a firm and optimal capital and debt maturity structures, have often been researched. Corporate financing decisions are required when firms need to fund new investments. A study on corporate financing decisions is important as it enhances our understanding of the manner in which firms are financed which can directly affect firms' value. Capital and debt maturity structures are among the most perplexing, and most frequently examined, issues in corporate finance and financial management. The important issue is always the relationship between capital or debt maturity structures and the firm's value.

The starting point for research in this area is the seminal paper by Modigliani and Miller (1958) which paved the way for the development of alternative theories and empirical research. Their irrelevancy propositions suggest that, under a restrictive set of conditions in the world of perfect capital markets[1], a firm's financing policy should not affect its market value. No debt-to-equity ratio can be regarded as superior to another, and they imply that maturity of debt has no effect on a firm's value. However, perfect markets do not exist in reality, and it is naive to conclude that investment and financing decisions are unrelated. Several theories have subsequently been developed with the relaxation of the assumptions of Modigliani and Miller's (1958) theory. The first generation of research showed how firms' value may vary with changes in debt-equity mix when one or more aspects of the fundamental perfect market assumptions, such as taxes and bankruptcy and liquidation costs, are relaxed. Whether there are specific target capital or debt maturity structure ratios that firms try to achieve has also been investigated, and various attempts have been made to introduce other perspectives of financial markets into the theory, such as agency costs and the presence of asymmetric information, yielding a number of valuable insights. The role of corporate governance has also been studied and found to have a significant effect on firms' financing decisions.

Assuming an optimal capital structure does exist, it is believed that a firm could maximize its value by selecting the appropriate proportion of debt and equity, provided the firm can identify its optimal capital structure. Managers have alternatives, and the combinations of financing sources chosen normally come with opportunity costs which can increase, or decrease, the value of firms, depending on how they choose to finance their investments. They can forego growth opportunities, but if they want to undertake new investment opportunities, they can either finance their projects from internal sources, such as retained earnings, or from external sources, such as borrowing through debt instruments or issuing new shares. According to the pecking order theory, internal finance is always preferable to external finance, and among external finance debt is

[1] Absence of transaction costs, taxes, informational asymmetries, financial distress and agency costs.

normally chosen before equity. This hierarchy order of finance is still under question as to whether such an order exists in practice. Assuming firms have first exhausted their internal finance, as suggested by the pecking order theory, the next available funding has to come from external sources with a combination of debt and equity. The essence of debt is that the firm has a commitment to make fixed payments in the future, including interest payments and the principal repayment. Once firms decide to issue debt, there is the question of whether short-term or long-term debt should be acquired, or what the appropriate proportion of long-term debt to short-term debt should be.

1.2 Justification for the Research

Most previous studies focus on US and UK firms, and it is therefore important to investigate further whether the capital and debt maturity structure choices of non-financial firms in Asia Pacific countries are related to factors similar to those which appear to influence the financing decisions of US and UK firms. Results from a single country might not represent the average for other countries in different environments and economies. Due to limited empirical evidence based on firms in other countries, it is possible that the significant relationship between previously identified factors in the literature on firm leverage or debt maturity might possibly even be coincidental as the majority of the existing empirical studies only use data from the same, or a single, environment. This highlights a need to test the robustness of empirical findings outside the environment of previous research. The study of firms in Asia Pacific countries adds important international evidence to the current literature and a unique data set from financial statements of firms listed in Asia Pacific countries, namely Thailand, Malaysia, Singapore and Australia, has been chosen for this research project. These four sample countries were chosen as several factors contribute to the importance of this study.

Firstly, although all sample countries have been affected by the East Asian financial crisis of 1997, the degrees of the effects vary across sample countries. The crisis originated in Thailand and its effects spread to other countries.[2] Among the sample countries, Thailand and Malaysia were the countries most affected by the crisis (Kamin, 1999) while Singapore successfully averted the worst effects of the crisis and recovered quickly (Cha and Oh, 2000; Chowdhry and Goyal, 2000). There is evidence suggesting that Australia was less affected by the crisis, that Australia's economic fundamentals can hold Australia in a good shape and that Australia will retain the reputation as a country with responsible economic and financial management (Macfarlane, 1998a and 1998b; Grenville, 1999; Summers, 2001; Ellis and Lewis, 2001). This is not unexpected because Australia was not subject to the fatal combination of large volatile capital flows and fragile domestic financial sectors that characterized other Asian countries. Australia has a more matured financial market as a consequence of the financial deregulation of the 1980s and the Wallis Inquiry in 1996.

Claessens et al. (1999b) and Caprio and Kingebiel (2003) categorize Thailand and Malaysia as 'crisis-countries' and Australia and Singapore as 'non-crisis countries'. However, it is naive to assume that Australia and Singapore are not totally affected by the crisis because (i) the crisis increased uncertainty in the world financial markets; (ii) Asian countries are important markets for Australian and Singaporean firms; (iii) there are financial debt exposures to the crisis affected countries.[3] Therefore, based on Claessens et al.'s (1999b) and Caprio and Kingebiel's (2003) classification and the evidence from previous studies (Kamin, 1999; Cha and Oh, 2000; Chowdhry and Goyal, 2000, among others), in this thesis Thailand and Malaysia are grouped as

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[2] Arsiraphongphisit et al. (2000) note that the crisis had significant effects on financial policies and practices in Thailand and elsewhere in the Asia Pacific region. Caution should therefore be exercised when comparing policies and practices in Thailand during the crisis with those of other Asia Pacific countries.

[3] Ellis and Lewis (2001)

countries most affected by the crisis while Singapore and Australia are grouped as countries least affected by the crisis.[4]

Before the financial crisis, Thailand and Malaysia were among the fastest growing economies in the Pacific Rim. Attitudes toward financing decisions, such as leverage (especially dollar denominated debt), capital investment and dividends have been affected by the realities of the financial crisis. Little is, however, yet known about the financing decisions of firms in the Asia Pacific region, especially the effects of the East Asian financial crisis in 1997 on their decisions. Experiences from each sample country have important implications for policy makers in all other countries in the world. The study is divided into pre- and post-crisis periods, to investigate the effects of the financial crisis on the determinants of capital structure and debt maturity structure, and the adherence to related theories. This helps explain the differences in the observed financing pattern across the countries before and after the crisis period. This selection of sample countries allows investigations of the effects of the crisis at different levels, and these countries are of particular interest.

Secondly, existing studies on corporate financing decisions not only reflect mostly on corporate environments in developed countries, but empirical studies of financing decisions of firms in Asia Pacific countries are also quite sparse while the existing literature on Asia Pacific markets does not compare results from one country with another in the same region over the same period of time.[5,6] Most previous studies are in a single country context. There are few studies that explicitly compare the capital structure and debt maturity structure of firms in different countries and under different

[4] However, it should be noted that this classification of countries most and least affected by the crisis is not free of subjective judgment as each country is affected by the crisis both directly and indirectly up to different degrees.
[5] With the exception of Wiwattanakantang (1999); Pandey et al. (2000); Booth et al. (2001); Pandey (2001) among others.
[6] See Comerton-Forde and Rydge (2006) for a critical review of the market design of ten stock exchanges in the Asia Pacific region.

economies.[7] There is insufficient evidence to prove whether theories formulated in developed economies can be applied to firms outside these settings. Focusing on a cross-country context contributes to the literature by analysing the effect of differences in economic factors, corporate governance and institutional settings on firms' financing decisions. Insights into the determinants of corporate financing decisions enhance our knowledge of the relationship between corporate finance and financial, economic developments and monetary processes in the relevant countries.

Thirdly, the sample countries operate at different levels of economic development, and in different legal, financial and institutional settings. Different economic conditions, corporate governance and institutional environments influence the relationship between managers, shareholders, creditors and investors. This may offer explanations for the different patterns of financing behaviour observed across countries and regions. Little is known of how observed differences in economic conditions, corporate governance and institutional environment affect corporate financing choices. These differences in the sample countries help one consider a number of important determinants not widely explored in the literature. Firms in developing countries may have different financing objectives compared to firms in developed countries for several reasons (Groth and Anderson, 1997):

(i) Most firms in developing countries are smaller in size, or developing markets consist of a large number of private firms or family-oriented firms with different financing strategies from firms in developed markets;

(ii) Due to a lower level of market development, firms in developing countries have access to limited types of financial instruments;

[7] Recent studies using international data include Rajan and Zingales (1995) on G-7 countries, Demirguc-Kunt and Maksimovic (1999) on 30 developed/developing countries, Booth et al. (2001) on 10 developing countries, Antoniou et al. (2002, 2006) on 3 major European countries, Fan et al. (2004) on 39 developed/developing countries, and Deesomsak et al. (2004, 2005) on 4 Asia Pacific countries.

(iii) Firms in developing countries are more vulnerable to any shock to the market such as a financial crisis;

(iv) Accounting and auditing standards in developing countries are not as effective and efficient as those in developed countries, leading to differences in the extent and contents of financial disclosure and the level of asymmetric information;

(v) There are several factors that complicate the capital and debt maturity structures of firms in emerging markets compared to firms in developed countries, such as greater uncertainty about taxes and tax rates, higher perceived risk of realization of actual benefits of projects, relatively high cost of capital, volatility in equity markets and the absence of capital markets for long-term capital, particularly debt.

This thesis adds to the current literature by examining a set of sample countries, which provides a diversity of institutional structures, corporate governance and financial institutions, to explain variations in financing structure and their determinants across countries. It is expected that the disparity in corporate governance and institutional environments will affect the relevance of the different potential determinants of capital and debt maturity structures and thus contribute to explaining variations of financing decisions across the sample countries.

1.3 Aims and Summary of the Results

The questions of interest are whether firms behave according to any particular financing pattern in order to reach the optimal financial structure as predicted by any capital structure theories and whether there are any factors in particular that determine the optimal structure which ultimately maximizes firms' value. The main objectives of this thesis are to identify the important determinants of capital and debt maturity structures and to test the adherence to the pecking order theory of firms in Asia Pacific countries where the institutional settings differ from those in previous studies. The findings of this study reveal that financing decisions of firms in this region are not only products of their own characteristics but also of the financial and legal environment in which they operate. In addition, the financial crisis is found to have had significant impact on firm-specific, market and corporate governance determinants of both capital and debt maturity structures. The effects vary depending on the degrees to which the relevant countries were affected by the crisis. Moreover, the results show that the pecking order theory is active in practice and firms in this region do behave as predicted by the pecking order theory especially after the financial crisis.

1.4 Contents of the Thesis

The structure of the remainder of this thesis is as follows: Chapter 2 provides an overview of the corporate governance and institutional environments of the sample countries including financial orientation and stock markets, financial indicators and level of development, financial structure, legal origin, rule of law, legal protection, bankruptcy code, tax system, accounting practices and ownership structure. The implications of these aspects of corporate governance and institutional environment on corporate financing decisions are also discussed. This chapter also briefly outlines the 1997 financial crisis and its possible impact on firms' financing decisions.

Chapters 3 and 4 investigate firm-specific and country-specific determinants of capital and debt maturity structures for firms in the Asia Pacific region over the period of 1993 to 2001, respectively. These two chapters aim to empirically identify the factors that influence the capital and debt maturity structure decisions. In particular, they aim to examine whether factors that have been found to be significantly correlated to firms' leverage and long-term debt ratios in certain countries have the same influence for firms in Asia Pacific countries. In addition, the effects of the financial crisis on the determinants of capital and debt maturity structures are examined. Country groupings are analysed according to how severely each market was hit by the crisis to examine whether there are any variations of behaviour between each country grouping.

Chapter 5 focuses on testing the pecking order theory. The predictions of the pecking order theory are tested using several econometric techniques including linear regressions using ordinary least square (OLS), predictive logistic regressions and non-linear quantile regressions. Financing deficit is nested in traditional trade-off models with other firm-specific variables in order to test whether the effect of financing deficit is wiped out by other conventional variables. In addition, country-specific variables are introduced into the analysis. As in previous chapters, this chapter also investigates the effects of the crisis and how it affects firms' financing behaviour. Chapter 6 concludes the thesis and discusses the implications of the results and potential areas for future research.

Chapter 2

Economic Conditions, Corporate Governance and Institutional Environments in the Asia Pacific Region

2.1 Introduction

A number of theoretical and empirical studies indicate that a country's legal and financial institutions can affect external financing of firms in that country.[8] La Porta et al. (1999) suggest that the determinants of corporate financial decisions are likely to be different across countries because the structure of capital markets and corporate governance systems are different. La Porta et al. (1997, 1998, 2000) suggest the use of international data because the severity of agency problems differs across countries due to the variations of shareholder protection. Firms in different countries are highly likely to be operating in different cultures, legal and economic environments leading to different levels of development of corporate governance systems. These differences can affect the determinants of capital and debt maturity structures.

Empirically, several studies show the existence of a significant relationship between both institutional environments and corporate governance and financial structures. For example, Rajan and Zingales (1995) show that differences in institutional settings could be used to explain some differences in aggregate capital structure. Antoniou et al. (2002, 2006) pave the way to the new area of the literature in the capital structure and debt maturity structure that firms' financing decisions depend not only on firms' characteristics but also on the institutional environment which firms are operating in. They suggest that the importance of the factors varies depending on the changes in the level of financial market orientation, legal protection and corporate governance.

[8] See for example Rajan and Zingales (1995, 1998); Demirguc-Kunt and Maksimovic (1996, 1998, 1999); La Porta et al. (1997, 1998); Booth et al. (2001); Antoniou et al. (2002, 2006); Beck et al. (2002); Deesomsak et al. (2004, 2005).

There are a few arguments on the effect of corporate governance mechanisms which may vary depending on different legal systems such as legal origin and legal protection. Different legal systems have different ways of achieving effective corporate governance. Firms in countries with strong legal protection or with concentrated ownership structures might operate in different ways to achieve effective corporate governance systems. Very few studies compare the implications of corporate governance systems on financing decisions across different countries. There has been little research into corporate governance in the Asia Pacific region. Therefore, this chapter presents a review of corporate governance systems in the Asia Pacific region, namely Thailand, Malaysia, Singapore and Australia and their implications on corporate financing decisions.

The objective of this chapter is to review the literature on the differences between economic conditions, corporate governance and institutional environment across countries in the Asia Pacific region and to predict their impact on corporate financing decisions. The structure of this chapter is as follows. The next section examines corporate governance and institutional environments in the Asia Pacific region including financial orientation and stock markets, financial indicators and level of market development, financial structure, legal structure, bankruptcy code, accounting practices, and ownership structure. The third section briefly discusses the financial crisis of 1997. The last section reviews and concludes the chapter.

2.2 Corporate Governance and Institutional Environments

Corporate governance can be defined in several different ways. However, the basic definition of corporate governance is the mechanism that is used to control and direct firms. It is the method of dealing with agency problems between minority shareholders and controlling shareholders within firms. Corporate governance not only considers the rights and responsibility of shareholders but also of stakeholders. Corporate governance normally addresses the issue of how managers are influenced by banks, equity markets or other mechanisms and how they act toward those mechanisms to serve the interests of shareholders and maximize the value of firms (Khan, 2003). Corporate governance varies depending on the legal, regulatory and institutional environment where firms are operating in.

Good corporate governance can provide incentives for managers to pursue objectives that are in the interests of both firms and stakeholders leading to the efficient use of resources and increased confidence of investors. Good corporate governance can also be used to minimize agency problems by protecting minority shareholders from being expropriated by managers or controlling shareholders. The expropriation can be effected through excessive salaries, perquisite consumption, special dividends, diverting resources toward (over-investment) or away (under-investment) from investment or by other means such as insiders stealing the profits, insiders selling the assets, insiders reducing firms' opportunities by recruiting unqualified family members or overpaying wages, dilution of outside investors through share issues to the insiders, or management paying off their personal debts.[9]

For corporate governance to be effective, the decisions and actions of related parties such as shareholders, managers, creditors and potential investors should be coordinated in order to protect stakeholder rights. Moreover, punishment should be effected when the appropriate actions are not carried out. Effective and efficient corporate governance should be able to ensure that the goal of firms is to increase stakeholders' value and to allocate resources efficiently.[10] Weak corporate governance can result in a sub-optimal allocation of resources, highly risky investments,

[9] Shleifer and Vishny (1997); La Porta et al. (2000); Johnson et al. (2000); Mitton (2002)

[10] Nam et al. (1999) identify three main requirements for effective corporate governance: transparency, equity and accountability. Transparency is concerned with the use of information which is needed for efficient coordination and motivation. Equity refers to the legal protection of stakeholders. Accountability provides adequate and appropriate incentives and discipline for management.

expropriation of minority shareholders and financial distress. Corporate governance in the Asia Pacific region has received much attention recently partly because of the financial crisis. Nam et al. (1999) suggest that the weak corporate governance in East Asia, which has developed due to unhealthy relationships between lenders and borrowers and poor bank supervision, was one of the causes of the financial crisis in 1997. There is some evidence suggesting that financing decisions are related to corporate governance. Scott (1999) argues that the proportion of equity finance is highly correlated with the status of corporate governance. Before examining the determinants of capital and debt maturity structures in each country, it is crucial to look at the similarities and differences of corporate governance across countries in each region and to find out whether the underdeveloped corporate governance for countries in the Asia Pacific region has any significant influence on firms' financing decisions.

2.2.1 Financial Orientation and Stock Markets

There are two main streams of financial orientation, market-based systems and bank-based systems. In bank-oriented economies, banks play the key role of monitoring firms' performance. They can exploit scale economies in processing information, alleviate moral hazard problems via effective monitoring, form long-term relationships with firms in order to reduce asymmetric information leading to the increases in growth, and force firms to repay their debts more effectively (Rajan and Zingales, 1998; Levine, 2002). Firms rely on powerful bank relationships as their primary forms of external finance and tend to have close relationships with their primary banks. Bank-based systems are better than market-based systems at mobilizing savings and activating corporate control (Levine, 2002). Firms in bank-based economies should have high levels of leverage because of the greater availability of debt finance from banks but they might not want to borrow beyond a certain point because of the costs of excessive bank debt. Examples of countries that adopt bank-based systems are Japan and Germany.

In market-oriented economies, firms normally have several bank lenders and widely held publicly traded equity. 'Arms-length' banking relationships are expected. Examples of countries with market-based economies are the US and UK. Levine (2002) suggests that market-based systems do a better job than bank-based systems in allocating capital, providing risk management tools, and mitigating problems arising from excessively powerful banks; however, well-developed markets quickly and publicly reveal information which can lead to a decline in the incentives for investors to acquire information. All sample countries studied in this thesis have been classified as having market-based systems (Demirguc-Kunt and Maksimovic, 1999). Recent research has argued that classifying countries into bank-based and market-based systems is not a very useful way to distinguish financial systems (La Porta et al., 2000 and Levine, 2002). Rajan and Zingales (1995) do not find any systematic differences in the level of leverage between bank-based and market-based economies leading to a question whether the distinction of financial orientation has any effect on observed financing decisions. When considering the ownership structure of firms, firms in East Asia, namely Thailand, Malaysia and Singapore, are classified as family-based systems where both ownership and management are controlled by a group of families holding the power in firms' decisions. The comparisons between three financial orientation systems are summarized in Table 2.1. The importance of equity markets is shown in Table 2.2. Singapore is ranked the highest while Thailand has the lowest score. This implies that Singaporean firms rely more on the equity market than the debt market compared with firms in other sample countries. Therefore, Thai firms should generally have the highest level of debt, followed by Australian and Malaysian firms.

Table 2.1 : Comparison of market-based system, bank-based system and family-based system of corporate governance

Source : Khan (2002, 2003)

	Types of Corporate Governance System		
	Market-Based System	**Bank-Based System**	**Family-Based System**
Share of control-oriented finance	Low	High	High initially, but may vary as family groups get bank and equity financing from outside
Financial / Equity markets	Large, highly liquid	Not necessarily small but less liquid than EMS	Small, less liquid
Share of all firms listed on exchanges	Large	Not necessarily small	Usually small
Ownership of debt and equity	Large	Concentrated	Concentrated
Investor orientation	Portfolio-oriented	Control-oriented	Control-oriented for family groups
Shareholder rights	Strong	Weak	Weak for outsiders
Creditor rights	Strong	Strong for close creditors but applied according to a 'contingent governance	Strong for close creditors Weak for arm's length creditors
Dominant agency conflict	Shareholder vs management (agency cost of equity)	Bank vs investors Workers may be important stakeholders as in Aoki's model of the Japanese firm	Controlling vs minority investors
Role of board of directors	Important	Limited, but less so than in the case of FBS	Limited
Role of hostile takeovers	Potentially important	Quite limited	Almost absent
Role of insolvency and bankruptcy	Potentially important	Potentially important; but possible systemic crisis may postpone bankruptcies	Potentially important
Information asymmetry and agency costs rise with the growth of firms, making monitoring more costly	Can be done through interlocking directorships, but equity market and threat of takeovers are the most important mechanisms	Mixed : with adequate regulations that are enforced and stable intra-group shareholding monitoring can be effective (Aoki's contingent governance)	Mixed : in the presence of strong regulations and government vigilance monitoring could be efficient. However, the presence of moral hazard and possibility of bail-outs could lead to lax monitoring /Information asymmetry and agency costs rise with the growth of firms, making monitoring more costly
Self-monitoring	Possible : but the mechanisms above apply for the most part	Possible : with oversight by government and members of the group / Potential for abuse	Initially, self-monitoring is effective because of non-separation of owner and management. Later stages present monitoring problems as agency costs rise due to separation of owner-managers and outside financiers. At later stages there is a strong tendency for insiders to be predatory towards outsiders. Could still be efficient but efficiency depends on the performance of owner-managers.

Table 2.2 : Stock markets

	Thailand	Malaysia	Singapore	Australia	Source	Definitions
Financial Orientation	Market-based & Family-based	Market-based & Family-based	Market-based & Family-based	Market-based	Demirguc-Kunt and Maksimovic (1999) Khan (2003)	See Table 2.1
Importance of Equity Market	14.3	25.3	28.8	24.0	Leuz et al. (2003)	The important of equity market is measured by the mean rank across 3 variables (each variable is ranked such that higher scores indicate a greater importance of the stock market) used in La Porta et al. (1997) 1) the ratio of the aggregate stock market capitalization held by minorities to gross national product 2) the number of listed domestic firms relative to the population 3) the number of IPOs relative to the population
Bank Development	5.0553	5.5927	8.0553	1.0101	Datastream	The ratio of bank assets to GDP
Stock Market Development	2.0826	5.1284	5.4856	0.8061	Datastream	The ratio of market capitalization to GDP
Level of Economy Development	Developing	Developing	Developed	Developed	Fan et al. (2004)	Indicates whether the country is classified as developed or developing according to the World Bank classification based on countries' gross national income levels.

2.2.2 Level of Bank and Stock Market Development

There are differences in the level of financial development across the sample countries. Table 2.2 shows that there are variations in the size of banking and capital markets in relation to the country's GDP (bank development and stock market development). In Malaysia and Australia banks and capital markets have roughly the same share of assets, but banks are much more important in Thailand and Singapore than stock markets. Financial development is important because it can accelerate economic growth by enhancing savings, channelling these savings into real investment, and allowing capital to flow to more productive uses leading to the improvement in the efficiency of resource allocations (La Porta et al., 2000).

Singapore is a small country with an open trade policy and rapid growth. It has a sophisticated financial market and engages in significant global trading and was classified as a Newly Industrialized Economy (NIE) by the United Nations in 1990. The economy of Singapore has become more mature with rapid growth (Teen and Phan, 2001). Chau and Gray (2002) show that total market capitalization of Singapore increased nearly ten times during 1990 to 1999. In 1999, it was ranked as the fourth largest economy in Asia. Kim et al. (2004) suggest that less developed market structures have more asymmetric information environments. Therefore, firms in Thailand and Malaysia should have higher level of asymmetric information than firms in Singapore and Australia. Malaysia was ranked as the largest debt and equity market in ASEAN in the mid 1990s (World Bank, 1999). Its financial activity or liquidity of stock market (measured by the ratio of market capitalization over GDP) is quite large.

2.2.3 Financial Structure

When firms need to finance their investments, they can either (i) use their internally generated funds such as retained earnings (and funds from families and friends) or (ii) obtain external finance in terms of debt or / and equity. Beck et al. (2002) find that in most developed countries, firms use external financing to finance over 50% of their investment. However, firms in Malaysia use more external finance (57.61%) than firms in the US where higher levels of external finance are expected due to high rating in financial and legal development. There are also some variations in the level of external finance between Malaysia and Singapore. External finance includes bank finance, equity finance, operations finance and other finance. The most common source of external finance in Malaysia is 'Operations Finance' followed by 'Bank Finance' while 'Bank Finance' is the most common source of external finance in Singapore followed by 'Equity Finance' (see Table 2.3). It is also expected that firms in more developed countries should have better access to external finance. Titman et al. (2001) examine financing patterns for Asian firms and find the opposite results, showing that Asian firms use more external than internal funds because the investment needs are more than their internally generated funds. This is supported by the higher use of external finance in Malaysia than in Singapore (as shown in Table 2.3). Singh and Hamid (1992) and Singh (1995) also find that although there are variations in corporate financing patterns among developing countries, in general they use more external than internal funds to finance their growth.

Table 2.3 : Financial patterns

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source	Definitions
Financing Patterns						
External Finance	-	57.61	39.07	-	Beck et al. (2002)	includes financing from banks, equity, operations and other finance
Bank Finance	-	16.27	24.07	-	Beck et al. (2002)	includes financing from domestic as well as foreign banks
Equity Finance	-	10.88	7.13	-	Beck et al. (2002)	-
Operations Finance	-	24.57	6.02	-	Beck et al. (2002)	the sum of leasing and supplier credit
Other Finance	-	5.88	1.85	-	Beck et al. (2002)	includes financing from development banks, money lenders, public sector and other sources
Financial Structure (1995 - 1996)						
Leverage (median)	1.05	0.46	0.36	0.34	Claessens et al. (2000b)	total debt/book value of equity
Leverage (median)	0.92	0.14	0.21	0.20	Claessens et al. (2000b)	total debt/market value of equity
Debt Maturity (median)	0.22	0.04	0.06	0.12	Claessens et al. (2000b)	long term debt to market value of equity
Performance Measures (1995 -1996)						
ROA (median) (in percent)	6.83	8.57	4.16	6.65	Claessens et al. (2000b)	return to assets

Singh (2003) suggests that in the countries where the level of market development is low and stock market and banking systems are not fully developed, firms would rely on internal funds and external funds will be quite rarely used. If external funds are needed, firms will rely more on bank borrowing because the banking system is normally more developed relative to the stock market in developing countries. This is consistent with the preferences of the pecking order hypothesis. The effect of pecking order should be stronger in East Asia because East Asian firms have family-based ownership structure. Family owners generally do not want to lose their control by issuing equity and prefer debt to equity. Singh (2003) argues that the stock markets in most developing countries are small and immature. The imperfections of the stock market can lead to volatility in share prices. This can discourage risk-averse firms from getting funds from stock markets. In addition, because of the lack of clear cut bankruptcy laws and lack of enforcement, firms in developing markets prefer to be financed from banks than stock markets.

Table 2.3 also shows the financial structure in 1996 for East Asian firms. Leverage was quite high in most East Asian countries. The high leverage created high currency risks when short-term foreign exchange borrowing became increasingly important in the 1990s especially in Thailand and Malaysia. This vulnerability is therefore considered as one of the factors that could have triggered the financial crisis in 1997. This should induce firms with high earnings volatility to reduce level of leverage. Table 2.3 also shows that profitability or financial performance varies across countries.[11] Profitability was relatively lower in Singapore while Malaysia had higher real returns. Table 2.3 also shows that long-term debt was lower in Malaysia and Thailand. Claessens et al. (1998) find that short-term borrowing became increasingly important in Thailand and Malaysia.

[11] Claessens and Djankov (1999) suggest that ROA is a good measure for profitability because it is not influenced by the liability structure of firms and it also excludes interest payments, financial income, and other income or expenses.

2.2.4 Legal Structure

Legal Origin

Legal origin can play an important role in financing decisions. It has been found in the literature that firms in common law countries have greater access to external finance such as banks and equity (La Porta et al., 1997; Demirguc-Kunt and Maksimovic, 1998). Common law includes the law of England and those laws influenced by English law. The common law spread to British colonies such as Malaysia and Singapore, including the US, Australia, and many other countries. However, in some cases although the basic origin of laws is clear, the laws have been amended with the influence of other laws. For example, Thailand's laws originated by common law but are somewhat influenced by French civil laws. Beck et al. (2002) find that firms in less developed financial systems and in civil law countries substitute less efficient forms of external finance for bank loans and equity leading to less long-term external finance in these countries. Therefore, we expect that firms in Thailand should have lower levels of long-term external finance than firms in the other sample countries. Claessens et al. (2000b) study the corporate risk around the world and find that firms in common law countries and market-based economies seem to be less risky. They also document that firms in common law countries can react faster to new developments and convey less uncertainty than civil law countries. They also find that firms in civil law countries tend to have more unstable cash flows, higher earnings volatility, higher firm leverage and mismatch between the maturity structure of assets and liabilities. Therefore, Thai firms should have the highest levels of risk and debt with the strongest influence of earnings volatility as the determinant of their capital structure relative to firms in the other sample countries.

Rule of Law

Lemmon and Lins (2003) show that the rule of law varies substantially across countries. La Porta et al. (1998) argue that the quality of law enforcement varies depending on the legal origin. The quality is highest in Scandinavian and German civil law countries followed by common law countries and lowest in French civil law countries. Table 2.4 shows the score for rule of law for each sample country. Thailand (mixed between Common law and Civil French law) scores the lowest for most of the items on rule of law. In general, this shows that rule of law in Australia is the strongest, followed by Singapore and Malaysia while Thailand has the lowest scores. Previous studies show that firms in countries with weak legal and financial systems find it more difficult to obtain external financing resulting in reduction in their growth and investment efficiency (Beck et al., 2002). Therefore, we expect the financing behaviour of firms in countries with weak systems to follow the pecking order theory as they tend to use more internally generated funds than external finance. Khan (2003) argues that when the level of market development is low and legal systems are inefficient, transaction costs are higher. This implies that in Thailand where rule of law is weak and the level of development is lower and not efficient, transaction costs should be higher than those of other sample countries. The high scores of rule of law and efficiency of judicial systems in Singapore and Australia indicate more developed legal structures and enforcement.

Table 2.4 : Rule of law

	Thailand	Malaysia	Singapore	Australia	Source	Definitions
Rule of Law						
Efficiency of judicial system	3.25	9	10	10	La Porta et al. (1998)	Assessment of the 'efficiency and integrity of the legal environment as it affects business, particularly foreign firms' produced by the country risk rating agency Business International Corp. It 'may be taken to represent investors' assessments of conditions in the country in question'. Average between 1980 and 1983. Scale from 0 to 10; with lower scores, lower efficiency levels
Rule of Law	6.25	6.78	8.57	10	La Porta et al. (1998)	Assessment of the law and order tradition in the country. This indicator is produced by the country risk rating agency International Country Risk (ICR). Scale from 0 to 10; lower scores reflect less tradition for law and order.
Law and Order	4.31	3.69	5.19	6	Demirguc-Kunt and Maksimovic (2002)	This indicator is produced by International Country Risk rating agency. It reflects the degree to which the citizens of a country are willing to accept the established institutions making and implementing laws and adjudicating disputes. It is scored between 0 and 6 with higher scores indicating sound political institutions and a strong court system. Lower scores indicate a tradition of depending on physical force or illegal means to settle claims
Risk of expropriation	7.42	7.95	9.3	9.27	La Porta et al. (1998)	Assessment of the risk of 'outright confiscation' or 'forced nationalization'. This indication is produced by ICR. Scale from 0 to 10 with lower scores for higher risks
Risk of contract repudiation	7.57	7.43	8.86	8.71	La Porta et al. (1998)	ICR's assessment of the 'risk of a modification in a contract taking the form of a repudiation, postponement, or scaling down' due to 'budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities'. Average of the months of April and October of the monthly index between 1982 and 1995. Scale from 0 to 10, with lower scores for higher risks.
Financial Obstacles	-	2.62	2.03	-	Beck et al. (2002)	General obstacles as indicated in the firm questionnaire. They take values 1 to 4, with higher values indicating greater obstacles.

Table 2.4 : Rule of law (continued)

	Thailand	Malaysia	Singapore	Australia	Source	Definitions
Corruption						
Corruption	5.18	7.38	8.22	8.52	La Porta et al. (1998)	Assessment of the corruption in government. This indicator is produced by the country risk rating agency International Country Risk. Lower scores indicate that 'high government officials are likely to demand special payments' and 'illegal payments are generally expected throughout lower levels of government' in the form of 'bribes connected with import and export licenses, exchange controls, tax assessment, policy protection, or loans'. Scale from 0 to 10 with lower scores for higher levels of corruption.
Corruption Index	6.95	4.9	0.87	1.45	Fan et al. (2004)	An index ranges from 0 to 10, with larger value indicating more severe corruption.This index reflects the extent to which corruption is perceived to exist among public officials and politicians, where corruption is defined as the abuse of public office for private gain. The index proxies for the threat of all or part of investor rights being expropriated.
Index of low corruption (1)	1.5	6	10	10	Mauro (1995) / Aivazian et al. (2003)	The scale is 10 for no corruption to 0 for maximum corruption. The indices are based on standard questionnaires filled in by Business International correspondents stationed in about 70 countries in 1980 – 1983. It is likely that the indices reflect those faced by foreign businessmen in a country, not necessarily what citizens face.
Index of low red tape (2)	3.25	6	10	9.25	Mauro (1995) / Aivazian et al. (2003)	The scale is 10 for no corruption to 0 for maximum corruption. The indices are based on standard questionnaires filled in by Business International correspondents stationed in about 70 countries in 1980 – 1983. It is likely that the indices reflect those faced by foreign businessmen in a country, not necessarily what citizens face.
Index of the efficiency of the legal system (3)	3.25	9	10	10	Mauro (1995) / Aivazian et al. (2003)	The scale is 10 for no corruption to 0 for maximum corruption. The indices are based on standard questionnaires filled in by Business International correspondents stationed in about 70 countries in 1980 – 1983. It is likely that the indices reflect those faced by foreign businessmen in a country, not necessarily what citizens face.
Governance (average of 1 to 3)	2.67	7	10	9.75	Mauro (1995) / Aivazian et al. (2003)	The scale is 10 for no corruption to 0 for maximum corruption. The indices are based on standard questionnaires filled in by Business International correspondents stationed in about 70 countries in 1980 – 1983. It is likely that the indices reflect those faced by foreign businessmen in a country, not necessarily what citizens face.
Perceived corruption ranking, 1996	3.3	5.3	8.8	8.6	Aivazian et al. (2003)	An average of data from several surveys, the respondents of which are mostly people working for multinational firms and institutions. The scale is 10 for no corruption to 0 for maximum corruption.

Because of the weak rule of law in Thailand, it is expected that the level of expropriation of minority holders should be the highest in Thailand implying that the agency problem should be greatest and will significantly affect the financing decisions of Thai firms. La Porta et al. (1998) suggest that a strong legal enforcement should be able to substitute for weak rules because active and well-functioning courts should be able to step in to help mitigate expropriation problems. This is supported by the score of risk expropriation in Table 2.4. Beck et al. (2002) suggest that law and order is stronger in more developed countries. Table 2.4 shows support for this finding indicating that Singapore and Australia have higher scores in law and order than Thailand and Malaysia because they are more developed.

Financial obstacle scores are referred to as a proxy for the cost of marginal external financing. Beck et al. (2002) find that in more developed financial systems, firms with high financial obstacles are likely to use more external finance. For example, Malaysia has higher levels of external finance than Singapore (as shown in Table 2.3) as it has higher financial obstacles (as shown in Table 2.4). Moreover, Table 2.4 also shows the score of corruption for each country. The lower the score indicates high corruption in that country. Thailand has the highest level of corruption followed by Malaysia and Australia while Singapore shows the lowest level, or no corruption at all. Mauro (1995) suggests that corruption could lower investment. If investment is reduced, the need for external finance should be smaller as well. However, for Singapore, the opposite result is found. Table 2.4 shows that Singapore has virtually no corruption but, as shown in Table 2.3, Singaporean firms use less external finance than Malaysian firms who generally have more corruption.

Legal Protection

Legal protection consists of the contents of law and the quality of its enforcement. There are several studies showing that legal protection can affect fir ms' financing decisions. La Porta et al. (2000) suggest that legal protection helps develop financial intermediaries and explain the differences among countries better than financial orientation. La Porta et al. (1998) argue that the absence of strong legal protection in many emerging economies can increase the level of agency costs of debt which affect the firm's financing decisions. There is also evidence that firms' value is positively related to legal protection.[12]

Legal protection provides several benefits to firms (La Porta et al., 1998, 2000, 2002). First, it can be used as the protection or guarantee of rights in the views of investors. Without strong protective rights, investors will not be able to get paid which makes it more difficult for firms to raise external finance. Investors can be very sensitive to, and dependent on, protection of their rights and law enforcement because they are more vulnerable to expropriation than insiders who have lower risk of being mistreated. When laws are protective of outside investors and are well enforced, investors are more willing to finance firms leading to greater value in the financial markets because they recognize that better legal protection can help them to get more of firms' profits in terms of interest or dividends. This implies that, for countries with weak investor rights, firms might tend to use internally generated funds rather than external funds because outside investors are not willing to finance firms due to poor protection. Therefore, the pecking order theory is expected to perform better in countries with poor protection.

[12] Johnson et al. (2000); La Porta et al. (2002); Lemmon and Lins (2003)

Second, legal protection helps to attract more external financiers especially in terms of equity. When investors are well protected, they tend to pay more for their investment in firms which makes it more attractive for firms to issue equity. In addition, investor protection also encourages the development of financial markets. Therefore, firms in countries with strong legal protection should have higher levels of equity than firms in countries with weak legal protection leading to lower levels of debt. Table 2.5 presents legal protection scores for the sample countries. Because Malaysia and Singapore show strong legal protection while Thailand shows weak shareholder protection, the level of equity should be higher for Malaysian and Singaporean firms than for Thai firms or in other words the level of debt should be higher in Thailand. Third, legal protection helps firms to reduce expropriation problems because it makes expropriation less efficient. Johnson et al. (2000) suggest that expropriation can be weak as long as growth lasts because managers have no incentive to steal or expropriate wealth from minority shareholders. When growth declines, such as during the crisis, the lack of good corporate governance becomes more important.

Variations across countries in terms of the degree of protection against stakeholders can result from one or more of several factors. First, legal origin can have some influences on legal protection. La Porta et al. (1998) find that common law countries generally have the strongest legal protections of shareholders and creditors while French civil law countries have the weakest and German and Scandinavian civil law countries fall between because common law countries have less political influence. Firms in common law countries should be able to raise more external finance on cheaper terms than firms in civil law countries because they have better protection for minority shareholders. This implies that Thai firms should have the least external finance compared with other sample countries.

Table 2.5 : Legal protection

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source	Definitions
Shareholder Rights (Anti-director rights)	2	4	4	4	La Porta et al. (1998)	An index aggregating the shareholder rights we labeled as 'antidirector rights'. The index ranges from 0 to 6 and is formed by adding 1 when (1) the country allows shareholders to mail their proxy vote to the firm (2) shareholders are not required to deposit their shares prior to the general shareholders' meeting, (3) cumulative voting or proportional representation of minorities in the board of directors is allowed, (4) an opposed minorities mechanism is in place, (5) the minimum percentage of share capital that entitles a shareholder to call for an extraordinary shareholders' meeting is less than or equal to 10% (the sample median), or (6) shareholders have preemptive rights that can be waived only by a shareholders' vote.
One share-one vote	No	Yes	Yes	No	La Porta et al. (1998) / Nam et al. (1999)	Equals Yes if the company law or commercial code of the country requires that ordinary shares carry one vote per share, and No otherwise. Equivalently, this variable equals 1 when the law prohibits the existence of both multiple-voting and nonvoting ordinary shares and does not allow firms to set a maximum number of votes per shareholder irrespective of the number of shares owned, and 0 otherwise.
Proxy by mail allowed	No	No	No	Yes	La Porta et al. (1998)	Equals Yes if the company law or commercial code allows shareholders to mail their proxy vote to the firm, and No otherwise.
Shares not blocked before meeting	Yes	Yes	Yes	Yes	La Porta et al. (1998)	Equals Yes if the company law or commercial code does not allow firms to require that shareholders deposit their shares prior to a general shareholders meeting, thus preventing them from selling those shares for a number of days, and No otherwise.
Cumulative voting/ proportional representation	Yes	No	No	No	La Porta et al. (1998)	Equals Yes if the company law or commercial code allows shareholders to cast all their votes for one candidate standing for election to the board of directors (cumulative voting) or if the company law or commercial code allows a mechanism of proportional representation in the board by which minority interests may name a proportional number of directors to the board, and No otherwise.
Oppressed minority	No	Yes	Yes	Yes	La Porta et al. (1998)	Equals Yes if the company law or commercial code grants minority shareholders either a judicial venue to challenge the decisions of management or of the assembly or the right to step out of the company by requiring the company to purchase their shares when they object to certain fundamental changes, such as mergers, asset dispositions, and changes in the articles of incorporation. The variable equals No otherwise. Minority shareholders are defined as those shareholders who own 10 % of share capital or less.

Table 2.5 : Legal protection (continued)

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source	Definitions
Preemptive right to new issues	No	Yes	Yes	No	La Porta et al. (1998)	Equals Yes when the company law or commercial code grants shareholders the first opportunity to buy new issues of stock, and this right can be waived only by a shareholders' vote; equals No otherwise.
Percentage of share capital to call an extraordinary shareholder meeting	0.20	0.1	0.1	0.05	La Porta et al. (1998)	The minimum percentage of ownership of share capital that entitles a shareholder to call for an extraordinary shareholders' meeting; it ranges from 1 to 33%.
Mandatory dividend	0	0	0	0	La Porta et al. (1998)	Equals the percentage of net income that the company law or commercial code requires firms to distribute as dividends among ordinary stockholders. It takes a value of zero for countries without such a restriction.
Right to make proposals at shareholder meeting	Yes	Yes	-	-	Nam et al. (1999)	-
Mandatory shareholder approval of interested transactions	Yes	Yes	-	-	Nam et al. (1999)	-
Proxy Voting	Yes	Yes	-	-	Nam et al. (1999)	-
Penalties for Insider Trading	Yes	Yes	-	-	Nam et al. (1999)	-
Provisions on takeovers legislation	Yes	Yes	-	-	Nam et al. (1999)	-
Mandatory disclosure of non-financial information	Yes	Yes	-	-	Nam et al. (1999)	-
Mandatory disclosure of connected interests	Yes	-	-	-	Nam et al. (1999)	-
Mandatory shareholder approval of major transactions	Yes	Yes	-	-	Nam et al. (1999)	-
Allow proxy by mail	No	No	-	-	Nam et al. (1999)	-
Creditor rights / Bankruptcy	3	4	4	1	La Porta et al. (1998)	An index aggregating different creditor rights. The index ranges from 0 to 4 and is formed by adding 1 when (1) the country imposes restrictions, such as creditors' consent or minimum dividends to file for reorganization; (2) secured creditors are able to gain possession of their security once the reorganization petition has been approved (no automatic stay); (3) secured creditors are ranked first in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm; and (4) the debtor does not retain the administration of its property pending the resolution of the reorganization.
Automatic stay on assets	No	No	No	Yes	La Porta et al. (1998) / Claessens et al. (2003)	Equals No if the reorganization procedure does not impose an automatic stay on the assets of the firm on filing the reorganization petition. Automatic stay prevents secured creditors from gaining possession of their security. It equals Yes if such a restriction does exist in the law. Whether the creditor is barred by the 'automatic stay' from taking collection action against the debtor's assets during the bankruptcy proceedings.

Table 2.5 : Legal protection (continued)

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source	Definitions
Secured creditors first paid	Yes	Yes	Yes	Yes	La Porta et al. (1998) / Claessens et al. (2003)	Equals Yes if secured creditors are ranked first in the distribution of the proceeds that result from the disposition of the assets of a bankrupt firm. Equals No if non-secured creditors, such as the government and workers, are given absolute priority.
Priority of claims	Cost of proceedings are paid first, followed by taxes, wage claims, and secured creditors	Secured creditors paid first	Secured creditors paid first	-	Claessens et al. (2003)	-
Management stay in reorganization	No	No	No	Yes	La Porta et al. (1998) / Claessens et al. (2003)	Equals No when an official appointed by the court, or by the creditors, is responsible for the operation of the business during reorganization. Equivalently, this variable equals No if the debtor does not keep the administration of its property pending the resolution of the reorganization process. Equals Yes otherwise.
Restrictions for going into reorganization	No	Yes	Yes	No	La Porta et al. (1998)	Equals Yes if the reorganization procedure imposes restrictions, such as creditors' consent, to file for reorganization; equals No if there are no such restriction.
Time required to render a bankruptcy judgement	No timetable	180 Working days after a creditor's petition is registered	90 working days	-	Claessens et al. (2003)	-
Legal reserve required as a percentage of capital	0.1	0	0	0	La Porta et al. (1998)	The minimum percentage of total share capital mandated by corporate law to avoid the dissolution of an existing firm. It takes a value of zero for countries without such as restriction.
Investor Protection	AS	GS	-	-	Aivazian et al. (2003)	Rated G = good, of internationally acceptable quality, A = adequate, P = Poor, requires reform. S = functioning securities commission/ government regulating market activity.

a as percentage of the number of shares
b as percentage of votes

Second, legal protection can also be related to the concentration of the corporate ownership structure. La Porta et al. (1998) find that concentration of ownership is negatively related to investor protection indicating that a very high ownership concentration may reflect poor investor protection. This can be supported by the evidence from Thai firms whose ownership structure is highly concentrated and shareholder protection is found to be low. In contrast, however, Malaysian firms' ownership structure is highly concentrated but their legal protection is high.

Nam et al. (1999) find some significant differences across countries in term of corporate governance systems and legal protection in East Asia. Singapore and Malaysia provide higher standards of corporate governance and have also developed more sophisticated legal systems to protect the rights of investors. On the other hand, Thailand shows a low level of legal protection, weak enforcement, and ineffective regulation of financial sector. They also suggest that in general corporate governance in East Asia tends to be at a satisfactory level. Nevertheless, the key problem is in terms of enforcement or how to ensure the existing corporate governance mechanisms work properly.

There are two main types of legal protection, shareholder rights and creditor rights, which vary across countries in this region. Shareholder rights encourage the development of equity markets. Therefore, firms in countries with strong shareholder rights should have higher levels of equity or lower levels of debt than firms in countries with weak shareholder rights. Shareholder rights can vary depending on countries' legal origins. La Porta et al. (1998) find that common law countries provide the best legal protection for shareholders while French civil law countries provide the worst. The differences in legal protection for shareholders are significant between common law and French civil law countries. This suggests that shareholders can operate in significantly different ways depending on the legal environments in each country.

Unlike shareholder rights, creditor rights encourage the development of lending. Therefore, firms in countries with high creditor rights should have higher levels of debt. The protection of creditors can be more complicated than the protection of shareholders for two main reasons. First, there are several types of creditors who have different interests. Protecting the rights of one group of creditors can end up harming the rights of other groups. Second, there are two strategies when firms default: liquidation and reorganization. In some countries, where liquidation procedure is perfect, the reorganization procedure can be ineffective and will never be used (La Porta et al., 1998). Similar to shareholder rights, creditor rights also vary depending on several factors including legal origins (La Porta et al., 1998). Common law countries provide the strongest legal protection for creditors while French civil law countries provide the weakest. Creditor rights matter most when firms are in financial distress and close to the level of bankruptcy. More details of creditor rights will be explained in the section of bankruptcy codes.

Table 2.5 shows the definitions and scores of shareholder and creditor rights. Creditors are more protected in Malaysia and Singapore and their laws protect shareholders and creditors equally. This is supported by high levels of external finance as shown earlier in Table 2.3. Shareholders seem to be better protected than creditors in Australia while shareholder protection is quite weak for Thailand. Thus, Australian firms are expected to have relatively higher levels of equity while Thai firms are more likely to have higher levels of debt. Shareholders are more protected than creditors in Australia while the opposite is seen in Thailand. Claessens et al. (2000b) find that firms with weak shareholder protection have higher cash flow volatility, higher firm leverage, lower liquidity risk, higher short-term debt and lower profitability. Therefore, we expect to find stronger effects of earnings volatility and weaker effects of profitability as determinants of capital structure for firms in Thailand than firms in other countries where shareholder protection is stronger. They also find that firms with weak creditor protection have higher liquidity and use less short-term debt. Australia is grouped as a weak creditor protection country; therefore, Australian firms are expected to have high liquidity and to use less short-term debt.

In addition, creditor rights are also related to bankruptcy. In the bankruptcy literature, little is known on how much formal insolvency systems have actually been used, on how creditor rights can be related to the use of courts in resolving financial distress and on whether there are any specific creditor rights that matter more than another. Claessens and Klapper (2005) were the first to explore the relative importance of country characteristics as well as the effects of different forms of creditor rights. There are different types of creditor rights such as 'an automatic stay on assets', 'priority of claims', 'management stay in reorganization' and 'timetable to render a bankruptcy judgement'.[13] First, the reorganization procedure does not impose 'an automatic stay on the assets' of firms on filing the reorganization petition in Thailand, Malaysia and Singapore while such a restriction does exist in the law in Australia. Therefore, in Australia the insolvency law provides creditors with some bargaining power that may allow them to negotiate more easily on debt restructuring out of court. The absence of an automatic stay in Thailand, Malaysia and Singapore may lead creditors to race to seize assets which will lead to an increase in the possibility of financial distress and bankruptcy. Therefore, financial distress and bankruptcy in these three countries should be at higher rates than in Australia. This leads to the prediction on the determinants of capital structure that firm size should have a stronger relationship to firm leverage in Thailand, Malaysia and Singapore than in Australia because firm size is an inverse proxy for bankruptcy cost.

[13] La Porta et al. (1998); Claessens et al. (2003); Claessens and Klapper (2005)

Second, 'priority of claims' can help to reduce the possibility of financial distress and help to overcome creditor coordination problems during restructuring. According to La Porta et al. (1998), secured creditors are paid first in all sample countries except for Thailand where Claessens et al. (2003) find that costs of proceedings are paid first, followed by taxes, wage claims, and then secured creditors. Third, 'management stay in reorganization' can affect the conflicts of interests between managers and shareholders. Managers might or might not act on behalf of shareholders depending on the incentives which also vary depending on whether the insolvency law stipulates whether managers have to automatically leave during bankruptcy or not (Claessens and Klapper, 2005). Table 2.5 shows that in Thailand, Malaysia and Singapore management does not have to remain in control of the company during reorganization or bankruptcy.

Last, for 'timetable to render a bankruptcy judgement', the reorganisation procedure imposes restrictions, such as creditors' consent, on filing for reorganisation in Malaysia and Singapore while there are no such restrictions in Thailand and Australia. The longer time to render bankruptcy judgements, the lower the payoff for the creditors because of the depreciation of the present value of the assets. Therefore, both Malaysia and Singapore have restrictions on the time allowed to render judgement. Malaysia allows a longer period than Singapore leading firms in Malaysia to use less formal bankruptcy and more negotiation out of court. Claessens and Klapper (2005) show that the presence of restrictions for going into reorganization provides creditors with more legal tools leading to more use of formal bankruptcy. Therefore, based on restrictive reorganization alone, firms in Thailand and Australia should use less formal bankruptcy because there is no such restriction.

In sum, there are different types of creditor rights which vary across countries. Thailand, Malaysia and Singapore have quite similar types of creditor rights such as no automatic stays on assets and management stay in reorganization while opposite restrictions are imposed in Australia. Malaysia and Singapore share restrictions for going into reorganization while there are no such restrictions in Thailand and Australia. Because there are similarities and differences in creditor rights across countries, creditors' behaviour and the use of bankruptcy are expected to be different across countries. The combinations of different types of creditors may help to predict the behaviour of creditors. For example, the longer the time it takes to render a bankruptcy and the lower the priority of claims for secured creditors, the less likely that creditors will use formal bankruptcy (Claessens et al., 2003).

2.2.5 Bankruptcy Code

The financial crisis in 1997 led a number of firms in this region to financial distress. Claessens et al. (2003) show that the majority of firms in their sample countries (including Thailand and Malaysia) filed for bankruptcy in the second half of 1998 due to the crisis. There are two ways of dealing with bankruptcy: the use of formal bankruptcy processes via courts and the use of out-of-court agreements (Claessens et al., 2003). Financial distress can carry high costs including extensive legal fees. It can also destroy managers' reputation and reduce the firm's value. Therefore, firms with high relationship with their creditors will try to negotiate the bankruptcy out of court.

Faccio and Sengupta (2006) study the corporate responses to financial distress in countries most affected by the financial crisis, Malaysia and Thailand. They suggest that in order to avoid formal bankruptcy, dismissal of management and liquidation of the firm, firms will try to respond to financial distress by restructuring assets or liabilities. They find that the latter was the most common type of response to financial distress during the crisis. However, they also find that the transactions of major asset sales have dropped substantially, during the crisis compared to pre-crisis period. They also find that for countries most affected by the crisis, the bankruptcy procedures are likely to result in very little liquidation.

Bankruptcy law has several important effects such as obliging creditors to penalize management if firms experience financial distress providing incentives for management to stay out of it (Rajan and Zingales, 1995). Bankruptcy may vary across countries depending on several factors such as financial orientation, ownership structure, rule of law and legal protection. First, in terms of financial orientation, firms in bank-oriented economies have close relationships with their primary banks; therefore, creditors might have less need to use formal bankruptcy to resolve financial distress and banks can also act as coordinators of financial restructuring. Claessens et al. (2003) suggest that firms in bank-oriented economies seem to recover quicker from financial distress without using formal bankruptcy. They also report that bank ownership and group affiliations such as in East Asian countries reduce the likelihood of formal bankruptcy procedures. Firms in market-oriented economies have arms-length banking relationship leading to greater incentives for their creditors to use formal bankruptcy in order to coordinate among several creditors. Therefore, firms in market-oriented economies might benefit more from bankruptcy laws. Their results confirm that bankruptcy use is greater in market-oriented economies because, in bank-oriented economies, banks have closer relationships and firms have less dispersed creditors leading to less need for the use of formal bankruptcy via courts. However, even though Thailand, Malaysia and Singapore are classified as market-oriented, they show that several firms in East Asia appear to have banks as their controlling shareholders; therefore, formal bankruptcy to resolve financial distress is less likely to be used.

Second, bankruptcy can also vary depending on ownership structure of firms. Claessens et al. (2003) find that bankruptcy is less likely for firms with ownership links to family and banks. Therefore, it is expected that the number of formal bankruptcies in

East Asian countries such as Thailand, Malaysia and Singapore should be lower than in Australia. Third, differences in bankruptcy can be explained by the differences in rule of law and legal protection. Claessens et al. (2003) find that filing for formal bankruptcy procedure is positively related to a country's rule of law and creditor protection. Because Thailand has the weakest rule of law, it is expected that there will be fewer formal bankruptcies in Thailand compared with other countries where rule of law is stronger.

Table 2.6 shows some details of numbers of bankruptcies in each sample country. Claessens and Klapper (2005) show that the ratio of the number of bankruptcies to the number of firms during 1990 to 1999 was highest in Singapore and lowest in Thailand. This supports the relationship between formal bankruptcy and a close relationship with creditors in Asia, especially in Thailand where ownership structure is highly concentrated with families as controlling shareholders with close relationships with their primary banks leading to more use of negotiation out of court and less formal bankruptcy procedure in Thailand. It is also shown that in Thailand, Singapore and Australia, there are liquidation and reorganization procedures. Between 1997 and 1998 more than 40% of firms were financially distressed in Thailand and Malaysia and the largest number of bankruptcies occurred in Thailand and Malaysia due to the degree of severity of the crisis in each country. The processes of liquidation and restructuring are not expensive for Thailand and Singapore but are expensive for Malaysia. Although the process of liquidation is slow for Thailand and Malaysia, it is quick for Singapore. Both processes are efficient for all countries. In contrast to the process of liquidation, the process of restructuring is difficult for Thailand and Malaysia but easy for Singapore. The process is quick for Thailand and Singapore but slow in Malaysia.

Table 2.6 : Bankruptcy

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source
Bankruptcy Law					
No. of Bankruptcies (1990 – 1999)	346.73	-	227.8	5,166.50	Claessens and Klapper (2005)
Number of bankruptcies to the number of firms (1990 – 1999)	0.12	-	3.06	2.1	Claessens and Klapper (2005)
Liquidation Procedure	1	-	1	1	Claessens and Klapper (2005)
Reorganization Procedure	1	-	1	1	Claessens and Klapper (2005)
Bankruptcy code origination	Introduced as part of 1940 Commercial Code and amended in April 1998	Based on the 1985 British Bankruptcy law	1965 and based on the Australian law of 1961.	-	Claessens et al. (2003)
			Amended in 1987 to include a formal court supervised rescue scheme		
Number of distressed firms (1997 and 1998)	146	296	-	-	Claessens et al. (2003)
Distressed firms as a % of country observations (1997 and 1998)	40.33%	47.21%	-	-	Claessens et al. (2003)
Number of bankruptcies (1997 and 1998)	33	21	-	-	Claessens et al. (2003)
Number of bankruptcies as a % of distressed firms (1997 and 1998)	22.60%	7.09%	-	-	Claessens et al. (2003)
Judicial Efficiency	6.5	5.5	-	-	Claessens et al. (2003)
Process of liquidation	Not expensive, easy, efficient, slow	Expensive, easy, efficient, slow	Not expensive, easy, efficient, quick	-	Claessens et al. (2003)
Process of restructuring	Not expensive, difficult, efficient, quick	Expensive, difficult, efficient, slow	Not expensive, easy, efficient, quick	-	Claessens et al. (2003)
Firms facing illiquidity and / or insolvency (% of all firms in the sample)					
Illiquid and Insolvent	6.4	1.5	-	-	Claessens and Djankov (1999)
Illiquid and Solvent	35.1	39.3	-	-	Claessens and Djankov (1999)
Liquid and Solvent	57.2	59.2	-	-	Claessens and Djankov (1999)
Liquid and Insolvent	1.2	0	-	-	Claessens and Djankov (1999)
Total					
Illiquid	41.5	40.8	-	-	Claessens and Djankov (1999)
Insolvent	7.6	1.5	-	-	Claessens and Djankov (1999)

Table 2.6 also shows firms facing illiquidity and / or insolvency (% of all firms in the sample). In Thailand and Malaysia nearly 50% of the sample firms are illiquid. However, a higher percentage of firms in Thailand are insolvent than firms in Malaysia. About 40% of Malaysian firms are still illiquid which is a very similar proportion to Thai firms.

2.2.6 Tax System

Tax systems can be important factors in determining an optimal capital structure because tax treatment of interest and dividend payments is different across countries. Fan et al. (2004) observe three main tax systems among the sample countries: (i) the classical tax system; (ii) the dividend relief tax system; and (iii) the dividend imputation tax system.

The classical tax system is in place in Malaysia and Singapore. Dividend payments are taxed at both corporate and personal levels while interest payments are tax-deductible expenses at the personal level only. The dividend relief tax system is in place in Thailand. This system is different from the classical tax system in terms of dividend payment taxing. There are two forms in this system. Under the first form dividend payments are not taxed at the corporate level but are taxed at the same rate as interest payments at the personal level. Under the second form dividend payments are taxed at the corporate level but they are also taxed at a reduced rate at the personal level. The dividend imputation tax system is in place in Australia. Firms' interest payments are tax-deductible at the corporate tax rate. The domestic corporate tax rate they pay provides a tax credit to taxable resident shareholders that offsets the personal tax on dividend payments. However, the proportion of corporate tax available as a tax credit varies across countries where this system exists. Australia is one of the countries where the full amount of the corporate tax paid can be distributed as a tax credit. Because tax systems differ across countries, tax benefits of debt financing are expected to vary across different tax systems leading to the expectation of different effects of tax systems on capital structure. Fan et al. (2004) argue that debt will be used less in countries that adopt the dividend imputation tax system or dividend relief tax system than other countries that adopt the classical tax system. They also expect that the differences will be most significant for the countries that adopt the dividend imputation tax system. Therefore, the level of debt is expected to be lower for Australian firms than firms in the other sample countries.

2.2.7 Accounting Practices

Graham and King (2000) suggest that there are international differences in accounting systems for each country which are of major concern to investors, accounting standards setters, stock exchanges and financial analysts. William and Tower (1998) suggest that difference in culture may help to explain international differences in accounting systems. Table 2.7 shows that the market shares of Big-5 auditors are quite high in developed countries implying that there is lesser presence of information intermediaries in the less developed countries relative to more developed countries in the sample.[14] Table 2.7 also presents other aspects of accounting practices such as transparency and disclosure, including auditors and voluntary disclosure, accounting standards, tax, price earnings information published, financial reporting, and earnings management.

Greater transparency and disclosure keep corporate stakeholders better informed about the way a firm is being managed. Australia has the highest rating among the sample countries implying less asymmetric information problem.

[14] Now known as Big-4 auditors.

Table 2.7 : Accounting practices

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source	Definition
Big-5 auditors' market share	0.58	0.66	0.99	0.89	Fan et al. (2004)	The share of assets of listed companiesaudited by Big-five auditors
Average number of analyst per firm	13.34	23.55	22.05	13.61	Fan et al. (2004)	Average number of analysts following a listed company in a country / Average numbers of analysts per firm
Transparency and Disclosure						
S&P Transparency and Rating	51.63	45.44	58.86	61.14	Doidge et al. (2005)	Transparency & Disclosure scores are developed by Standard & Poor's to analyze the
Disclosure	66	79	79	80	DeFond and Hung (2003)	An index developed for each country by the Center for International Financial Analysis and Research (CIFAR[1995]). The index represents the average percentage of 85 items included in the annual reports of a sample of domestic companies for each country, where higher scores equal greater disclosure.
Price earnings information published	Regularly and internationally	Regularly and internationally	-	-	Demirguc-Kunt and Maksimovic (1996)	-
Auditors						
Percentage of firms that hire Big Five or Big Five-affiliated auditors by year						
1994 - 1996	65.3 (209)	74.0 (304)	88.3 (362)	-	Fan and Wong (2005)	Calculated based on the number of firm-years (firms) that hire Big 5 or Big 5-affliated auditors divided by the number of firm-years (firms) in the sample (subsample)
1994	59.3 (51)	79.4 (73)	85.5 (71)	-	Fan and Wong (2005)	
1995	65.5 (76)	71.1 (104)	88.8 (142)	-	Fan and Wong (2005)	
1996	69.5 (82)	73.0 (127)	89.2 (149)	-	Fan and Wong (2005)	
Percentage of modified opinions 1994 – 1996	13.33 (28)	0.65 (2)	0.92 (3)	-	Fan and Wong (2005)	
Rating on accounting standard	64	76	78	75	La Porta et al. (1998)	This index is created by examining and rating companies' 1990 annual reports on their inclusion or omission of 90 items. These items fall into 7 categories (general information, income statements, balance sheets, funds flow statement, accounting standards, stock data and special items). A minimum of 3 companies in each country were studied. The companies represent a cross section of various industry groups; industrial companies represented 70%, and financial companies represented the remaining 30%.
Accounting Standards	Adequate IAS and US FASB	Good IAS	- IAS	- US FASB	Aivazian et al. (2003) Teen and Phan (1999)	Of internationally accepted quality -

Table 2.7 : Accounting practices (continued)

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source	Definition
Financial Reporting						
Source of GAAP	-	-	Government & Private	Government only	Ali and Hwang (2000)	-
Accounting Cluster	-	-	British-American	British-American	Ali and Hwang (2000)/Hung (2000)	Refers to the cluster classification assigned according to the country's accounting practices
Financial-Tax alignment	-	-	Low	Low	Ali and Hwang (2000)	-
Tax-book conformity index	-	-	Low	Low	Hung (2000)	Shows the convergence between tax reporting and financial accounting
Accrual index	-	-	0.64	0.82	Hung (2000)	Represents the degree to which the accounting system moves away from a cash method measure of performance. A higher index value indicates higher use of accrual accounting
Financial Reporting Regulatory Agencies						
Government Agencies						
Companies law administrator	Ministry of Commerce	Registrar of Companies	Registrar of Companies and businesses	Australian Securities and Investments Commission	Craig and Diga (1996) and Australian Government website	-
Securities market regulator	Securities and Exchange Commission	Securities Commission	Monetary Authority of Singapore	Australian Securities and Investments Commission	Craig and Diga (1996) and Australian Government website	-
Accounting licensing agency	Ministry of Commerce	Malaysian Institute of Accountants	Public Accountants Board	Australian Accounting Standard Boards	Craig and Diga (1996) and Australian Government website	-
Private Sector Bodies						
Professional accounting body	Institutes of Certified Accountants and Auditors of Thailand	Malaysian Association of Certified Public Accountants	Institutes of Certified Public Accountants of Singapore	Institutes of Chartered Accountants in Australia	Craig and Diga (1996) and www.icaa.org.au	-
Private stock exchange	Securities Exchange of Thailand	Kuala Lumpur Stock Exchange	Stock Exchange of Singapore	The Australian Stock Exchange	Craig and Diga (1996) and ww.asx.com.au	-

Table 2.7 : Accounting practices (continued)

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source	Definition
Companies Law and Securities Legislation						
Companies Law	Securities Law	Companies Act, 1965 (as amended)	Companies Act, 1967 (as amended)	Companies Act, 1981 (as amended)	Craig and Diga (1996) and http://www.doingbusiness.org/LawLibrary/	-
Securities Law	Securities and Exchange Act B.E. 2535 (1992)/Public Limited Company Act B.E. 2535 (1992)	Securities Industries Act, 1983 (as amended)	Securities Industries Act (Cap 289) (as amended)	Securities Industries Act, 1980 (as amended)	Craig and Diga (1996) and http://www.doingbusiness.org/LawLibrary/	-
Earnings Management						
Earnings Smoothing Measure						
EM1 (-)	0.602	0.569	0.455	0.625	Leuz et al. (2003)	The country's median ratio of the firm-level standard deviations of operating income and operating cash flow (both scaled by lagged total assets)
EM2 (-)	-0.868	-0.857	-0.882	-0.79	Leuz et al. (2003)	The country's Spearman correlation between the change in accruals and the change in cash flow from operations (both scaled by lagged total assets)
Earnings Discretion Measures						
EM3 (+)	0.671	0.578	0.627	0.45	Leuz et al. (2003)	The country's median ratio of the absolute value of accurals and the absolute value of the cash flow from operations
EM4 (+)	3.136	2.658	3	1.486	Leuz et al. (2003)	The number of 'small profits' divided by the number of 'small losses' for each country
Aggregate Earnings Management Score	18.3	14.8	21.6	4.8	Leuz et al. (2003)	The average rank across all four measures, EM1-EM4

Price earnings information is published regularly and internationally for Thailand and Malaysia (Demirguc-Kunt and Maksimovic, 1996). This suggests that there should be less asymmetric information for firms in this region. Fan and Wong (2002) report that accounting transparency of Asian firms is generally low due to agency problems and relationship-based transactions. Ball et al. (2000) examine the transparency of listed firms in Thailand, Malaysia and Singapore among other countries and find a lack of transparency in reported earnings. They also conclude that adopting the International Accounting Standard alone cannot help to improve transparency. Disclosure quality can also be measured by the use of Big-5 auditors.

Mitton (2002) suggests that firms would have higher disclosure quality if their auditors were one of the Big-5 international accounting firms. Table 2.7 shows the percentage of firms that hired Big-5 or Big-5-affiliated auditors by year from 1994 to 1996 for Thailand, Malaysia and Singapore. Singaporean firms hired Big-5 auditors most frequently while Thai firms use the lowest percentage of hired Big-5 auditors implying better disclosure quality in Singapore and lower disclosure quality in Thailand. There is an increase in the percentage from 1994 to 1996 indicating improvement of disclosure quality in this region.

Rahman (1998) finds that the majority of Malaysian firms neglect disclosure of lending and borrowing activities with associates and do not disclose amounts of foreign debts. There was no disclosure about accounting policy on foreign currency risk management and the commitments in support of off-balance sheet debt financing. Rahman (1998) also studies the disclosure of Thai firms and finds that only half of the sample firms disclosed the amount of related party lending and borrowing. Chau and Gray (2002) study corporate voluntary disclosure in Singapore and Hong Kong and find that Asian firms have fewer incentives for transparent disclosure than firms in Anglo-

American economies.[15] Their disclosure orientations are also influenced by cultural environment. The cultural environment in Singapore does not encourage voluntary disclosure because Singapore has been dominated by Chinese families. Since most Asian firms are also dominated by families, it can be assumed that the same situation in terms of culture applies to Thailand and Malaysia. Chinese society is characterized by high levels of collectivism and large power distance indicating that people tend to adhere to the rules and regulations. Therefore, voluntary disclosure is less likely in this region compared to firms in the UK and US.

In addition to Chinese domination, firms in East Asia are also frequently family-owned where managers tend to have little motivation to disclose information especially where the information is not required to be disclosed. Therefore, it could be expected that East Asian firms, dominated mostly by Chinese and families, would have less voluntary disclosure leading to more asymmetric information than firms in the UK, US or Australia. In terms of rating of accounting standards, Singapore, Malaysia and Australia are scored at similar levels while Thailand's score is lower. This implies that general information, income statements, balance sheets, funds flow statements, accounting standards, stock data, and special items generated by Thai firms are of lower quality than those generated by firms in the other sample countries. Although Thailand is scored the lowest among sample countries, the accounting standard in Thailand is considered as adequate in terms of internationally acceptable quality (Demirguc-Kunt and Maksimovic, 1996; Aivazian et al., 2003).

In terms of tax, Singaporean firms pay the least corporate tax (27%) while Australian firms pay the most (33%). This also predicts that non-debt tax shields should be negatively related to debt to a greater extent for Australian firms as well because non-debt tax shields can be used as a substitute for debt. For financial reporting, the

[15] Voluntary disclosure is defined as disclosure in excess of mandatory requirements, representing the choice of the management to provide information that is relevant to the decision making of users of the annual report.

information is available in the literature for Singapore and Australia only. National accounting standards for Singapore and Australia are set by government bodies; however, private-sector bodies are also involved for Singapore (Ali and Hwang, 2000). Both countries are classified as British-American model countries and their level of alignment of financial and tax accounting is low (Alford et al., 1993; Ali and Hwang, 2000). In terms of accrual indices, Australian firms have the highest use of accrual accounting which implies that their accounting system moves away from a cash method measure of performance at a higher rate than firms in other sample countries.

There are several studies suggesting differences in financial reporting practices. For example, Alford et al. (1993) find differences across countries in the relative disclosure of information. Australia, the UK, US and France have relatively high information contents. Therefore, it is expected that Australian firms will have higher information content in their disclosures than Thai, Malaysian and Singaporean firms leading to less asymmetric information in Australia. In the literature, it has been suggested that financial reporting practices and disclosure can be affected by institutional environment and stage of development (Salter, 1998).

In addition, Table 2.7 also presents the main firms' law and securities laws. For countries in ASEAN such as Thailand, Malaysia and Singapore, securities laws regulate financial reporting. The purpose of company laws and securities laws is to ensure that firms provide sufficient financial information for the needs of users such as creditors and shareholders. According to Craig and Diga (1996) and Teen and Phan (2001), in Malaysia and Singapore, the 'true and fair view' is required by the Firms Act to present information to meet the needs of investors. In Thailand, it is also expected that investors and creditors are the principal users of the financial reports. There are several qualitative objectives such as relevance, clarity, neutrality and comparability. Representational faithfulness is also considered an important objective for Malaysia and Singapore.

Another common characteristic of financial reporting for Thailand, Malaysia and Singapore is the active participation of private sector organizations, especially professional accounting bodies and stock exchanges, in formulating and enforcing accounting regulations (Craig and Diga, 1996). Table 2.7 also presents the government agencies and private sector bodies that are involved in regulating financial reporting in Thailand, Malaysia and Singapore. Firms' laws and securities laws are administered separately by government agencies.

There are some differences in term of clusters which are influenced by company law requirements, securities market regulations, and accounting standards across sample countries. In term of firms' law requirements, Malaysia and Singapore are seen taking a British approach while Thailand takes a mixed country approach. Malaysia and Singapore are different from Thailand because both of them are former British colonies; therefore, they have adopted a Firms Act modelled on the UK Firms Act 1948 together with the Australian Uniform Firms' Act 1961. Therefore, even though Australia is not amongst the sample countries in Craig and Diga (1996), it can also be assumed that Australian law requirement is quite similar to that of Malaysian and Singaporean firms. Firms in these countries are required to keep the accounting records providing a sufficient and accurate explanation of their financial position. Thailand (non-British colony) is influenced by Civil and Commercial codes stipulating that true accounts must be maintained. Unlike other countries in Asia which have been colonized, there is no exogenous legal system in Thailand. Besides, instead of following the British Acts, Thailand created its commercial laws by selecting from Eastern and Western legal systems (Craig and Diga, 1996). The Securities Industry Acts of Malaysia and Singapore focus narrowly on stock broking business while the laws in Thailand include stockbrokers and firms who issue securities. Another difference lies in the accounting standards. Malaysian and Singaporean accounting standards are based on accounting pronouncements of the International Accounting Standards Committee (IASC).[16] However, Thai accounting standards are a hybrid of IASC and US GAAP accounting standards.

IAS requirements are less detailed than US FASB standards and allow more discretion in adopting accounting policies (Teen and Phan, 2001). Therefore, the quality of financial disclosure in Singapore and Malaysia, where IAS standards are adopted, and in Thailand, where a combination of both standards is employed, should be weaker than in more developed economies such as the UK, US and Australia, where US accounting standards are in use. Rahman (1998) finds that, although Malaysia has adopted IAS standards, there is still a lack of appropriate enforcement efforts suggested by the mixed findings on compliance with the required accounting practices. Graham and King (2000) also find that accounting systems may vary in their faithfulness to factors such as conservatism of their accounting practices and find that the accounting system in Malaysia was less conservative than the accounting system in Thailand.

Moreover, Table 2.7 gives information about earnings management in each sample country. Higher scores for the respective EM measures indicate more earnings management. Singaporean firms have the highest level of earnings management followed by Thai firms and Malaysian firms while Australian firms have the lowest level. This suggests that agency problems should be most severe for Singaporean firms and least severe for Australian firms.

[16] IASC and the International Organization of Securities Commissions (IOSCO) have devoted considerable effort to standardize and harmonize the accounting practices across countries (Graham and King, 2000).

2.2.8 Ownership Structure

The major difference between firms in East Asia and in developed Western economies lies in ownership structure. La Porta et al. (1999) suggest that ownership structure is more important for emerging market countries than developed countries. Rajan and Zingales (1995) suggest that the effect of ownership structure on capital structure is far from obvious. Ownership structure can affect financial structure because it has some implications on the extent of agency problems which affects the expropriation of minority shareholders and firms' value (Anderson et al., 2002; Lemmon and Lins, 2003). Ownership structure can play an important role in determining the extent of the agency problems as to whether there is any expropriation of minority shareholders. Managers' and shareholders' interests can be more aligned when managerial ownership increases leading to improvement in firms' performance. However, when managerial ownership continues to increase up to certain levels, managers' interests will begin to deviate from those of shareholders leading to greater agency costs of equity and decline in performance.

There is also evidence that separation of cash flow ownership and control is negatively related to firms' value because it can influence the incentives of expropriation of minority shareholders (Claessens et al., 2003; Lemmon and Lins, 2003). Lemmon and Lins' (2003) results are complementary to the results of Claessens et al. (2003) who find that Tobin's Q value in East Asia is negatively related to the separation of ownership and control. If the large shareholders of firms are banks, they might want to reduce the amount of funds from outside sources by forcing firms to borrow more from banks. Therefore, the relationship between ownership structure and capital structure might not be clear as it depends on who the large shareholders are.

Ownership structure has also been found to be related to costs of debt financing. Anderson et al. (2002) find that founding family ownership is related to a lower cost of debt financing.[17] Therefore, firms in countries with high concentrations of ownership structure should have lower costs of debt leading to higher levels of debt than firms in countries with low concentrations of ownership structure. Agency conflicts also occur more easily with founding family ownership because families can place their members in CEO positions. Anderson et al. (2002) also find that bondholders prefer firms with founding family ownership because they offer better protection. Therefore, founding family ownership can affect agency costs in two different ways: (i) it can reduce agency cost of equity because the interests of shareholders and managers are more aligned with the increase in managerial ownership; and (ii) founding family ownership tends to exacerbate agency cost of debt because founding families have powerful voices to force firms to meet their demands. Founding family ownership has been found to be beneficial to firms as well. It should lead to better performance because the large shareholders have incentives as well as the ability to monitor managers leading to less corruption. Families also generally have longer investment horizons that can mitigate short-sighted investment decisions by managers.

La Porta et al. (1998) show that the ownership concentration differs across countries and it relates to legal origin. Highly concentrated ownership structures can also lead to poor investor protection. They find that poor investor protection found in French civil law was associated with highly concentrated ownership structures. Because ownership structure is related to investor protection, firms should adapt to the limitations of the legal system they are operating in. Ownership structure in large firms

[17] Founding family ownership is defined in Anderson et al. (2002) as families present in 30% of firms and holding 19% of the outstanding equity on average. It represents a large shareholder that has unique incentive structures and powerful and strong motives and voice to manage one particular firm. Founding families also worry more about firm survival and reputation; therefore, they are more likely to maximize firm value.

in Australia is relatively dispersed while East Asian firms are dominated by a small number of families and the environment is mainly a family-based relationship.[18]

In family-based systems, there are three main financing sources. The business is financed at first by internal funds. However, as firms grow, banks can play a more prominent role and then equity becomes more important at the later stages of the business. However, neither banks nor equity markets ultimately control the management of firms. Despite control by families, the main finance source in Asia is from banks rather than equity markets because equity markets require a more complex institutional and regulatory framework. Although banks play a more important role, leading firms to have higher levels of debt, the bank-based system has never taken hold. When firms in family-based systems are financed mostly by internal funds, the asymmetric information is not problematic because there is no effective separation between management and ownership. However, once the business grows and firms require external finance either from banks or capital markets, there are more conflicts of interest between owner-managers and the financiers. Therefore, there is a greater chan ce of the failure of family-based systems when firms grow.

However, family-based systems still work well, especially in Asia. Khan (2003) suggests that family-based systems can work well when there exist self-monitoring, and banking and security market regulation and an effective legal system such that misuse of finances is more difficult. Moreover, most commercial banks and financial firms in Thailand are controlled by groups of families. Therefore, firms can borrow from banks more easily due to the close relationships among families leading Thai firms to have higher levels of debt than firms in other countries especially Australia.

[18] Rajan and Zingales (1998); Claessens et al. (1998, 1999a, 2000a); Nam et al. (1999); Wiwattanakantang (1999); Khan (2002, 2003); Claessens and Fan (2002); Zhang (2003)

Table 2.8 shows that around 50% of firms are owned by families. This confirms that firms in Thailand, Malaysia and Singapore are largely family-based. The top 15 families control over 50% of firms in East Asia. The high concentration of ownership structure leads to an expropriation of minority shareholders by controlling shareholders (owner-managers). Because in Asia there is no strong bank-centred monitoring mechanism as there is in Japan and Germany, there is a lack of market mechanisms to discipline managers. A tight relationship among firms can lead to better performance because pooling of resources and information decreases transaction costs (Nam et al., 1999). In addition, concentrated ownership structures might help to reduce asymmetric information and agency costs. In less developed markets such as Thailand, there is a high level of asymmetric information (Kim et al., 2004). The alignment of interests between shareholders and managers can help to avoid agency costs (known as managerial alignment in the literature) which are caused by asymmetric information.

High managerial ownership can also help to reduce expropriation in some ways because the incentives for controlling insiders to divert resources from profitable investments can be reduced if insiders have higher proportional cash flow ownership (Lemmon and Lins, 2003). However, high concentration of ownership structures can cause problems as well. It can lead to a high possibility of expropriation of minority shareholders (known in the literature as the entrenchment effect). When management and controlling shareholders are the same group, the expropriation is easier to achieve (Johnson et al., 2000) but the problem seems to be less severe in Malaysia and Singapore than the rest of the region. The reports of these countries do not show widespread expropriation (Nam et al., 1999).

Table 2.8 : Ownership structure

Variables/Country	Thailand	Malaysia	Singapore	Australia	Source
Control of Publicly Traded Companies (weighted by market capitalization, 1996)					
Widely Held	8.2	16.2	7.6	-	Claessens et al. (2000a)
Family	51.9	42.6	44.8	-	Claessens et al. (2000a)
State	24.1	34.8	40.1	-	Claessens et al. (2000a)
Widely Held Financial	6.3	1.1	2.7	-	Claessens et al. (2000a)
Widely Held Corporation	9.5	5.3	4.8	-	Claessens et al. (2000a)
Concentration of Family Control (% of total value of listed corporate assets that families control, 1996)					
Top 1 family	9.4	7.4	6.4	-	Claessens et al. (2000)
Top 5 families	32.2	17.3	19.5	-	Claessens et al. (2000)
Top 10 families	46.2	24.8	26.6	-	Claessens et al. (2000)
Top 15 families	53.3	76.2	48.3	-	Claessens et al. (2000)
Percentage of Total Voting Shares Equity, 1995					
CEO ownership	-	-	0.143	-	Teen and Phan (1999)
Insider directors' ownership	-	-	0.229	-	Teen and Phan (1999)
Blockholder ownership (5% or more)					
All blockholders	-	-	0.617	-	Teen and Phan (1999)
Individual blockholders	-	-	0.053	-	Teen and Phan (1999)
Insitutional/ corporate blockholders (non-nominees)	-	-	0.363	-	Teen and Phan (1999)
Nominee blockholders	-	-	0.203	-	Teen and Phan (1999)
Cash flow and voting rights of the largest ultimate owners					
Voting rights (%)	36.32	30.73	28.95	-	Fan and Wong (2002)
Cash flow rights (%)	34.23	26.03	22.96	-	Fan and Wong (2002)
Control of large publicly traded firms (20% cutoff)					
Widely Held	-	-	0.15	0.65	La Porta et al. (1999)
Family	-	-	0.3	0.05	La Porta et al. (1999)
State	-	-	0.45	0.05	La Porta et al. (1999)
Widely Held Financial	-	-	0.05	0	La Porta et al. (1999)
Widely Held Corporation	-	-	0.05	0.25	La Porta et al. (1999)
Ownership by 3 largest shareholders of 10 largest non-financial domestic firms (The average percentage of common shares owned by the three largest shareholders in the ten largest non-financial, privately owned domestic firms in a given country. A firm is considered privately owned if the state is not a known shareholder in it.)	0.47	0.54	0.49	0.28	La Porta et al. (1998)

Claessens et al. (2000a) study ownership structure of East Asian firms and find that the use of pyramid structure and cross-holding in East Asian firms leads to controlling shareholders exercising control rights (measured by voting rights a shareholder is entitled to) far beyond their stock ownership stakes (cash flow rights). Table 2.8 shows the percentage of cash flow rights and control rights. Voting rights exceed cash flow rights indicating high control by controlling shareholders in East Asia. Zhang (2003) suggests that ownership structure might affect firms' profitability. Lemmon and Lins (2003) also find worse stock performance for firms with larger disparity between ownership and control during the crisis. A high concentration of corporate ownership and control can allow the dominant families to make key decisions including the appointment of board members. As a consequence, there is a high possibility of conflict between controlling and minority shareholders. Nam et al. (1999) indicate that for firms in East Asia, the relationship started with firms largely financed by banks under government influence. There is a close relationship between and among firms and their banks which later developed to be a family-based system.

In economies where ownership structure is concentrated with family ownership, corporate governance is likely to be weak (Scott, 1999). Although concentrated ownership in Asia can cause agency conflict and asymmetric information, Shleifer and Vishny (1997) suggest that there is a benefit from concentrated ownership in less developed countries where property rights are not well defined and investors are not well protected. This is also confirmed by La Porta et al. (1999) who find a significant relationship between the top three shareholders of the largest listed firms around the world and weak legal and institutional environments. Moreover, Shleifer and Vishny (1997) hypothesize that ownership concentration can be a very important corporate governance mechanism when legal protection is low because it provides incentives and power to monitor managers.

Nam et al. (1999) find that on average more than 60% of Thai firms are owned by individuals and family shareholders while banks and institutional investors do not normally own large block non-financial firms. Moreover, banks in Thailand play more of a role as creditors rather than investors. The country report shows that institutional investors such as domestic banks and other financial institutions own only around 13% of the 150 largest firms. Thai firms have not utilized credit instruments widely enough to support private industries. However, Thai banks provide subsidized credit to the public sector with interest rate control leading firms to rely more on borrowing than equity financing. In Thailand, cross-debt guarantees among business groups allow firms to borrow even more easily and many financial and non-financial institutions are family-based. Thai banks are allowed to hold a controlling share in listed firms without any investment restrictions. There is also evidence that Thai banks invest heavily in unlisted firms. Nam et al. (1999) conclude that Malaysian firms do not have much experience in the involvement of credit invention. Moreover, conglomerates control is less severe than in Thailand. Only a few commercial banks are controlled by conglomerates. However, loans to related parties are prohibited by the central banks thus loans from banks are more difficult to get through close relationships with the banks.

Nam et al. (1999) also find that there are some significant differences across countries in ownership structure: (i) pyramid structure, (ii) bank control and (iii) government involvement. First, there are the variations of pyramid structures across Asian economies. Wiwattanakantang (2001) find a positive relationship between performance and family ownership among Thai firms. This is due to low agency problems of Thai firms because they do not adopt pyramidal ownership structures. This is supported by Claessens and Fan (2002) who find that 80% of the controlling shareholders in Thailand do not employ cross-shareholding or pyramid structures. Second, in terms of bank control, Nam et al. (1999) also find that there are differences across countries in East Asia in the relationships between banks and firms. Claessens and Fan (2002) find that banking and affiliating with banks is common in this region. One benefit of firms being affiliated with banks is that the degree of information asymmetry between lenders and firms is smaller than that of firms with arms-length lending. There has been some empirical evidence supporting the positive side of firms depending on banks. For example, Ferri et al. (2001) find positive effects between bank relation and firm's value during the crisis in 1997 and 1998. The relationship with banks reduced the degree of financial constraint thereby mitigating the problems of costly bankruptcy. But Claessens and Fan (2002) suggest that bank affiliation can also lead to the problem of misallocation of capital.

Teen and Phan (2001) and Mak and Li (2001) show that the proportion of shares owned by all blockholders is more than 60% in Singapore (as shown in Table 2.8).[19] La Porta et al. (1998) report that on average the three largest stockholders own 49% of the voting stock of the 10 largest firms in Singapore, 54% in Malaysia and 46% for Thailand compared with 20%, 22% and 22% for the US, UK and Japan, respectively. However, unlike other countries, banks in Singapore are not allowed to directly own significant proportions of shares in firms under the Banking Act of 1970 (Teen and Phan, 2001). According to the law, banks and funds are not permitted to hold shares in firms. Therefore, the relationship between firms and banks in Singapore should be lower than in Thailand because Thai firms can have their primary banks as shareholders allowing Thai firms to access borrowing from banks more easily with less collateral required than Singaporean firms. Therefore, the influence of collateral on firm leverage should be weaker in Thailand than in Singapore. Claessens et al. (2003) show that the percentage of firms with bank ownership is large in Malaysia and Thailand. They find that the principal shareholders in the majority of firms in East Asia are commercial firms and financial institutions and group affiliation is extensive. Because of their close relationships with banks, firms in Thailand and Malaysia might not be required to use collateral when they borrow or might be required to provide less collateral compared with firms in other countries. Thus, the effect of tangibility on firms' leverage should be weaker in Thailand and Malaysia.

In Malaysia, firms are dominated by banks. There is an over-dependence on banks in Malaysia due to the over-protection of banks and the over regulation of capital markets leading to the underdevelopment of several parties such as non-bank financial

[19] Mak and Li (2001) also find that blockholders ownership tends to be much higher in East Asian countries than other Western developed economies.

institutions, capital markets, risk management processes, risk intermediaries and trading and market making (World Bank, 1999). This leads to several expectations on financial decisions. First, Malaysian firms should have higher levels of debt, especially bank borrowing than firms in other countries. Suto (2003) examines capital structure in Malaysia before and after the crisis and finds an increase in debt ratio before the crisis due to bank dependency which is encouraged by the government leading to excessive investments before the crisis. Second, there should be less effect of collateral on firm leverage because firms should be able to borrow more easily without, or with less, collateral compared with firms in other countries. Third, there should be less effect of firm size on firm leverage in Malaysia because there should be less bankruptcy when firms are very dependent on banks.

Third, there are differences in the involvement of government across countries. The country reports show that institutional investor participation is limited in the governance of firms. Banks cannot get involved too much in a business because the Banking Act limits the investments of the banks in other non-financial firms to a maximum of 20% of their total capital. Teen and Phan (2001) and Mak and Li (2001) find that in Singapore the government holds major ownership in the firms and it facilitates governance through government-linked corporations (GLCs). While in other countries all other blockholders are majority shareholders and blockholders play an important third party role in facilitating the takeovers of firms which are performing poorly, the government as a major shareholder in Singaporean firms is expected to play role of long-term investor instead. Nam et al. (1999) indicate that on average more than 60% of ownership are blockholders which are government, firms or sometimes individuals. Mak and Li (2001) suggest that Singapore should be described as a mix between family-based and government-based economies. They also suggest a number of reasons why GLCs might have weaker corporate governance compared to non-GLCs:

(i) GLCs must respond to some signals which are not related to firm's profit or value maximization but to the well-being of the nation; (ii) GLCs receive funding from government but they face less pressure in paying dividends leading to higher agency costs; (iii) the government is likely to be less active in monitoring GLCs' investment; and (iv) government is expected to be a long-term investor and is unlikely to support unsolicited takeover offers for GLCs.

Government linkage in firms in Singapore offers several advantages to GLCs compared to non-GLCs in other countries (Teen and Phan, 2001; Mak and Li, 2001; Khan, 2003): (i) they are more protected from the weak market for corporate control; (ii) they can also have easier access to different sources of financing relative to non-GLCs in other countries; (iii) because of close guidance from the government, Singaporean firms are performing better than firms in other family-based countries such as Thailand and Malaysia; and (iv) GLCs are guaranteed solvency because the government is perceived by the lenders to have a moral and legal responsibility for firms' liabilities (La Porta et al., 1998). Therefore, bankruptcy for firms in Singapore should be lower compared to firms in Thailand and Malaysia. This implies that firm size should have stronger effects on firm leverage in Thailand and Malaysia than in Singapore due to the lower level of solvency. In addition, because GLCs in Singapore have greater guarantees of solvency, banks and other financial institutions such as insurance firms are more willing to lend money to these firms. Therefore, borrowing should be at a higher level in Singapore than in other countries and a less important role for asset tangibility, liquidity, earnings volatility and firm size.

In summary, the above review shows that the differences in corporate governance, legal and institutional environment across sample countries have implications on firms' financing decisions because they affect the ability of firms to access different sources of finance, asymmetric information level, agency cost problems, etc.

2.3 The East Asian Financial Crisis

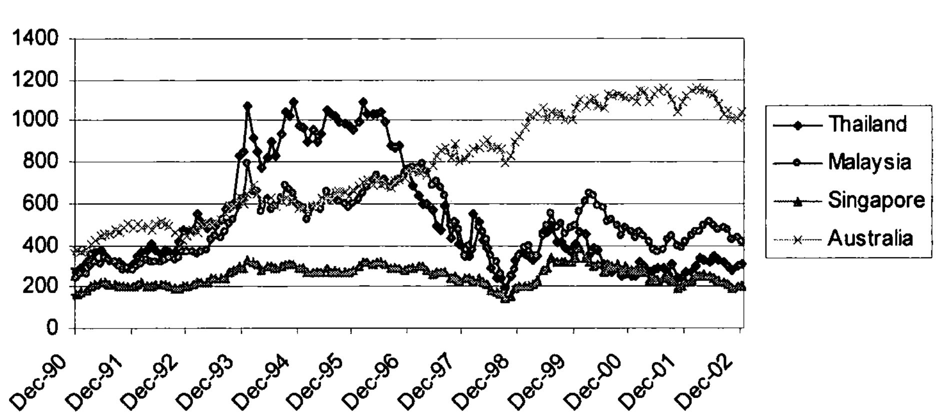
Firms' financing decisions may be influenced by unforeseeable economic events such as the financial crisis of 1997. The East Asian financial crisis started from Thailand after the government announced the change in exchange rate regime from fixed to floating rate on the 2nd of July 1997 spreading to Korea, Indonesia and Malaysia. The crisis has passed a lot of damages to other countries around the world.

The effect of the crisis on individual countries varied considerably and revealed the vulnerability of the less developed economies in the region. The crisis has affected the capital markets of the region severely. In East Asian countries, stock markets' values fell more than 30% within 1 year. The East Asian capital markets saw an outflow of foreign investments and governments responded by changing their regulations related to capital flows. The sudden and unexpected financial crisis of these high growth economies has affected investors around the world. Investors have become more cautious and more concerned with the risk of firms they are investing in and have started looking for better investor protection. Raising capital has become more costly. Interest rates in affected countries have been increased in order to support the local currency resulting in lower use of debt in affected countries.

Mishkin (1999) suggests that in the period preceding the Asian crisis asymmetric information problems worsened, and the deterioration of balance sheets eventually led to the crisis. Financial markets were no longer able to allocate funds efficiently. Firms became more concerned about their exposure to debts and creditors more stringent in their lending. In financial sectors characterised by weak regulation and supervision, the financial institutions operating in East Asia could not screen and monitor their loans properly. Therefore, it is expected that the effects of the financial crisis would have been felt more by firms in economies with less developed financial systems, while firms in economies with more developed financial systems would have been sheltered from the worse effects.

Figure 2.1 presents monthly price index for the stock market in each sample country. It shows that price index decreased substantially after the 1997 financial crisis for countries most affected by the crisis (Malaysia and Thailand) while it continued to increase for Australia. On the other hand, price index of Singapore stock market appears stable over the period. This shows that Singaporean and Australian firms are not as severely affected by the crisis as firms in Malaysia and Thailand.

Figure 2.1: Monthly Price Index (1990 - 2002)



Chowdhry and Goyal (2000) review the theoretical explanations of the causes of the financial crisis and present their empirical and policy implications. Two theories that stand out as offering explanations of the crisis are moral hazard and self-fulfilling run on liquidity. Moral hazard happens when there are distortions due to adverse incentives or implicit guarantees given by the IMF and the government to financial institutions to make unsound loans without adequate supervision leading to overinvestment and overvaluation of assets. If moral hazard is present, investors should be aware that the analysis using share price alone might be misleading. It reflects the combination of imprudent investment and implicit guarantees. The aftermath solution would be to remove the implicit guarantees. Self-fulfilling run on liquidity happens when there is mismatch of maturity and liquidity between deposits and loans especially with the sudden withdrawal of short-term debt leading banks to fail. The use of shorter-term debts has dual and opposite effects: (i) it enables creditors to make sounder fund allocation decisions due to more frequent monitoring; and (ii) it exposes firms to potential rollover difficulties, liquidity risk and uncertainty about the fluctuation of interest rates and inflation. If the main weakness that worsened the effects of the Asian financial crisis was a run by short-term debtholders, a deposit insurance system is required.

In a highly uncertain and volatile environment, financial analysts' opinions became paramount to financing decision making, and this may have partly contributed to the differing impact of the crisis across the affected countries. Financial analysts' opinions are important to financing decisions because the analysts' main roles are to collect, process and provide the information on firms to the market. As financial analysts may behave differently and irrationally in each country, the crisis is expected to have different effects across different countries in the region. Ang and Ma (2001) suggest that there are in general five models regarding analyst behaviour: (i) normal model where analysts are assumed to be rational and expected to have no differences in their behaviour between crisis and normal period; (ii) panic and herding model where analysts are aware of the earnings downgrade and behave irrationally by downgrading their forecasts leading other analysts to downgrade even more or by assigning too much weight to the event leading them to report over-pessimistic forecasts; (iii) self-denial model where analysts hold on to the information they have with the hope that the effect will be reduced soon which lead them to produce over-optimistic forecasts; (iv) influence model where the analysts are under the influence of their clients either by cross-shareholdings or other inter-corporate relationship leading them to forecast in the favour of firms; and (v) pre-condition model where the analysts rely on the past conditions of the markets.[20]

Ang and Ma (2001) also analyse the financial analysts' behaviour during the crisis in four Asian countries, including Thailand and Malaysia, and observe significant variations across countries in the reactions of financial analysts before and after the crisis. They find that analysts in Thailand behave in the same way as predicted by the influence model suggesting high agency costs. There was evidence of large disagreement among analysts in Thailand after the end of year suggesting high levels of asymmetric information in Thailand. The analysts reacted slowly to the event but they did finally present a true picture and seemed to be able to differentiate between the performance of top and bottom firms. The accuracy of forecasting from analysts in Thailand gradually improved. On the other hand, analysts in Malaysia appear to behave consistently with the self-denial model. They switched from being unbiased to over-optimistic and took a considerably longer time to respond to the severity of the crisis. Analysts in Malaysia also appear to be unable to distinguish top from bottom performing firms.

The 1997 Asian crisis not only highlighted the importance for firms and their lenders of carefully choosing the maturity-mix of debts but also reflects the inefficiency in corporate governance, the legal and institutional environments in this region, such as unsound and unsupervised lending decisions, and the lack of transparency in the system. Because banks play the main role in financing firms' investment and can potentially contribute to the financial crisis, the effects of the crisis should be larger in the financial sectors characterised by weak regulation and supervision because financial institutions could not screen and monitor their loans properly. It is therefore reasonable to expect

[20] See Ang and Ma (2001) for detailed information on the predictions and implications of each analyst behaviour model.

that this economy-wide event may have had a significant impact on the financing decision of firms in the affected countries.

The response of the governments to the financial crisis varied significantly across countries. Thailand has received help from the IMF to regain international credibility (Shivakumar, 1998). In general, Thailand has implemented several steps to economic recovery including a decrease in interest rates to stimulate renewed investment in the economy leading to lower borrowing costs. In order to solve the liquidity and debt crisis, special institutions were established to help financially troubled firms and the management of bad assets. Insolvent banks and finance firms were closed while weak but viable financial institutions were rehabilitated through recapitalization or mergers. Unlike Thailand, Malaysia did not accept IMF assistance because Malaysia's external borrowing was relatively low compared to other East Asian countries. According to Bank Negara Malaysia (1998), Malaysia has attempted to raise interest rates among other remedies.[21] However, it had the adverse effect of exacerbating the current phase of economic slow down leading to a decline in equity markets. As in Thailand, a new organization was formed after the crisis to review and reform corporate governance in Malaysia by setting out broad principles of good corporate governance and proposing a detailed code of best practice for firms as well as making 65 recommendations to strengthen laws, enhance disclosure and transparency, and promote effective enforcement. This suggests that corporate governance in Thailand and Malaysia should be improving after the crisis leading to better protection of stakeholders. During 1999 to 2000, Malaysia was among the strongest economies as its recovery from the crisis was accompanied by reduced vulnerability of the financial system (Meesok et al., 2001). In addition, investors' confidence was improved by stronger growth and a gradual easing of capital controls.

[21] See Nesadurai (2000) for more information on three phases of Malaysia's responses to the crisis.

In contrast to other countries, investors' confidence has been enhanced by the 1998 rating of the Business Environment Risk Intelligence in Singapore. Although not severely affected by the crisis, several policy measures have also been adopted by the Government in Singapore to minimise the impact of the crisis. Unlike other countries, Australia escaped the severe effects of the crisis and was one of only two countries to participate in the IMF second tier support arrangements for affected countries including Thailand (Downer, 1999). Due to the conditions described above, firms in the East Asian countries suffered difficulties in raising capital. This is likely to have implications on the financing decisions of firms operating in these countries. Arsiraphongphisit et al. (2000) indicate that the financial crisis has had significant effects on financial policies and practices in the Asia Pacific region, especially in Thailand. The financial structure was very fragile in 1997. They suggest that firms find themselves very exposed to the changes in economic environment following the crisis. Therefore, it is important to find out whether the financial crisis has had any impact on the firms' financing decisions and their determinants. Thus, we examine for any possible changes in the effect of the determinants of capital structure and debt maturity structure during the pre- and post-crisis periods.

2.4 Summary

It has been shown that firms in the Asia Pacific region, especially Thailand, Malaysia and Singapore, have different corporate governance from firms in more developed countries such as the US and UK. In the Asia Pacific region, there are similarities and differences in corporate governance and institutional environments which might suggest certain explanations of the differences in financial decisions across countries in the region. However, the information on Australia is not as readily available as countries in East Asia such as Thailand, Malaysia and Singapore. Therefore, in most cases, the comparisons have been made excluding Australia.

There are several principal similarities and differences among the sample countries. First, Malaysia, Singapore and Australia are based on common law while Thailand is based on both common law and civil law systems. Thailand and Malaysia are developing countries while Singapore and Australia are more developed. East Asian firms tend to rely more on external finance than expected. Thailand, Malaysia and Singapore are grouped as having market-based and family-based relationships while Australia is a pure market-based economy with arms-length relationships with creditors. Rule of law in this region also varies across countries. Thailand is found to have the lowest score in most of the cases in terms of rule of law. For legal protection, there are also differences in scores between shareholder rights and creditor rights. Thailand shows the lowest shareholder rights score while Australia shows the lowest score for creditor rights. This shows that Australian laws are not creditor friendly; therefore, the level of debt of Australian firms should be lower than firms in other countries.

Firms in this region rely more on informal bankruptcy procedures. In accounting practices, firms are required to disclose financial information at the satisfactory level compared with other more developed countries. Voluntary disclosure is less likely due to the culture and family-based systems in this region. Lastly, firms in this region, except in Australia, have high ownership concentrations leading to more agency problems. However, although in Malaysia and Thailand the controlling shareholders are families, in Singapore the government plays an important role, leading Singaporean firms to have more guarantees and protection for investors as well as easier access to capital markets. Because there are similarities and differences in corporate governance and institutional environments across countries in the Asia Pacific region, it is expected that financing decisions for firms in this region may vary. The impact of corporate governance and institutional environments relates more to the choices between internal and external finance rather than the proportion of external finance that the next chapters will be focusing on. Therefore, the differences in financing decisions in the next chapters might not be obvious and might not be detected by simple regressions, and country-specific variables are needed.

Chapter 3*

The Determinants of Capital Structure

3.1 Introduction

Nearly half a century ago, Modigliani and Miller (1958) were the first to point out that the value of a firm is independent of its capital structure under a number of certain assumptions because the value of the firm is determined by its real assets not by its sources of financing. Therefore, internally generated finance and external finance such as debt and equity can be a perfect substitute for each other assuming that the capital market is perfect and transactions costs, bankruptcy costs, taxation, information asymmetry and agency cost do not apply. Modigliani and Miller's (1958) seminal paper paved the way for the recent development of alternative theories and empirical research on capital structure decisions. If the propositions of Modigliani and Miller (1958) hold, the empirical results should be in the direction that differences in capital structure across countries are just an accident of history or a random product (Spremann and Gantenbein, 2002). However, this is far from reality. Once Modigliani and Miller's (1958) assumptions were relaxed, capital structure theories have evolved to acknowledge that capital structure decisions become relevant to the value of firms. Because of market imperfections, firms will try to reach an optimal capital structure. However, the puzzle about the choice of capital structure is still unsolved. Although there is consensus on a number of factors that make capital structure relevant to a firm's value, the dispute over other factors still goes on.

There are several well-known capital structure theories in the literature that offer explanations on why and how debt and equity become relevant to the firm's value. It has been suggested that the choice of debt and equity depends on firm-specific

* The main elements of this chapter have appeared in Deesomsak et al. (2004).

characteristics and country-specific factors. However, there are occasions when different capital structure theories predict different relations between firm leverage and firm-specific and country-specific factors. Empirically, the predictions of each theory on the relationship between firm leverage and each factor still overlap. Also one measurement can be a proxy for different variables. Therefore, it is difficult to distinguish the correlation of each factor with firm leverage. Briefly, there are two main capital structure theories that stand up in the literature; the trade-off theory and the pecking order theory. According to the trade-off theory, firms have a target capital structure which they try to move toward. Firms optimise their capital structure over time in order to reflect tax rates, asset type, business risk, profitability, the bankruptcy legislation and agency costs, etc. their objective being to minimise total capital costs. Agency costs of equity, conflicts between inside and outside investors, stand out as one of the major capital costs. Leverage can be used as a control instrument to mitigate the conflict; therefore, choice of debt and equity is important to firms. The pecking order theory postulates that firms have an order of financing preferences. Market imperfections, such as transaction costs and asymmetric information, play an important role in the choice of financing source for new investment and thus influence the overall financial structure. Due to asymmetric information, firms will undertake new investments by using internally generated funds first. If external funding is required, debt will be preferable than equity due to the smaller impact of asymmetric information.

Therefore, the questions to be answered in this chapter are (i) whether corporate financial decisions differ significantly across countries in the Asia Pacific region; (ii) whether the factors that are correlated to firm leverage are similar across countries in this region; and (iii) whether the East Asian financial crisis in 1997 has had any significant impact on capital structure decisions of firms in this region. Generally, this chapter contributes to the existing literature and empirical studies in several areas. First, it investigates the determinants of capital structure in Asia Pacific countries which operate under different economic development from the countries focused on by previous studies. Second, each sample country was hit by the financial crisis to differing degrees leading to potential different effects on the factors that determine firms' capital structure in each country. Third, most previous studies on capital structure consider the determinants of capital structure only in terms of firm-specific characteristics and fail to control for the possible effects of market-related conditions.

The structure of this chapter is as follows. The next section views capital structure theories which are the basis of understanding capital structure in general. This section starts with a brief summary of well-known and influential theories of capital structure. Some of these theories can be combined or are referred to in the literature as one theory because they are based on similar assumptions. Most theories are found to be robust and can be used to explain observed patterns of capital structure. Section 3 summarizes costs and benefits of debt and equity based on these theories. Section 4 reviews hypotheses development of the determinants of capital structure and is followed by the methodology applied and variable identification while section 5 describes the data and their descriptive statistics. Then the next section presents empirical results which are divided into three sections: (i) firm-specific determinants; (ii) the effects of the crisis on firm-specific determinants; and (iii) country-specific determinants. The last section draws conclusions from the discussion.

3.2 Capital Structure Theories: An Overview

3.2.1 Traditional View

Traditionally, it has been believed that the lowest weighted cost of capital (WACC) will maximise firms' market value which means that there is an optimum relationship between debt and equity because debt is generally cheaper than equity as an investment financing source. WACC is important and is related to the firm value because the firm value is equal to the present value of the net cash flow discounted by WACC. Therefore, the value of the firm can be increased by minimising WACC which is used to discount its cash flow to the present value. In other words, if the cash flows to the firm are held constant, and WACC is minimised, the value of the firm will be maximised. Under this view, it was believed that the objective of capital structure is to minimise WACC and firms will try to use a specific capital structure that will minimise this cost. Therefore, firm value and costs of capital are related to capital structure.

3.2.2 Irrelevancy Theory

Unlike the traditional view, Modigliani and Miller (1958) assume that, under perfect market conditions, the value of the firm is independent of its capital structure. This implies that firms' financing decisions cannot change the total value of the firm which should be determined by its real assets, not by financing sources. Therefore, a firm's investment decisions can be separated from its financing decisions. The assumptions of the irrelevancy theorem are that capital markets are perfect and frictionless. There are no transaction costs, bankruptcy costs, taxes or agency costs. Securities can also be purchased and sold costlessly and instantaneously. Moreover, information is free of costs and is available for everyone, including public and corporate insiders. There is no information asymmetry or signalling opportunities. It is also assumed that investors behave rationally and that managers aim to maximise shareholder's wealth. Market operators are expected to be utility maximizers. In addition, firms may issue only risk-free debt or risky equity. Firms can borrow and lend unlimited amounts at the risk-free rate. It is also assumed that there is no growth and every firm has perpetual cash flows with equal time values and firms can be divided in homogenous risk classes.

Modigliani and Miller (1958) put forward three propositions: (i) the value of the firm; (ii) the behaviour of the equity cost of capital; and (iii) the cut-off rate for new investment. Proposition I is well-known as Modigliani and Miller's irrelevancy proposition. It states that the market value of any firm is independent of its capital structure. This proposition is based on an arbitrage argument where individuals can borrow and lend on their own account or do or undo anything the firm can do on their own. This is commonly referred to as homemade leverage. It says that a firm's value is a constant regardless of the proportion of debt and equity. Therefore, the firm's WACC is independent of its capital structure. According to this proposition, WACC is constant and changing the capital structure cannot affect the firm's value.

Proposition II states that the rate of return required by shareholders (r_E) rises linearly or positively as the firm's debt to equity ratio increases and that risk increases with leverage. Since WACC and r_D (return on debt or cost of financing with debt) are constant from Proposition I, there is different r_E (return on equity or cost of financing with equity) for different mixes of capital structure. Although r_E increases when borrowing increases, the increase in r_E is also offset by the higher risk. Therefore, the attempt to substitute debt for equity fails to reduce WACC. This implies that WACC is still constant even when firms change their capital structure as claimed in Proposition I; therefore, firms are not better off with debt or equity. Proposition III follows directly from Proposition I and Proposition II. It states that a firm will only undertake investments whose returns are at least equal to WACC. The cut-off rate equals the capitalization rate.[22]

[22] However, according to Peyser (1999), without perfectly competitive product markets and constant returns to scale, it is not appropriate to assume that cut-off rate and capitalization rate are equal even for an all-equity firm. Because most product markets are somewhat oligopolistic, proper calculation of the cut-off rate is important for determining the level of capacity that maximizes the wealth of shareholders. The capitalization rate is applicable to total expected cash flow while cut-off rate is applicable to marginal expected cash flow at the optimal level of investments.

Stiglitz (1974) argues that the theoretical importance of the irrelevancy theorem is greater than that of the assumptions that underlie it. Modigliani and Miller's (1958) propositions are extended to a multi-period model which produces the same irrelevant results. However, Stiglitz (1974) also raises some limitations of Modigliani and Miller's (1958) propositions that irrelevancy depends on the existence of risk class which seems to imply objective rather than subjective probability distribution over the possible outcomes. Moreover, Modigliani and Miller's (1958) model is based on partial equilibrium rather than the general equilibrium analysis. It also is not clear whether the theorem holds only for competitive markets or not and how the possibility of firm bankruptcy affects the validity of the theorem.

However, there are several reasons to believe that the capital structure is related to the firm's value. Some argue that the restrictive perfect market assumptions do not hold in the real world which means firms' financing decisions matter. Once one or more of the fundamental assumptions are relaxed, capital structure may become relevant. Besides, there is extensive literature introducing market imperfections and they show that capital structure matters and an optimal capital structure does exist. Moreover, firms may find that there are restrictions to their access to external financing; therefore, firms' value may vary with changes in the mix of debt and equity. Brealey and Myers (2000) argue that market imperfections make personal borrowing costly, risky and inconvenient for some types of investors. This can create a natural clientele who will be willing to pay a premium for shares of levered firms. Therefore, firms should borrow to take advantage of the premium. Because it is reasonable to expect that an optimal capital structure exists, other capital structure theories have been introduced.

3.2.3 The Trade-Off Theory

The trade-off theory determines an optimal capital structure by relaxing the perfect market assumptions such as taxes, financial distress and agency cost. It presumes that a firm has a target debt-to-equity ratio and gradually moves toward it.[23] An optimal capital structure is determined by a trade off between the costs and benefits of debt financing.[24] Costs of debt include agency costs of debt, bankruptcy costs, and loss of non-debt tax shields. Benefits of debt include signalling benefit and tax deductibility of interest payment. At an optimal capital structure, the benefits of the last dollar of debt will just offset the costs of debt. It is preferable to increase the use of debt financing until the costs of debt become large enough to offset the benefits of debt and the optimal debt ratio will be at the point that WACC is minimised. If firms continue borrowing, the overall cost of capital will increase and the firm's value will decrease.

Tax

The first attempt to take account of corporate taxes was Modigliani and Miller's (1963) 'correction' paper. In this seminal paper, they show that the firm's value is not independent of capital structure due to the benefit of tax deductibility of interest payment at the corporate level. They propose that the firm's value could be increased by the use of debt because interest payments can be deducted from taxable corporate income while dividend and retained earnings are not. Therefore, the return to debtholders escapes taxation at the corporate level. The addition of debt should add a tax-shield value to the firm. There is an increasing linear function of debt usage if the only imperfection is corporate income tax. However, this does not mean that firms should use 100% of debt because there are other forms of financing such as internally generated funds that can be cheaper than debt personal taxes are taken into account.

[23] Marsh (1982); Auerbach (1985); Kjellman and Hansen (1995); Tauren (1999)
[24] The trade-off model makes a similar prediction about dividends as well. In term of dividends, a firm will maximize its value by choosing the dividend payout that equates the costs and benefits of dividends.

There are also other limitations imposed by lenders and other costs of debt such as bankruptcy costs, the costs of holding excessive debt and agency costs that can make 100% debt unfavourable. A 100% debt-financed firm is in fact technically bankrupt.

According to Myers (2001), there are also other reasons why firms should not be 100% debt-financed. It is not completely correct to think of debt as a fixed and perpetual payment as assumed by Modigliani and Miller (1963). In reality, a firm's ability to carry debt varies over time as profit and firm value change. Investors cannot be sure about the size and duration of future interest tax shields. In addition, borrowing incurs other costs such as bankruptcy costs. Firms also have different marginal tax rates and they can use interest tax shields only if there is a future profit to shield, which no firm can be certain about. A sequence of bad years might take away the firm's taxable income which could reduce any benefit from the interest tax shields. Because the firm may not always be profitable, the average effective future tax rate is less than the statutory rate. There are other types of tax such as personal tax that can affect capital structure because investors have the ability to defer capital gains and then pay taxes at a lower capital gains rate.

Robicheck and Myers (1966) hypothesize that, in the absence of taxes, the value of the firm will not change but will decrease with high level of debt and, in the presence of taxes, an optimal degree of debt exists. Mackie-Mason (1990) predicts that firms with low marginal tax rates would be more likely to issue equity when compared to firms with more profits who face the full statutory tax rate giving support to the trade-off theory that tax paying firms favour debt. However, this does not imply that debt increases firm value. Swoboda and Zechner (1995) suggest that firms in countries with higher corporate tax and inflation rates have a comparative advantage in issuing debt. Therefore, these firms should have higher levels of debt than firms in countries with low corporate tax and inflation rates because firms in high tax environments can deduct more interest expenses.

However, some empirical evidence raises doubts as to the benefits of debt due to corporate tax deductibility. Miller's (1963) evidence suggests a relative stability in the capital structure of US firms from 1926 – 1956 while corporate tax rose from 10% to 52% during this period. This evidence casts doubt on the relationship between capital structure and corporate tax. If an optimal capital structure is the balance between tax advantages and costs of debt, it is puzzling as to why there was so little change in that period. Other empirical evidence also shows that profitable firms borrow the least which contradicts the trade-off model in term of tax benefits. Fama and French (1998) find no evidence that interest tax shields contribute to the market value. In practice, there are many established and profitable firms with superior credit ratings who have low debt ratios such as Microsoft and the major Pharmaceutical firms in the US (Myers, 2001).

Graham (2000) examines the interest rate spread between corporate bonds and tax-exempt bonds and shows that firms could have doubled their tax benefits (about 7.5% on average) by taking on more debt.[25] However, those firms continue using conservative debt levels. This can occur because interest deductions reduce taxable income which will decrease the possibility that firms will be fully taxable and this in turn reduces the tax benefit. However, Myers (2001) argues that the estimates from Graham (2000) are not definitive. It is uncertain who the relevant marginal investors are. However, in practice, there is still a significant tax incentive for the firm to use debt. If firms can absolutely use debt to shield tax, in equilibrium there should be no firms paying taxes at all. This implies that there are still other factors apart from taxes that can affect capital structure.

[25] Graham (2000) estimates that the tax benefit of interest deductibility equals 9.7% of market value while it should have been 13.2% under trade-off model.

Miller (1977) later introduces personal income taxes under a number of assumptions: (i) all investors are taxed at the same rate; (ii) the objective of the firm is to maximise its value; (iii) there is no capital gains tax and bankruptcy risk; and (iv) firms pay all of their earnings in dividends. Miller (1977) proposes equilibrium of aggregate supply and demand for corporate debt where the tax advantage of debt at the firm level is exactly offset by the tax disadvantage of debt at the personal level (income tax paid by marginal investor). There might be an equilibrium capital structure that applies to the corporate sector as a whole but there should be no such optimal capital structure for any single firm. This equilibrium would lead different firms to have different debt levels depending on their tax status. Tax-exempt investors do not pay any tax on interest; therefore, their personal tax is zero. As a result, investors in high tax brackets will hold equity while tax-exempt investors will hold corporate bonds. If firms want to issue more debt, it has to attract investors in high tax brackets by offering a higher return. This process will continue until equilibrium is reached which is where the marginal corporate tax benefit exactly offsets the marginal cost of issuing debt at higher returns. Therefore, Miller's (1977) irrelevancy theorem turns back to the irrelevancy propositions of Modigliani and Miller (1958) that a firm's value is independent of its capital structure but for a different reason. Myers (2001) also agrees that there is no net gain when both corporate and personal taxes are considered. However, Miller's (1977) model predictions are possible only if the effective tax rate on equity income is substantially lower than on interest. It should be low enough to offset the corporate tax shield. Masulis (1980) introduces different personal taxes across investors, where debt interest income is taxed at a higher rate than capital gains income and argues that Modigliani and Miller's (1963) conclusion is no longer definitive. In this case, corporate tax deductions are at least partially offset by additional personal tax.

Graham and Harvey (2001) survey capital structure and find little evidence that firms directly consider personal taxes when deciding on financing decisions. Swoboda and Zechner (1995) argue that if there is a marginal investor with a personal income tax rate equal to the corporate tax rate, firms will be indifferent between debt and equity. However, if personal tax rate is less than corporate tax rate, then all firms would choose maximum leverage. If personal tax rate is higher than corporate tax rate, firms will be better off with all equity. Graham (1999) also focuses on how personal tax affects financing decisions. The personal tax on interest income is higher than the tax on equity income because long-term capital gains are taxed at a rate below statutory personal tax rates. Taxes on capital gains can be deferred until the gain is realized and can be avoided if equity shares are held until death. Therefore, Graham (1999) shows that personal taxes discourage the use of debt. It is also found that, controlling for personal taxes, debt usage is positively and significantly correlated with tax rates for the period of 1980 – 1994. Graham's (1999) evidence shows that personal tax penalty reduced but did not eliminate the tax incentive to use debt. This result offers evidence against Miller's (1977) irrelevancy theorem.

Borrowing is not the only way for firms to shield income against tax. DeAngelo and Masulis (1980) extend Miller's (1977) work by incorporating non-debt tax shields (NDTS) such as depreciation, investment tax credits, R&D expenditures, oil depreciation allowances, pension funds and loss carry forward as substitutes for debt in corporate financial structures. NDTS leads to a greater chance of having no taxable income, a lower expected corporate tax rate and a lower expected payoff from interest tax shields. In other words, NDTS decreases the probability of utilising the interest tax shield. Firms with large NDTS effectively exhaust the firm's tax-saving capacity. The more NDTS advantage firms have, the higher the chance that firms will not be able to realise all the advantages including interest tax shields. Therefore, firms with large NDTS should have less debt.

DeAngelo and Masulis (1980) suggest that in the presence of NDTS, personal tax bias against net income diminishes but does not eliminate the net corporate tax benefit of interest payment. The importance of NDTS could overturn the irrelevancy theorem of Miller (1977) without taking bankruptcy, agency or any other related costs of debt into consideration. However, Bradley et al. (1984) and Titman and Wessels (1988) find that leverage seems to be positively related to NDTS. This can happen because the assets which generate such NDTS could also be used as collateral for additional debt. Firms with high tangible assets should have higher levels of secured debt. Because debt can offer advantages from corporate tax and disadvantages from personal taxes and NDTS, firms should try to minimise the present value of all taxes paid on corporate income. Firms should also take into consideration not only corporate tax but also personal tax, other taxes and NDTS.

Financial Distress and Bankruptcy Costs

Financial distress is likely to occur when firms have difficulties in paying back their debt or when promises to creditors are broken. The probability of financial distress increases with additional borrowings and it can lead to bankruptcy. Bankruptcy is the legal mechanism that allows creditors to take over when there are too many declines in the value of assets. Corporate bankruptcy normally occurs when shareholders exercise their right to default which is important because shareholders have limited liability and can walk away and leave the trouble to creditors. When firms are in trouble, limited shareholder liability encourages managers/shareholders to pursue their self-interests by investing in more risky projects, leaving the potential risks to the creditors. There are two types of financial distress, direct costs and indirect costs. Direct costs can be seen as out-of-pocket cash expenses which are directly related to the filing and the action of bankruptcy including fees for lawyers, investment bankers, administrative fees and the value of managerial time spent in the process of bankruptcy (Haugen and Senbet, 1978). Indirect costs are the expenses or losses that result from bankruptcy but are not the cash expenses on the process of bankruptcy. Indirect costs include sales that are lost during and after the bankruptcy process which can happen because of the fear of impaired service and loss of trust, diversion of management time during bankruptcy and loss of important employees after bankruptcy. Indirect costs are basically costs that arise because people perceive firms to be financially troubled.

Warner (1977) and Pham and Chow (1989) find that direct bankruptcy costs appear to have only small effects on firm value. Graham and Harvey (2001) show that cost of financial distress is not important while Haugen and Senbet (1978) argue that the only bankruptcy costs relevant to the determination of a firm's optimal capital structure are the direct administrative costs of bankruptcy. Altman (1984) and Pham and Chow (1989) report larger importance of bankruptcy costs when indirect bankruptcy costs are considered and conclude that bankruptcy costs can be sufficient to influence firms' behaviour. Several studies support the theory that the risk of bankruptcy affects capital structure.[26] They suggest that bankruptcy costs discourage the use of debt and that the costs of expected bankruptcy against benefits of tax shield can define an optimal capital structure. If firms have high financial distress costs, they should not rely completely on debt. Therefore, according to the trade-off model, firms should trade-off between benefits of debt and the potential costs of bankruptcy. Bankruptcy cost related models can be used to predict the relationship between firm leverage and firm size, earnings volatility and profitability. Warner (1977) and Ang et al. (1982) provide evidence that large firms tend to be more diversified and are less prone to bankruptcy; therefore, they should have higher levels of debt. Warner (1977) finds that a firm with high volatility of

[26] Kraus and Litzenberger (1973); Scott (1977); Haugen and Senbet (1978); Ang et al. (1982)

earnings would have a high risk of bankruptcy; therefore, they tend to have less debt. Expected bankruptcy costs rise when profitability declines; therefore, less profitable firms should have lower leverage.

Agency Costs

Jensen and Meckling (1976) were the first to emphasize the role of financial contracts in creating and controlling agency problems. Their seminal work has been extended mainly by Fama (1990), Fama and Jensen (1983), and Shleifer and Vishny (1986), among others. Agency costs occur because the interest of managers is not aligned with the interest of security holders such as debtholders and shareholders. Shareholders are interested in high dividend ratios and high share prices; debtholders are interested in interest payments and debt repayment and managers are interested in remuneration. Jensen and Meckling (1976) define two types of conflicts or agency costs, conflicts between shareholders and managers (agency costs of equity) and conflicts between debtholders and shareholders (agency costs of debt).

Agency costs of equity normally occur when managers hold less than 100% of the residual claim and are maximised when managers do not hold any share in firms. A conflict between managers and shareholders arises because it is always assumed that managers can misreport output or extract private benefits partly at the expense of new shareholders, because they bear only a fraction of these costs (Levy, 2000). Agency costs of equity include the monitoring expenses of the shareholders, the bonding expenses of managers and the money value of the reduction in welfare of the shareholders due to the differences between the interests of managers and shareholders. Agency problems will be more severe when the level of asymmetric information is high because managers have the capacity and incentive to transfer wealth between parties. It can be expected that agency costs will be higher for smaller firms because their managers are likely to put their own interest first, especially in the early years when survival is crucial. When firms need external equity, agency cost of equity might not be severe for firms with strong investment opportunities because managers and shareholders' interests coincide. If firms do not have strong investment opportunities, equity can generate agency costs of managerial discretion which can be limited by using debt.

Agency costs of equity can occur in different circumstances. First, if the firm issues equity, the manager's fractional interest in the firm decreases. This will increase the incentive or induce managers to act in their own economic self-interest and pursue greater non-pecuniary benefits or perk consumption such as corporate jets or plush offices because they can share the costs of their actions with the new shareholders. Managers can reduce the cost of engaging in perk activities by selling a fraction of the company and can benefit fully from the activities. Self-interested managers have an incentive to reduce debt to a level which is less than the optimal level. Second, agency costs of equity can arise because managers may prefer short-term projects which produce quick returns and enhance their reputation quickly rather than long-term, profitable projects. Alternatively, managers might prefer less risky investments and lower leverage to reduce the probability of bankruptcy. The conflicts can also arise in terms of employment termination. Managers might wish to minimise the likelihood of employment termination which is likely to increase when there are changes in corporate control. Managers might resist take-over regardless of the effect on shareholders' wealth.

Third, conflicts might occur when managers and shareholders disagree over a firm's operating decisions. Managers might prefer continuing operations even if shareholders are better off with liquidation (Harris and Raviv, 1990). Fourth, conflict might occur when managers prefer to invest all available funds when shareholders might want the fund to be allocated as dividends instead (Stulz, 1990). However, in an efficient market, investors are aware of these behaviours which will be reflected in share prices in order to take account of the monitoring costs of external shareholders. When a fraction of a firm is sold, there will normally be a decrease in share price. If the share prices decrease, it implies that even if a fraction of a firm is sold, managers still bear the full cost of the perk activities. Managers might prefer to finance the new projects with debt instead of equity to avoid the decrease in share price.

There are several ways to reduce agency costs of equity. First, agency costs of equity can be reduced by mechanisms of monitoring and control which can come through an independent auditor. Investors can discourage perk activities by using independent directors and the threat of take-over (Myers, 2001) but these mechanisms are costly. Perfect monitoring is unlikely to happen. Second, the good design of compensation packages to managers can help to reduce the differences between the interests of managers and shareholders but there is no perfect compensation package because managers will never bear the full costs unless they also own the firm. There is no way to observe managers' performance perfectly. Third, firms can issue more debt and let debtholders act as the auditors of the company.[27] Firms can use debt to overcome agency costs because managers will have less free cash flow to spend in their own interests and debt forces managers to confront directly and to be monitored by the public and also allows managers to hold a larger fraction of shares which make managers' interest closer those of other shareholders (Easterbrook, 1984; Jensen, 1986). Managers will begin to pay a larger share of the costs associated with non-value maximisation; therefore, they will be less likely to waste the firm's wealth. Grossman and Hart (1982) also agree that debt can create an incentive for managers to work harder and make better investment decisions.

[27] However, debt can also generate its own agency costs.

In terms of cash flow, if a fraction of the firm is sold, the cash flow to firms will be divided and goes to both managers and shareholders. If firms choose to issue debt instead of equity, managers will receive the full cash flow. Normally managers tend to work harder if they are the owners of firms because they bear the full costs of their action and get the full benefit of that action. Harris and Raviv (1990) also stress the use of debt to mitigate agency costs of equity. Debt allows investors to generate information to be used for monitoring managers and implementing efficient operating decisions because debtholders can use their legal rights to force managers to provide information to outsiders. However, the optimal amount of debt will depend on the trade-off between the value of information and opportunities for disciplining managers and the probability of monitoring costs. Although debt can help to reduce agency costs of equity, it does come with costs. Similarly, dividend is another way to reduce agency costs of equity because managers have to pay out more of the firm's excess cash. Easterbrook (1984) also makes similar claims on dividends. Therefore, the model predicts that highly profitable firms with a lot of free cash flow will have higher levels of debt or dividends than less profitable firms. Jensen and Meckling (1976) and Smith and Warner (1979) argue that managers can still be disciplined by the use of convertible debt. However, Graham and Harvey (2001) find little evidence that firms use convertible debts to reduce the conflicts between managers and shareholders.

Agency costs of debt arise due to the conflicts between debtholders and shareholders. They only arise when there is a risk of default. If debt is free of default, debtholders have no interest in the firm's income, value or risk. However, if there is a chance of default, shareholders can gain at the expenses of debtholders. In this case, managers are assumed to maximize the wealth of shareholders and act in their interest. Conflicts occur because once firms increase the amount of debt, it is the debtholders who will take on increasing amounts of the firm's business and operating risk while shareholders and managers control the firm's investment and operating decisions. Managers have the incentive to use several strategies which will increase shareholders' and their own wealth on the behalf of debtholders who will bear the costs of the actions. Agency costs of debt also include the opportunity costs caused by the impact of debt on the investment decisions, the monitoring and bond expenditures by debtholders and managers or shareholders, and the costs associated with bankruptcy. The agency costs of debt are maximised when all the external funds are obtained from debt.

There are four different types of agency costs of debt (Smith and Warner, 1979; Eriksson and Hede, 1999). First, managers will have an incentive to undertake risky projects, called 'bait-and-switch' strategy or 'asset substitution'. Managers can pretend to borrow for the safe project but actually go for the risky one which will offer the same expected return, but in a recession the outcome is less than the loan principal. Debtholders who believe that the project is safe will offer low interest rates on the loan. In a recession, it is the shareholders who will default and the debtholders who will have to take control of the empty firm. Shareholders' loss is limited to the value of their equity holdings. In case of a boom with the risky project, the firm will be able to repay the debtholders and then gain from the excess project return. Debtholders share the costs of bankruptcy but do not share the additional expected returns. Because the firm will take on a high risk/return project with a low interest rate, managers have the incentive to undertake risky projects. The second form of agency cost of debt is called 'milking property'. Like the first form, once the proportion of debt in the firm increases, debtholders' portions in business and operating risk increase. However, in this case, managers have an incentive to transfer the wealth from debtholders to shareholders by paying out the borrowed money as dividends to shareholders. Therefore, after the firm defaults, there is no money left for the debtholders when they take control of the firm because all the money has already gone to shareholders. This strategy normally happens when firms are in financial distress and managers try to milk out all the money to the shareholders. The overall value of the firm does not change but the market value of the existing debt decreases.

The third form of agency cost of debt happens when firms underinvest.[28] Normally the firm will invest up to the point where the expected return is equal to WACC. However, underinvestment happens when firms are close to bankruptcy. The greater the risk of default, the greater the benefits to existing debt from additional investment. If firms go for positive net present value, they will gain as a whole. However, shareholders have the feeling that they have to contribute with all the financing but share the gain with bondholders. Managers perceive that benefit will be used to pay off existing debtholders. Therefore, although positive net present value projects will be accepted by unlevered or all-equity firms and levered firms, they tend to be rejected for the levered firm that is close to bankruptcy. Underinvestment can also be caused by something else. When debt is risky, debtholders can share in the profitable future investments returns which extract some of the net present value. This transfers wealth from shareholders to debtholders. This can cause the shareholders to reject good investment opportunities. Therefore, the agency cost of debt is the combination of the value of forgone opportunities and the costs of enforcing contractual provisions.

Another form of agency cost of debt happens when firms undertake negative net present value projects. Unlike the underinvestment problem, when firms are about to go bankrupt, firms might accept negative net present value projects because shareholders have limited liability. When taking the negative net present value project, the shareholders are using debtholders' future money in case of bankruptcy. Shareholders and managers have nothing to lose in case of either successful or failed projects because firms are about to go bankrupt anyway. But if successful, the firm will no longer go

[28] Myers (1977) calls this form of agency cost 'underinvestment' or 'debt overhang' problem.

bankrupt so managers and shareholders are better off taking a chance with negative net present value projects while debtholders are better off rejecting it.

Another type of agency cost is called 'claim dilution' (Smith and Warner, 1979). It happens because bonds are normally issued with the assumption that firms will not carry any more leverage. The existing debt will fall in value if the new debt has higher priority. Even if the newly issued debt does not have higher priority, the existing debt's value will still fall if the risk of bankruptcy increases. Moreover, managers might 'play for time' by hiding the problems of firms from the creditors in order to prevent the creditors forcing firms into immediate bankruptcy or reorganization (Myers, 2001). This lengthens the effective maturity of debt and makes it riskier for debtholders. Therefore, it is debtholders who will suffer while shareholders and managers gain. However, debtholders are aware of the above behaviour of managers and shareholders when firms are close to bankruptcy. Therefore, they will charge those firms with higher interest rate on their loan in order to protect themselves. The closer firms are to bankruptcy, the higher the interest rate debtholders will charge.

There are also several ways to reduce agency costs of debt. One effective way is for debtholders to write debt covenants which will constrain the ability of firms to engage in inappropriate projects or activities.[29] However, it is a trade off because writing debt covenants can be costly to negotiate but might be worth while compared with high agency costs of debt. An alternative way to reduce agency costs of debt is to issue secured debt which will be collateralized by firms' tangible assets because if they go bankrupt, debtholders will get the salvage value of the tangible assets. This can explain the empirical results that firms with high tangible assets tend to have high levels of debt. Jensen and Meckling (1976) also point out that convertible securities could be used to mitigate the risk-shifting incentives.

[29] Eriksson and Hede (1999) discuss more in details about debt covenants.

Another way to reduce costs of debt is to reduce the level of debt. Once the level of debt is decreased, agency costs of debt are reduced because the amount that managers can transfer from debtholders to shareholders will be decreased. Myers (1977) suggests the use of short-term debt to reduce agency costs of debt. The greater the proportion of growth assets in firms, the greater the agency costs of debt because it is easier to change the firm's market value and risk to benefit shareholders to the cost of debtholders. In order to minimise this conflict, firms with high growth opportunities should have higher leverage and use greater amounts of short-term debt than firms with low growth opportunities. This suggests that short-term debt ratios might be positively related to growth rates. However, Graham and Harvey (2001) find little support for the idea that short-term debt is used to mitigate agency costs. Diamond (1989) suggests that reputation could help mitigate this agency cost of debt. The incentives to transfer the wealth from debtholders to shareholders will be greatest for firms with a reputation for selecting risky debts. Managers have an incentive to preserve their reputation by selecting relatively safe projects instead of risky projects. This implies that older firms will maintain their reputations by choosing safe projects while younger firms normally have lesser reputations and may choose risky projects. Later, if young firms survive, they will tend to choose safe projects. The agency theory predicts that the value of firms is maximised when total agency costs of debt and agency costs of equity are minimised. Therefore, an optimal capital structure exists when the marginal agency costs of debt financing equal the marginal agency costs of equity (Jensen and Meckling, 1976). Nevertheless, agency costs of equity might be insignificant because there are other types of pressures controlling managers' behaviour. Other studies suggest some mechanisms that can be used to control the behaviour of managers including the managerial labour market, capital market and market for corporate control (Shleifer and Vishny, 1986).

In conclusion, according to the trade-off theory, an optimal capital structure exists when the firm tries to balance between the costs of debt (agency cost of debt, bankruptcy costs, personal taxes and NDTS) and the benefits of debt (corporate tax savings, agency cost of equity). It suggests that target debt ratios may vary from firm to firm. Firms with safe, tangible assets and plenty of taxable income should have high debt while unprofitable firms with risky, intangible assets should rely more on equity. The trade-off theory can be used to explain some observed patterns of capital structure. Firms with extra heavy debt should issue equity, constrain dividends or sell off assets in order to raise cash to rebalance capital structure at the target level. Although the trade-off theory is widely utilised in corporate finance, it has been criticised because it cannot adequately explain some of the observed patterns of capital structure such as the findings from most empirical studies that profitable and successful firms tend to have lower level of debt and give up interest tax shields. It cannot explain why leverage increasing event such as stock repurchases and debt-for-equity exchange offers are always associated with large positive abnormal returns while leverage decreasing events are associated with share price decreases. According to the trade-off model, these events should both net out to zero abnormal return because some firms will be below their optimal capital structure when they issue debt while others are above the optimal level. These patterns can be well explained by the pecking order theory.

3.2.4 Free Cash Flow Theory

Like agency theory, the free cash flow theory assumes that there are conflicts of interest between shareholders and debtholders implying that managers might not always maximise the value of the firm. Free cash flow in this case is defined as the cash flow in excess of the amount required to fund all positive net present value projects. The objective of this theory is to motivate managers to disgorge the cash rather than to invest it in negative net present value projects or to waste it on inefficient work. Jensen (1986) points out that debt and dividends help the firm to reduce free cash flow when firms' operating cash flows are significantly greater than the profitable projects. Managers will be disciplined since there is less cash available to spend on perk activities. Debt can also reduce the freedom of decisions because the firm is forced to pay interest at certain times. Managers cannot do whatever they want to satisfy themselves. Because there will always be the risk of bankruptcy and default such that the firm will not be able to pay interest or repay the principal in time, managers have to work harder and organise the firm more efficiently. Therefore, highly profitable firms with a lot of free cash flow should have higher level of debt or dividends than less profitable firms. However, Graham and Harvey (2001) theory find very little evidence that firms discipline managers in the way that free cash flow theory suggests.

3.2.5 Signalling Model

The signalling model is based on the presence of asymmetric information. It is assumed that managers have more information than outsiders, such as investors, because managers always have access to information about firms that outsiders do not have. The seminal contributor for the signalling model with relation to capital structure is Ross (1977). In this model, managers use costly signals to differentiate their firms from weaker firms. This model is based on the idea of well-informed managers who have an incentive to convey information to poorly-informed outside investors in order to drive up share prices. Because outsiders cannot directly observe corporate characteristics in enough detail to calculate the value of all marketable securities, firms can adopt some financing strategies to signal positive information to investors, such as a highly levered capital structure. Investors tend to assign high valuations to high quality firms which are highly levered because it is costly for weak firms to mimic this financing behaviour due to higher marginal expected bankruptcy costs. Since the probability of bankruptcy for any given debt level is higher for low quality firms than for high quality firms, investors will take high levels of debt as a signal of higher quality. It is costly for low quality firms to have high levels of debt because managers will be penalised if firms go bankrupt and low quality firms normally do not have enough cash flow to back them up. For high quality firms, an increase in leverage conveys good news about the optimistic future of firms while a decrease in leverage conveys bad news.

In Ross' (1977) model, it is assumed that managers do not hold shares in the firm and management compensation is determined by a contingent contract which is related to the firm's value. Ross (1977) suggests three main implications: (i) like Modigliani and Miller's (1958) irrelevancy theorem, WACC is independent of the firm's financing decisions despite each firm having its own unique level of debt; (ii) the level of bankruptcy risk increases when firms increase the use of debt; and (iii) the firm's value is positively related to leverage; therefore, high quality firms should issue more debt. Leland and Pyle (1977) suggest that ownership structure, such as the proportion of equity held by the owner-managers, can be a signal of firm quality. Therefore, the value of the firm increases with the share of the firm owned by managers. Their model is consistent to Ross' (1977) model because it predicts that firms with more debt (meaning higher concentrations of insider ownership) will be of higher quality. Stiglitz (1974) also suggests that changes in financial policy might be an important signal for the real prospects of the firm. The use of debt can be used as the costless signal of a firm's value. However, Heinkel (1982) uses a similar approach to Ross (1977) but assumes that managers own firms instead and argues that high quality firms should have low levels of debt which is exactly opposite to what is found by Ross (1977) because of the different assumptions.

Noe (1988) shows that average quality of firms financing with debt is higher than average quality of firms financing with equity. The advantage of debt arises because it can keep unprofitable or weaker firms out of the market and can be used as a barrier to entry of inferior firms, thus improving the average quality of firms in the market. This gives the benefit to the remaining firms because if the market is unable to discriminate between them, it would value all of them at the average value. Therefore, undervalued firms will prefer debt to underpriced equity while overvalued firms will prefer equity. Apart from the studies discussed above, Masulis (1980), Brennan and Kraus (1987), Constantinides and Grundy (1989) all develop signalling models in which firms can reveal their types by the financing decisions.

However, the signalling model does not predict the actual behaviour of firms well enough as it cannot explain some observed patters of capital structure. For example, profitability is mainly found to be negatively related to leverage. But according to the signalling model, profitable firms should be positively related to leverage if they want to signal their quality. It predicts that industries with high growth options and other intangible assets should employ more debt than mature, high tangible asset industries because they have more severe information asymmetry problems and thus have greater need to signal to the market. Although the signalling model can explain why particular firms use some particular instruments such as debt as signals, it generally fails to show why one instrument is better than another or why one instrument should be chosen instead of another. Eriksson and Hede (1999) comment that although the signalling model can explain some of the observed patterns and how these structures are financed, it cannot help firms to predict an optimal capital structure.

3.2.6 The Pecking Order Theory

The pecking order theory is also based on the presence of asymmetric information. It is assumed that managers know more about firms' prospects, risks and values than outsiders. However, it does not take account of the effect of taxes, bankruptcy costs and agency costs. This theory assumes that firms have preferences in choosing ways to finance their projects. There are two views in the literature about why firms prefer internal finance to external finance. One view is by Donaldson (1961) and another by Myers (1984) and Myers and Majluf (1984). Donaldson (1961) first introduces the notion that firms follow a pecking order of corporate financing choice. Managers prefer internally generated funds to external funds when financing positive net present value projects. When internally generated funds are not sufficient for the new project, managers will sell off part of the investment in marketable securities and will be unlikely to cut down dividends and rather go for external funds if the funds are still not enough, except in the extreme case of financial distress. Internal finance is preferred to external finance because firms want to avoid floatation costs which usually come with external funds. Debt is preferred to equity because the floatation costs of debt are usually less than those of equity.

Myers (1984) and Myers and Majluf (1984) expand Donaldson's (1961) idea and call it the pecking order theory. They disagree with Donaldson's (1961) view that firms prefer internal equity to debt because of floatation costs. They argue that the net benefits of debt in terms of tax shields and financial distress risks are likely to outweigh floatation costs. In this view, internal funds are preferable because firms want to maximise the wealth of existing shareholders. The predictions are the same as those from Donaldson (1961) that firms prefer internal finance to external finance. Dividend payout ratios do not change too often. There will rarely be an increase or decrease in dividend in response to fluctuations in current profits. Dividends are sticky so that dividend cuts are not used to finance new projects and so that changes in cash requirements are not soaked up in short-run dividend changes. If internally generated cash flow is more than capital investment, the surplus will be used to pay off debt rather than repurchasing and retiring equity. If external funds are required, firms will issue the safest securities first by beginning with debt followed by convertible bonds, preferred stock and lastly common stock. Thus, the amount of debt will reflect the firm's cumulative need for external funds. In the pecking order theory, there is no optimal capital structure. Debt level tends to increase when there is a deficit and decrease when there is a surplus.

There are two main assumptions in Myers (1984) and Myers and Majluf's (1984) model. First, managers will act in the interest of old shareholders and the positive net present value project can be rejected if the new shareholders get most of the gain and old shareholders suffer the loss. Second, old shareholders are believed to be passive so that only new shareholders will purchase new issues. It is shown that firms might refuse to issue stock when the stock is mispriced by the market. The mispricing problem occurs because of the asymmetric information between managers and investors. Because investors do not know the true value of either the existing assets or the new investment opportunities, they cannot precisely value the securities. When there is asymmetric information, firms' equity may be underpriced. The sales of new shares might not be in the interests of existing shareholders because it usually comes with a decrease in the market price of the existing shares.[30] If a manager's objective is to maximise the wealth of old shareholders, the project might not be accepted because the new shareholders will obtain a higher capitalised cash flow from this investment than old shareholders unless the transfer from old to new shareholders is more than offset by the net present value of the new projects (Eriksson and Hede, 1999). The underpricing

[30] The evidence by Marsh (1982) is consistent with this suggestion.

problem can be solved by issuing securities that are not much affected by pricing from the market such as internally generated funds. Myers and Majluf (1984) point out that high quality firms can reduce the cost of information asymmetry by using external financing only if internally generated fund is not sufficient.

Myers and Majluf (1984) argue that debt is preferable to equity because an issue of a risk free debt will not have any impact on the value of existing shares. Even though debt is risky, the impact of its issue is still less than the impact from an issue of new shares because the priority of claims with debt will make the value of a new risky debt less sensitive to the release of new information than the value of new shares. Debt is also preferable to equity because of tax advantage and high transaction costs of outside sources, especially equity. Moreover, debt increases unwanted monitoring while equity increases both monitoring and control dilution (Kjellman and Hansen, 1995). The pecking order theory also stresses the importance of financial slack to avoid the need to for urgent and expensive external fundraising because without it firms will be forced to raise new shares at low valuations (issue undervalued shares). Or firms will be forced to borrow and pass up positive net present value investment opportunities. However, financial slack has a cost. Surplus cash tempts managers to overinvest, thus a high debt ratio can help.

Miller and Rock (1985) also develop a model in which internal financing dominates external financing. However, unlike Myers and Majluf (1984), Miller and Rock (1985) make no distinction between different types of external funds because all external funds signal to the market that internal sources are insufficient for the projects. This implies that Miller and Rock (1985) model is neither the pure pecking order nor pure trade-off model (Kjellman and Hansen, 1995). Krasker (1986) extends the model developed by Myers and Majluf (1984) by introducing a more generalised model and allowing for different sizes of equity issue. Krasker (1986) argues that the larger the stock issue, the worse the signal to investors leading to a fall in firms' share prices. The results are consistent with Myers and Majluf's (1984) model and share prices will be a decreasing function of the issue size. Narayanan (1988) agrees with the pecking order theory in considering information asymmetric with assets-in-place and allowing for the possibility of risky debt. The conclusions are that the firm will issue less risky securities before the risky ones. Internal finance is preferable to debt and debt is preferable to equity. It is better for firms to build up financial reserves (such as by restricting dividends) so that they can have enough capital to supply the project from internal sources. Therefore, Narayanan (1988) concludes that when there is asymmetric information, all firms either issue debt or reject the project.

Baskin (1989) uses a simple OLS regression model to show that there is a positive relationship between past growth and debt and a negative relationship between past profitability and debt which give support to the pecking order hypothesis but contradicts the trade-off model. Pinegar and Wilbricht's (1989) survey of US firms shows that managers of their sample are more likely to follow a financing hierarchy than to maintain a target debt-equity mix. Heinkel and Zechner (1990) extend the work of Narayanan (1988) by allowing firms to choose an optimal capital structure before investment decisions. They conclude that the use of debt or hybrid securities such as preferred stock tends to cause underinvestment problems implying that firms have an optimal capital structure which consists of a mixture of debt and equity. This contradicts the pecking order theory because in the pecking order theory firms do not have an optimal capital structure.

Shyam-Sunder and Myers (1999) attempt to compare the trade-off theory with the pecking order theory by fitting the two models to their sample. The evidence supports both theories but they find that the pecking order theory has greater explanatory power than the trade-off theory. They conclude that the pecking order theory explains more of the variation of financing decisions of firms and the pecking order theory is the best explanation of the financing behaviour of firms in their sample. Chirinko and Singha (2000) disagree with Shyam-Sunder and Myers (1999) and state that the test by Shyam-Sunder and Myers (1999) generate misleading inferences. It is suggested that alternative tests are required to identify the determinants of capital structure. Fama and French's (2002) results also confirm the predictions of the pecking order theory and contradict the trade-off theory. They show that short-term variation in investment and earnings is mostly absorbed by debt which is consistent with the prediction of the pecking order theory.

The pecking order model can give an explanation of the observed patterns (Eriksson and Hede, 1999). First, the model can be used to explain why share prices might fall on the announcement of equity issue. It is sometimes found that leverage increasing events such as stock repurchases and debt-for-equity exchange offers are associated with large positive abnormal returns while leverage decreasing events are associated with share price decreases. The announcements of leverage increasing events suggest that corporate managers are confident enough of the firm's future earnings power that they can increase corporate debt levels without losing the firm's ability to fund its investment internally. Therefore, leverage-increasing events are taken positively by the stock market. Second, it can explain why firms are reluctant to issue equity. It is found that firms issue debt securities frequently while seasoned equity issues are rare. Third, the model can explain why firms build up financial slack by restricting dividend payments when there are few investment opportunities. It can also explain why the most profitable firms have the lowest level of debt which is exactly opposite to the predictions of the trade-off and signalling theories.

Eriksson and Hede (1999) argue that the pecking order theory does not provide a formula for calculating an optimal capital structure. Myers (2001) comments that the pecking order theory cannot explain why financing strategies are not developed to avoid the financing consequences of managers' superior information. Baker and Wurgler (2002) argue that the pecking order theory cannot provide a good explanation for why temporary fluctuations in the market to book ratio have a permanent impact on observed capital structure. Moreover, there are a number of studies that cast doubt on the pecking order theory. Brennan and Kraus (1987) contest the results presented by Myers and Majluf (1984) by arguing that Myers and Majluf's (1984) model only incorporates equity and riskless debt. They examine financial strategies such as the combination of an equity issue and a debt retirement which is believed to be able to resolve information asymmetry problems. They suggest that issuing equity is a negative signal but issuing equity and repurchasing debt with a portion of the issue can be a positive signal. This contradicts the pecking order prediction that equity is the last resort of financing. Constantinides and Grundy (1989) and Noe (1988) present similar arguments to Brennan and Kraus (1987) and conclude that firms do not necessarily issue debt straight over equity and the underinvestment problem can be resolved by using other types of financial options. They also contradict the prediction of the pecking order theory that equity is the financing last resort.

Myers (1977) suggests that firms should not use debt to finance growth opportunity because debt might lead firms to pass up some positive net present value projects leading to underinvestment problems. This suggestion implies that firms with high growth opportunities will not follow the pecking order theory by issuing debt before equity. The suggestion by DeAngelo and Masulis (1980) of NDTS might lead firms to prefer debt to internally generated funds. If firms have little NDTS that can be used as substitutes for debt, they may prefer to use debt before internally generated funds in order to gain the tax shield advantages of debt. Viswanath (1993) shows that long-term strategic considerations may make a firm prefer external funding to internally generated funds in the short term. Helwege and Liang (1996) disagree with the evidence that supports the pecking order theory for firms that were involved in IPO's during 1984. Their finding yields little support to the pecking order theory and is more consistent with the idea of an optimal capital structure. There is the evidence that firms go for external financing even when there is a surplus. They also find that among firms that raise external funds, riskier firms are unlikely to issue equity while the pecking order theory predicts that as firms' risk increases, firms will move down the pecking order. This can be explained with the argument that if a firm can issue riskless debt, asymmetric information has no effect on the pricing of its debt. However, if firms can issue only risky debt, this is not advantageous compared to equity.

The pecking order theory has some limitations when compared with the trade-off theory in its ability to explain how taxes and bankruptcy costs influence the capital structure of a firm. It also ignores agency problems. There is one main problem with the assumption in the case of the obligation for UK firms to issue new shares to existing shareholders through a rights issue. The rights issue discredits the pecking order model of Myers and Majluf (1984) because there will be no cost to the old shareholders if they are the investors who purchase the underpricing equity. According to the rights issue, there is no cost associated with equity even when asymmetric information exists. Like all theories of capital structure, the pecking order theory works better in some contexts than in others.

3.2.7 Managerial Behaviour Theory

According to managerial behaviour theory, debt can be favourable and unfavourable at the same time. Firms might prefer to use debt rather than equity for several reasons. Managers can adopt excess debt in order to inflate voting power (Stulz, 1988). High debt can also be used to reduce the possibility of take-over attempts by signalling a commitment to sell assets or restructure (Berger et al., 1997). Capital structure can also be affected by the fear of dismissal of managers (Zwiebel, 1996). If wage rates for managers are positively related to firms' profit, they have an incentive to increase profit even when the decision is not to maximise the firms' value. Berkovitch et al. (2000) show that managerial compensation is positively correlated with leverage and expected cash flow. Managers of firms with risky debt outstanding are promised lower severance payments than managers of firms that do not have risky debt. Therefore, firms have to ensure that the levels of incentive to managers to pursue the goals of the firm are appropriate.

Equity is sometimes preferable to debt. Zwiebel (1996) shows that high market valuations and good investment opportunities might allow managers to issue equity but also allow them to become entrenched and it is likely that they will resist raising debt which is sometimes necessary to rebalance the optimal level of capital structure. In this case, managers are not attempting to exploit new investors but instead exploit existing investors or shareholders by not rebalancing their capital structure. Managers may prefer to use less debt than an optimal capital structure because they want to reduce the firms' risk to protect their undiversified human or due to pressure from the commitment to dispose of large amounts of cash or to pursue their private objectives by controlling corporate resources rather than by paying interest (Jensen, 1986; Stulz, 1990). Some firms might want to issue equity so that they can build empires (Jung et al., 1996). Debt can be less favoured than equity because when firms issue external equity, management and shareholder's interests coincide. Berger et al. (1997) find that managers prefer to use debt conservatively and they will only lever up after perceiving a threat to job security.

3.2.8 Market Timing Theory

Market timing theory as developed by Baker and Wurgler (2002) refers to the practice of issuing firms' shares instead of debt when market value is high relative to book value and past market value (at high share prices) and repurchasing equity when market value is low (at low share prices). It is assumed that timing the market will benefit ongoing shareholders at the expense of entering and existing shareholders. Therefore, it can be implied that managers are more concerned about ongoing shareholders. There is also no optimal capital structure because it depends on the market valuations by investors. There are two versions of market timing theory (Baker and Wurgler, 2002). The first version is based on the dynamic version of Myers and Majluf (1984) with rational managers and investors. Lucas and McDonald (1990) extend Myers and Majluf's (1984) theory by allowing a dynamic setting where managers with private information about the firm's value cannot issue debt and delay equity issues until their share price rises to or above its true value. This shows the influence of timing the market. Korajczyk et al. (1991) find that firms tend to announce equity after the information releases which are believed to reduce asymmetric information. Bayless and Chaplinsky (1996) argue that the window of opportunity in which capital can be raised at favourable terms results in observed periods of extreme equity issue as firms time their equity issues. Equity issues normally occur around the periods of smaller announcement effects. They show that in general the price reaction to equity issue announcements is less negative during the announcement periods. The second version of market timing theory involves irrational investors and mispricing. In this version, managers believe that investors are irrational; therefore, they are likely to issue equity when they believe that the shares are overvalued and repurchase equity or issue debt when shares are undervalued. Therefore, capital structure depends on the perception of mispricing.

In Baker and Wurgler (2002), market to book value ratio is a proxy for market valuation. Their main finding is that unlevered (levered) firms are those that raise funds when market valuations are high (low). They find persistent effects for at least a decade on capital structure because firms are likely to issue more equity than debt when their market valuations are high. They conclude that capital structure is the cumulative outcome of past attempts of managers to time the market. According to the survey by Graham and Harvey (2001), managers admit that they follow market timing theory. They find little evidence that executives are concerned about asymmetric information but find that two thirds of CFOs agree that the amount of undervalued or overvalued shares is important to consider in issuing equity. Equity market prices are also regarded as nearly the most important factors in issuing equity decisions. This survey gives support to market timing theory and it shows that managers believe that they can time the market.

According to Myers (2001), all capital structure theories give a general explanation of financing strategy and they are not designed to be general. Each of them can explain some observed capital structure patterns well but not others because they are conditional theories of capital structure. Therefore, sometimes it is possible that researchers can find statistically significant results that are consistent with more than one theory. However, it does not mean that one theory is better than another, because it depends on the circumstances.

3.3 Benefits and Costs of Debt and Equity

It is likely that firms do not follow any particular capital structure theories when they determine their capital structure because each theory has its flaws and they cannot be used to explain the observed patterns completely. Therefore, it is only fair to expect firms to follow a financing strategy that combines different capital structure theories together. What can be concluded from the theories in the previous section is that debt and equity have their costs and benefits. Different theories use debt and equity to mitigate different problems in their own ways. Therefore, this section summarizes costs and benefits of debt and equity based on capital structure theories presented in the previous section.

3.3.1 Benefits and Costs of Debt

Debt offers many advantages for firms if they retain debt at the appropriate level. Based on agency theory, debt can be used to mitigate the agency costs of equity because it forces managers to confront and to be monitored by the public as well as allowing investors to generate useful information for implementing efficient operating decisions including liquidation (Easterbrook, 1984; Harris and Raviv, 1990; Agrawal and Knoeber, 1996). Outstanding debt effectively limits management's ability to reduce firm value through perquisite consumption and to solve the overinvestment problem because it reduces the amount of free cash flow so that firms cannot invest when they should not (Jensen, 1986; Grossman and Hart, 1982; Stulz, 1990). Debt can reduce the risk of managers investing in unrelated diversification strategies which do not create value for the firm. Fama and Jensen (1983) argue that debt limits managers' ability to expropriate minority shareholders due to managers' reputation and career concerns. Debt can also be served as a device to discipline managers because the default allows creditors to force the firm into liquidation which will harm managers themselves. Managers have to be sure that the investments they make will earn at least enough return to cover interest payments. The costs of not doing so are bankruptcy and loss of their job.

Higher debt allows managers to hold a larger fraction of its common stock so it brings managers' interests closer to those of other shareholders. Debt can be an incentive for managers to work harder, make better investment decisions, restore investment efficiency, improve the firm-level operating performance and reduce overall investment expenses (Grossman and Hart, 1982; Brealey and Myers, 2000). Debt can be used to force managers to liquidate inefficient operations (Williamson, 1988; Harris and Raviv, 1990). According to tax-based model, debt has tax advantages so firms can use debt to reduce the negative valuation effects of operating in a high-tax environment (Modigliani and Miller, 1963; Graham, 2000). Firms are allowed to deduct interest expenses from taxable income when borrowing money; therefore, their taxes reduce. However, if they issue equity, they are not allowed to deduct payments to equity such as dividends from their taxable income. Therefore, the amount of tax benefit depends on the tax rate and the interest payment.

According to the signalling theory, the announcement of a new equity issue is usually bad news for investors who believe that it signals lower future profit or higher risk; therefore, in this case debt seems to be preferable. In the world of asymmetric information, the use of debt by profitable firms can keep the inferior firms out of the market even when the market is unable to distinguish firms of different quality. This can help to increase the average quality of firms remaining in the market (Ross, 1977; Narayanan, 1988). The elimination of inferior firms increases the overall average quality of firms remaining in the market. This benefits the remaining firms because if the market cannot distinguish firms, it will value all of them at the average value. In this case, debt can help to minimize the information advantages of the corporate managers. If investors are uncertain about the quality of managers and the efficiency of business strategy, debt can be used to generate information about these aspects (Harris and Raviv, 1990). Following managerial behaviour theory, managers might want to choose debt to credibly constrain their own future empire building. Entrenched managers have to trade off between their empire building ambitions and the need to ensure sufficient efficiency to prevent control challenges such as take-over through the threat of bankruptcy and the associated loss of managerial entrenchment (Zwiebel, 1996). Because of the threat of losing their job in the firm, debt prevents managers from adopting value-decreasing decisions (Jensen, 1986). In terms of claim, debt has a prior claim on assets and earnings while equity is the residual claim.

Although debt seems to offer firms a lot of advantages, excess debt can be dangerous. According to agency theory, debt can increase the incentive for stockholders to make risky investments that shift wealth from debtholders but do not maximise the firm's value (Jensen and Meckling, 1976). Debt can facilitate expropriation by giving the controlling shareholders more control over firms' resources. Firms with heavy debt may have to pass up their value-increasing projects because they cannot pay back their debt which leads to underinvestment problems. High levels of debt can also be interpreted as financial constraints as high-levered firms might be constrained from pursuing valuable investments. As a result, high debt can influence the allocation of investment within a firm. Debt can lead to costly financial distress if firms cannot effectively manage their debt levels. When the level of debt increases, the risk of bankruptcy increases and at a certain point it will be higher than the benefits of debt which will cause depreciation to the firm's value. The excessive use of debt may endanger the survival of firms because too high a level of debt increases the risk of financial distress especially in periods of economic downturn.

Transaction costs are another cost of debt. They can discourage the use of debt especially in financially distressed firms which restructure their debt out of court. Debt can be disadvantageous if present borrowing requires additional financing and the cost of it is uncertain. Based on the managerial behaviour theory, excess debt might be costly because it loses its ability to constrain managers from undertaking bad and risky projects which can be called the asset substitution problem (Zwiebel, 1996). Debt also reduces the freedom of decision making because firms have a commitment to pay interest at certain times.

3.3.2 Benefits and Costs of Equity

Although debt offers different kinds of advantages to firms, in some circumstances equity might be preferable. Equity financing plays an important role in reducing conflicts of interest between different stockholders in the firm. Equity financing might be able to mitigate the incentive problems caused by debt financing. Equity financing from stock markets can provide firms with liquidity and opportunities to diversify their portfolios (Demirguc-Kunt and Maksimovic, 1996). Another advantage of funding from stock markets over debt financing is that stock trading has an important informational role. Equity markets aggregate information about the firm's prospects which will be observed publicly by potential investors and creditors. Investors will prefer to issue equity because equity markets facilitate the monitoring of firms by making it less costly for investors to monitor firms.

Equity issues also come with some costs. The pecking order theory postulates that equity should be the financing source of last resort for several reasons. First, equity issues come with asymmetric information problems, floatation costs and transaction costs. So they are not the safest option to choose. Second, equity issues require additional disclosure of financial information. They can bring in unwanted monitoring and unwanted control dilutions to managers and existing shareholders. Third, mispricing problems are more severe with equity issues than debt issues. Equity can be interpreted as a signal to the market that the stocks are overvalued and it is expected that earnings might decline in the future; therefore, investors tend to discount share prices accordingly. Announcement of new equity issues or debt decreasing events always appear to signal bad news and can lead to a decline in share price. Signalling theory also suggests that debt issues can be perceived as firms being confident in repaying back their debt while equity issues signal the opposite.

Because debt and equity can have both positive and negative effects on the firm's value, managers need to keep these in mind when they determine their debt-equity choice. The trade off between the positive and negative effects of debt and equity may lead to an optimal capital structure.

3.4 Methodology, Hypotheses Development and Variable Identification

3.4.1 Firm-Specific Determinants

Previous studies such as Rajan and Zingales (1995) suggest that capital structure is cross-sectionally correlated with a number of factors. The analysis in this chapter is aimed to find out whether the relationships between leverage and factors, identified in previous studies, hold generally in the Asia Pacific region and across countries or not and whether the relationship holds in the same directions or not. Previous studies use different estimation techniques and find the results to be robust to the technique adopted.[31] Therefore, in this chapter the cross-sectional regressions are estimated firstly by using the ordinary least square (OLS) regressions and the results are reported with heteroscedasticity consistent standard errors. In order to assess the determinants of capital structure for the sample countries, individual firms' leverage ratios are modelled as a function of several firm-specific factors in a cross-sectional framework.

[31] Rajan and Zingales (1995) estimate their regressions using maximum likelihood, a censored Tobit model and OLS. They argue that their OLS results are very similar to the results using alternative techniques. Bevan and Danbolt (2002) perform both censored Tobit analysis and OLS estimation and also find that the results are extremely robust to the estimation technique adopted. Pandey (2001) applies pooled time-series and cross-sectional OLS, cross-sectional OLS, and fixed effects model and concludes that with some differences the results are generally robust to the estimation methods and the time periods.

The following relationship is estimated using OLS for each country[32]:

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^{N} \gamma_k FF_{k,i,t-a} + \varepsilon_{i,t} \tag{3.1}$$

where, i refers to the individual firms, $Y_{i,t}$ is firm's i leverage ratio at time t, measured at the accounting year-end; $FF_{k,i,t-a}$ is a vector of k firm i's specific factors, averaged over the previous a years to reflect the medium to long term nature of the decision. For the full sample period, the average of eight-year data of independent variables from 1993 to 2000 is used against dependent variables at 2001. The average of the data for each variable is used in order to smooth the independent variables to reduce the measurement error caused by random fluctuation or noise over the period in the variables and to account for slow adjustments.[33] Because there tends to be the potential for reverse causality between independent and dependent variables in cross-sectional analysis and normally the financing decisions made in this period is the carry over from the previous period decision, the independent variables are lagged one period in order to isolate the analysis from this causality and to provide a more robust test of the theory.[34]

In addition to the cross-sectional analysis, all firms in the sample countries over the sample period are pooled creating one unbalanced panel dataset for the purpose of pooled time-series and cross-sectional analysis. There are several advantages that make panel data analysis more suitable to this line of financial research than cross-sectional analysis.[35] First, the panel data set should be utilized in this study because it captures the dynamic of financing decisions of firms. The role, nature and strength of the factors that

[32] The empirical version of equation (3.1) controls for industry effects; however, no statistically significant effect was found.
[33] Bradley et al. (1984) use 20 year average; Bennett and Donelly (1993); Rajan and Zingales (1995) and Pandey (2001) use 4 year average; Chkir and Cosset (2001) use 5 year average; Titman and Wessels (1988), Hirota (1999), Bevan and Danbolt (2002) use 3 year average.
[34] The one period lagged independent variables are also adopted in Rajan and Zingales (1995), Pandey (2001) and Bevan and Danbolt (2002) among other papers.
[35] Hsiao (1986) and Baltagi (1995)

influence firms' financing decision change over time. Therefore, a cross-sectional analysis may not be sufficient in the dynamic analysis of the determinants of the financial structure. Second, multicollinearity is one of the major problems with the analysis that employ financial data because financial data are expected to be correlated to each other by nature. Due to a larger number of data points, panel data allow an increase in the degrees of freedom and reduce the collinearity among explanatory variables. Thus, the efficiency of econometric estimates is improved. Third, panel data allows the investigation of problems that cannot be addressed by either cross-section or time-series datasets because it exploits time-series variation in the observations. Fourth, panel data allows us to consider a firm-specific time-invariant effect. This technique enables us to eliminate the potential biases in the resulting estimates due to correlation between unobservable individual effects and the explanatory variables. Fifth, they allow us to control for individual heterogeneity that characterizes firms. The estimation results could be biased in time-series or cross-section studies because they do not control for heterogeneity. Finally, they provide a means of reducing the missing value problem. Therefore, individual firm's capital structure is modelled as a function of several firm-specific factors in a pooled cross-sectional and time-series framework. More specifically, the following relationship is estimated using OLS for each country[36]:

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^{N} \gamma_k FF_{k,i,t} + \alpha_t + \mu_{i,t} \qquad (3.2)$$

where, $Y_{i,t}$ is firm's i leverage ratio at time t, measured at the accounting year-end; $FF_{k,i,t}$ is a vector of k firm i's specific factors. α_t captures firm-invariant time-specific effects. α_t is the same for all firms at a given point in time but varies through time. α_t is needed to control for both observable and unobservable aggregate effects.

[36] All model specifications include year and industry dummies, but their coefficients are not reported.

Because each sample country was affected by the financial crisis to different degrees, the pooled time-series and cross-sectional analysis is further investigated by dividing the sample into two country groupings: (i) the countries least affected by the crisis, namely Singapore and Australia; and (ii) the countries most affected by the crisis, namely Thailand and Malaysia. This country grouping not only takes account of the severity of the effect from the crisis but also of market development in each country. The markets in the countries least affected by the crisis are more developed than the markets in countries most affected by the crisis.

As stated earlier, one of the main objectives of this chapter is to investigate the possible effect of the 1997 East Asian financial crisis on the determinants of capital structure. In order to achieve this, equation (3.1) is further estimated over two sub-samples in cross-sectional framework: (i) a pre-crisis period, where the dependent variable is the leverage ratio of 1996 and the explanatory variables are the average of the data over 1993 to 1995 and (ii) a post-crisis period, where the dependent variable is the leverage ratio of 2001 and the explanatory variables are the average of data over 1998 to 2000. Since this crisis started in mid 1997, the data of this year are excluded in the sub-sample analysis.[37] Similarly, in pooled time-series and cross-sectional framework, equation (3.2) is re-estimated over two sub-samples where the pre-crisis period covers 1993 to 1996 and the post-crisis period covers 1998 to 2001. Wald-statistics are estimated to examine whether there have been any significant changes in the role of the explanatory variables due to the financial crisis.

Previous papers have uncovered several firm-specific factors that can be correlated with firm leverage.[38] The consensus from previous papers is that firm leverage is positively correlated with tangibility, non-debt tax shields, investment opportunities and firm size while negatively correlated with volatility, advertising /

[37] Gul (1999) also excludes the period of crash in order to evaluate the impact of the crash.
[38] The main literature can be found in Harris and Raviv (1991) and Prasad et al. (2003).

research and development expenditure, the probability of bankruptcy and uniqueness of product (Harris and Raviv, 1990). The choice of factors and the hypothesis formulation are motivated by theoretical and empirical concerns. Therefore, the vector of firm-specific variables incorporates tangibility, profitability, firm size, growth opportunity, non-debt tax shields, liquidity, earnings volatility and share price performance.[39] Their expected relationships with firm leverage are presented as followed.

Leverage

Due to the availability of data and the consistency across sample countries, leverage (*LEV*), the main dependent variable, is measured as the ratio of total debt to total capital where total capital is the combination of total debt, market value of equity and book value of preference shares.[40] Several studies, including Rajan and Zingales (1995) and Bevan and Danbolt (2002), show that the determinants of capital structure are sensitive to the measure of leverage. Harris and Raviv (1991) argue that there are difficulties involved in measuring both leverage and the explanatory variables which one should be aware of when the results are interpreted. Bevan and Danbolt (2002) also confirm, by using more recent data than that of Rajan and Zingales (1995), that there is a high degree of definitional dependence in the determinants of leverage. In addition to different leverage measures, choice of value of debt or equity can play an important role for the determinants of capital structure. The value of equity and debt can be one of the factors that make the capital structure decision from one firm differ from another one. Levels of optimal leverage can vary depending on whether book or market value is used. Although there are different views on the use of book or market value of equity and debt, most studies tend to use both book and market value of equity and book value of debt for ease. In this chapter, leverage ratio based on market value of equity will be

[39] Other topics such as ownership structure, which has been found to have a direct relationship with capital structure, are not covered because data is not available for our sample countries and because it is the subject of a substantial literature in its own right.
[40] This measure is among one of leverage measures in Rajan and Zingales (1995).

used because it gives more theoretically consistent results in line with Wiwattanakantang (1999) and Suto (2003) among others.

Tangibility

Tangibility (*TANG*) is defined as the ratio of total fixed assets to total assets. The type of assets held in a firm plays a significant role in determining the firm's capital structure. Tangibility can be negatively related to leverage due to several considerations. Agency costs of equity increase for firms that have low levels of collaterizable assets (Grossman and Hart, 1982) because the monitoring costs of shareholders of firms with fewer collaterizable assets will be higher than the costs of firms that have more collaterizable assets. Therefore, a firm with limited tangible assets should have high debt to reduce the agency costs of equity because debt allows the firm to be more stringently monitored by creditors such as bondholders and financial intermediaries. High-tangible-asset firms tend to have high fixed operating costs which raise operating risk and probability of bankruptcy (Grossman and Hart, 1982; Pandey, 2001), so they should have low leverage. Gallego and Loayza (2000) also support a negative relationship and show that a rise in asset tangibility appears to shift the financial structure of the firm toward higher equity and lower debt in Chile. The pecking order theory also predicts negative influence of tangibility on firm leverage.

According to agency based theory, firms with high leverage tend to underinvest and thus transfer wealth away from debtholders to shareholders. If debt can be secured against assets, firms as borrowers are restricted to using the loan for specific projects and creditors have guarantees of repayment depending on the value of the assets.[41] Lenders may themselves demand security in terms of tangible assets from firms with high leverage.[42] Firms that are unable to provide collateral for loans with tangible assets will have to pay higher interest which is an incentive for those firms to issue equity

[41] Jensen and Meckling (1976); Myers (1977); Titman and Wessels (1988)
[42] Scott (1977); Williamson (1988); Harris and Raviv (1990)

instead of debt. Assets that serve as collateral provide a guarantee over debts and reduce the risk of investment from the banks. Therefore, tangible assets have a positive relationship with leverage because they can serve as collateral which leads to higher debt capacity and helps to reduce the risk of agency costs of debt of the lenders (such as risk shifting). However, the extent of the relationship between tangibility and firm leverage seems to depend on the relationship between firms and lenders as well. When firms have close relationships with lenders, they can provide less collateral relative to firms with more distant relationships because of the substitution between relationship and physical collaterals.

Myers (1977) argues that shareholders see firms' value from the future earnings from investment but debtholders cannot rely on these investments and tend to see firms' value in terms of tangible assets instead. The more tangible assets firms have, the more willing the lenders to lend to them. Myers and Majluf (1984) suggest that secured debt could be advantageous. Their model demonstrates that there might be costs associated with issuing securities when there is asymmetric information which can be avoided by issuing debt with the secured tangible assets. Michaelas et al. (1999) focus on small firms and provide evidence in support of a positive relationship. Since small firms tend to have higher agency and asymmetric information problems, they need high levels of tangible assets in order to provide collateral as security for bank loans. According to Antoniou et al. (2002), intangible assets are more difficult to monitor; therefore, lenders can require greater restrictions on firms with relatively more intangible assets.

Rajan and Zingales (1995) argue that the liquidation value of the firm's assets would be higher with tangible assets. This will decrease the probability of mispricing in the event of bankruptcy which makes lenders more willing to supply the loans. Eriksson and Hede (1999) argue that firms with tangible asset structures experience a lower business risk and therefore lower financial distress costs. Hirota (1999) also argues that the costs of financial distress depend on the types of assets firms hold. If firms have high levels of tangible assets, they tend to have smaller costs of financial distress than firms with intangible assets such as R&D or advertising expenses. This is because tangible assets have higher resale values than intangible assets and the value of intangible assets will disappear in financial distress. Therefore, firms with high tangible assets tend to have high levels of debt. It is likely that in the case of bankruptcy, intangible assets such as goodwill will rapidly disappear which diminishes the firm's net value and in the end will accelerate the probability of bankruptcy. Firms with high levels of tangible assets can borrow at lower interest rates (Scott, 1977; Williamson, 1988). These encourage those firms to use more debt. Therefore, a positive relationship between tangibility of assets and leverage is expected.

Profitability

Profitability (*PROF*) is defined as the ratio of earnings before interest, tax and depreciation to total assets. Although different capital structure theories predict different correlations between profitability and firm leverage, profitability is always found to play an important role in firms' financial structure decisions. The pecking order theory postulates that managers prefer to finance projects with internal rather than external funds because of the asymmetric information between managers and outside investors. Donaldson (1961) argues that as a result of transaction costs, firms will prefer to use internally generated funds from retained earnings first, then from debt and finally from issuing equity. Profitability can be expected to be negatively related to firm leverage because firms might prefer not to raise external equity in order to avoid the dilution of their ownership structure. This can be more obvious for firms with highly concentrated ownership structure, such as family businesses. In terms of bankruptcy costs, high profitability is associated with high risk; thus, profitability should be negatively related to leverage. Kjellman and Hansen (1995) and Myers (2001) argue that highly profitable firms are in less danger of bankruptcy and can have high level of debt without risking financial distress. Therefore, the relationship between firm leverage and profitability should be positive.

Due to tax deductibility benefit, firms with high profits should use more debt to obtain attractive tax shields because they have high incomes to shield and need greater tax shelters. But interest tax shields might not be important if the profitable firms have high levels of other tax shields such as depreciation. Jensen (1986) argues that the relationship can be positive if the market for corporate control is effective in forcing firms to commit to pay out cash by using more debt because managers cannot avoid the disciplinary role of debt and lenders should be more willing to lend to profitable firms. If the control is ineffective, opposite signs will be expected because firms will still avoid the disciplinary role of debt. The disciplinary role of debt can be explained using the free cash flow theory. The interests of managers are not always in alignment with the interests of security holders. Managers are likely to waste free cash flow, which is the excess of cash earnings over profitable investments, on perquisites and bad investments. Debt can help reduce the agency cost of free cash flow because it can ensure that managers are disciplined to make efficient decisions and do not pursue their own interests.

Ross (1977) argues from the signalling theory that if current profits are a good indication of future profits, firms should use debt as a signal to the market which predicts a positive relationship between profitability and leverage. Or, if there is asymmetric information, profitable firms may signal quality by raising debt. According to Heinkel (1982), high value firms issue more debt. In order to imitate high value firms, a lower value firm must issue more underpriced debt and reduce the amount of overpriced equity. Similarly, in order to imitate the low value firms, high value firms should issue less overpriced debt and more underpriced equity. The market should be reluctant to offer funding to those firms who are currently unprofitable (Prasad et al., 2003).

Because both negative and positive influences of profitability and firm leverage are supported by theoretical and empirical evidence, the controversy as to which capital structure theories firms follow still remains unresolved. Based on the results found by the majority of empirical studies, an inverse relationship between profitability and leverage is expected.

Firm Size

Firm size (*SIZE*) is measured by the natural log of total assets. Firm size is found to play an important part in firms' financial policies because there are economies of scale in issuing securities. Larger firms may have more access to financial markets. According to the pecking order theory, firm size should be negatively related to leverage if it is a proxy for information because there is less asymmetric information between insiders and the capital markets for large firms which leads to less incentive to raise debt. Large firms should have more capacity for issuing informationally sensitive securities such as equity and therefore should have low levels of debt. Titman and Wessels (1988) suggest that the cost of issuing equity and debt is related to firm size. Costs of issuing equity are greater for smaller firms. Marsh (1982) also argues that small firms, due to their limited access to the equity capital market, tend to rely heavily on bank loans; therefore, they become more levered than larger firms. Titman and Wessels (1988) and Ooi (1999) also argue that accessibility to the equity market and economies of scales with respect to issuing costs can influence the firm's debt equity choice.

According to the trade-off theory, in terms of financial distress, firm size should be positively related to debt. Bankruptcy codes play an important role in determining the choice of capital structure because lower expected bankruptcy costs enable firms to take up more debt. Warner (1977) and Ang et al. (1982) show that bankruptcy costs are found to be relatively smaller for larger firms than for smaller firms. There are economies of scale associated with bankruptcy. Firm size is expected to be negatively related to expected bankruptcy costs and risk. Thus, the expected relationship between firm size and leverage is positive. Previous studies also show that larger firms tend to be more diversified so they have lower financial distress costs because the diversified activities can reduce the risk of bankruptcy.[43] Large firms normally fail less and are less likely to be liquidated because large firms' bankruptcy could have a destabilizing effect on the whole economic system and could be socially unacceptable (Colombo, 2001). Smaller firms tend to have lower leverage because smaller firms are more likely to be liquidated when they are in financial distress.

Colombo (2001) also suggests that firm size is related to political measures in determining the level of capital structure. As big firms are politically protected by concern about their employment level, they can have higher levels of debt with lower bankruptcy costs than smaller firms. Based on agency theory, the conflicts between shareholders and debtholders (agency costs of debt) may be severe for smaller firms (Michaelas et al., 1999; Smith and Warner, 1979). Debt capacity tends to be higher and the monitoring costs should be smaller for large firms because they tend to provide more information to lenders. In addition, smaller firms are expected to be less profitable; therefore, they tend to have less taxable income and less need for tax shields. Smaller firms tend to face lower marginal tax rates and expect to have lower profit than larger firms; therefore, they need less interest deductible tax shields and should use less debt. In addition, cash flow of large firms is less volatile which increases the probability that the firm can use tax shields from interest payment (Hovakimian et al., 2001).

[43] Rajan and Zingales (1995); Agrawal and Knoeber (1996); Gul (1999); Ozkan (2001)

Furthermore, small firms tend to earn higher risk-adjusted returns meaning they have higher systematic risk; therefore, they should have less debt.

Other empirical studies (Wiwattanakantang, 1999; Graham, 2000) also show that large firms have less restrictions and greater opportunities for accessing credit markets such as non-bank debt financing due to higher credit rating and pay lower interest rates as well as having lower informational costs. The easier accessibility to capital markets for larger firms provides greater flexibility to large firms to raise funds on short notice compared with smaller firms. Antoniou et al. (2002) argue that larger firms have lower information asymmetry; therefore, they tend to have easier access to debt markets and to be able to borrow at lower cost. Besides, small firms tend to use more equity than debt because they do not enter into contracts that are publicly visible and some small firms do not have audited financial statements so they cannot convey their quality to outsiders by raising debt (Berger and Udell, 1998). However, Barclay et al. (1995) show that the relationship between firm size and firm leverage is sensitive to the chosen method of estimation. Because the previous evidence appears stronger in support of the argument postulated by the trade-off theory, firm size is expected to have a positive effect on leverage.

Growth Opportunity

Growth opportunity (*GROW*) is measured by market to book ratio which is the book value of total assets less the book value of equity plus the market value of equity divided by the book value of total assets. This proxy is normally used as the proxy for growth or investment opportunity because the market to book ratio measures the expectation from the market on the value of growth and investment opportunity of firms. Barclay and Smith (1999) find that market to book ratios produce similar results to those obtained with other proxies for growth opportunities. If the market believes that there is a high possibility of the firm achieving a positive net present value, the market will value the firm higher which leads to an increase in market to book ratio. In theory, the relationship between leverage and growth opportunity is expected to be negative. Due to asymmetric information, firms with high growth opportunity should have less debt to reduce underinvestment problems because highly levered firms are more likely to pass up profitable investment opportunities.[44] According to financial distress cost, firms might not want to commit themselves to debt because growth opportunities, which are largely intangible, cannot provide revenue immediately. Growth opportunities as intangible assets provide limited collateral or liquidation value to the firm leading to higher financial distress costs. Intangible assets are likely to be lost if financial distress takes place. Firms with high growth or high market to book values tend to have higher costs of financial distress which can force firms to reduce the level of debt (Rajan and Zingales, 1995; Hirota, 1999).

Based on agency costs, empirical studies show that firms with high growth opportunities tend to have higher agency costs of debt because they have more flexibility in their choice of investments creating an incentive to invest suboptimally or they may accept risky projects which will expropriate wealth from bondholders to shareholders (Myers, 1977). Because agency costs of debt are high, firms with high growth opportunities will be reluctant to issue debt. It is also possible that the relationship between market-to-book ratio and firm leverage can come from perceived mispricing. Market timing theory predicts that firms attempt to time the market by issuing equity when their share price is perceived to be high.[45] For example, firms tend to issue equity only when their share prices are high relative to book value (Korajczk et al.,1991; Rajan and Zingales, 1995). High growth firms should have less debt. The free cash flow theory also predicts a negative relationship. Because firms with high

[44] Jensen and Meckling (1976); Myers (1977); Stulz (1990)

[45] If the negative relationship between market-to-book ratio and firm leverage is caused by the attempt of firms to time the market, the relationship should be found to be temporary only because firms will change to lever up instead once book value is higher relative to market value.

investments relative to earnings have less need to use debt to discipline managers from using the excess earnings for their own interest, they can have low leverage.

The relationship between growth opportunities and firm leverage also depends on the relationship between firms and lenders (Antoniou et al. 2002). The closer relationship between lenders and firms indicates less information asymmetry which can lead to higher debt capacity. However, if firms do not have close relationships with lenders, lenders are not likely to be fully informed about the quality and possibility of positive net present value investment. Therefore, lenders can require higher risk premiums which will convince firms to use less debt. As a consequence, a negative relationship between growth opportunity and firm leverage should be stronger in firms with arms-length relationships with their lenders than in firms with closer relationships. Firms with historically high growth may not require external funds because they have enough internal funds for the new projects.

However, a positive relationship between firm leverage and growth opportunity is possible. Miguel and Pindado (2001) argue that firms with high growth opportunities might have higher debt capacity because growth opportunity can guarantee to lenders that they will fulfil their financial obligations. Moreover, if investment exceeds retained earnings, a positive relationship between growth opportunities and leverage is expected based on the pecking order theory. Thies and Klock (1992) and Michaelas et al. (1999) argue that fast growing firms are likely to have insufficient internally generated funds to finance all of their growth opportunities. However, they are reluctant to issue equity due to asymmetric information problems and high floatation costs; therefore, high growth firms tend to issue more debt.

In sum, the influence of growth opportunity on firm leverage is mixed. This suggests that the overall direction is still not established. The conflicting relationship might be due to the fact that the measure for growth opportunity picks up the positive relationship between firm leverage and tangibility instead (Prasad et al., 2003). The reason tangibility and growth opportunity has an indirect relationship in this way is that firms borrow against fixed assets when they are required to meet an increase in sales that can help increase growth. However, if tangibility is controlled, the relationship between growth opportunity and debt should be clearer. Because the evidence for a negative relationship is stronger in the literature, an inverse relationship between growth opportunity and leverage is expected.

Non-Debt Tax Shield

Non-debt tax shield (*NDTS*) is defined as the ratio of depreciation to total assets. Firms can use NDTS such as depreciation, investment tax credit and tax credit for pension funds to reduce corporate tax payments (DeAngelo and Masulis, 1980). Therefore, firms that have higher NDTS are likely to use less debt because NDTS can be the substitute for debt. The greater the level of NDTS, the lower the tax benefit of additional debt. Most empirical studies also show support to the negative relationship between NDTS and debt. Miguel and Pindado (2001) show that NDTS has a higher explanatory power for Spanish firms than US firms due to the fact that Spanish firms have more NDTS than US firms. MacKie-Mason (1990) argues that the substitute effect between NDTS and interest deductibility might not be the same for every firm. For example, firms with high profitability with high taxable income can have high NDTS and high levels of debt at the same time. Firms that face tax exhaustion are likely to issue less debt because the associated interest deduction is cancelled out by NDTS. Therefore, the negative relationship between NDTS and leverage should be stronger for firms with the experience of tax exhaustion.

A positive relationship between NDTS and leverage is possible because firms can borrow at low interest rates if their debts can be secured with tangible assets and firms may have higher debt capacity if they have high levels of tangible assets. Scott (1977) suggests that firms with substantial NDTS invariably have considerable collateral assets which can be used to secure debt; therefore, firms can borrow at lower interest rates. Bradley et al. (1984) suggest that firms with high levels of tangible assets can generate high levels of depreciation and tax credits and tend to have higher levels of debt. NDTS is the instrumental variable for the securability of the firm's assets. That means more securable assets come with high NDTS and lead to higher levels of debt. On the other hand, some empirical work, such as Titman and Wessels (1988), shows that NDTS has no relationship with leverage. The correlation between NDTS and firm leverage seems to be mixed because both negative and positive influence of non-debt tax shields can be predicted depending on the theories. Prasad et al. (2003) add that the estimated relationship between NDTS and firm leverage varies depending upon the way in which the tax shield is measured. Although a mixed relationship has been found between NDTS and debt, most previous empirical studies show support for a negative relationship. Therefore, when tangibility is controlled, a negative relationship between NDTS and leverage is expected.

Liquidity

Liquidity (*LIQ*) is defined as the ratio of current assets to current liabilities. A negative relationship is expected because firms can use liquid assets to finance their investment giving support to the pecking order theory. Liquid assets can be the evidence of agency costs of debt due to the fact that these assets can be manipulated by shareholders at the expense of debtholders (Prowse, 1990; Ozkan, 2001). On the other hand, positive relationships between liquidity and leverage can be possible. Liquidity can increase firm value in liquidation leading to an increase in debt capacity (Shleifer and Vishny, 1992). Firms with high liquidity ratios might be able to support high debt ratios because of greater ability to meet short-term obligations when they are due.

Liquidity is expected to be negatively related to debt because the explanations that support negative relationships are stronger.

Earnings Volatility

Earnings volatility (*VOL*) is defined as the absolute difference between the annual percentage change in earnings before interest and taxes and the average of this change over the sample period. According to trade-off theory, higher earnings volatility or risk increases the probability of financial distress because firms with high earnings volatility might not be able to meet their debt commitments leading to lower debt capacity. Lenders always count on firm's future earnings as the means of protection. If firms have high risk and earnings are volatile, debt capacity might decrease. Bradley et al. (1984) find that the relationship depends on the costs of bankruptcy. Their results show that the relationship would be monotonically negative when bankruptcy costs are high and will be U-shaped when bankruptcy costs are low.

Antoniou et al. (2002) suggest that correlations between earnings volatility and firm leverage might vary depending on the relationship between firms and lenders. The close relationship between lenders and firms can reduce the possibility of firms failing to meet the commitment from debt. Therefore, firms with close relationships with lenders are expected to show less concerned on earnings volatility while firms with arms-length relationships with lenders should be more concerned about earnings volatility because the cost of failing to meet the debt commitment is higher. According to Fama and French (2002), the complex version of the pecking order theory also predicts a negative relationship between earnings volatility and debt. Firms try to balance current and future financing costs. Therefore, in order to lower the chance of issuing new risky securities or forgoing profitable investments when net cash flows are low, firms with more volatile cash flows are likely to have less leverage.

On the other hand, agency theory predicts a positive relationship between earnings volatility and leverage. Higher earnings volatility may encourage the use of debt because large gains accrue to shareholders first whereas large losses are shared by both shareholders and debtholders (Boyle and Eckhold, 1997). Although the theories predict both positive and negative relationships between earnings volatility and debt, earlier studies find negative relationships. Therefore, an inverse relationship between earnings volatility and leverage is expected.

Share Price Performance

Share price performance (*SPP*) is defined as the first difference of the logs of annual share prices, matched to the month of firms' fiscal year-end. Share price performance can also be related to financing decisions. Past history of share prices and market conditions have been shown to have an impact on firm's capital structure (Marsh, 1982). When there is information asymmetry between managers and outside investors, investors will require discount with equity issues. Firms will issue equity only when the cost of discount is less than the benefit of issuing equity. However, if equity is issued right after an increase in share price when share prices are overvalued, the discount cost will be very little for existing shareholders. Therefore, this leads firms to prefer equity to debt when share prices increase. This is supported by the market timing theory. Therefore, share price performance is expected to be inversely related to leverage.

3.4.2 Country-Specific Determinants

In addition to firm-specific variables, country-specific factors have not been much considered to have any significant relationship with firms' capital structure with the exception of work by Demirguc-Kunt and Maksimovic (1999) and Antoniou et al. (2002). Because firms in the sample countries are operating under different economic conditions, legal and corporate governance environments as presented in Chapter 2, it is likely that those differences may affect firms' financing decisions. In order to test the effect of country-specific determinants, equation (3.2) is augmented by including country dummies where equal to 1 for Thailand (*THDUM*), Malaysia (*MLDUM*) and Singapore (*SPDUM*) respectively, and 0 otherwise. These country dummies are intended to capture differences in leverage that are not detected by other variables between the sample countries. These country dummies are then replaced by country-specific variables one at a time to avoid potential multicollinearity problems due to high correlations between these variables. The inclusion of country-specific variables also helps to control for fluctuations in the market.

The country-specific explanatory variables used in this chapter are classified into two groups: (i) market-wide determinants, which include economic development, bank development, stock market development, inflation, level of interest rates, term structure of interest rates, and equity premiums; and (ii) legal and corporate governance determinants, which include quality of legal enforcement, legal protection, ownership concentration and information intermediary activity. As suggested by Demirguc-Kunt and Maksimovic (1999), significant changes in the legal system of countries from year to year are quite rare. The indicators of the institutional environment such as creditor rights and shareholder rights also do not vary over time. Therefore, the indicator calculated or collected by previous studies should be suitable to incorporate in the model.[46] In addition, as in the analysis of firm-specific determinants, the sample countries are divided into two country groupings: (i) the countries least affected by the crisis and (ii) those most affected by the crisis. Moreover, like the investigation of firm-specific determinants, the sample period is divided into (i) a pre-crisis period covering the period of 1993 to 1996 and (ii) a post-crisis period covering the period of 1998 to 2001. Due to the nature of the data, country groupings and sub-sample periods will be applied only for market-wide determinants.

Economic Development

Firms in developed countries such as Singapore and Australia where their stock markets are matured should have higher levels of equity. In order to be certain that this is the case, a developing economy dummy variable is included. It takes a value of 1 if the country is classified as a developing economy according to the World Bank classification based on countries' gross national income levels and 0 otherwise (*EDEV*). The inclusion of this dummy variable might help to pick up an element of financial development that is not captured by other country-specific variables. Therefore, a positive relationship between economic development dummy and leverage is expected.

Bank Development

Financial intermediaries or banking sectors directly influence the financial structure of firms as they are the main sources for firms' financing. The prime function of such intermediaries is to monitor firms. They have greater incentives to use collected information to discipline borrowers than other smaller investors due to the free-rider problem. When the banking system is developed, firms are more likely to have higher

[46] It should be noted that the legal and corporate governance factors are not time-varying. They are indicators calculated or collected by previous empirical studies and other organizations as averages of particular periods in those studies. Therefore, we might not be able to detect some of the time-varying effects due to this limitation. It should also be noted that these factors may be affected by the effect of the crisis. Due to data unavailability, no time-varying data can be applied; therefore, cautions must be made when interpreting the results.

debt capacity; therefore, the relationship between bank development and leverage is expected to be positive. Bank development (*BKDEV*) is measured by the ratio of bank assets to GDP.

Stock Market Development

As in Demirguc-Kunt and Maksimovic (1999), stock market development (*MKDEV*) is measured by the ratio of market capitalization to GDP. If the stock market is active or fully developed, firms are more likely to raise their capitals through equity markets. Therefore, stock market development is expected to be inversely related to leverage.

Inflation

Inflation (*INF*) is measured as changes in the consumer price index. In practice, inflation seems to affect firms' capital structure significantly. According to Graham and Harvey (2001), one-third of the CFOs of US manufacturing firms take into consideration factors such as inflation when they make financing decisions. Moreover, because debt contracts are normally written in nominal terms, the rate of inflation might affect the risk level of debt financing in real terms (Demirguc-Kunt and Maksimovic, 1996). Prasad et al. (2003) argue that inflation reduces the real cost of employing debt via the erosion of the repayment of the principal. However, several studies argue in favour of a negative relationship because high and volatile inflation rates may prevent borrowing. Boyd et al. (2001) argue that as inflation increases, the financial sector will make fewer loans. In economies with high inflation, lenders will lend less and allocate capital less effectively. Therefore, there is less money available to borrow which implies a negative relationship between inflation and leverage. Booth et al. (2001) suggest that the negative correlation implies that firms borrow against real but not inflationary growth prospects. Beck et al. (2002) find that as inflation increases, it is less likely that firms will obtain external financing and the proportion of investment financed by external funding declines. Firms in high inflation countries are less likely to access bank loans and tend to use a smaller proportion of loans in their financing mix. On the other hand, firms in high inflation areas will be more likely to issue equity because equity provides better protection for investors. Therefore, a negative relationship between inflation and debt is expected.

The Level of Interest Rates

The level of interest rate (*INT*) is defined as the lending rate, the maximum rate charged by commercial banks as recorded by the IMF International Financial Statistics and reported by Datastream, matched to the month of firms' fiscal year-end. Nejadmalayeri (2002) indicates that in an efficient and integrated market setting such as in Modigliani and Miller (1958), macroeconomic factors such as the fluctuation of interest rates can affect equally both value of debt and equity. Therefore, there is no benefit in trying to reach an optimal capital structure. Merton (1974) suggests that in the presence of frictions such as taxes and bankruptcy costs, changes in interest rates could affect capital structure. Managers have incentives to try to change the mix between debt and equity according to the movement in interest rate. Interest rate movements influence costs of debt and equity differently therefore affecting an optimal capital structure. The interest rate issue is interesting because despite numerous theoretical indications on the pertinence of interest rates in financing decisions, there is still no or little direct evidence as to whether interest rate in fact influences capital structure decisions or not.[47]

[47] Nejadmalayeri (2002) points out that the relationship between interest rate and firm leverage varies depending on whether one uses actual measures of interest rates, their transformation, such as the real T-bill yield, real term spread, yield curve volatility and inflation or their principle components. Nejadmalayeri (2002) finds that as the real Treasury Bill yield rises, the value of future interest deductions and the inverse likelihood of defaults increase, leading firms to find external debt financing. On the other hand, when the real Treasury bond yield rises, the value of future interest deductions and the inverse likelihood of default decrease, making external debt financing less likely.

When interest rates become more volatile, firms tend to issue less debt because higher interest rate volatility erodes the value of interest tax shields. In practice, interest rates seem to have some significant influences on firms' capital structure. One-third of CFOs of US manufacturing firms take into consideration factors, such as interest rates, when they make financing decisions (Graham and Harvey, 2001). Thies and Klock (1992) suggest that interest rate could be related to debt. Interest rate can be used as a proxy for long-term expected inflation which implies that firms will shift from equity to debt when interest rate increases. When interest rate includes a premium for expected inflation, the repayment of principal is a tax-deductible interest expense. Ooi (1999) suggests the opposite relationship. Firms are more likely to use debt when the costs of borrowing are low. Therefore, if interest rates increase, the costs of borrowing increase and, as a result, firms tend to use less debt. Because in reality firms should be more concerned with costs of borrowing, a negative relationship is expected.

Term Structure of Interest Rates

Term structure of interest rates (*TERM*) is defined as the month-end yield on long-term (10 years or more) government bonds, minus the short-term lending interest rate matched to the month of firm's fiscal year-end. Normally when firms determine their capital structure, they tend to be more concerned with the costs of getting the fund which arise mainly from interest expenses. High interest rates increase the cost of borrowing, so firms will prefer equity to debt if interest rates are high. Term structure of interest rates plays a significant role for capital structure when firms raise debt capital by issuing bonds where interest rate is in a long-term maturity (Antoniou et al., 2002). Therefore, a negative relationship is expected between term structure of interest rates and firm leverage.

Equity Premium

Equity premium (*EQPR*) is measured by the cost of equity relative to the return on risk free investment matched to the month of firms' fiscal year-end. There is little evidence on how the equity premium correlates to firm leverage. Antoniou et al. (2002) were among the first to investigate the relationship between equity premium and firm leverage. In theory, equity premium should be directly related to debt because equity premium measures the cost of equity compared with risk-free rate. There are two themes relating to the equity premium (Antoniou et al., 2002): (i) high equity premium means high cost of equity; therefore, firms will prefer debt to equity if they need external finance; and (ii) in line with the market timing theory, firms tend to issue equity when share price is high or overvalued. If equity premium is high due to overvaluation of the stocks from the market, firms will prefer equity to debt implying a negative relationship. Therefore, the relationship varies depending on the source of change in equity premium leading to two hypotheses for the relationship between equity premium and debt: (i) equity premium is positively related to debt if equity premium represents the cost of equity and (ii) equity premium is negatively related to debt if equity premium is high due to the overvaluation of the stocks from the market.

Quality of Legal Enforcement

The quality of legal enforcement is determined by the efficiency and integrity of the legal system. It has been suggested that when the legal system has less integrity, debt would be used more than equity because the structure of debt limits the potential of expropriation of creditor rights (Fan et al. 2004). Efficiency of the legal system / integrity can be proxied by level of corruption which is inversely related to integrity. The proxy for integrity is the corruption index (*CORR*), prepared by Transparency International, which is an index ranging from 0 to 10.

Legal Protection

There are two types of legal protection; creditor rights (*CRR*) and shareholder rights (*SHR*) calculated from La Porta et al. (1998). Better creditor rights encourage the development of markets for loan capital leading to the prediction of a positive relationship between creditor rights and leverage for countries with high scores of creditor rights. When shareholders are protected, the ability of firms to raise capital through equity markets increases. Therefore, in countries where the shareholder rights score is high, a high level of equity issues is expected leading to a prediction of a negative relationship between shareholder rights and leverage.

Ownership Concentration

Ownership by the three largest shareholders of the ten largest non-financial domestic firms from La Porta et al. (1998) is used as a proxy for ownership concentration (*OWN*). When ownership structure is highly concentrated, managers-owners are more concerned about control dilution. Therefore, they hesitate to raise capital by issuing equity leading to the prediction of a positive relationship between ownership concentration and leverage.

Information Intermediary Activity (Auditors and Analysts)

As in Fan et al. (2004), big-5 auditors' market share (*AUD*) and the average number of equity analysts following a firm (*ANA*) are used as measures of the level of information intermediary activity. The existence of asymmetric information is likely to move capital structure toward more debt. Because capital structure is likely to be determined by corporate information, the institutions that collect and disseminate information play a significant role in determining debt and equity mix. Auditors play an important role in enhancing the credibility of public information by certifying the firm's accounts and mitigating the importance of private information.

Fan and Wang (2002) argue that the credibility of accounting information in emerging markets is due to the agency problems and the protection of information. There is evidence showing that the level of use of high quality external auditors is high for firms with more severe agency problems supporting the important role of auditors. Choi and Wong (2002) present evidence that reputable auditors are more likely to be employed by larger firms especially in weak legal enforcement countries supporting the crucial role of auditors. Firms in countries with stronger legal enforcement have higher Big-5 auditors' market shares than countries with weak legal enforcement. This confirms that auditor role contains important information about country's legal enforcement. Fan et al. (2004) suggest that markets that are characterized by a strong audit function should have lower debt than markets with a weaker audit role leading to a negative relationship between the role of auditors and equity analysts and leverage.

The definitions of the indicators of the above firm-specific and country-specific variables are shown in Table 3.1. The summary of theories and expected relations between firm leverage and firm-specific and country-specific determinants are shown in Table 3.2.

Table 3.1 : Indicators of variables

Panel A : Leverage and Firm-Specific Determinants

Determinants		Indicators	Source
Leverage	LEV	Debt to total capital = Total debt / (Total debt+MV of equity + BV of preference share)	Datastream
Tangibility	TANG	Total fixed assets / Total assets	Datastream
Profitability	PROF	Earnings before interest, tax and depreciation / Total assets	Datastream
Firm Size	SIZE	Natural Logarithm of assets	Datastream
Growth Opportunity	GROW	Market-to-book ratio = (Total assets – Book value of equity + Market value of equity) /	Datastream
Non-Debt Tax Shield	NDTS	Depreciation / Total assets	Datastream
Liquidity	LIQ	Current assets/ Current liabilities	Datastream
Earnings Volatility	VOL	Absolute value of $\frac{[(EBIT_t - EBIT_{t-1})]}{EBIT_{t-1}}$ - average of $\frac{[(EBIT_t - EBIT_{t-1})]}{EBIT_{t-1}}$	Datastream
Share Price Performance	SPP	The first difference of the logs of annual share prices (matched to the month of firms' fiscal year end)	Datastream

Panel B : Market-Wide Determinants

Determinants		Indicators	Source
Economic Development	EDEV	Dummy equal to 1 for developing economy and 0 otherwise	Datastream
Bank Development	BKDEV	Monthly Bank assets / GDP (matched to the month of firms' fiscal year end)	Datastream
Stock Market Development	MKDEV	Monthly Market capitalization / GDP (matched to the month of firms' fiscal year end)	Datastream
Inflation	INF	Changes in monthly consumer price index (matched to the month of firms' fiscal year end)	Datastream
Level of Interest Rate	INT	Monthly lending rate (matched to the month of firms' fiscal year end)	Datastream
Term Structure of Interest Rates	TERM	Government Bond Yield (long-term) – Monthly lending Rate (matched to the month of firms' fiscal year end)	Datastream
Equity Premium	EQPR	Monthly market return – Risk free rate* (matched to the month of firms' fiscal year end)	Datastream

Panel C : Legal and Corporate Governance Determinants

Determinants		Thailand	Malaysia	Singapore	Australia	Definition	Source
Level of Corruption	CORR	6.95	4.9	0.87	1.45	See Table 2.4	Fan et al. (2004)
Creditor Rights	CRR	3	4	4	1	See Table 2.5	La Porta et al. (1998)
Shareholder Rights	SHR	2	4	4	4	See Table 2.5	La Porta et al. (1998)
Ownership Concentration	OWN	0.47	0.54	0.49	0.28	See Table 2.8	La Porta et al. (1998)
Information Intermediary Activity	AUD	0.58	0.66	0.99	0.89	See Table 2.7	Fan et al. (2004)
	ANA	13.34	23.55	22.05	13.61	See Table 2.7	Fan et al. (2004)

* Thailand : Risk free rate = repurchase rate (1 month)
Australia : Risk free rate = government bond yield (short term)

Table 3.2 : Expected relation between firm leverage and firm-specific and country-specific determinants

Panel A : Firm-Specific Determinants

Variables	Positive	Negative	Mostly found / Expected Relation
Tangibility	Agency theory : Agency cost of debt Trade-off theory : Financial distress / Business risk Collateral / Liquidity and resale value / Asymmetric information / Interest rate	Agency theory : Agency cost of equity Trade-off theory : Non-debt tax shield Pecking order theory Fixed costs	Positive
Profitability	Trade-off theory : Tax Free cash flow theory Signalling theory	Pecking order theory Trade-off theory : Bankruptcy costs Dilution of ownership structure	Negative
Firm Size	Trade-off theory : Bankruptcy costs / Tax Agency theory : Agency cost of debt Restrictions to the market / Access to the market	Pecking order theory Information asymmetry / Access to the market / Economies of scales	Positive
Growth Opportunity	Trade-off theory : Target capital structure Signalling theory Pecking order theory	Agency theory : Agency cost of debt Trade-off theory : Financial distress / Tax Pecking order theory (as proxy for profitability) Market timing theory Free cash flow theory Asymmetric information	Negative
Non-Debt Tax Shield	Collateral / Tangibility	Trade-off theory : Tax	Negative
Liquidity	Ability to meet short-term obligation	Agency theory : Agency cost of debt Pecking order theory Financing source / Liquidation value	Negative
Earnings Volatility	Agency theory	Trade-off theory : Financial distress Pecking order theory	Negative
Share Price Performance	-	Market timing theory	Negative

Panel B : Market-Wide Determinants

Variables	Positive	Negative	Mostly found / Expected Relation
Economic Development	Maturity of the market	-	Positive
Bank Development	Development of banking system	-	Positive
Stock Market Development	-	Development of stock markets	Negative
Inflation	Real cost of debt	Fewer loans	Positive
Level of Interest Rate	Trade-off theory : Tax (related to inflation)	Cost of borrowing	Negative
Term Structure of Interest Rates	-	Cost of borrowing	Negative
Equity Premium	Market timing theory : Mispricing	Cost of equity	Negative / Positive

Panel C : Legal and Corporate Governance Determinants

Variables	Positive	Negative	Mostly found / Expected Relation
Level of Corruption	Agency theory	-	Positive
Creditor Rights	Debt capacity	-	Positive
Shareholder Rights	-	Equity capacity	Negative
Ownership Concentration	Agency theory : Control dilution	-	Positive
Information Intermediary Activity	-	Level of asymmetric information	Negative

3.5 Data, Descriptive Statistics and Correlation Analysis

3.5.1 Data

The annual corporate data used for the empirical analysis in this chapter were obtained mainly from Datastream with some exceptions for variables for Australia and Thailand for which specific crucial data are not available from DataStream. For Thailand, risk-free rate data was requested from the Bank of Thailand. For Australia, total bank assets and market capitalization were obtained from Reserve Bank of Australia. Datastream contains balance sheet and profit and loss statement information. Balance sheet data are interesting because, as Krugman (1999) argues, deteriorating balance sheets can play a crucial role during and after a financial crisis.

The main sample criterion was to exclude financial firms such as banks and insurance firms from the sample because their financial characteristics and use of leverage are substantially different from non-financial firms. Financial firms are heavily regulated and have special capital structure.[48] Their leverage can be influenced by other factors such as deposit insurance and cannot be compared with that of non-financial firms. Moreover, some regulations, such as minimum capital requirements, may affect the capital structures of financial firms. In order to mitigate survivor bias, firms are included in the analysis even if data is not available for every year.

The data was obtained from 1993 to 2001. For Thailand, the total sample is 294 firms listed on the Stock Exchange of Thailand (SET) resulting initially in 2,646 observations. For Malaysia, the total sample is 669 firms listed on the Kuala Lumpur Stock Exchange giving 6,021 observations initially. For Singapore, the total sample is 345 firms listed on the Stock Exchange of Singapore resulting initially in 3,105 observations. For Australia, the total sample is 219 firms listed on the Australia Stock Exchange (ASX) resulting in 1,971 observations initially. However, not all of these

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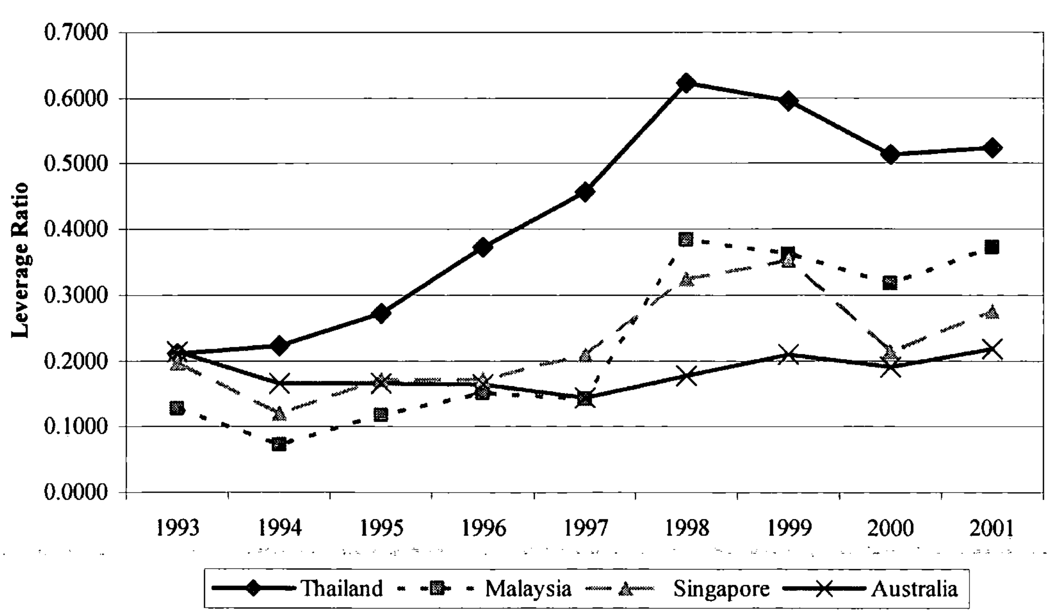
[48] Rajan and Zingales (1995); Berger et al. (1997); Fan and So (2000); Pandey (2001); Hovakimian et al. (2001)

could be used, due to missing data and outliers resulting from data errors and extreme values. Moreover, it should be noted that the sample size varies from year to year and from measure to measure due to the availability of data and existence of the company in that year.

3.5.2 Descriptive Statistics and Correlation Analysis

Figure 3.1 presents the annual average leverage ratio of the sample countries over the period of 1993 to 2001. It shows that the extent to which firms are levered is not similar across Asia Pacific countries where Thai firms are heavily levered while Australian firms had the lowest leverage ratios. It can be assumed at this point that maybe the cost of borrowing in Australia is quite high relative to the cost of borrowing in other countries. In addition, this implies that debt has been an important financing source for Thai firms. This is consistent with Singh and Hamid (1992) and Singh (1995) who find that Thailand usually had high debt ratios.

Figure 3.1
Average leverage ratios (Total debt / Total capital)



The differences in levels of leverage ratios across sample countries can be explained by the differences in corporate governance in each country. Shareholder rights encourage the development of equity markets. Legal protection of shareholders is highest in Australia and lowest in Thailand. On the other hand, because creditor rights encourage the development of lending, firms in countries with strong creditor protection should have higher levels of debt relative to firms in weak creditor protection countries. Thailand, Malaysia and Singapore are classified as having high creditor rights while Australia scores the lowest. Therefore, Australian firms have the lowest level of debt while Thai firms have the highest compared to firms in other sample countries. In addition, one of the reasons that Thailand has the highest level of debt is because Thailand's laws are mixed between civil and common laws. This is consistent to what is found by Beck et al. (2002) that firms in civil law countries substitute less efficient forms of external finance for bank loans.

In addition, when compared shareholder and creditor rights (as shown in Table 2.5), shareholders and creditors are protected equally by laws in Malaysia and in Singapore. On the other hand, creditors are more protected than shareholders in Thailand while shareholders are more protected than creditors in Australia. Because creditors are less protected in Australia, Australian firms would find it easier to get funding from stock market (equity issues). Creditors in Australia would hesitate to lend to firms because their protection is low and there is no guarantee that they will get their money back at the end of the contract. Also consistent to tax treatment, firms in countries that adopt dividend imputation tax system (such as Australia) is found to have lower level of leverage giving support to Fan et al. (2004).

Figure 3.1 also shows that the average leverage ratios in Thailand and Malaysia increased substantially after the financial crisis. This emphasises the importance of investigating possible implications of the crisis on corporate financing decisions. After the financial crisis, firms in countries most affected by the crisis would find it difficult to raise finance through stock market. Therefore, the only channel would be to issue debt leading to higher use of debt issues after the crisis. On the other hand, Australia is not as severely affected by the crisis; therefore, their source of finance is stable over time.

Averages of firm-specific and market-wide variables over the sample period are presented in Table 3.3. Panel A presents the averages of the variables by individual country. According to Bevan and Danbolt (2002), if book values provide fair estimation of replacement values or the value of assets in place, GROW substantially in excess of 1 indicates that firms on average have valuable investment opportunities. For Thailand, Malaysia and Singapore, the market-to-book ratios (GROW) range from 1.4 to 2 indicating that the market values of the firms in the sample on average equal 1.4 to 2 times the book value of total assets in each country which means book values do not adequately reflect the market value of these firms. However, for Australia, GROW is at around –9 indicating that the market underestimates the value of total assets substantially (~ 9 times). Australian firms should bear this in mind when they make decisions on the mix of debt and equity using market values.

Net fixed assets on average account for approximately 30 - 40% of book value of total assets for firms in all sample countries. The means of PROF show that average return on assets for Thai firms is higher than that for firms in other countries. For NDTS, it shows that depreciation accounts for approximately 3 - 4 % of book value of total assets for all sample countries. LIQ is highest in Australia. This is consistent with the prediction based on legal protection in Chapter 2. Claessens et al. (2003) find that firms in countries with weak creditor rights have higher liquidity.

Table 3.3 : Averages of firm-specific and market-wide variables

Panel A : By country

Variable	Thailand			Malaysia			Singapore			Australia		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
LEV	0.4436	0.2794	0.5644 ***	0.2697	0.1206	0.3582 ***	0.2412	0.1594	0.2882 ***	0.1856	0.1771	0.1996 **
t-statistics			(-23.6907)			(-33.4382)			(-12.8352)			(-2.0860)
TANG	0.4326	0.4177	0.4470 ***	0.3799	0.3663	0.3876 **	0.3512	0.3260	0.3630 ***	0.3342	0.3360	0.3350
t-statistics			(-2.8952)			(-2.5374)			(-3.2714)			(0.0854)
PROF	0.1056	0.1386	0.0778 ***	0.0667	0.1180	0.0362 ***	0.0818	0.0980	0.0728 ***	0.0758	0.0460	0.0863
t-statistics			(9.5675)			(13.7852)			(5.2039)			(-1.3148)
SIZE	14.5149	14.2821	14.6532 ***	12.5064	12.4274	12.5365 **	12.0207	12.0794	11.9746	12.3413	12.1538	12.4751 ***
t-statistics			(-4.8411)			(-2.0663)			(1.3808)			(-2.6346)
GROW	1.3624	1.8323	1.0564 ***	2.0103	3.0202	1.3646 ***	1.5246	1.8255	1.3665 ***	-8.8308	-13.3568	-7.0530 **
t-statistics			(15.0168)			(13.4419)			(7.6598)			(-2.3233)
NDTS	0.0439	0.0395	0.0481 ***	0.0282	0.0250	0.0302 ***	0.0328	0.0283	0.0353 ***	0.0387	0.0406	0.0382
t-statistics			(-6.8850)			(-7.1634)			(-5.3498)			(0.8876)
LIQ	1.5333	1.5940	1.4966	1.8178	1.8800	1.7828	1.8629	1.9330	1.8301	2.9478	2.9285	2.9942
t-statistics			(1.1144)			(0.9199)			(1.3421)			(-0.1795)
VOL	3.2767	3.1903	3.5682	2.6391	2.3152	2.7802	2.7773	2.3764	2.9758	4.0945	4.5257	3.4969
t-statistics			(-0.5484)			(-1.4068)			(-0.8962)			(0.9364)
SPP	-0.1996	-0.2363	-0.0060 ***	-0.0989	0.2817	-0.1777 ***	-0.1096	0.0902	-0.1586 ***	0.0408	0.1439	-0.0529 ***
t-statistics			(-9.0249)			(21.9094)			(8.6204)			(6.3621)
BKDEV	5.0553	4.3361	5.5344 ***	5.5927	4.8654	6.1798 ***	8.0553	7.1405	9.0215 ***	1.0101	0.9143	1.1060 ***
t-statistics			(-70.7353)			(-157.6413)			(-89.3294)			(-92.7513)
MKDEV	2.0826	3.1742	1.2704 ***	5.1284	6.3515	3.9978 ***	5.4856	5.8022	5.4075 ***	0.8061	0.6251	0.9848 ***
t-statistics			(89.8611)			(98.5270)			(9.9730)			(-103.5254)
INF	4.0425	5.3272	1.8704 ***	3.0428	3.4767	2.6746 ***	5.6952	10.9602	1.5344 ***	2.5086	2.7899	2.7984
t-statistics			(54.5485)			(24.0199)			(24.8619)			(-0.1053)
INT	10.9843	12.2494	8.6524 ***	8.1483	8.3050	7.5561 ***	6.0671	6.0265	5.9551 ***	9.1974	10.3458	8.0084 ***
t-statistics			(53.9257)			(21.4102)			(3.5018)			(69.7234)
TERM	-1.9810	-1.4994	-1.8623 ***	-1.8475	-1.8877	-1.6353 ***	-2.7007	-2.9655	-2.3517 ***	-16.4418	-18.9654	-13.9812 ***
t-statistics			(8.8561)			(-9.6550)			(-28.9208)			(-92.9741)
EQPR	-8.3267	-9.5932	-3.1677	-4.9196	-5.2958	-3.8967 ***	-1.3532	-1.1515	-1.4408 ***	-5.5234	-6.1833	-4.9938 ***
t-statistics			(-79.0977)			(-30.6743)			(12.3381)			(-26.3402)

Leverage (LEV) is the debt to capital ratio. Tangibility (TANG) is defined as the ratio of total fixed assets to total assets. Profitability (PROF) is the ratios of earnings before interest, tax and depreciation to total assets. Firm size (SIZE) is the natural logarithm of total assets. Growth opportunity (GROW) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. Non-debt tax shield (NDTS) is defined as the ratio of depreciation to total assets. Liquidity (LIQ) is the ratio of current assets to current liabilities. Earnings volatility (VOL) is the absolute difference between annual percentage change in earnings before interest and taxes and the average of this change. Share price performance (SPP) is the first difference of logs of annual share price. Bank development (BKDEV) is the ratio of bank assets to GDP. Stock market development (MKDEV) is the ratio of market capitalization to GDP. Inflation (INF) is changes in consumer price index. The level of interest rate (INT) is defined as the lending rate matched to the month of firms' fiscal year-end. Term structure of interest rates (TERM) is the difference between government bond yield and lending rate. Equity premium (EQPR) is measured by the cost of equity relative to the return on risk free investment matched to the month of firms' fiscal year-end. T-Test in column (3) is used to test whether the differences of the averages of variables between sub-periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 3.3 : Averages of firm-specific and market-wide variables (continued)
Panel B : By country groupings

Variable	Countries Least Affected by the Crisis			Countries Most Affected by the Crisis		
	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
LEV	0.2146	0.1685	0.2478 ***	0.3342 ***	0.1930	0.4247 ***
t-statistics			(-10.5588)	(-22.8519)		(-34.1152)
TANG	0.3431	0.3311	0.3502 **	0.3995 ***	0.3897	0.4068 ***
t-statistics			(-2.2973)	(-11.6291)		(-2.6642)
PROF	0.0789	0.0713	0.0789	0.0811	0.1274	0.0496 ***
t-statistics			(-0.4834)	(-0.3513)		(17.2047)
SIZE	12.1741	12.1175	12.2026	13.2509 ***	13.2692	13.2202
t-statistics			(-1.1857)	(-27.4032)		(0.9552)
GROW	-2.9056	-4.3510	-2.3118 *	1.7701 ***	2.4793	1.2652 ***
t-statistics			(-1.7544)	(-9.2846)		(16.6497)
NDTS	0.0356	0.0346	0.0366	0.0340 **	0.0315	0.0359 ***
t-statistics			(-1.3365)	(2.2737)		(-6.4328)
LIQ	2.3815	2.4432	2.3598	1.7119 ***	1.7495	1.6901
t-statistics			(0.4531)	(7.5631)		(0.8461)
VOL	3.4567	3.6560	3.2256	2.8833	2.7336	3.0501
t-statistics			(0.6078)	(1.6085)		(-0.8973)
SPP	-0.0344	0.1201	-0.1101 ***	-0.1349 ***	0.0716	-0.1222 ***
t-statistics			(10.8188)	(7.1901)		(11.3368)
BKDEV	5.3197	4.7229	5.9479 ***	5.4288 **	4.7038	5.9828 ***
t-statistics			(-11.7609)	(-2.1736)		(-128.7655)
MKDEV	3.6686	3.7920	3.6902	4.1985 ***	5.3815	3.1652 ***
t-statistics			(1.3760)	(-13.2042)		(61.8787)
INF	4.4598	7.7899	2.0238 ***	3.3465 ***	4.0405	2.4312 ***
t-statistics			(23.1601)	(9.2681)		(47.7391)
INT	7.2807	7.7025	6.7501 ***	9.0098 ***	9.5067	7.8879 ***
t-statistics			(18.2114)	(-49.0959)		(36.8594)
TERM	-8.0395	-9.1865	-6.8674 ***	-1.8880 ***	-1.7694	-1.7040 ***
t-statistics			(-11.3347)	(-63.0023)		(-2.9289)
EQPR	-2.9700	-3.1040	-2.8165 ***	-5.8671 ***	-6.3553	-3.6774 ***
t-statistics			(-4.2793)	(50.4814)		(-52.9234)

Leverage (LEV) is the debt to capital ratio. Tangibility (TANG) is defined as the ratio of total fixed assets to total assets. Profitability (PROF) is the ratios of earnings before interest, tax and depreciation to total assets. Firm size (SIZE) is the natural logarithm of total assets. Growth opportunity (GROW) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. Non-debt tax shield (NDTS) is defined as the ratio of depreciation to total assets. Liquidity (LIQ) is the ratio of current assets to current liabilities. Earnings volatility (VOL) is the absolute difference between annual percentage change in earnings before interest and taxes and the average of this change. Share price performance (SPP) is the first difference of logs of annual share price. Bank development (BKDEV) is the ratio of bank assets to GDP. Stock market development (MKDEV) is the ratio of market capitalization to GDP. Inflation (INF) is changes in consumer price index. The level of interest rate (INT) is defined as the lending rate matched to the month of firms' fiscal year-end. Term structure of interest rates (TERM) is the difference between government bond yield and lending rate. Equity premium (EQPR) is measured by the cost of equity relative to the return on risk free investment matched to the month of firms' fiscal year-end. T-Test in column (3) is used to test whether the differences of the averages of variables between two sub-periods are statistically significant or not while t-Test in column (4) is used to test whether the differences of the averages of variables between two country groupings are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Because Australia scores the least in term of creditor rights, Australia is expected to have the highest level of liquidity relative to the other sample countries. Table 3.3, Panel A, also presents the average of the variables for pre-crisis and post-crisis periods with the t-test being used to test whether means between the two sub-samples are significantly different. It shows that for Thailand and Malaysia, the averages of the variables are significantly different from each other between pre-crisis and post-crisis periods. Therefore, the role of each determinant is expected to vary accordingly. Although the t-test shows a number of significant differences in means between pre-crisis and post-crisis periods in Singapore, the level of differences is not as high as in Thailand and Malaysia. As expected, the variables in Australia are not much affected by the crisis. Table 3.3, Panel B, shows the averages of firm-specific and market-wide variables by country groupings, countries least affected and countries most affected by the crisis. The table shows that the averages of the variables for the full sample between country groupings and between sub-samples are significantly different from each other according to the t-test. As expected, the variables are significantly affected by the crisis mostly in countries most affected by the crisis. This table suggests that it would be useful to divide the sample countries into two sub-groups as it is highly likely that the role of each determinant on firms' financing decisions differs between the two country groupings.

Before proceeding regression analyses, it was necessary to examine the correlation structure between variables. The results of the Pearson correlation analysis are shown in Table 3.4. In general, the correlation between leverage (LEV) and its determinants are quite consistent to the hypotheses identified in the previous section. Firm size, earnings volatility, bank development and equity premium are positively correlated with leverage while negative correlations are found for liquidity, stock market development and interest rate for all sample countries giving support to the market timing theory.

Table 3.4 : Correlation Matrix

Panel A : Thailand

	LEV	TANG	PROF	SIZE	GROW	NDTS	LIQ	VOL	SPP	BKDEV	MKDEV	INF	INT	TERM	EQPR
LEV	1.000														
TANG	0.080	1.000													
PROF	-0.383	-0.004	1.000												
SIZE	0.187	-0.051	-0.107	1.000											
GROW	-0.329	-0.110	0.030	0.024	1.000										
NDTS	0.031	0.360	0.149	-0.140	-0.069	1.000									
LIQ	-0.352	-0.176	0.102	-0.077	0.017	-0.132	1.000								
VOL	0.107	0.080	-0.052	0.035	-0.018	0.036	-0.040	1.000							
SPP	0.060	0.031	0.086	-0.059	-0.055	0.103	0.027	0.006	1.000						
BKDEV	0.392	0.030	-0.131	0.121	-0.346	0.055	-0.044	-0.001	-0.101	1.000					
MKDEV	-0.393	-0.038	0.172	-0.118	0.366	-0.096	0.007	0.016	0.086	-0.856	1.000				
INF	-0.231	-0.057	0.115	-0.035	0.154	-0.145	-0.007	-0.038	-0.365	-0.094	0.317	1.000			
INT	-0.193	-0.056	0.120	-0.019	0.118	-0.148	-0.016	-0.033	-0.376	0.030	0.222	0.951	1.000		
TERM	-0.117	0.017	0.007	-0.063	0.180	0.053	0.017	0.026	0.327	-0.699	0.511	-0.530	-0.623	1.000	
EQPR	0.139	0.048	-0.099	-0.001	-0.057	0.112	-0.001	0.038	0.422	-0.198	0.044	-0.801	-0.847	0.805	1.000

Panel B : Malaysia

	LEV	TANG	PROF	SIZE	GROW	NDTS	LIQ	VOL	SPP	BKDEV	MKDEV	INF	INT	TERM	EQPR
LEV	1.000														
TANG	-0.013	1.000													
PROF	-0.348	0.041	1.000												
SIZE	0.228	-0.089	0.068	1.000											
GROW	-0.251	-0.033	-0.061	-0.282	1.000										
NDTS	-0.017	0.469	-0.073	-0.277	0.031	1.000									
LIQ	-0.288	-0.166	0.088	-0.119	0.152	-0.121	1.000								
VOL	0.076	-0.035	-0.224	-0.049	0.024	-0.008	-0.029	1.000							
SPP	-0.090	0.014	0.024	-0.015	0.022	0.015	0.010	-0.019	1.000						
BKDEV	0.341	0.018	-0.104	0.035	-0.252	0.061	-0.013	0.018	-0.317	1.000					
MKDEV	-0.302	-0.034	0.091	-0.031	0.218	-0.066	0.017	0.003	0.551	-0.615	1.000				
INF	-0.060	-0.046	0.114	0.018	0.042	-0.108	-0.011	-0.017	-0.067	-0.154	0.116	1.000			
INT	-0.131	-0.050	0.137	0.021	0.071	-0.094	0.004	-0.011	-0.365	0.054	0.040	0.622	1.000		
TERM	0.036	0.037	-0.115	-0.020	-0.014	0.045	-0.022	-0.002	0.294	-0.151	-0.112	-0.262	-0.684	1.000	
EQPR	0.175	0.047	-0.159	-0.014	-0.110	0.105	-0.011	0.021	0.406	0.063	0.051	-0.621	-0.879	0.456	1.000

Panel C : Singapore

	LEV	TANG	PROF	SIZE	GROW	NDTS	LIQ	VOL	SPP	BKDEV	MKDEV	INF	INT	TERM	EQPR
LEV	1.000														
TANG	0.102	1.000													
PROF	-0.294	0.057	1.000												
SIZE	0.258	-0.170	0.042	1.000											
GROW	-0.417	-0.041	0.225	-0.111	1.000										
NDTS	-0.109	0.494	0.164	-0.270	0.108	1.000									
LIQ	-0.368	-0.266	0.045	-0.120	0.102	-0.173	1.000								
VOL	0.033	0.040	-0.113	-0.030	-0.040	0.001	-0.009	1.000							
SPP	0.026	0.013	0.054	0.034	-0.102	0.029	-0.042	0.005	1.000						
BKDEV	0.253	0.046	-0.109	-0.051	-0.219	0.108	-0.001	-0.010	-0.109	1.000					
MKDEV	-0.023	0.002	-0.045	-0.025	0.060	0.021	-0.004	0.030	0.526	-0.172	1.000				
INF	-0.172	-0.064	0.060	0.020	0.231	-0.073	0.033	-0.010	0.000	-0.343	0.245	1.000			
INT	-0.068	0.004	0.056	0.046	0.048	-0.028	-0.009	-0.011	-0.293	-0.180	-0.375	0.115	1.000		
TERM	0.174	0.030	-0.091	-0.019	-0.094	0.054	-0.022	0.017	0.166	0.415	0.178	0.047	-0.679	1.000	
EQPR	0.055	-0.037	-0.061	-0.025	-0.129	-0.060	-0.027	-0.052	0.107	0.054	-0.075	0.178	0.011	-0.152	1.000

Panel D : Australia

	LEV	TANG	PROF	SIZE	GROW	NDTS	LIQ	VOL	SPP	BKDEV	MKDEV	INF	INT	TERM	EQPR
LEV	1.000														
TANG	0.267	1.000													
PROF	0.002	0.175	1.000												
SIZE	0.373	0.433	0.271	1.000											
GROW	0.119	0.172	0.199	0.337	1.000										
NDTS	0.025	0.351	0.017	0.070	0.020	1.000									
LIQ	-0.194	-0.301	-0.058	-0.309	-0.370	-0.173	1.000								
VOL	0.007	-0.001	-0.051	-0.072	-0.011	0.032	0.086	1.000							
SPP	-0.073	0.009	0.001	-0.049	0.015	-0.035	-0.027	0.003	1.000						
BKDEV	0.071	0.003	0.048	0.099	0.063	-0.023	-0.004	-0.025	-0.137	1.000					
MKDEV	0.065	0.000	0.042	0.095	0.068	-0.033	-0.003	-0.021	-0.126	0.982	1.000				
INF	0.067	-0.006	0.001	0.055	-0.021	0.002	0.012	-0.020	-0.101	0.272	0.209	1.000			
INT	-0.066	-0.007	0.005	-0.045	-0.043	0.006	-0.006	0.027	0.118	-0.686	-0.714	0.252	1.000		
TERM	0.066	0.016	0.006	0.065	0.060	-0.006	0.002	-0.020	-0.131	0.760	0.773	-0.192	-0.937	1.000	
EQPR	0.048	0.000	-0.042	0.012	0.006	0.006	0.002	-0.009	-0.020	0.380	0.404	-0.428	-0.839	0.765	1.000

See Table 3.1 and 3.3 and Section 3.4 for the definition of variables

However, there are some variations among the sample countries. Profitability has a negative correlation with leverage which is consistent to pecking order theory for Thailand, Malaysia and Singapore. On the other hand, a positive correlation is found for Australian firms which may indicate that Australian firms do not follow pecking order theory. Share price performance is found to be negatively related to leverage according to market timing theory only for Malaysia and Australia. Non-debt tax shield has negative correlations with leverage for Malaysia and Singapore giving support to tax hypothesis. There are also positive correlations between tangibility and leverage for Thailand, Singapore and Australia which gives the support to the theory that firms can use tangible assets as collateral. There are some small correlations among independent variables. For Thai and Australian firms the relationship between growth opportunity and firm size is positive implying that larger firms may grow faster than smaller firms. On the contrary, negative relationship is found for Malaysian and Singaporean firms implying that smaller firms grow faster than larger firms. Profitability has positive correlation with firm size for most sample countries implying that larger firms have higher profitability. As observed from Table 3.4, the correlation coefficients are not sufficiently large to cause multicollinearity problems among firm-specific variables in the regressions. However, there are high correlations among country-specific factors in each country; therefore, multicollinearity problems need to be accounted for in analysis relating to country-specific factors.

3.6 Empirical Results

The empirical analysis of the determinants of capital structure is performed in the following order. First, the focus is on firm-specific determinants of capital structure. The analysis starts with the cross-sectional results from estimating equation (3.1) for each sample country over the whole sample period of 1993 to 2001. Then equation (3.1) is re-estimated for the pre- and post-crisis periods in order to find the possible significant effects of the crisis on firm-specific determinants where the pre-crisis sample covers the period of 1993 to 1996 and the post-crisis sample covers the period of 1998 to 2001. Next, equation (3.2) is estimated in a pooled time-series cross-sectional framework using OLS based on the full sample and sub-samples. After examining the firm-specific determinants of capital structure, the focus is moved to country-specific determinants: (i) market-wide and (ii) legal and corporate governance determinants. The data for all sample countries are pooled to create one panel data set. Equation (3.2) is augmented by adding country dummies and then these country dummies are replaced with market-wide variables one at a time. The effect of the crisis on market-wide determinants is investigated using two sub-samples. Where sub-sample periods are concerned, Wald-statistics are estimated to test for any statistically significant change in the role of the identified variables as a consequence of the financial crisis. Finally, equation (3.2) is augmented by adding legal and corporate governance variables one at a time.

3.6.1 Firm-Specific Determinants: Cross-Sectional Analysis

Table 3.5 presents the results of estimating equation (3.1) for each country over the full sample period using cross-sectional regressions of leverage ratios on firm-specific variables. Although, ***tangibility*** is found to be positively related to leverage for all sample countries, the relationship is statistically significant only in Australia. Australia is a market-based economy in which firms have dispersed ownership structure and arms-length relationships with banks. Therefore, collateral plays an important role. Australia has the lowest level of creditor protection among the sample countries. Therefore, lenders tend to require added security when firms raise debt capital.

Table 3.5 : Cross-sectional analysis of firm-specific determinants of capital structure: Whole sample period

Variables	Thailand	Malaysia	Singapore	Australia
Constant	0.0817	0.1980	0.2905	-0.1306
t-statistics	(0.3849)	(1.3962)	(1.3169)	(-1.3109)
TANG	0.1647	0.0404	0.1027	0.1955 **
t-statistics	(1.4382)	(0.5947)	(0.8742)	(2.3544)
PROF	-0.2561	-0.8142 ***	-0.1834	-0.0568
t-statistics	(-0.9196)	(-4.8539)	(-0.5939)	(-0.7838)
SIZE	0.0315 ***	0.0329 ***	0.0251	0.0299 ***
t-statistics	(2.6213)	(3.5395)	(1.6182)	(3.8037)
GROW	-0.0623 **	-0.0029	-0.0713 ***	0.0001
t-statistics	(-2.1136)	(-0.2730)	(-2.7062)	(0.1408)
NDTS	-2.5573 ***	-2.4605 ***	-2.7709 ***	-1.2201 **
t-statistics	(-3.1771)	(-3.2152)	(-3.4073)	(-2.2811)
LIQ	-0.0591 **	-0.0433 **	-0.0682 ***	-0.0040 **
t-statistics	(-2.3208)	(-2.5398)	(-3.2718)	(-2.2669)
VOL	0.0023	-0.0003	-0.0027	0.0012
t-statistics	(1.1816)	(-0.1887)	(-0.5280)	(1.3118)
SPP	-0.6497 ***	-0.3099 ***	-0.3513 ***	-0.2452 **
t-statistics	(-5.6853)	(-6.6146)	(-2.8776)	(-2.4488)
Adj R^2	0.4665	0.3614	0.3232	0.2028
No. of obs.	277	584	211	187

$Leverage_{i,t} = \beta_1 + \beta_2 TANG_{i,t-4} + \beta_3 PROF_{i,t-4} + \beta_4 SIZE_{i,t-4} + \beta_5 GROW_{i,t-4} + \beta_6 NDTS_{i,t-4} + \beta_7 LIQ_{i,t-4} + \beta_8 VOL_{i,t-4} + \beta_9 SPP_{i,t-4} + \varepsilon_{i,t}$

The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. See Table 3.1 and 3.3 and Section 3.4.1 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

The insignificant relationships found in other sample countries can be explained by tight family held and concentrated ownership. Firms in East Asian countries appear to have close relationships with their lenders which lead to a reduced need for collateral. Zhang (2003) finds that many Asian banks are controlled by a single family who also own many non-financial firms. Claessens et al. (2003) show that the percentage of firms with bank ownership is large in Malaysia and Thailand. Moreover, Malaysian firms are over-dependent on banks; therefore, firms can get access to bank loans easily without collateral. For Singapore, banks are not allowed to own firms directly; however, Singaporean firms are dominated by government. In addition, weak corporate governance and lack of bank supervision can also lead to unsound lending. All of these ownership characteristics mean that firms in East Asian countries have less need to provide collateral when they borrow.

Profitability is uniformly found to be negatively related to debt for all sample countries as suggested by the pecking order theory that firms rely on internal financing sources and have less need for external finance. However, the relationship is statistically significant only in Malaysia. It can also be assumed that Malaysian firms might have high financial slack to use when they need financing. The majority of insignificant relationships found for other sample countries is in contrast to the findings of previous studies (Rajan and Zingales, 1995; Booth et al., 2001; Zoppa and McMahon, 2002; Cassar and Holmes, 2003). One possible explanation for this is that previous studies focus only on a limited set of variables while equation (3.1) includes additional firm-specific variables overcoming a possible omitted variables problem in the earlier studies.[49] The insignificant relationship found does not suggest that firms in this region do not follow the pecking order theory because profitability is not the only variable that can be used to test the predictions of the pecking order theory. The evidence may be picked up by other variables such as liquidity.

Firm size is found to be positively related to debt for all sample countries, in line with the trade-off and agency theories and is also consistent with the findings of previous studies (Wiwattanakantang, 1999; Booth et al., 2001; Pandey, 2001; Prasad et al., 2003). The positive relationship implies that larger firms have higher debt capacity than smaller firms because they normally fail less, have smaller bankruptcy costs, smaller agency costs of debt, less volatile cash flow, lower interest rates and lower informational costs, are more diversified, and have easier access to bank credit. The relationship between firm size and leverage is weakest in Singapore because of high government support in Singapore. Singaporean firms are dominated by government;

[49] A restricted version of equation (3.1) with only four conventional firm-specific variables as in Rajan and Zingales (1995) was estimated. The results confirm a significant negative relationship between profitability and leverage in all sample countries showing that the findings presented in this chapter are not data specific.

therefore, firms face lower risks of financial distress and lower level of solvency regardless of their size and also perform better with close guidance from government.

Growth opportunity is found to be negatively related to debt at significance level for all countries except Australia but the relationship is statistically significant only for Thailand and Singapore. The negative and significant relationships found give support to agency theory and market timing theory and are also consistent with previous studies (Zoppa and McMahon, 2002). The results imply that Thai and Singaporean firms with high growth might try to use less debt because of high agency costs of debt especially in Thailand where the risk of expropriation is high (as shown in Table 2.4). These firms also do not want to lose the opportunity of investing in positive net present value projects by committing themselves to use debt that might come with possible restrictions imposed by lenders. This is also consistent with the fact that countries in this region are growing; therefore, firms would not want to lose any opportunities when they arise. Moreover, it is shown that firms do time the market. When market value is high, firms tend to issue equity rather than debt.

Non-debt tax shield is uniformly found to be negatively related to debt for all countries at a highly significance level, consistent with earlier research (Wiwattanakantang, 1999) and the trade-off theory. The results imply that firms use non-debt tax shields to reduce their corporate tax payments. ***Liquidity*** is found to be uniformly and highly significantly negatively related to debt as expected for all countries. This shows that firms in this region have substantial amounts of liquidity which they can use to finance their investment instead of raising external finance giving support to the pecking order theory. ***Earnings volatility*** appears to have no significant effect on leverage for all sample countries which is also consistent with the findings of Wiwattanakantang (1999) and Antoniou et al. (2002). The results suggest risk, financial distress costs and the costs of entering into liquidity are so low that they can be ignored.

It might imply that these firms are risk-neutral and do not take into account of risk or earnings volatility in deciding their financing mix. If firms are operating below their debt capacity, or if ownership structure is highly concentrated, earnings volatility has no effect on firms' capacity for borrowing. ***Share price performance*** is uniformly found to be negatively related to debt for all sample countries giving strong support to the market timing theory. This suggests that firms issue equity after share prices increase.

In conclusion, the cross-sectional results from Table 3.5 show the variations across sample countries which can be explained by the differences in corporate governance. However, in general the results are consistent with the findings of previous studies and give support to capital structure theories. The results confirm the significant role of firm-specific characteristics in determining the capital structure of firms in this region. In general, among the four conventional firm-specific variables, tangibility and firm size are found to be positively related to debt while profitability and growth opportunity are found to be negatively related to debt. In addition, the results show that firm-specific variables other than the four conventional variables such as non-debt tax shield, liquidity and share price performance are also found to be inversely related to debt at significance levels giving support to the pecking order, market timing and trade-off theories. However, earnings volatility appears to have no significant effect on firms in this region. These findings are consistent with the results from most previous empirical studies. Therefore, it can be concluded that firms in the Asia Pacific region determine their capital structure based on the same factors as firms in other regions and those factors affect the use of debt in the same direction. However, some variations can be explained by the differences in institutional, legal and corporate governance among sample countries such as ownership structure, rule of law and legal system and might possibly be due to the effect of the financial crisis. These will be further investigated in the next sections.

3.6.2 The Effect of the Financial Crisis on Firm-Specific Determinants: Cross-Sectional Analysis

As stated earlier, one of the objectives of this chapter is to examine the possible effects of the Asian financial crisis of 1997 on the importance of various determinants of capital structure. To achieve this, the full sample is divided into two sub-samples: pre- and post-crisis periods. The dependent variable for pre-crisis (post-crisis) period is the leverage of 1996 (2001) while the explanatory variables are the averages of 1993-1995 (1998-2000). The Wald statistic is estimated to examine whether there has been any significant change in the role of the explanatory variables due to the financial crisis of 1997. The cross-sectional results for pre- and post-crisis periods are presented in Table 3.6.

Table 3.6 : Cross-sectional analysis of firm-specific determinants of capital structure: Pre- and post-crisis periods

Variables	Thailand		Malaysia		Singapore		Australia	
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	0.4100 ***	0.2374	0.2218	0.3390 ***	0.4677 **	0.2482	0.1240	-0.1700 *
t-statistics	(2.8522)	(1.1490)	(1.4661)	(2.8672)	(2.4498)	(1.1806)	(0.6704)	(-1.8024)
Wald Test		<2.0396>		<8.9291> ***		<1.9829>		<2.8808> *
TANG	0.0096	0.0830	-0.0626	0.0956	0.1307	0.0035	-0.0236	0.1979 **
t-statistics	(0.1208)	(0.6469)	(-0.9886)	(1.4403)	(1.0512)	(0.0336)	(-0.1646)	(2.5558)
Wald Test		<0.9036>		<0.3685>		<0.0013>		<7.6095> ***
PROF	-0.5058 ***	-0.5563 ***	-0.6977 ***	-0.4521 ***	-0.1173	-0.2695	0.0201	-0.0772
t-statistics	(-2.7392)	(-3.0813)	(-5.0258)	(-4.9134)	(-0.3013)	(-1.0077)	(0.3069)	(-0.8626)
Wald Test		<0.1346>		<18.5424> ***		<1.8382>		<0.8423>
SIZE	0.0120	0.0328 ***	0.0130	0.0192 **	-0.0066	0.0246 *	0.0078	0.0316 ***
t-statistics	(1.4604)	(2.6475)	(1.2467)	(2.4664)	(-0.5300)	(1.7090)	(0.4773)	(4.2547)
Wald Test		<9.9026> ***		<6.4001> **		<4.2885> **		<15.6852> ***
GROW	-0.0540 ***	-0.0872	-0.0057	-0.0440 ***	-0.0561 **	-0.0723 ***	0.0007	-0.0002
t-statistics	(-3.0772)	(-1.6290)	(-1.1875)	(-2.7380)	(-2.4923)	(-3.0949)	(0.9266)	(-0.4141)
Wald Test		<5.9451> **		<22.1087> ***		<0.7754>		<0.1480>
NDTS	-0.8552	-1.6209 **	-0.7225	-2.5251 ***	-1.9254	-1.5163 **	-0.3952	-1.1701 ***
t-statistics	(-1.2718)	(-2.3845)	(-1.0257)	(-3.6835)	(-1.4516)	(-2.3077)	(-0.8426)	(-4.0655)
Wald Test		<5.7658> **		<20.9707> ***		<4.8766> **		<11.1914> ***
LIQ	-0.0301 *	-0.0786 ***	-0.0049	-0.0565 ***	-0.0327 *	-0.0635 ***	-0.0023	-0.0042 **
t-statistics	(-1.7730)	(-2.6220)	(-0.4409)	(-3.8952)	(-1.7728)	(-2.9362)	(-0.3902)	(-2.2897)
Wald Test		<21.5140> ***		<85.8641> ***		<4.4432> **		<3.2021> **
VOL	0.0003	0.0024 *	0.0005	-0.0008	0.0008	-0.0019	-0.0010	0.0013
t-statistics	(0.6285)	(1.7121)	(0.2063)	(-0.4453)	(0.3750)	(-0.4253)	(-0.8342)	(0.7458)
Wald Test		<3.6780> *		<0.3360>		<0.6786>		<1.7299>
SPP	-0.3096 ***	-0.1899 ***	-0.1945 ***	-0.2587 ***	-0.1253 *	-0.3017 ***	0.0221	-0.2464 ***
t-statistics	(-5.4233)	(-3.3197)	(-2.6996)	(-7.0460)	(-1.7625)	(-3.6024)	(0.2067)	(-4.6967)
Wald Test		<5.3208> **		<3.6252> *		<6.8993> ***		<35.4607> ***
Adj R^2	0.4409	0.4149	0.2321	0.4393	0.2346	0.3424	-0.1172	0.3042
No. of obs.	197	277	235	584	105	211	79	187

$Leverage_{i,t} = \beta_1 + \beta_2 TANG_{i,t-k} + \beta_3 PROF_{i,t-k} + \beta_4 SIZE_{i,t-k} + \beta_5 GROW_{i,t-k} + \beta_6 NDTS_{i,t-k} + \beta_7 LIQ_{i,t-k} + \beta_8 VOL_{i,t-k} + \beta_9 SPP_{i,t-k} + \varepsilon_{i,t}$

The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not. See Table 3.1 and 3.3 and Section 3.4.1 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

The results show that the crisis appears to have had a significant effect on capital structure decisions. In general, first, the significances of some firm-specific determinants such as firm size, non-debt tax shield, and liquidity found in the whole sample period are driven by significant relationships from the post-crisis period. Second, other firm-specific variables, including tangibility, profitability and earnings volatility, appear to be statistically unaffected by the crisis. Last, where the determinants are significantly related to leverage for both pre- and post-crisis periods, the coefficients have different impacts between the two periods for variables such as share price performance.

The crisis appears to have had a significant impact on the role of ***firm size***. The coefficients are insignificant before the crisis but became significant after the crisis indicating that firms are more concerned with survival and the higher probability of bankruptcy after the crisis. Lenders are more willing to lend to larger firms than to smaller because of the lower default risk. In particular, Singaporean firms are dominated by government; therefore, they are protected more and are at less risk of financial distress. However, after the crisis, as in other countries, lenders were more concerned about survival and tended to lend to larger firms to reduce the risk of bankruptcy. In Thailand, Malaysia and Singapore, the reorganization procedure dos not impose 'an automatic stay on the assets' of firms on filing the reorganization petition as shown in Table 2.5; therefore, creditors may race to seize the assets which further lead to an increase in financial distress and bankruptcy in these countries. Therefore, in order to be safe, creditors prefer to lend only to large firms.

The roles of ***growth opportunity*** and impact from the crisis appear to differ across sample countries. In Thailand, growth opportunity is found to be negatively related to debt at significance level before the crisis but became insignificant after the crisis. This shows that, after the crisis, growth opportunities reduced and there was less concern for underinvestment. Moreover, after the crisis investors can no longer rely on the increase or decrease in market value of firms because it varies depending on how firms coped with the crisis. Therefore, the market timing behaviour reduced after the crisis. In contrast to Thai firms, growth opportunity originally is found not to be related to debt at significance level. However, after the crisis it became an important determinant of capital structure for Malaysian firms. It shows that Malaysian firms recovered from the crisis better than Thai firms and have higher growth opportunities than Thai firms. Therefore, in order to avoid underinvestment, Malaysian firms will use less debt when they have high growth opportunities. In addition, after the crisis, firms have to concern themselves more with revenue and expenses and survival. A negative relationship found for the post-crisis period implies that Malaysian firms do not want to commit themselves to debt because growth opportunities cannot provide immediate revenue and have limited collateral or liquidation value. The evidence shows that Malaysian firms are risk takers and decided to take chances in the movements of their market value due to the financial crisis by issuing equity when market value was high relative to book value. The evidence also shows that growth opportunity was the significant determinant of capital structure for Singaporean firms and the crisis had no significant effect on this relationship. On the other hand, it is found that growth opportunity has no relationship with debt at all for the full sample or either sub-sample for Australian firms. This implies that Australian firms do not consider growth opportunity when they determine their capital structure. If market to book ratio is a proxy to test market timing theory, it also shows that Australian firms do not time the market by issuing equity when market to book ratio is high.

Non-debt tax shield is found to be negatively related to debt because of tax deductibility benefit. The results are very robust across sample countries. The relationship is found to be insignificant before the crisis but became significant after the crisis because the crisis has lead to higher costs of borrowing and bankruptcy risk; therefore, firms try alternative ways to minimize their tax expenses. The results show a significant influence of the financial crisis on the relationship between ***liquidity*** and leverage. For Thailand and Singapore, liquidity is found to be consistently and negatively related to debt for both sub-samples. This shows that Thai and Singaporean firms do use liquid assets to finance their investments first before looking for finance from other external sources. The Wald test shows that the coefficients increased significantly after the crisis indicating that these firms rely more on using liquid assets to finance their investments instead of debt probably because the cost of borrowing became higher after the crisis. On the other hand, for Malaysia and Australia the coefficients are found to be insignificant before the crisis but became significant after the crisis implying that costs of external financing are cheaper before the crisis for Malaysia and Australia than in Thailand and Singapore. Therefore, although firms have liquid assets, they prefer using external finance to following the pecking order theory.

Share price performance was uniformly found to be negatively related to debt for both sub-samples for all countries except Australia where an insignificant relationship was found for the pre-crisis period. It shows that before the crisis, Australian firms did not move along with the trend and did not time the market movement. However, after the crisis, there was a big movement in the share price; therefore, Australian firms gave more consideration to the movement of the share price leading to a negative relationship. On the other hand, negative and significant relationships found in other sample countries for both sub-samples show strong support to the market timing theory. Although consistently related to leverage for both sub-samples, the role of share price performance on leverage is found to be significantly influenced by the crisis as well. The Wald test shows that the values before and after the crisis for those countries are significantly different from each other. However, the differences are in different directions. The coefficient decreased significantly for Thailand. The crisis originated in Thailand leading to the loss of confidence in firms. Therefore, Thai firms found it more difficult to issue equity when share prices were overvalued leading to the decline in the coefficient. In addition, there is revaluation of assets; therefore, the overvaluation is less severe leading to reduced use of market timing. In contrast, the coefficient increased significantly for Malaysia and Singapore. This implies that after the crisis asymmetric information may have been more severe in Malaysia and Singapore than in Thailand. When there is asymmetric information, investors will require discount. The discount will be very little if firms issue equity rights after share prices increase.

In summary, the sub-sample results from Table 3.6 reveal that firm-specific factors that influence capital structure decisions are significantly driven by changes in economic condition such as the financial crisis. The analysis of sub-samples shows that firms' reliance on some of these variables changed after the crisis because the crisis increased the risk of bankruptcy and costs of financing. In addition, the impact of the crisis also appears to differ to different degrees across the sample countries necessitating the investigation of the role of differences in economic conditions, corporate governance and institutional settings.

3.6.3 Firm-Specific Determinants and the Effect of the Financial Crisis: Panel Analysis

In this section, the investigation of the firm-specific determinants of capital structure and its effect from the crisis is performed using panel analysis as in equation (3.2). Table 3.7, Panel A, presents the results of estimating equation (3.2) for the dataset that contains firms in all four sample countries using pooled time-series cross-sectional regressions of leverage ratios on firm-specific variables.

Table 3.7 : Panel analysis of the firm-specific determinants of capital structure

Equation	Panel A : Pooled 4 countries			Panel B : Countries least affected by the crisis			Panel C : Countries most affected by the crisis		
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	-0.3653 ***	-0.1818 ***	-0.2663 ***	-0.1116 *	-0.0261	-0.1893 ***	-0.4404 ***	-0.1981 **	-0.0487
t-statistics	(-6.0000)	(-2.9800)	(-4.3200)	(-1.7700)	(-0.3790)	(-2.6500)	(-5.2900)	(-2.0400)	(-0.5640)
TANG	0.0815 ***	0.0414	0.1014 ***	0.1572 ***	0.1193 ***	0.1876 ***	0.0082	-0.0460	0.0107
t-statistics	(3.2100)	(1.4800)	(3.4000)	(4.2400)	(2.8300)	(4.3700)	(0.2550)	(-1.3700)	(0.2820)
Wald Test			<11.5931> ***			<2.5297>			<0.0797>
PROF	-0.2327 ***	-0.0581 *	-0.2996 ***	-0.0830 ***	-0.0161	-0.1733 ***	-0.3588 ***	-0.7762 ***	-0.3353 ***
t-statistics	(-5.1900)	(-1.9200)	(-7.2200)	(-2.7400)	(-1.0900)	(-3.6100)	(-8.1400)	(-9.2000)	(-7.3000)
Wald Test			<33.9203> ***			<13.0057> ***			<92.1108> ***
SIZE	0.0506 ***	0.0331 ***	0.0553 ***	0.0294 ***	0.0190 ***	0.0374 ***	0.0502 ***	0.0348 ***	0.0492 ***
t-statistics	(13.1000)	(7.5900)	(13.0000)	(6.5400)	(3.4100)	(7.0800)	(9.3800)	(5.3800)	(9.1400)
Wald Test			<27.0943> ***			<12.1429> ***			<7.1767> ***
GROW	-0.0009 *	-0.0006 **	-0.0004	-0.0002	0.0004	0.0001	-0.0106	-0.0103 **	-0.0258 ***
t-statistics	(-1.8900)	(-2.3500)	(-0.4370)	(-0.7760)	(1.2200)	(0.1430)	(-1.4800)	(-2.3500)	(-3.2900)
Wald Test			<0.0550>			<0.0204>			<3.9386> **
NDTS	-0.1161	0.1242	-0.3209	-0.6221 ***	-0.1749	-0.8588 ***	0.4333	1.7798 ***	0.1024
t-statistics	(-0.6430)	(0.5240)	(-1.4700)	(-2.7900)	(-1.0400)	(-3.1000)	(1.5100)	(5.0700)	(0.3320)
Wald Test			<2.1738>			<9.6019> ***			<29.6191> ***
LIQ	-0.0141 ***	-0.0048 **	-0.0190 ***	-0.0051 ***	-0.0011	-0.0058 ***	-0.0273 ***	-0.0075 **	-0.0434 ***
t-statistics	(-5.1400)	(-2.0700)	(-4.6800)	(-2.9400)	(-0.4600)	(-3.4000)	(-4.3600)	(-2.5600)	(-4.0800)
Wald Test			<12.3298> ***			<11.5475> ***			<11.4153> ***
VOL	0.0014 ***	0.0010 **	0.0017 ***	0.0007 *	0.0005	0.0010 ***	0.0014 ***	0.0002	0.0017 ***
t-statistics	(4.1700)	(2.3100)	(4.2400)	(1.9000)	(0.8850)	(2.9500)	(3.4700)	(0.4840)	(3.2700)
Wald Test			<3.5887> *			<8.7224> ***			<10.7086> ***
SPP	-0.0064 *	-0.0250 **	-0.0015	-0.0144 **	0.0347 **	-0.0256 ***	-0.0032	-0.0478 ***	0.0057
t-statistics	(-1.7600)	(-2.2100)	(-0.2930)	(-2.1700)	(2.2300)	(-3.2300)	(-0.7570)	(-3.6500)	(0.9380)
Wald Test			<19.7515> ***			<57.9771> ***			<76.6208> ***
Adj R^2	0.3213	0.1956	0.3021	0.2068	0.1217	0.2317	0.3784	0.3575	0.3363
No. of obs.	7541	1868	4780	2395	644	1491	5146	1224	3289

$$Leverage_{i,t} = \beta_1 + \beta_2 TANG_{i,t} + \beta_3 PROF_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 GROW_{i,t} + \beta_6 NDTS_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 VOL_{i,t} + \beta_9 SPP_{i,t} + \alpha + \mu_{i,t}$$

The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not. See Table 3.1 and 3.3 and Section 3.4.1 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

The results show that for the full sample period leverage is positively related to tangibility, firm size, and earnings volatility while negatively related to profitability, growth opportunity, liquidity and share price performance. In general, these relationships appear to be consistent with capital structure theories and the results are quite robust to the cross-sectional analysis. Like cross-sectional analysis, the financial crisis is found to significantly affect the role of each firm-specific variable in determining the capital structure of a firm.

Apart from being a test of robustness for a cross-sectional analysis, the use of panel analysis offers the opportunities to further divide the sample countries into two sub-groups with regard to how severely they were hit by the crisis (and their level of market development), (i) countries least affected by the crisis (Singapore and Australia) and (ii) countries most affected by the crisis (Thailand and Malaysia). Table 3.7, Panels B and C, presents the results of estimating equation (3.2) for the dataset that contains firms in the two country groupings using pooled time series cross-sectional regressions of leverage ratios on firm-specific variables. Although the results are quite robust to the cross-sectional analysis, the variations across countries in the previous sections are made clearer by the use of country groupings. The results show that firms rely on firm-specific characteristics differently depending on the severity of the impact of the crisis on the market; this is except for firm size and earnings volatility for which relationships with leverage appear to be similar between both country groupings. The differences are not only in the attitude of the role of the firm-specific determinants but also in the direction of how it relates to leverage.

Tangibility is found to play a significant role for firms in countries least affected by the crisis while it plays no role for countries most affected. The results suggest that in the latter group, firms are not required to provide any collateral when they borrow. This might be due to high ownership concentrations in these countries. On the other hand, firms in countries least affected by the crisis have arms-length relationships with lenders; therefore, collateral is important. The results also show that the crisis has no impact on the role of tangibility in determining capital structure. Although ***profitability*** is found to be negatively related for the full sample for both country groupings, the sub-sample results reveal that profitability did not play any role in determining capital structure for firms in the countries least affected by the crisis during the pre-crisis period. This implies that firms did not follow the pecking order when they financed before the crisis. However, the crisis has made firms in both country groupings more aware of the available options and also of tax expenses leading to a more significant relationship between profitability and firm leverage after the crisis.

Growth opportunity appears to play no role in determining capital structure for firms in the countries least affected by the crisis while the relationship is negative and significant for firms in countries most affected by the crisis. Similarly, ***non-debt tax shield*** also plays an opposite role between the two country groupings. In countries least affected by the crisis, the trade-off theory based on the tax hypothesis is supported. When the non-debt tax shield is high, firms tend to issue more equity. However, the evidence is driven by the crisis. In countries most affect by the crisis, the relationship is found to be positive for pre-crisis period for firms. However, after the crisis, no significant role is found. ***Liquidity and earnings volatility*** appear to play similar roles in both country groupings except for the insignificant relationship detected during the pre-crisis period for countries least affected by the crisis. In addition, the crisis has significantly increased the role of both liquidity and earnings volatility. In contrast, ***share price performance*** has a different role in firms' financing decisions between the two country groupings. The market timing theory is supported more by countries least affected by the crisis or countries with more matured stock markets.

In summary, dividing the sample into two country groupings provides new insights into the role of each firm-specific determinant on firms' financing decisions. The findings reveal that firms in different country groupings or different market development do behave differently. The evidence from countries least affected by the crisis also supports capital structure theories more. As expected, the crisis affected the role of firm-specific determinants differently depending on the severity of the crisis. It appears that the crisis made firms behave more closely to, or be more aware of, the predictions of capital structure theories.

3.6.4 Country-Specific Determinants: Panel Analysis

3.6.4.1 Market-Wide Determinants

Table 3.8 presents the results of estimating equation (3.2) with the inclusion of country dummies and market-wide factors as discussed in Section 3.4.2, using panel data that combine all firms across all sample countries over the whole sample period to show the aggregate effects of market-wide determinants on leverage ratios. Market-wide factors include economic development, bank development, stock market development, inflation, level of interest rates, term structure of interest rates, and equity premium.

Overall, the results present similar relationships between firm-specific variables and leverage to the cross-sectional results from the previous section. All three country dummies are significantly different from zero suggesting that corporate capital structure decisions are significantly influenced by country-specific factors. However, similar to the role of firm-specific determinants, the role of market-wide determinants may vary depending on how severely the sample countries were hit by the crisis, and thus estimating across all countries may be misleading as effects may cancel each other out in the full set of sample countries as in Table 3.8.

Table 3.8 : Panel analysis of the firm-specific and market-wide determinants of capital structure : Whole sample period

Equation	Model -1	Model -2	Model -3	Model -4	Model -5	Model -6	Model -7	Model -8
Constant	-0.1207 *	-0.3364 ***	-0.3893 ***	-0.2616 ***	-0.3697 ***	-0.4562 ***	-0.3099 ***	-0.3590 ***
t-statistics	(-1.8500)	(-5.5600)	(-6.2400)	(-3.8900)	(-6.0600)	(-8.0900)	(-5.0300)	(-5.9600)
TANG	0.0633 ***	0.0700 ***	0.0762 ***	0.0882 ***	0.0820 ***	0.0803 ***	0.0727 ***	0.0802 ***
t-statistics	(2.6100)	(2.7200)	(2.9800)	(3.5500)	(3.2300)	(3.2300)	(2.8300)	(3.1800)
PROF	-0.2234 ***	-0.2265 ***	-0.2303 ***	-0.2357 ***	-0.2328 ***	-0.2343 ***	-0.2285 ***	-0.2337 ***
t-statistics	(-4.8800)	(-5.1200)	(-5.1800)	(-5.1100)	(-5.1900)	(-5.0900)	(-5.1600)	(-5.1500)
SIZE	0.0308 ***	0.0473 ***	0.0511 ***	0.0455 ***	0.0505 ***	0.0438 ***	0.0496 ***	0.0478 ***
t-statistics	(7.5300)	(12.1000)	(13.1000)	(11.4000)	(13.1000)	(10.9000)	(12.9000)	(12.2000)
GROW	-0.0009 *	-0.0010 **	-0.0010 **	-0.0006	-0.0009 *	-0.0007	-0.0011 **	-0.0008 *
t-statistics	(-1.8800)	(-2.2700)	(-2.2600)	(-1.1300)	(-1.9000)	(-1.4500)	(-2.3500)	(-1.7000)
NDTS	-0.5713 ***	-0.0825	-0.0689	-0.3320 **	-0.1144	-0.2820 *	-0.0669	-0.1756
t-statistics	(-3.3300)	(-0.4510)	(-0.3760)	(-1.9600)	(-0.6340)	(-1.6500)	(-0.3640)	(-0.9920)
LIQ	-0.0155 ***	-0.0143 ***	-0.0140 ***	-0.0145 ***	-0.0141 ***	-0.0145 ***	-0.0141 ***	-0.0143 ***
t-statistics	(-5.4800)	(-5.2000)	(-5.1100)	(-5.2500)	(-5.1300)	(-5.2500)	(-5.1300)	(-5.1900)
VOL	0.0012 ***	0.0014 ***	0.0014 ***	0.0014 ***	0.0014 ***	0.0014 ***	0.0014 ***	0.0014 ***
t-statistics	(3.8900)	(4.2800)	(4.1200)	(4.1400)	(4.1800)	(4.2000)	(4.1700)	(4.2800)
SPP	-0.0017	-0.0048	-0.0053	-0.0011	-0.0058	0.0047	-0.0056	0.0006
t-statistics	(-0.4710)	(-1.3100)	(-1.4400)	(-0.2790)	(-1.5900)	(1.2000)	(-1.5500)	(0.1470)
THDUM	0.1985 ***							
t-statistics	(9.5900)							
MLDUM	0.0395 ***							
t-statistics	(2.8000)							
SPDUM	0.0477 ***							
t-statistics	(2.9300)							
EDEV		0.0538 ***						
t-statistics		(4.4200)						
BKDEV			0.0070 ***					
t-statistics			(3.1500)					
MKDEV				-0.0166 ***				
t-statistics				(-5.0600)				
INF					0.0021 ***			
t-statistics					(4.2400)			
INT						0.0190 ***		
t-statistics						(6.7700)		
TERM							0.0035 ***	
t-statistics							(3.5200)	
EQPR								-0.0062 ***
t-statistics								(-6.0600)
Adj R^2	0.3643	0.3275	0.3235	0.3308	0.3218	0.3342	0.3240	0.3273
No. of obs.	7541	7541	7541	7541	7541	7541	7541	7530

$Leverage_{i,t} = \beta_1 + \beta_2 TANG_{i,t} + \beta_3 PROF_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 GROW_{i,t} + \beta_6 NDTS_{i,t} + \beta_7 LIQ_{i,t} + \beta_8 VOL_{i,t} + \beta_9 SPP_{i,t} + \beta_{10} MARKET\text{-}WIDE\ FACTORS_{i,t} + \alpha_i + \mu_i$

Market-wide determinants replace country dummies one at a time.The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. See Table 3.1 and 3.3 and Section 3.4 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

In addition, the aggregate effects from Table 3.8 may hide conflicting country-specific influences that some determinants may have on leverage ratio. Therefore, the sample countries are subsequently divided into two groups, countries least affected and countries most affected by the Asian crisis. Equation (3.2) is then augmented again with market-wide factors (excluding economic development dummy), one at a time over the whole sample period. The results for the pooled panels of the two country groupings are presented in Table 3.9 in comparison with the aggregate effect in Table 3.8. As the relationships between market-wide determinants and leverage found in Table 3.9 are in the opposite directions between two country groupings, the results show the importance of country groupings and how the severity of the crisis on the sample countries and their market developments may affect the role of market-wide determinants and may explain the variations of the determinants of capital structure among sample countries.

Table 3.9 : Panel analysis of the firm-specific and market-wide determinants of capital structure by country groupings: Whole sample period

	Panel A : Countries least affected by the crisis							Panel B : Countries most affected by the crisis						
Equation	**Model-1**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**	**Model-1**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**
Constant	-0.1116 *	-0.1628 **	-0.1515 **	-0.1082 *	-0.0174	-0.0658	-0.0751	-0.4404 ***	0.2317	0.0931	-0.4885 ***	-0.6053 ***	-0.5179 ***	-0.4647 ***
t-statistics	(-1.7700)	(-2.5100)	(-2.3500)	(-1.7000)	(-0.2450)	(-1.0400)	(-1.1900)	(-5.2900)	(1.3800)	(0.8360)	(-5.9900)	(-8.1700)	(-6.5600)	(-5.8000)
TANG	0.1572 ***	0.1396 ***	0.1437 ***	0.1561 ***	0.1514 ***	0.1455 ***	0.1467 ***	0.0082	0.0085	0.0095	0.0086	0.0118	0.0111	0.0091
t-statistics	(4.2400)	(3.8700)	(3.9800)	(4.2000)	(4.1500)	(4.0200)	(4.0700)	(0.2550)	(0.2750)	(0.3150)	(0.2710)	(0.3870)	(0.3520)	(0.2870)
PROF	-0.0830 ***	-0.0772 ***	-0.0779 ***	-0.0823 ***	-0.0806 ***	-0.0789 ***	-0.0787 ***	-0.3588 ***	-0.3637 ***	-0.3686 ***	-0.3540 ***	-0.3581 ***	-0.3630 ***	-0.3546 ***
t-statistics	(-2.7400)	(-2.7200)	(-2.7400)	(-2.7100)	(-2.7400)	(-2.7400)	(-2.7300)	(-8.1400)	(-8.2200)	(-8.3000)	(-7.9900)	(-8.0600)	(-8.1300)	(-8.0000)
SIZE	0.0294 ***	0.0315 ***	0.0309 ***	0.0296 ***	0.0299 ***	0.0305 ***	0.0305 ***	0.0502 ***	0.0413 ***	0.0315 ***	0.0493 ***	0.0403 ***	0.0473 ***	0.0469 ***
t-statistics	(6.5400)	(7.0200)	(6.9300)	(6.5900)	(6.7200)	(6.8500)	(6.8600)	(9.3800)	(7.3300)	(5.6900)	(9.2400)	(7.4800)	(8.8700)	(8.8500)
GROW	-0.0002	-0.0003	-0.0003	-0.0002	-0.0002	-0.0003	-0.0002	-0.0106	-0.0112	-0.0081	-0.0091	-0.0070	-0.0094	-0.0078
t-statistics	(-0.7760)	(-1.3900)	(-1.3100)	(-0.7280)	(-1.0300)	(-1.2400)	(-1.1800)	(-1.4800)	(-1.6200)	(-1.2900)	(-1.3000)	(-1.0700)	(-1.3500)	(-1.1700)
NDTS	-0.6221 ***	-0.5460 ***	-0.5633 ***	-0.6254 ***	-0.5919 ***	-0.5654 ***	-0.5629 ***	0.4333	0.0724	-0.3708	0.3739	-0.0387	0.2871	0.2605
t-statistics	(-2.7900)	(-2.6600)	(-2.7100)	(-2.7800)	(-2.7600)	(-2.7100)	(-2.6900)	(1.5100)	(0.2590)	(-1.3000)	(1.3000)	(-0.1370)	(1.0200)	(0.9150)
LIQ	-0.0051 ***	-0.0048 ***	-0.0049 ***	-0.0051 ***	-0.0050 ***	-0.0049 ***	-0.0049 ***	-0.0273 ***	-0.0279 ***	-0.0287 ***	-0.0275 ***	-0.0282 ***	-0.0275 ***	-0.0277 ***
t-statistics	(-2.9400)	(-2.8500)	(-2.8700)	(-2.9400)	(-2.8900)	(-2.8600)	(-2.8300)	(-4.3600)	(-4.3900)	(-4.4000)	(-4.3800)	(-4.4200)	(-4.4000)	(-4.3700)
VOL	0.0007 *	0.0005 *	0.0006 *	0.0007 *	0.0006 *	0.0006 *	0.0006 *	0.0014 ***	0.0013 ***	0.0013 ***	0.0014 ***	0.0013 ***	0.0013 ***	0.0014 ***
t-statistics	(1.9000)	(1.7200)	(1.7300)	(1.9200)	(1.8300)	(1.7600)	(1.7600)	(3.4700)	(3.4800)	(3.4100)	(3.5100)	(3.2800)	(3.2300)	(3.5000)
SPP	-0.0144 **	-0.0094	-0.0134 **	-0.0149 **	-0.0120 *	-0.0100	-0.0105	-0.0032	-0.0054	0.0196 ***	0.0009	0.0172 ***	0.0084 *	0.0080 *
t-statistics	(-2.1700)	(-1.4200)	(-2.0000)	(-2.2500)	(-1.8300)	(-1.5100)	(-1.5900)	(-0.7570)	(-1.2800)	(3.7100)	(0.2210)	(3.6000)	(1.9400)	(1.9000)
BKDEV		0.0104 ***							-0.1175 ***					
t-statistics		(4.4600)							(-5.2000)					
MKDEV			0.0139 ***							-0.0451 ***				
t-statistics			(3.9100)							(-7.7700)				
INF				-0.0020 ***							0.0161 ***			
t-statistics				(-2.7500)							(5.4800)			
INT					-0.0113 **							0.0316 ***		
t-statistics					(-2.3700)							(7.7200)		
TERM						0.0043 ***							-0.0432 ***	
t-statistics						(3.4000)							(-7.5100)	
EQPR							0.0129 ***							-0.0105 ***
t-statistics							(3.4300)							(-8.6000)
Adj R^2	0.2068	0.2303	0.2233	0.2084	0.2113	0.2192	0.2184	0.3784	0.3906	0.4133	0.3822	0.4001	0.3869	0.3910
No. of obs.	2395	2395	2395	2395	2395	2395	2395	5146	5146	5146	5146	5146	5146	5135

$Leverage_{i,t} = \beta_0 + \beta_1 TANG_{i,t} + \beta_2 PROF_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROW_{i,t} + \beta_5 NDTS_{i,t} + \beta_6 LIQ_{i,t} + \beta_7 VOL_{i,t} + \beta_8 SPP_{i,t} + \beta_9 MARKET\text{-}WIDE\ FACTORS_{i,t} + \alpha + \mu_{i,t}$

Market-wide determinants replace country dummies one at a time. The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. See Table 3.1 and 3.3 and Section 3.4 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

Table 3.8 shows a positive relationship between ***economic development*** and leverage as expected. The results show that firms in developing countries tend to issue more debt than firms in developed countries confirming the highest level of debt found in Thailand and the lowest level of debt found in Australia as shown by Figure 3.1.An expected positive relationship between ***bank development*** and leverage is also found from Table 3.8. However, once the sample countries are divided into 2 country groupings as in Table 3.9, the opposite relationship is found. Firms in countries least affected by the crisis use higher levels of debt when bank development is high while banks play an opposite role for firms in countries most affected by the crisis. Bigger size of banking sector does not guarantee higher borrowing capacities to firms in these countries. A similar pattern is found for the relationship between ***stock market development*** and leverage ratio. The results show that stock market development also plays a role in capital structure decisions. A negative relationship is found for firms in countries most affected by the crisis. When stock market development is high, firms in these countries tend to issue more equity. In contrast, a positive relationship is found for firms in countries least affected by the crisis.

A positive relationship between ***inflation*** and leverage is found for firms in countries most affected by the crisis showing that inflation reduces the real cost of employing debt. However, an inverse relationship is found for firms in countries least affected by the crisis. ***The level of interest rates*** is found to be positively related to leverage for firms in countries most affected by the crisis implying that firms in these countries are more concerned about the benefit of high interest rates as tax deductibility than the cost of borrowing itself. Higher interest rate means higher cost of borrowing. Even when the cost of borrowing is higher, firms still prefer debt to equity implying the higher cost of issuing equity. In addition, a positive relationship may also suggest that firms may be more concerned about the effects of future inflation on their cost of capital than the immediate risk of default. On the other hand, the direct role of interest rate is found for firms in countries least affected by the crisis where high interest rate means higher cost of borrowing leading firms in these countries to borrow less.

Term structure of interest rates is found to be negatively related to leverage for firms in countries most affected by the crisis implying that firms in these countries rely more on short-term borrowings. Therefore, when short-term loans are cheap relative to long-term loans, firms prefer debt to equity issues. On the other hand, a positive relationship is found for firms in countries least affected by the crisis. The results show that ***equity premium*** is found to be inversely related to leverage for firms in countries most affected by the crisis. This gives support to the market timing theory given that there is an overvaluation in the stock market; therefore, when equity premium is high due to the overvaluation, firms will prefer equity to debt in order to time the market. On the other hand, the evidence fails to support the market timing theory for firms in countries least affected by the crisis where a positive relationship is found.

The next step is to investigate whether the role of firm-specific and market-wide determinants changed as a result of the crisis. Table 3.10, Panel A, presents the estimates of equation (3.2) using a panel data set that includes all firms across all sample countries over the pre- and post-crisis periods where pre-crisis period covers the sample of 1993 to 1996 and post-crisis period covers the sample of 1998 to 2001. Similar to the full sample analysis, the sample countries are divided into two country groupings; countries least affected by the crisis and countries most affected by the crisis. The estimates based on the two country groupings are presented in Table 3.10, Panels B and C. The results from Table 3.10 show that market-wide factors play opposite roles for firms in different country groupings confirming the significance of dividing the sample countries into two country groupings based on the severity with which the countries were hit by the crisis.

Table 3.10 : Panel analysis of the firm-specific and market-wide determinants of capital structure: Pre- and post-crisis periods

Equation	Panel A : Pooled 4 countries											
	Model-1		Model-2		Model-3		Model-4		Model-5		Model-6	
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	-0.1600 **	-0.3295 ***	-0.0860	-0.1963 ***	-0.1877 ***	-0.2490 ***	-0.2282 ***	-0.3977 ***	-0.2189 ***	-0.1991 ***	-0.1423 **	-0.2410 ***
t-statistics	(-2.5100)	(-5.1300)	(-1.3500)	(-2.6700)	(-3.0400)	(-3.9900)	(-4.1500)	(-6.5000)	(-3.5600)	(-3.2000)	(-2.4200)	(-3.8000)
TANG	0.0415	0.0924 ***	0.0428 *	0.1062 ***	0.0430	0.1008 ***	0.0302	0.1051 ***	0.0445	0.0788 ***	0.0309	0.0984 ***
t-statistics	(1.5000)	(3.0900)	(1.6600)	(3.5800)	(1.5400)	(3.3900)	(1.1700)	(3.5400)	(1.6000)	(2.6200)	(1.1500)	(3.3100)
Wald Test		<9.5265> ***		<4.5673> **		<11.4796> ***		<12.5388> ***		<6.8513> ***		<10.9245> ***
PROF	-0.0581 *	-0.2952 ***	-0.0565 *	-0.3026 ***	-0.0583 *	-0.2994 ***	-0.0567 *	-0.3022 ***	-0.0580 *	-0.2836 ***	-0.0579 *	-0.2974 ***
t-statistics	(-1.9300)	(-7.1600)	(-1.8300)	(-7.2800)	(-1.9300)	(-7.2500)	(-1.7300)	(-7.2300)	(-1.9500)	(-6.9600)	(-1.7800)	(-7.2000)
Wald Test		<33.0499> ***		<35.0185> ***		<34.0728> ***		<34.4521> ***		<30.6850> ***		<33.5687> ***
SIZE	0.0329 ***	0.0562 ***	0.0297 ***	0.0521 ***	0.0332 ***	0.0552 ***	0.0233 ***	0.0512 ***	0.0342 ***	0.0535 ***	0.0257 ***	0.0555 ***
t-statistics	(7.5800)	(13.1000)	(7.0300)	(11.2000)	(7.5800)	(13.0000)	(5.3000)	(11.6000)	(7.7700)	(12.7000)	(5.7600)	(13.0000)
Wald Test		<29.3982> ***		<23.1154> ***		<26.6317> ***		<40.0684> ***		<21.0350> ***		<48.5267> ***
GROW	-0.0005 **	-0.0006	-0.0002	-0.0003	-0.0006 **	-0.0004	-0.0003	-0.0003	-0.0005 **	-0.0008	-0.0005 *	-0.0005
t-statistics	(-2.0200)	(-0.6850)	(-0.7960)	(-0.2720)	(-2.3700)	(-0.4530)	(-1.2600)	(-0.3070)	(-1.9600)	(-0.9490)	(-1.7900)	(-0.4890)
Wald Test		<0.0054>		<0.0740>		<0.0515>		<0.0940>		<0.0991>		<0.0001>
NDTS	0.0947	-0.2492	-0.0864	-0.4450 **	0.1232	-0.3342	-0.0812	-0.4227 *	0.0964	-0.2183	0.0036	-0.3145
t-statistics	(0.4170)	(-1.1300)	(-0.4730)	(-2.0500)	(0.5200)	(-1.5400)	(-0.4320)	(-1.9500)	(0.4260)	(-0.9940)	(0.0172)	(-1.4500)
Wald Test		<1.2876>		<4.2016> **		<2.3659>		<3.8138> *		<0.9888>		<2.0969>
LIQ	-0.0048 **	-0.0189 ***	-0.0050 **	-0.0193 ***	-0.0048 **	-0.0191 ***	-0.0053 **	-0.0193 ***	-0.0047 **	-0.0190 ***	-0.0053 **	-0.0190 ***
t-statistics	(-2.1300)	(-4.6300)	(-2.3200)	(-4.7100)	(-2.0700)	(-4.7100)	(-2.4300)	(-4.6800)	(-2.0900)	(-4.6500)	(-2.3500)	(-4.6800)
Wald Test		<11.9008> ***		<12.1883> ***		<12.5009> ***		<11.4693> ***		<12.1964> ***		<11.4718> ***
VOL	0.0010 **	0.0017 ***	0.0008 **	0.0017 ***	0.0010 **	0.0017 ***	0.0008 **	0.0017 ***	0.0010 **	0.0017 ***	0.0009 **	0.0017 ***
t-statistics	(2.3100)	(3.9700)	(2.0300)	(4.4300)	(2.3000)	(4.2200)	(1.9600)	(4.3900)	(2.3200)	(3.9800)	(2.1300)	(4.2000)
Wald Test		<3.0347> *		<5.2023> **		<3.5973> *		<5.8436> **		<2.9950> *		<4.4886> **
SPP	-0.0250 **	-0.0009	-0.0026	-0.0002	-0.0246 **	-0.0022	-0.0078	0.0061	-0.0258 **	-0.0031	-0.0110	-0.0046
t-statistics	(-2.2400)	(-0.1640)	(-0.2470)	(-0.0279)	(-2.1700)	(-0.4200)	(-0.7820)	(1.0900)	(-2.3000)	(-0.5970)	(-1.0700)	(-0.8340)
Wald Test		<21.1362> ***		<0.0008>		<18.0119> ***		<1.1971>		<18.7010> ***		<0.6947>
BKDEV	-0.0073 **	0.0091 ***										
t-statistics	(-1.9900)	(3.7100)										
Wald Test		<44.7136> ***										
MKDEV			-0.0217 ***	-0.0095 **								
t-statistics			(-6.7100)	(-2.2400)								
Wald Test				<8.1622> ***								
INF					0.0012 **	-0.0039 *						
t-statistics					(2.4700)	(-1.8600)						
Wald Test						<5.8217> **						
INT							0.0192 ***	0.0202 ***				
t-statistics							(6.7600)	(4.7300)				
Wald Test								<0.0605>				
TERM									-0.0021 *	0.0083 ***		
t-statistics									(-1.8000)	(6.5800)		
Wald Test										<68.5590> ***		
EQPR											-0.0125 ***	0.0051 *
t-statistics											(-5.4400)	(1.8800)
Wald Test												<41.2134> ***
Adj R^2	0.1988	0.3060	0.2397	0.3042	0.1966	0.3024	0.2390	0.3082	0.1985	0.3137	0.2251	0.3032
No. of obs.	1868	4780	1868	4780	1868	4780	1868	4780	1868	4780	1866	4771

$Leverage_{it} = \beta_0 + \beta_1 TANG_{it} + \beta_2 PROF_{it} + \beta_3 SIZE_{it} + \beta_4 GROW_{it} + \beta_5 NDTS_{it} + \beta_6 LIQ_{it} + \beta_7 VOL_{it} + \beta_8 SPP_{it} + \beta_9 MARKET\text{-}WIDE\ FACTORS_{it} + \alpha + \mu_{it}$

Market-wide determinants replace country dummies one at a time. The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not. See Table 3.1 and 3.3 and Section 3.4 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

Table 3.10 : Panel analysis of the firm-specific and market-wide determinants of capital structure: Pre- and post-crisis periods (continued)

Equation	Panel B : Countries least affected by the crisis											
	Model-1		Model-2		Model-3		Model-4		Model-5		Model-6	
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	-0.0245	-0.2885 ***	-0.0226	-0.2771 ***	-0.0213	-0.1882 ***	-0.0310	-0.0005	-0.0301	-0.1586 **	-0.0256	-0.1428 **
t-statistics	(-0.3470)	(-4.0300)	(-0.3210)	(-3.9300)	(-0.3070)	(-2.6500)	(-0.3950)	(-0.0055)	(-0.4330)	(-2.2400)	(-0.3690)	(-2.0000)
TANG	0.1189 ***	0.1546 ***	0.1183 ***	0.1565 ***	0.1161 ***	0.1850 ***	0.1190 ***	0.1665 ***	0.1186 ***	0.1564 ***	0.1194 ***	0.1555 ***
t-statistics	(2.8300)	(3.6500)	(2.8000)	(3.7000)	(2.7500)	(4.3400)	(2.8300)	(3.9100)	(2.8200)	(3.6800)	(2.8400)	(3.6800)
Wald Test		<0.7107>		<0.8155>		<2.6123>		<1.2409>		<0.7886>		<0.7302>
PROF	-0.0161	-0.1552 ***	-0.0161	-0.1529 ***	-0.0154	-0.1721 ***	-0.0161	-0.1602 ***	-0.0161	-0.1551 ***	-0.0160	-0.1545 ***
t-statistics	(-1.1000)	(-3.7800)	(-1.1000)	(-3.6900)	(-1.0700)	(-3.6500)	(-1.1000)	(-3.7400)	(-1.1000)	(-3.7500)	(-1.0900)	(-3.7700)
Wald Test		<14.2783> ***		<13.5836> ***		<13.3548> ***		<14.0173> ***		<14.0640> ***		<14.2156> ***
SIZE	0.0190 ***	0.0406 ***	0.0190 ***	0.0404 ***	0.0191 ***	0.0378 ***	0.0190 ***	0.0397 ***	0.0190 ***	0.0403 ***	0.0190 ***	0.0404 ***
t-statistics	(3.4100)	(7.7600)	(3.4000)	(7.7900)	(3.4300)	(7.1600)	(3.4100)	(7.6500)	(3.4100)	(7.7400)	(3.4100)	(7.7800)
Wald Test		<17.0803> ***		<17.0893> ***		<12.5863> ***		<15.9446> ***		<16.7602> ***		<17.0549> ***
GROW	0.0004	-0.0002	0.0004	-0.0002	0.0004	0.0000	0.0004	-0.0001	0.0004	-0.0002	0.0004	-0.0002
t-statistics	(1.2300)	(-0.7160)	(1.2300)	(-0.7160)	(1.2400)	(0.0769)	(1.2200)	(-0.3730)	(1.2300)	(-0.6610)	(1.2200)	(-0.6780)
Wald Test		<0.5131>		<0.5123>		<0.0059>		<0.1393>		<0.4374>		<0.4594>
NDTS	-0.1757	-0.7208 ***	-0.1764	-0.7392 ***	-0.1750	-0.8543 ***	-0.1757	-0.7757 ***	-0.1764	-0.7298 ***	-0.1746	-0.7153 ***
t-statistics	(-1.0400)	(-2.6400)	(-1.0500)	(-2.7300)	(-1.0400)	(-3.0900)	(-1.0400)	(-2.8400)	(-1.0500)	(-2.6700)	(-1.0400)	(-2.6100)
Wald Test		<6.9686> ***		<7.4653> ***		<9.5400> ***		<8.0891> ***		<7.1414> ***		<6.7993> ***
LIQ	-0.0011	-0.0055 ***	-0.0011	-0.0056 ***	-0.0011	-0.0058 ***	-0.0011	-0.0056 ***	-0.0011	-0.0056 ***	-0.0011	-0.0055 ***
t-statistics	(-0.4640)	(-3.2700)	(-0.4690)	(-3.3200)	(-0.4740)	(-3.4200)	(-0.4630)	(-3.3800)	(-0.4670)	(-3.2900)	(-0.4570)	(-3.2700)
Wald Test		<10.6630> ***		<11.0532> ***		<11.6851> ***		<11.3953> ***		<10.8289> ***		<10.6691> ***
VOL	0.0005	0.0008 **	0.0005	0.0008 **	0.0006	0.0010 ***	0.0005	0.0009 **	0.0005	0.0008 **	0.0005	0.0008 **
t-statistics	(0.8850)	(2.1500)	(0.8970)	(2.1400)	(0.9250)	(2.8500)	(0.8860)	(2.3000)	(0.8930)	(2.1200)	(0.8770)	(2.1700)
Wald Test		<4.6128> **		<4.5781> **		<8.1369> ***		<5.2848> **		<4.5003> **		<4.6912> **
SPP	0.0345 **	-0.0233 ***	0.0345 **	-0.0285 ***	0.0333 **	-0.0243 ***	0.0346 **	-0.0227 ***	0.0344 **	-0.0228 ***	0.0348 **	-0.0226 ***
t-statistics	(2.2800)	(-2.9400)	(2.2600)	(-3.6500)	(2.2100)	(-3.0500)	(2.2600)	(-2.8500)	(2.2700)	(-2.8700)	(2.2900)	(-2.8300)
Wald Test		<53.4790> ***		<64.9295> ***		<52.2888> ***		<51.6209> ***		<51.8757> ***		<51.4419> ***
BKDEV	-0.0005	0.0127 ***										
t-statistics	(-0.1370)	(5.1300)										
Wald Test		<26.3087> ***										
MKDEV			-0.0015	0.0210 ***								
t-statistics			(-0.3250)	(5.1500)								
Wald Test				<26.5724> ***								
INF					-0.0010	-0.0077						
t-statistics					(-1.3200)	(-1.5600)						
Wald Test						<2.4280>						
INT							0.0006	-0.0298 ***				
t-statistics							(0.1170)	(-4.1000)				
Wald Test								<16.8068> ***				
TERM									-0.0003	0.0081 ***		
t-statistics									(-0.2380)	(4.8100)		
Wald Test										<23.0924> ***		
EQPR											0.0002	0.0266 ***
t-statistics											(0.0454)	(5.0100)
Wald Test												<25.1031> ***
Adj R^2	0.1203	0.2670	0.1206	0.2646	0.1224	0.2325	0.1203	0.2491	0.1204	0.2623	0.1203	0.2638
No. of obs.	644	1491	644	1491	644	1491	644	1491	644	1491	644	1491

$Leverage_{it} = \beta_0 + \beta_1 TANG_{it} + \beta_2 PROF_{it} + \beta_3 SIZE_{it} + \beta_4 GROW_{it} + \beta_5 NDTS_{it} + \beta_6 LIQ_{it} + \beta_7 VOL_{it} + \beta_8 SPP_{it} + \beta_9 MARKET\text{-}WIDE\ FACTORS_{it} + \alpha + \mu_{it}$.

Market-wide determinants replace country dummies one at a time. The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not. See Table 3.1 and 3.3 and Section 3.4 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

Table 3.10 : Panel analysis of the firm-specific and market-wide determinants of capital structure: Pre- and post-crisis periods (continued)

Equation	Panel C : Countries most affected by the crisis											
	Model-1		Model-2		Model-3		Model-4		Model-5		Model-6	
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre_Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	1.3123 ***	0.6878 ***	0.2440 **	0.3687 ***	-0.2036 **	0.2124 **	-0.2714 ***	-0.3477 ***	-0.2350 ***	-0.1106	-0.2180 ***	-0.0022
t-statistics	(5.4800)	(3.3000)	(2.2700)	(3.3900)	(-2.4000)	(1.9800)	(-3.4500)	(-3.9800)	(-2.5900)	(-1.3100)	(-2.7000)	(-0.0235)
TANG	-0.0358	0.0091	-0.0375	0.0127	-0.0434	0.0080	-0.0412	0.0181	-0.0456	0.0146	-0.0407	0.0081
t-statistics	(-1.1700)	(0.2460)	(-1.2200)	(0.3470)	(-1.3800)	(0.2140)	(-1.3400)	(0.4850)	(-1.3800)	(0.3890)	(-1.3100)	(0.2130)
Wald Test		<0.0603>		<0.1204>		<0.0460>		<0.2356>		<0.1510>		<0.0454>
PROF	-0.7670 ***	-0.3372 ***	-0.7843 ***	-0.3437 ***	-0.7731 ***	-0.3401 ***	-0.7835 ***	-0.3396 ***	-0.7746 ***	-0.3403 ***	-0.7827 ***	-0.3337 ***
t-statistics	(-9.4800)	(-7.3200)	(-9.8900)	(-7.5000)	(-9.5900)	(-7.4500)	(-9.7500)	(-7.3800)	(-9.2800)	(-7.3200)	(-9.7900)	(-7.2900)
Wald Test		<87.1225> ***		<92.4796> ***		<89.8830> ***		<92.9938> ***		<87.3299> ***		<96.1158> ***
SIZE	0.0236 ***	0.0405 ***	0.0197 ***	0.0297 ***	0.0247 ***	0.0451 ***	0.0200 ***	0.0425 ***	0.0321 ***	0.0477 ***	0.0198 ***	0.0488 ***
t-statistics	(3.9500)	(6.9400)	(3.3400)	(5.0000)	(3.9900)	(8.3000)	(3.2900)	(7.6300)	(4.8900)	(8.9000)	(3.3100)	(8.9900)
Wald Test		<8.3509> ***		<2.8423> *		<14.0071> ***		<16.3438> ***		<8.5423> ***		<28.5580> ***
GROW	-0.0100 ***	-0.0252 ***	-0.0096 **	-0.0233 ***	-0.0097 **	-0.0258 ***	-0.0089 **	-0.0250 ***	-0.0100 **	-0.0252 ***	-0.0091 **	-0.0260 ***
t-statistics	(-2.6000)	(-3.3500)	(-2.5600)	(-3.3400)	(-2.4000)	(-3.3400)	(-2.3000)	(-3.3700)	(-2.2800)	(-3.2700)	(-2.3600)	(-3.3000)
Wald Test		<4.0851> **		<3.8862> **		<4.3420> **		<4.6931> **		<3.8886> **		<4.5999> **
NDTS	1.0372 ***	-0.2264	0.9088 **	-0.6710 **	1.2550 ***	-0.0375	0.9809 ***	-0.2031	1.6700 ***	0.0215	0.9164 **	0.1081
t-statistics	(2.9500)	(-0.7440)	(2.5400)	(-2.1800)	(3.6600)	(-0.1230)	(2.7600)	(-0.6690)	(4.8100)	(0.0706)	(2.5300)	(0.3510)
Wald Test		<17.2339> ***		<26.3514> ***		<18.1026> ***		<15.1919> ***		<29.3253> ***		<6.8906> ***
LIQ	-0.0086 ***	-0.0441 ***	-0.0085 ***	-0.0449 ***	-0.0082 ***	-0.0435 ***	-0.0084 ***	-0.0441 ***	-0.0075 **	-0.0436 ***	-0.0084 ***	-0.0434 ***
t-statistics	(-2.7600)	(-4.1100)	(-2.6100)	(-4.1700)	(-2.7100)	(-4.1300)	(-2.6400)	(-4.1100)	(-2.5300)	(-4.1100)	(-2.5800)	(-4.0500)
Wald Test		<10.8921> ***		<11.4223> ***		<11.2153> ***		<11.0518> ***		<11.5690> ***		<10.6613> ***
VOL	0.0002	0.0016 ***	0.0001	0.0015 ***	0.0000	0.0016 ***	0.0000	0.0016 ***	0.0001	0.0016 ***	0.0001	0.0017 ***
t-statistics	(0.5210)	(3.2100)	(0.3180)	(3.0100)	(0.0965)	(3.0700)	(0.0593)	(3.0500)	(0.2940)	(3.1000)	(0.2520)	(3.3100)
Wald Test		<10.2993> ***		<9.0866> ***		<9.4049> ***		<9.3248> ***		<9.6089> ***		<10.9547> ***
SPP	-0.0019	0.0026	0.0161	0.0137 **	-0.0311 ***	0.0001	-0.0121	0.0255 ***	-0.0489 ***	0.0194 ***	0.0112	0.0005
t-statistics	(-0.1590)	(0.4280)	(1.3700)	(2.1400)	(-2.7500)	(0.0221)	(-1.1300)	(3.4600)	(-3.7500)	(2.8200)	(0.9600)	(0.0685)
Wald Test		<0.1831>		<4.5827> **		<26.8829> ***		<11.9509> ***		<98.7953> ***		<0.0047>
BKDEV	-0.2973 ***	-0.0965 ***										
t-statistics	(-7.4200)	(-4.2800)										
Wald Test		<79.4126> ***										
MKDEV			-0.0428 ***	-0.0494 ***								
t-statistics			(-8.3600)	(-6.5200)								
Wald Test				<0.7607>								
INF					0.0371 ***	-0.0399 ***						
t-statistics					(7.2200)	(-4.9700)						
Wald Test						<91.9974> ***						
INT							0.0281 ***	0.0386 ***				
t-statistics							(7.7100)	(5.1900)				
Wald Test								<2.0112>				
TERM									-0.0293 ***	-0.0339 ***		
t-statistics									(-4.1100)	(-4.7600)		
Wald Test										<0.4177>		
EQPR											-0.0333 ***	0.0067 *
t-statistics											(-7.9600)	(1.6500)
Wald Test												<97.8604> ***
Adj R^2	0.4149	0.3460	0.4325	0.3638	0.3985	0.3438	0.4202	0.3468	0.3648	0.3401	0.4312	0.3375
No. of obs.	1224	3289	1224	3289	1224	3289	1224	3289	1224	3289	1222	3280

Leverage $_{it} = \beta_0 + \beta_1 TANG_{it} + \beta_2 PROF_{it} + \beta_3 SIZE_{it} + \beta_4 GROW_{it} + \beta_5 NDTS_{it} + \beta_6 LIQ_{it} + \beta_7 VOL_{it} + \beta_8 SPP_{it} + \beta_9$ MARKET-WIDE FACTORS $_{it} + \alpha + \mu_{it}$

Market-wide determinants replace country dummies one at a time. The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not. See Table 3.1 and 3.3 and Section 3.4 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

When looking at Table 3.10, Panel A, in comparison with Panels B and C, the results show that the effects of market-wide factors are offsetting each other. In order to see the real effects of each market-wide factor, the estimates based on country groupings are more reliable. Although the findings show that the financial crisis did not influence the direction of the role of each market-wide factor, it is found to have influenced the attitude of each factor. One main finding is that firms in countries least affected by the crisis do not take much account of market-wide factors when they determine their financing decisions during normal stable economic conditions. However, once the economic conditions start to be unstable, firms rely more on the market-wide factors when they decide their debt-equity mix. On the other hand, firms in countries most affected by the crisis consistently take account of market-wide factors regardless of the economic conditions but the severe effect from the crisis changed the significance of the role of a few market-wide factors.

In the countries least affected by the crisis, ***bank development*** plays a significant role in determining the capital structure of firms only for the post-crisis period. The high development of banking sectors induces firms to borrow more after the crisis. On the other hand, in countries most affected by the crisis, although the relationship was consistently negative, the role of bank development reduced significantly after the crisis implying that firms in these countries rely more on bank development when they determine their capital structure. One possible explanation is the decrease in credit supply due to the fact that banks were also severely hit by the crisis. The role of ***stock market development*** also becomes significant for firms in countries least affected by the crisis only for the post-crisis period. On the other hand, the relationship between stock market development and leverage is consistently negative for pre- and post-crisis periods for firms in countries most affected by the crisis.

The crisis has turned a positive relationship between ***inflation*** and leverage found for the pre-crisis period to a negative relationship during the post-crisis period for firms in countries most affected by the crisis. A positive relationship suggests that inflation reduces the real cost of employing debt. When inflation was high, firms preferred to issue debt with the hope that inflation would get lower in the future. However, higher inflation rate due to the crisis led lenders to lend less and at higher interest rates which then affect the cost of borrowing. The relationship between ***level of interest rate (term structure of interest rates)*** and leverage is consistently positive (negative) for both pre- and post-crisis period for firms in countries most affected by the crisis. Wald tests reveal that the crisis did not affect the role of level of interest rates and term structure of interest rates on firms' borrowing decisions. On the other hand, level of interest rate and term structure of interest rates became significant factors for firms in countries least affected by the crisis only for the post-crisis period. Finally, the crisis changed a negative relationship between ***equity premium*** and leverage to a positive one for the post-crisis period for firms in countries most affected by the crisis. The results suggest that the overvaluation no longer existed after the crisis. On the other hand, a significant relationship is found for firms in countries least affected by the crisis only for the post-crisis period.

In conclusion, the results show that the financial crisis had several significant effects on the relationships between market-wide factors and leverage. In several cases, the crisis changed the direction of the impact of the market-wide factors. The findings also show that firms in this region behave differently and rely on each market-wide factor in different ways depending on how severely they were hit by the crisis and how well their stock market development is. The crisis also has significant effects for firms in countries least affected by the crisis. The evidence is provided by the fact that firms started to rely on market-wide factors only in the post-crisis period.

3.6.4.2 Legal and Corporate Governance Determinants

Having examined the role of firm-specific and market-wide determinants of capital structure, the focus now turns to the role of legal and corporate governance factors. Table 3.11 presents the estimates of equation (3.2) using a panel data set that includes all firms across all sample countries over the full sample period. Due to the nature of the data, only the full sample is analysed. Legal and corporate governance factors (quality of legal enforcement, legal protection, ownership concentration, and information intermediary activity) have been included as explained in Section 3.4.2.

Table 3.11 : Panel analysis of the firm-specific and legal and corporate governance determinants of capital structure: Whole sample period

Equation	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6
Constant	-0.2855 ***	-0.3726 ***	0.2243 **	-0.4057 ***	-0.1008	-0.1387 *
t-statistics	(-4.7700)	(-5.7400)	(2.5100)	(-6.0000)	(-1.2600)	(-1.7000)
TANG	0.0634 **	0.0802 ***	0.0697 ***	0.0768 ***	0.0686 ***	0.0900 ***
t-statistics	(2.5000)	(3.1400)	(2.9000)	(2.9900)	(2.6900)	(3.6600)
PROF	-0.2229 ***	-0.2321 ***	-0.2265 ***	-0.2304 ***	-0.2256 ***	-0.2369 ***
t-statistics	(-5.0300)	(-5.1800)	(-4.9100)	(-5.1700)	(-5.0800)	(-5.0900)
SIZE	0.0410 ***	0.0508 ***	0.0307 ***	0.0507 ***	0.0445 ***	0.0432 ***
t-statistics	(10.2000)	(13.0000)	(7.5100)	(13.1000)	(11.1000)	(10.4000)
GROW	-0.0010 **	-0.0009 *	-0.0007	-0.0010 **	-0.0010 **	-0.0006
t-statistics	(-2.2500)	(-1.9400)	(-1.5000)	(-2.1400)	(-2.1400)	(-1.0800)
NDTS	-0.2034	-0.1006	-0.6264 ***	-0.0690	-0.1455	-0.4255 **
t-statistics	(-1.1600)	(-0.5570)	(-3.6500)	(-0.3770)	(-0.8140)	(-2.5100)
LIQ	-0.0147 ***	-0.0141 ***	-0.0156 ***	-0.0141 ***	-0.0145 ***	-0.0147 ***
t-statistics	(-5.3300)	(-5.1300)	(-5.4900)	(-5.1300)	(-5.2700)	(-5.2800)
VOL	0.0014 ***	0.0014 ***	0.0012 ***	0.0014 ***	0.0014 ***	0.0013 ***
t-statistics	(4.2800)	(4.1700)	(3.9000)	(4.1900)	(4.3000)	(4.0300)
SPP	-0.0034	-0.0063 *	-0.0028	-0.0058	-0.0044	-0.0070 *
t-statistics	(-0.9290)	(-1.7200)	(-0.7570)	(-1.5800)	(-1.2300)	(-1.9100)
CORR	0.0200 ***					
t-statistics	(6.7200)					
CRR		0.0026				
t-statistics		(0.5210)				
SHR			-0.0822 ***			
t-statistics			(-8.9100)			
OWN				0.1071 *		
t-statistics				(1.8200)		
AUD					-0.2204 ***	
t-statistics					(-5.3300)	
ANA						-0.0077 ***
t-statistics						(-5.0800)
Adj R^2	0.3397	0.3213	0.3623	0.3220	0.3321	0.3335
No. of obs.	7541	7541	7541	7541	7541	7541

$Leverage_{it} = \beta_0 + \beta_1 TANG_{it} + \beta_2 PROF_{it} + \beta_3 SIZE_{it} + \beta_4 GROW_{it} + \beta_5 NDTS_{it} + \beta_6 LIQ_{it} + \beta_7 VOL_{it} + \beta_8 SPP_{it} + \beta_9 \text{LEGAL AND CORPORATE GOVERNANCE FACTORS}_{it} + \alpha + \mu_{it}$

Legal and corporate governance determinants replace country dummies one at a time. The *t-statistics* are the t-values adjusted for heteroscedasticity consistent standard errors. Industry dummies are included in order to control for industry effect but no statistically significant effect was found. See Table 3.1 and 3.3 and Section 3.4 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively

The results show a negative relationship between ***efficiency and integrity of legal system*** and leverage. Firms in countries with efficient legal systems prefer to use higher equity issues. ***Legal protection*** is also found to play an important role in determining the capital structure of firms. The coefficient of creditor rights shows a significant and positive relationship between the creditor rights index and leverage. The results confirm that when creditors are better protected by law, firms' borrowing is likely to be higher. The opposite relationship is found between the shareholder rights index and leverage suggesting that when shareholders are better protected, firms are likely to raise their capital through equity issues.

A positive relationship is found between ***ownership concentration*** and leverage. Firms in this region, with the exception of Australian firms, have concentrated ownership structures leading to lower levels of asymmetric information between lenders and borrowers and lower transaction costs. Because of easier access to borrowing, firms in countries with high ownership concentrations may find it easier to borrow. ***Information intermediary activity*** is another factor that significantly influence firms' capital structure. As auditors and analysts help to transmit information to the markets, the level of asymmetric information between firms and the markets should be lower when they are involved; therefore, firms are likely to issue equity.

In summary, the results confirm that country-specific factors (market-wide and legal and corporate governance) are as important as firm-specific characteristics in determining corporate capital structure. The results show that the coefficients of market-wide variables are highly significant and vary depending on the maturity of the stock market development and how severely the countries were hit by the crisis. Firms in different country groupings finance their projects in different ways suggesting the importance of country groupings. The findings confirm that a firm's capital structure is not only determined by its characteristics but also by the environment in which it operates.

3.7 Summary

In contrast to the irrelevancy theorem of Modigliani and Miller (1958), capital structure does matter and there are some specific factors that explain differences of capital structure across countries once the assumptions of Modigliani and Miller (1958) are relaxed. The analysis in this chapter adds to the literature by (i) focusing on firms in the Asia Pacific region, namely Thailand, Malaysia, Singapore and Australia; (ii) investigating the effect of the financial crisis on firms' capital structure; (iii) examining the effects of country-specific factors and (iv) investigating the determinants of capital structure based on two country groupings categorized by the severity with which each country was hit by the crisis. In this chapter the determinants of the capital structure of four countries have been analysed using both firm-specific and country-specific factors. The results show the variation in the determinants of capital structure across sample countries in the region. A firm's characteristics are basic important determinants of capital structure in the Asia Pacific region in the same direction as firms in other regions with the exception of earnings volatility. The results give support to the trade-off, market timing and pecking order theories. Although not significant for all sample countries, firm size and tangibility are found to be positively related to leverage. On the other hand, profitability, growth, non-debt tax shield, liquidity and share price performance are found to be inversely related to leverage.

In addition to firm-specific variables, both groups of country-specific factors (market-wide factors and legal and corporate governance factors) are also found to play an important role in capital structure decisions. The results are consistent with the research of Antoniou et al. (2002) that capital structure decisions are not only the product of firms' characteristics but also the corporate governance and institutional environment that they are operating in. The main interesting finding is firms' different behaviour found when sample countries were divided into two country groupings: (i) countries least affected by the crisis and (ii) countries most affected by the crisis. This country grouping is based mainly on how severely the countries were hit by the crisis but also can be linked to the maturity of the stock market in each country. The results show that firms in the different country groupings do rely significantly on market-wide factors but in opposite directions. The results also reveal that the financial crisis had a significant effect on both firm-specific and market-wide determinants of the capital structure of firms in this region. The relationships between determinants and leverage altered significantly between pre- and post-crisis periods.

In conclusion, although there are some variations in determinants of capital structure across countries in the Asia Pacific region, most of the time firms in this region rely on the same determinants in the same directions as the results found in most previous papers for firms in other regions. The results are consistent with the findings of Wiwattanakantang (1999), who examined financing policies in Thailand, that capital structure choices in Thailand are affected by similar factors as in developed economies. It can be concluded that firms in the Asia Pacific region do follow the way managers in other regions make their financing decisions. This gives robustness to results from previous papers such as Rajan and Zingales (1995) on G-7 countries. It implies that, to a certain extent, there are some universal factors that firms in different regions consider when they determine their capital structure. The analysis from this chapter also suggests a few lines of research. First, there are other related factors that might be important to firms when they determine their capital structure, such as ownership structure, because the data is not available for our sample countries. Second, this chapter shows only effects in term of regression analysis. However, practically, managers might determine their capital structure differently. Therefore, case studies or survey research might help to reveal more of the variation in term of capital structure across countries.

Chapter 4*

The Determinants of Debt Maturity Structure

4.1 Introduction

Corporate debt maturity decision is an integral part of the capital structure decision and is one of the most important financing decisions because a badly chosen mix of short- and long-term debt can result in inefficient liquidation of a positive net present value project. Under an imperfect market, the choice of debt maturity can also be used as a signalling device in order to provide information about firms' quality, creditability and future prospects. The debate on the existence of an optimal debt maturity structure can be traced back to Modigliani and Miller's (1958) seminal paper which not only proposes the irrelevancy of capital structure but also implies that maturity of debt has no effect on firms' value. Stiglitz (1974) also explicitly analyses the irrelevancy of debt maturity choice. Therefore, originally under a number of assumptions of perfect capital markets, all financial decisions including debt maturity do not matter. However, Morris (1976) suggests there is a role for short-term debt in reducing shareholder's risk if there is uncertainty about future interest rates due to the unavoidable inter-temporal risk. Therefore, in this context, debt maturity can affect firms' value.

Subsequent theoretical literature has extensively introduced market imperfections and their effects on optimal corporate debt maturity and firms' value. While there is a vast amount of both theoretical and empirical literature on firms' choice of debt and equity, there is much less investigating firms' choice of corporate debt maturity. This theoretical literature offers arguments for four main hypotheses: (i) moral hazard and agency hypothesis (Myers, 1977; Barnea et al., 1980); (ii) tax hypothesis (Brick and

* The main elements of this chapter have appeared in Deesomsak et al. (2005).

Ravid, 1985, 1991; Kane et al., 1985; Lewis, 1990); (iii) adverse selection and signalling hypothesis (Flannery, 1986); and (iv) liquidity risk hypothesis (Diamond, 1991). Despite an extensive amount of theoretical literature on debt maturity, there is less empirical work on the determinants of debt maturity than on debt-equity decisions. The first generation of empirical studies emerged as a by-product of the investigation of the determinants of corporate capital structure such as Titman and Wessels (1988). This was followed by a number of empirical studies that primarily focused on corporate capital structure and then decomposed leverage ratios into short-term and long-term debt ratio (Booth et al., 2001; Bevan and Danbolt, 2002). These empirical studies find that determinants of capital structure vary significantly depending on the maturity of the debt component being analysed. Therefore, the analysis of capital structure is incomplete without a detailed investigation of all forms of debt. Recently, much more work has been done directly in the area of debt maturity. Several studies have set out to test debt maturity theories and then empirically explain the observed debt maturity structure patterns.[50]

On the strength of both theoretical and empirical results, it is now widely accepted that debt maturity structure choice is one of the most important financing decisions and that a sub-optimal decision could lead to under-investment or an inefficient and ineffective choice of investment. It is possible that the relationship between capital structure and its determinants may vary between short- and long-term debt because the related costs of short- and long-term debt are different and because they have different incentive characteristics. Firms might decide to use short-term debt as a buffer when they want to change their capital structures (Bennett and Donnelly, 1993). High contracting costs also induce short-term debt. Despite this wealth of debt maturity

[50] Direct empirical evidence on debt maturity structure was given by Barclay and Smith (1995), Guedes and Opler (1996), Stohs and Mauer (1996), Demirguc-Kunt and Maksimovic (1999), Ozkan (2000, 2002), Scherr and Hulburt (2001), Barclay et al. (2003), Fan et al. (2004) and Antoniou et al. (2006) among others.

structure literature, both theoretical predictions and empirical evidence are still mixed. Research on the determinants of firms' maturity structure choice has until recently been limited to firms in developed countries. However, recent research shows that there are many similarities in the underlying factors of firms' debt maturity choices both in the developed and developing countries (Demirguc-Kunt and Maksimovic, 1999). Little is known about the empirical determinants of corporate debt maturity structure especially for firms in Asian Pacific countries, particularly with the aspects of the impact from the financial crisis on these determinants.

Therefore, the contribution of this chapter is the presentation of important international empirical evidence by examining the determinants of debt maturity of listed firms in Thailand, Malaysia, Singapore and Australia to determine the relative importance and potential effects of firm- and country-specific factors in corporate debt maturity decisions. It also presents evidence of the effects of the 1997 Asian financial crisis on the determinants of corporate debt maturity structure. The objectives of this chapter are to investigate (i) firm- and country-specific determinants of the debt maturity structure of firms in the Asia Pacific region; (ii) whether and how the financial crisis of 1997 in East Asia affects the determinants of the debt maturity structure of firms in this region; and (iii) why the determinants of corporate debt maturity structure in this region are different across countries that are at different stages of economic and financial development.

This chapter is organized as follows. Section 2 briefly reviews the insight of the main debt maturity hypotheses. Section 3 then examines the potential firm- and country-specific determinants of debt maturity structure, develops testable propositions, discusses methodology and presents the measurement of variables. Section 4 describes data and descriptive statistics. Section 5 presents the empirical results and section 6 concludes.

4.2 Debt Maturity Hypotheses

Previous research has put forward several hypotheses that identify factors that determine corporate debt maturity which can be categorized into four main hypotheses: (i) moral hazard and agency hypothesis; (ii) tax hypothesis; (iii) adverse selection and signalling hypothesis; and (iv) liquidity risk hypothesis.[51] This section briefly discusses how each hypothesis relates to the debt maturity structure of firms.

4.2.1 Moral Hazard and Agency Hypothesis

The moral hazard and agency hypothesis emphasizes the role of short-term debt in reducing agency problems. There are two main types of agency problem that are caused by the conflict between managers and debtholders; (i) underinvestment and (ii) asset substitution. When a firm has a future growth option, the benefits of these investments will be shared between shareholders and debtholders. Because part of the benefits will go to debtholders, managers might be reluctant to undertake the project if undertaking it means reducing the wealth of shareholders, assuming that managers aim to maximize shareholders' wealth. Shareholders may not capture enough of the return; therefore, managers may pass over new positive net present value projects. The reduced incentive to undertake that project leads to a decrease in investment opportunity set and ultimately to a decrease in the value of the firm. These problems are severe especially for risky firms with high growth opportunities. Myers (1977) points out that the magnitude of the underinvestment problem can be directly proportional to the maturity of debt. On the other hand, the asset substitution problem is known as the risk incentive cost of debt or risk shifting. Examples of the asset substitution problem are when shareholders intend to increase their payoffs by increasing the project risk or when firms that were financed with risky debt have an incentive to shift from low risk to high risk assets.

[51] See Ravid (1996) for the extensive survey of the various theoretical studies investigating the maturity structure of corporate debt.

There are several ways for firms to prevent asset substitution and underinvestment problems as well as to gain back the benefits of investment from debtholders. Myers (1977) and Barnea et al. (1980) suggest that firms can control underinvestment problems by decreasing the overall leverage, by restricting covenants or by shortening the effective maturity of its debt. Short-term debt can help reduce underinvestment problems if it matures or expires before growth options are exercised because there is an opportunity for firms to re-contract or re-negotiate. Refinancing its long-term debt before the growth option exercises allows debt to be repriced so that gains from the new investment do not go to debtholders. Therefore, short-term debt is preferable for firms with high growth. Myers (1977) assumes that the cost of rolling over short-term debt is higher than the cost of issuing long-term debt otherwise all firms would prefer short-term debt regardless of the severity of agency problems.[52] Barnea et al. (1980) argue that short-term debt can also mitigate adverse risk incentives of debt financing or asset substitution or risk shifting problems. Since short-term debt is less sensitive to shifts in risk of firms' underlying assets or changes in the variance of projects, it will reduce shareholders' incentives to engage in low-risk and high-variance projects leading to a reduction in loss of value. Firms with more growth options can face more severe asset substitution problems because it is likely to be easier to increase the risk of new investments. Therefore, it is suggested that high growth firms issue short-term debt to help reduce asset substitution problems.

In addition to using maturity of debt to mitigate these agency problems, banks can play an important role in hypotheses development. The predictions of the moral hazard and agency hypothesis can vary depending on the relationship between firms and banks. Because banks have a number of advantages over the public market in gathering information, renegotiating loans and enforcing other loan contract terms, firms should

[52] The higher cost of short-term debt includes higher floatation costs, higher opportunity costs of time management in dealing with more frequent debt issue and greater reinvestment risk and potential costs of illiquidity (Barclay and Smith, 1995).

be able to use other tools than shortening maturity of debt to reduce agency cost problems for risky (low quality) firms. As a consequence, in countries where the level of relationship between firms and their banks is high, there will be less use in managing debt maturity to mitigate agency problems. Therefore, the effect of the moral hazard and agency hypothesis on firms' debt maturity should be less significant in high bank related countries than in low bank related countries.

4.2.2 Tax Hypothesis

Brick and Ravid (1985) were the first to provide a framework for tax discussion. They show that debt maturity decisions are irrelevant. Tax might be affecting capital structure decisions but not debt maturity decisions. However, if any of the conditions in the irrelevance proposition is violated, debt maturity decision will matter. The tax hypothesis was then introduced by Brick and Ravid (1985, 1991) under both interest rate certainty and interest rate uncertainty. Under interest rate certainty, it is beneficial for firms to issue long-term debt if the yield curve is upward sloping because long-term debt provides a higher tax shield which helps to reduce the firm's tax liabilities leading to an increase in the firm's market value. The impact of long-term debt with an upward-sloping yield curve is even greater under interest rate uncertainty because the uncertainty increases the capacity of having long-term debt leading to greater tax benefits from long-term debt. Kane et al. (1985) establish that firms lengthen debt maturity if the tax advantages of debt are not less than amortized floatation costs. On the other hand, Lewis (1990) argues in favour of irrelevancy in the presence of taxes. In sum, long-term debt appears to be preferable to short-term debt because firms try to optimize their debt maturity by focusing on interest tax shields. However, irrelevance may happen if the term structure of interest rates is flat.

4.2.3 Adverse Selection and Signalling Hypothesis

According to the adverse selection and signalling hypothesis, rational investors can get information about firms by observing firms' choice of debt maturity. Flannery (1986) argues that when there is asymmetric information between lenders and firms, the nature of equilibrium is determined by transaction or floatation costs. The signalling model assumes that managers have better or timelier information about firm value than investors. In the presence of asymmetric information, the market cannot distinguish between good quality or low risk firms and bad quality or high-risk firms. Maturity is chosen to minimize the effects of private information on financing costs. There is a bias toward short-term debt which is induced by asymmetric information. Firms with favourable information avoid using long-term debt because they expect to be able to borrow under more favourable terms later. Firms with private information that they have relatively low risk or high quality (high risk or low quality) would prefer short-term debt (long-term debt) in order to avoid paying a market premium which reflects a probability of future credit quality problems that is above (below) their expectations for their quality. Therefore, it predicts debt maturity to be an upward (downward) sloping function of firms' risk (quality).

4.2.4 Liquidity Risk Hypothesis

The liquidity risk hypothesis also assumes the presence of asymmetric information. Firms have private information about their credit quality. However, a firm also has a liquidity risk which is defined as the risk that a firm is unable to pay back its debt because of deterioration in financial or economic conditions and therefore will be liquidated by its lenders. It is suggested that firms trade off the benefit of short-term debt in improving credit quality rating against their liquidity risk. Diamond (1991) argues that firms with high credit ratings or favourable private information will issue short-term debt because the benefit of upgrading ratings at the time of refinancing short-term debt is higher than the liquidation risk. Therefore, the benefit of using short-term debt for low risk (high quality) firms is that there is a high possibility that they will be revealed to the market as being at low risk or good quality at the time of refinancing; therefore, they can continue paying relatively low interest rates. On the other hand, firms with lower (intermediate) credit ratings or unfavourable private information would prefer long-term debt because the liquidity risk is higher. They prefer long-term debt in order to avoid the possibility that they will be revealed as being at high risk or low quality and will be required to pay relatively high rates or the possibility that they will be rejected for funds at the time of refinancing. Ideally, firms with the lowest credit ratings or lowest quality would also prefer long-term debt but they would be forced to use short-term debt because their access to the long-term debt market is limited due to their level of credit rating. Therefore, the differences between the prediction of adverse selection and signalling hypothesis and liquidity risk hypothesis in term of quality or credit risk of firms is that lenders may refuse to issue long-term debt to high risk firms to mitigate moral hazard and adverse selection problems.

4.3 Methodology, Hypotheses Development and Variable Identification

4.3.1 Firm-Specific Determinants

There is evidence to show that some factors might be captured by panel data analysis and the effect of some variables on debt maturity might not be picked up by cross-sectional analysis. Johnson (1997) estimates the equation in a single equation Ordinary Least Square (OLS) framework as the robustness test and suggests that OLS regression can be relatively robust to specification errors, multicollinearity problems and error-in-variables. There are a number of advantages that make panel analysis more suitable for this line of research as mentioned in Section 3.4. The panel data set should also be utilized because it captures the dynamic of financing decisions of firms. Therefore, to test the hypotheses regarding firm-specific determinants of debt maturity structure, the analysis starts with the OLS estimation using unbalanced panel data.[53] Individual firm's debt maturity structure (MAT) is modelled as a function of k firm-specific factors in a pooled cross-sectional and time-series framework. More specifically, the following relationship is estimated using OLS for each country[54]:

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^{N} \gamma_k FF_{k,i,t} + \alpha_t + \mu_{i,t} \qquad (4.1)$$

where, $Y_{i,t}$ is firm's i debt maturity structure at time t, measured at the accounting year-end; $FF_{k,i,t}$ is a vector of k firm i's specific factors. α_t captures firm-invariant time-specific effects and is the same for all firms at a given point in time but varies through time. Including α_t helps control for both observable and unobservable aggregate effects. The full sample covers the period of 1993 to 2001. To investigate the possible effects of the 1997 Asian crisis, equation (4.1) is re-estimated over two sub-sample periods: (i) the pre-crisis period of 1993-1996; and (ii) the post-crisis period of 1998-2001. Because the crisis started in mid-July 1997, the data for 1997 are excluded when analysing the sub-sample periods. Wald-statistics are also estimated to test for any statistically significant changes in the role of the identified variables as a consequence of the financial crisis.

Debt Maturity

One of the most significant differences in the empirical studies on debt maturity structure decisions is the formulation of the dependent variable or the measurement of debt maturity. Most studies consider some forms of a debt ratio. They differ in whether book or market values are used and also whether how long the maturity of long-term

[53] Cross-sectional and fixed effect analyses are applied as alternative methodologies for robustness tests.
[54] All model specifications include industry dummies, but their coefficients are not reported here. Previous empirical studies that also include industry dummies in the model to control for industry effects are Barclay and Smith (1995), Stohs and Mauer (1996) and Fan et al. (2004) among others.

debt is considered. In general, previous empirical studies have followed two approaches in studying the determinants of corporate debt maturity structure: (i) balance-sheet approach (the percentage of a firm's total debt that matures in certain periods) and (ii) incremental approach (maturity of bond issuance). The balance-sheet approach argues that in real life a debt issue is not a single operation; therefore, firms must take into account their current structure of assets and liabilities. This approach assumes that firms follow an optimal policy on a continuous basis. This can be tested by regressing a measure of maturity of the firm's debt against various variables. This approach defines debt maturity as a percentage of a firm's total debt that matures in more than a certain period of time (such as in Barclay and Smith, 1995)[55] or as the weighted-average maturity of a firm's liability item (such as in Stohs and Mauer, 1996; Scherr and Hulburt, 2001).[56] The most commonly used measure of debt maturity structure is the ratio of long-term debt to total debt.[57] However, different previous studies employ different maturity of debt to calculate this measure. The most commonly used maturity periods of debt are 1 year, 3 years and 5 years. Although there is no clear conclusion of definition sensitivity of debt maturity structure measure in previous studies as in capital structure studies, there are a few studies that find evidence of definition sensitivity in debt maturity structure studies (for example, Ozkan, 2000).

On the other hand, the incremental approach argues that the model is better to be tested by regressing the maturity of new issues on various variables. The incremental approach has been used by several empirical studies (Guedes and Opler, 1996; Stohs and Mauer, 1996). They examine debt maturity structure using term to maturity which

[55] This measure is also applied by Demirguc-Kunt and Maksimovic (1999); Ozkan (2000, 2002); Danisevska (2002); Barclay et al. (2003); Fan et al. (2004) and Antoniou et al. (2006) among others.

[56] The weighted-average maturity of a firm's liability is a more precise measure of corporate debt maturity than the proportion of total debt that matures in more than a certain period. However, not many studies have applied the weighted average maturity because data is not available and if they are available, obtaining them is time-consuming.

[57] Several previous empirical studies have combined the studies of debt maturity structure with capital structure and use the proportion of long-term debt or short-term debt of total assets as proxy for debt maturity structure. However, previous studies that directly focus on debt maturity structure mostly use the proportion of long-term debt to total debt.

should be a more appropriate proxy for debt maturity structure. However, the data is difficult to obtain especially for certain countries. Those who employ the incremental approach argue that balance sheet data often involves the averaging of financing decisions over time, which might resulting in misleading indications of the choice of debt maturity. In contrast, research using an incremental approach is better at dealing with debt choice issues because identification of debt type is really achieved and there is no bias of averaging of financing decision over time. Incremental approach is preferred when examining whether firms' choice of corporate debt maturity can signal their future prospects to the market and examining the effect of tax based theories on debt maturity choice. However, it is inappropriate and noisy to use this approach to test the moral hazard and agency hypothesis that suggests firms to match their maturity of assets and maturity of liabilities. Berger et al. (2005) suggest that tests based on incremental approaches (focusing on debt at issuance time) are more advantageous for testing the effect of risk and asymmetric information than tests based on a balance sheet approach (focusing on the existing maturity of debt) where risk and asymmetric information may be different as decisions were made at different historical points in time.

Due to the limited data available, debt maturity structure is defined as the proportion of long-term debt to total debt where long-term debt includes debt that matures in more than 1 year (*MAT*).[58,59] Prior empirical studies have identified several factors that can affect a firm's choice of debt maturity structure. Based on relevant debt maturity structure theories and availability of the data, firm-specific determinants

[58] An example of studies that define long-term debt as debt maturing in more than 3 years is Barclay and Smith (1995) and for debt maturing in more than 5 years is Ozkan (2000, 2002) among others.

[59] It should also be noted that there are limitations of using this approach. First of all, there is a problem concerning the misclassification of long-term debt in short-term debt category. Long-term debt that is long term in nature such as 10 year government bond may be categorized as short-term debt in the analysis if there is less than 1 year left in its maturity. However, by nature this type of debt should be classified as long-term debt. Secondly, there are different types of debt such as bank debt, commercial paper, private placements, debentures, notes, and bonds, etc. which are important components of liabilities of firms and may have different implications on bankruptcy cost, liquidation decisions and seniority of debt. Due to the data limitation, these aspects are not taken into account in the analysis.

included in the model are leverage, firm size, growth opportunities, earnings volatility, liquidity, profitability, share price performance, asset maturity, and firm quality.[60]

Table 4.1, Panel A, presents the measurement of firm-specific variables while Table 4.2, Panel A, summarizes the relationship postulated by different theories between firm-specific variables and debt maturity.

Table 4.1: Indicators of variables

Panel A : Debt Maturity and Firm-Specific Determinants

Variables		Definition	Source
Debt Maturity	MAT	Long-Term debt / Total debt	Datastream
Leverage	LEV	Debt to total capital = Total debt / (Total debt+MV of equity + BV of preference share)	Datastream
Firm Size	SIZE	Natural Logarithm of assets	Datastream
Growth Opportunity	GROW	Market-to-book ratio = (Total assets – Book value of equity + Market value of equity) / Total assets	Datastream
Earnings Volatility	VOL	Absolute value of $\frac{[(EBIT_t - EBIT_{t-1})]}{EBIT_{t-1}}$ - average of $\frac{[(EBIT_t - EBIT_{t-1})]}{EBIT_{t-1}}$	Datastream
Liquidity	LIQ	Current assets/ Current liabilities	Datastream
Profitability	PROF	Earnings before interest, tax and depreciation/ Total assets	Datastream
Share Price Performance	SPP	The first difference of the logs of annual share prices (matched to the month of firms' fiscal year end)	Datastream
Asset Maturity	AMAT	Total fixed assets / Total assets	Datastream
Firm Quality	QUA	Altman's Z-score*	Datastream

Panel B : Market-Wide Determinants

Determinants		Indicators	Source
Economic Development	EDEV	Dummy equal to 1 for developing economy and 0 otherwise	Datastream
Bank Development	BKDEV	Monthly Bank assets / GDP (matched to the month of firms' fiscal year end)	Datastream
Stock Market Development	MKDEV	Monthly Market capitalization / GDP (matched to the month of firms' fiscal year end)	Datastream
Term Structure of Interest Rates	TERM	Government Bond Yield (long-term) – Monthly lending Rate (matched to the month of firms' fiscal year end)	Datastream
Inflation	INF	Changes in monthly consumer price index (matched to the month of firms' fiscal year end)	Datastream

Panel C : Legal and Corporate Governance Determinants

Determinants		Thailand	Malaysia	Singapore	Australia	Definition	Source
Level of Corruption	CORR	6.95	4.9	0.87	1.45	See Table 2.4	Fan et al. (2004)
Creditor Rights	CRR	3	4	4	1	See Table 2.5	La Porta et al. (1998)
Shareholder Rights	SHR	2	4	4	4	See Table 2.5	La Porta et al. (1998)
Ownership Concentration	OWN	0.47	0.54	0.49	0.28	See Table 2.8	La Porta et al. (1998)
Information Intermediary Activity	AUD	0.58	0.66	0.99	0.89	See Table 2.7	Fan et al. (2004)

* Altman's Z-score (Proxy for quality and default risk) (High score means low probability of bankruptcy)
Manufacturing firms = (1.2*X1) + (1.4*X2) + (3.3*X3) + (0.6*X4) + (1*X5)
Non-manufacturing firms = (6.56*X1) + (3.26*X2) + (6.72*X3) + (1.05*X4)
X1 = working capital / total assets;
X2 = retained earnings / total assets;
X3 = EBIT / total assets;
X4 = market value / total liabilities;
X5 = sales / total assets

60 The set of variables is consistent with those identified by Barclay and Smith (1995), Demirguc-Kunt and Maksimovic (1999), Fan et al. (2004) and Antoniou et al. (2006)

Table 4.2 : Expected relation between debt maturity structure and firm-specific and country-specific determinants

Panel A : Firm-Specific Determinants

Determinants	**Positive**	**Negative**	**Mostly found / Expected relation**
Leverage	Liquidity risk hypothesis	Moral hazard and agency hypothesis	Positive
Firm Size	Moral hazard and agency hypothesis Signalling hypothesis Access to the market, transaction cost	Liquidity risk hypothesis	Positive
Growth Opportunity	Liquidity risk hypothesis	Moral hazard and agency hypothesis Signalling hypothesis	Negative
Earnings Volatility	Liquidity risk hypothesis	Moral hazard and agency hypothesis Bankruptcy cost	Negative
Liquidity	-	Capacity	Negative
Profitability	Tax hypothesis	-	Positive
Share Price Performance	Signalling hypothesis Market timing theory	Optimistic behaviour	Positive
Asset Maturity	Moral hazard and agency hypothesis Liquidity, financial distress, cash flow	Priority of claim	Positive
Firm Quality		Signalling hypothesis Moral hazard and agency hypothesis Liquidity risk hypothesis (non-monotonic)	Negative / Non-monotonic

Panel B : Market-Wide Determinants

Determinants	**Positive**	**Negative**	**Mostly found / Expected relation**
Bank Development	Creditor right	Monitoring system	Negative
Stock Market Development	Information	Other sources of finance	Positive
Term Structure of Interest Rates	Tax hypothesis	Market timing theory Optimistic behaviour	Positive
Inflation	-	Uncertainty	Negative

Panel C : Legal and Governance Determinants

Determinants	**Positive**	**Negative**	**Mostly found / Expected relation**
Level of Corruption	-	Moral hazard and agency hypothesis	Negative
Creditor Rights	-	Monitoring System	Negative
Shareholder Rights	Moral hazard and agency hypothesis	-	Positive
Ownership Concentration	-	Moral hazard and agency hypothesis	Negative
Information Intermediary Activity	Moral hazard and agency hypothesis	-	Positive

Leverage

As suggested by several previous studies such as Stohs and Mauer (1996), the regressions would be misspecified if leverage were not controlled. Leverage (*LEV*) is defined as total debt to total capital. Liquidity risk hypothesis predicts that a firm would lengthen its debt maturity as leverage increases in order to offset the higher probability of a liquidity risk and to delay their exposure to bankruptcy risk (Diamond, 1991 and Stohs and Mauer, 1996). Firms with high leverage try to avoid sub-optimal liquidation by choosing long-term debt (Diamond, 1991, 1993). Heavily levered firms would borrow long-term debt in order to make sure that they will earn enough money to repay their creditors (Heyman et al., 2003). Therefore, under the liquidity risk hypothesis, leverage is expected to be positively correlated with debt maturity.

On the other hand, Myers (1977) suggests that underinvestment problem can be mitigated by reducing leverage or by shortening debt maturity. If firms reduce debt to reduce underinvestment problems, there is less need to shorten their debt maturity structure. Therefore, the moral hazard and agency hypothesis predicts a negative relationship between leverage and debt maturity. Moreover, higher leverage causes higher monitoring costs; therefore, the relationship should be negative because shorter maturity accelerates the frequency of creditors' audit. Scherr and Hulburt (2001) suggest that the relationship between leverage and debt maturity might depend on the trade off between the costs of underinvestment and the cost of increased liquidity risk. On the one hand, a firm whose growth opportunity is more important should use short-term debt in order to reduce underinvestment problems while risking increasing liquidity risk. On the other hand, a firm whose liquidity problem is more important should use long-term debt instead of short-term debt to avoid sub-optimal liquidation.

Although not as common, Mitchell (1993), Guedes and Opler (1996), Barclay et al. (2003) are among those who find a negative and significant relationship between leverage and debt maturity. Guedes and Opler (1996) argue that a negative and significant relationship might be the effect of credit quality instead of the direct effect of leverage. If leverage can be used as a measure for credit quality, highly levered firms or those with high credit quality would use short-term debt which is partly consistent with the predictions of the signalling hypothesis. Barclay et al. (2003) argue that a negative relationship confirms the theory that leverage and maturity are substitutes for each other instead of a supplement in reducing underinvestment and over-investment problems. In contrast, there are a few previous studies that suggest that the relationship between leverage and debt maturity depends on the methodology used.[61]

Firm Size

As in Antoniou et al. (2006), Fan et al. (2004) and Esho et al. (2002) among others, firm size (*SIZE*) is proxied by the natural logarithm of total assets. There are several studies concluding that there are differences in the determinants of debt maturity structure between small firms and large firms because small firms differ from large firms in several important ways including tax, ownership, flexibility, industry, economies of scale, access to the market and level of asymmetric information (Scherr and Hulburt, 2001; Heyman et al., 2003). Smaller firms are more likely to face a higher potential conflict between shareholders and debtholders such as risk shifting, asset substitution and claim dilution. They tend to have more growth options and thus higher agency costs of debt than larger firms. Managers of small firms usually hold substantial amounts of equity in firms they manage; therefore, actions that benefit shareholders would also benefit managers. Because managers of small firms control the action of firms, they could be more risk seeking than managers for larger firms. Because of this conflict and risk, debtholders reduce the risk of lending to smaller firms by restricting

[61] For example, Johnson (1997) finds leverage to be insignificantly and negatively related to debt maturity in fixed effects regression while a negative and significant relationship is found for short-term maturity (a positive and significant relationship with long-term maturity) in pool time-series and cross-sectional regressions.

the length of debt maturity to smaller firms. The moral hazard and agency hypothesis suggests small firms reduce their maturity of debt to control this conflict (agency cost of debt). In addition, large firms tend to issue more long-term debt because of easier access to capital markets because the possibility of bankruptcy is low for large firms. Therefore, smaller firms are generally precluded from accessing long-term debt markets. As a result, smaller firms tend to rely more heavily on bank debt which has shorter maturity than public debt.

Moreover, the cost of issuing long-term debt is so high that smaller firms could not afford it. These high costs make smaller firms less responsive to small year-to-year changes in the economic environment. Small firms rely much more on short-term debt to minimize floatation and transaction costs of issuing long-term debt. Due to a large fixed component of issuance costs for public issues, there exist significant scale economies which smaller firms are less able to take advantages of. Larger firms would issue public debt which normally has longer maturity than private debt while smaller firms would go for private or bank debt which has shorter maturity (Barclay and Smith, 1995). Smaller firms have lower proportions of collateralizable assets to growth opportunity than larger firms; therefore, larger firms with higher tangible assets can issue more long-term debt. Signalling hypothesis also predicts a positive relationship between firm size and debt maturity. Firms with large potential information asymmetries are likely to issue short-term debt because long-term debt is associated with larger information costs. Due to economies of scale in information production and distribution, smaller firms might produce less information to outsiders leading to higher levels of asymmetric information. Firms with smaller potential asymmetric information, such as larger firms, will be less concerned about the signalling effects of their debt maturity choice and are more likely to issue long-term debt.

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The liquidity risk hypothesis suggests that firms with higher probability of defaults (smaller firms) will issue long-term debt leading to a negative relationship between firm size and debt maturity.[62] Moreover, the negative relationship implies that firm size can be a measure of credit quality. However, if firm size is a proxy for credit quality such as in Johnson (1997), a non-monotonic relationship is expected. High and low quality firms would prefer short-term debt while intermediate quality firms would issue long-term debt; therefore, large and small firms are expected to issue short-term debt and medium size firms would prefer long-term debt. In contrast to other studies, Danisevska (2002) finds no significant effect of firm size on debt maturity structure. Antoniou et al. (2006) find mixed evidence among their sample countries.[63] Scherr and Hulburt (2001) suggest that mixed evidence found by previous empirical studies on the effect of firm size and debt maturity structure could be caused by the fact that firm size could be used as a proxy for several variables such as agency cost, information asymmetry, credit quality, etc.

Growth Opportunity

Following Barclay and Smith (1995) and Guedes and Opler (1996), the ratios of market value of firms' asset to their book value is used as a proxy for growth opportunities (*GROW*) where market value equals book value of total assets minus book value of equity plus market value of equity. Firms with high market to book ratio are likely to have higher growth opportunities. Asset substitution and underinvestment problems are likely to be high for firms with high growth opportunity because it is easier to increase the risk of new investments than assets in place. Shortening debt

[62] Guedes and Opler (1996) find a negative relationship that firms with a high probability of bankruptcy (small firms) would prefer to issue long-term debt, supporting liquidity risk argument.

[63] A positive and significant relationship is found for UK firms while there is no significant effect found for French and German firms. The positive relationship found in the UK is consistent with previous studies for the US which might be due to the fact that financial traditions of UK and US firms are quite similar. On the other hand, bankruptcy costs, corporate ownership structure and long run relationship between firms and creditors are different in France and Germany than in the UK.

maturity is one of the options to mitigate these problems. Short-term debt can deter firms from shifting into riskier projects or from applying for negative net present value projects because short-term debt requires borrowers to re-apply for funding at regular short periods when information is revealed. Therefore, firms facing greater growth opportunities tend to issue shorter-term debt leading to a prediction of a negative relationship between growth opportunities and debt maturity.

Stulz and Johnson (1985) suggest that another way to control the underinvestment problem is to issue fixed claims with high priority which helps to limit wealth transfers from shareholders to bondholders. This reduces the incentive of shareholders to pass up the good projects. Short-term debt should have a higher effective priority outside bankruptcy because it is paid first. Therefore, high growth firms should issue more short-term debt. Adverse selection and signalling hypothesis also predicts a negative relationship because firms with large information asymmetries (such as high-growth firms) are likely to issue short-term debt to signal to the market and to avoid larger information costs that come with long-term debt. Stulz (1990) argues that firms with fewer growth opportunities should use more long-term debt because long-term debt is most effective at limiting managerial discretion in making bad investment decisions. Short-term debt is also preferable when firms have high growth opportunities because it can help to maintain financial flexibility (Barclay and Smith, 1999). Titman (1992) argues that high growth firms could benefit from issuing short-term debt and swapping it for a fixed rate contract because high growth firms have higher bankruptcy probability and optimistic future outlooks. Therefore, a low proportion of long-term debt is expected for firms with high growth opportunities.[64]

The liquidity risk hypothesis predicts a positive relationship between growth opportunity and debt maturity because shortening debt maturity in order to reduce asset

[64] Previous studies (Barclay and Smith, 1995; Guedes and Opler, 1996; Ozkan, 2000, 2002; Barclay et al., 2003; Danisevska, 2002; Fan et al., 2004) find that firms with high growth opportunities tend to issue significantly more short-term debt.

substitution and underinvestment problems comes with costs (liquidity risk).[65] Previous studies have found a negative and significant relationship between leverage and growth opportunities which implies that firms cannot reduce underinvestment problems completely by shortening maturity of debt; therefore, high growth firms need to use less debt. The reason why firms cannot shorten their debt maturity to avoid underinvestment problems totally is that short-term debt comes with a risk of optimal liquidation leading to increases in expected bankruptcy costs which, therefore, will reduce firms' optimal leverage. Liquidity risk hypothesis predicts that firms with high long-term growth opportunities which require ongoing managerial discretion should prefer to hedge or buy insurance against liquidity risk in form of long-term debt (Diamond, 1991). Therefore, firms can avoid inefficient liquidation of their risky growth opportunities by issuing long-term debt. The liquidity risk hypothesis predicts that firms with risky growth opportunities have an incentive to use long-term debt in order to avoid the threat of inefficient liquidation. Hart and Moore (1995) also argue that long-term debt could be used as a discipline device for self-interested managers and prevent them from financing unprofitable investments (overinvestment problem).

Earnings Volatility

As in Antoniou et al. (2006), earnings volatility (*VOL*) is defined as the absolute difference between the annual percentage change in earnings before interest and taxes and the average of this change over the sample period. Kane et al. (1985) argue that there is a trade off between bankruptcy costs and the cost of raising debt and pre-period tax advantage of debt financing which leads to the optimal debt maturity structure. Firms choose to have longer debt maturity structures when the earnings volatility is low because they do not have to rebalance their capital structure frequently due to expected bankruptcy costs. Firms with higher business risk are more likely to experience the

[65] Johnson (1997) explores the trade-off between the role of short-term debt in reducing underinvestment and asset substitution problems on the one hand and the liquidity risk on the other hand.

rating downgrade and more likely to be subject to higher agency costs; thus, they have an incentive to lower agency costs by shortening maturity. However, Johnson (1997) argues that firms with high earnings volatility may experience some difficulties in repaying debt; therefore, they would prefer long-term debt.

Liquidity

Liquidity (*LIQ*) is measured as a ratio of current assets to current liabilities which is the same measure as in Antoniou et al. (2006). Nam and Redulescu (2004) argue that liquidity should be negatively related to debt maturity. Excessive liquidity reduces managers' ability to commit to investment; therefore, high liquidity ratios may reduce firms' fund raising capacity, which in turn shorten the maturity for available debts. They argue that non-depreciating but liquid assets such as inventory do not support long-term debt. Therefore, a negative relationship between liquidity and debt maturity is expected.

Profitability

Profitability (*PROF*) is defined as the ratio of earnings before interest, tax and depreciation to total assets. Based on the tax hypothesis, profitability should be positively related to debt maturity because profitable firms have higher taxable income leading to higher tax expenses and long-term debt offers better tax advantages than short-term debt. Scherr and Hulburt (2001) argue that taxability can influence firms' debt maturity because choosing long-term debt over short-term debt can create a tax timing option to repurchase and reissue this debt. Fukuda et al.'s (1998) model suggests that the effect of profitability on debt maturity depends on whether liquidation risk or renegotiation exists. Based on their model, profitability is expected to be positively related to debt maturity if a liquidity risk is present but the opposite relationship is expected if there exists a chance of renegotiation.

Share Price Performance

Same as in Antoniou et al. (2006), share price performance is defined as the first difference of the logs of annual share prices, matched to the month of firms' fiscal year-end (*SPP*). The market timing theory predicts a positive relationship between share price performance and debt maturity by suggesting that undervalued (overvalued) firms issue short-term (long-term) debt in order to signal their undervaluation (overvaluation) because it is expected that undervalued (overvalued) firms will have positive (negative) abnormal stock returns at the issuance time (Antoniou et al., 2006). Share price performance such as past stock return can be used as a indicator of debt maturity because it is generally accepted, as in Lucas and McDonald's (1990) model, that firms will issue informationally disadvantaged securities (long-term debt) when share price increases (Guedes and Opler, 1996). If managers behave optimistically, firms with favourable information (positive share price) would try to avoid long-term debt by issuing short-term debt instead because they hope to get more favourable terms later leading to a negative relationship.

Asset Maturity

As in Demirguc-Kunt and Maksimovic (1999), asset maturity (*AMAT*) is defined as the ratio of fixed assets to total assets which is an indicator of the structure of firms' assets. This measure is commonly referred to as the measure of tangibility in capital structure studies. Several studies, including Ozkan (2000), have applied the ratio of net property, plant and equipment to annual depreciation expense as a proxy for asset maturity. As the measure for debt maturity structure is the proportion of long-term debt to total debt, it would be more appropriate to use the ratio of long-term asset to total assets as a proxy of asset maturity to test the matching maturity of assets and maturity of liabilities. It is believed that firms should match the maturity structure of their assets with the maturity structure of their liabilities. Thus firms with high long-term assets are expected to have more long-term debt. Myers (1977) argues according to the moral hazard and agency hypothesis that firms schedule debt payment to match the decline in asset value as a way to lower agency costs of debt. Therefore, firms with more long-term assets should be able to support more long-term debt. Because debt repayments are scheduled to correspond with the value of assets; matching maturity can reduce the agency costs of debt. Issuing debt that matures at the end of the life of assets can help to re-establish the appropriate investment incentives when new investment is required. Matching maturity also allows firms to extend their debt maturity without increasing the agency costs of debt. It can also be used to reduce the severity of asset substitution leading to a positive relationship between asset maturity and debt maturity because tangibility is an inverse proxy for the severity of asset substitution. When firms have few tangible assets, their degree of asset substitution is high. Therefore, they would prefer to use short-term debt to reduce the asset substitution problem. Matching maturity can also control for risk and costs of financial distress (Antoniou et al., 2006).

Moreover, matching maturity can also help firms with their cash flow problems which occur (i) when debt maturity is shorter than asset maturity leading to insufficient cash to pay back the debt obligation when it is due or (ii) when debt maturity is longer than asset maturity leading to the cease of cash flow while firms still have some debt commitment to pay or to the problem of firms finding new assets to support the existing debt services. It is risky to have a maturity of debt shorter than a maturity of assets because assets might not yield enough profit to pay back debt but it is also risky if maturity of debt is longer than maturity of assets because debt has to be repaid while there is no more return from the assets. Therefore, matching maturity can help firms reduce these insufficient cash flow problems leading to a prediction of a positive relationship (Stohs and Mauer, 1996; Nam and Redulescu, 2004). Maturity matching is therefore a form of hedging device that reduces expected financial distress costs.

Emery (2001) argues that firms can avoid term premiums by maturity matching. Because fixed assets are normally used as an indicator of the structure of firms' assets, firms with a high ratio of fixed assets should have greater borrowing capacity because fixed assets can be used as collateral. This collateral argument supports the matching maturity hypothesis because net fixed assets shift financing from short-term debt to long-term debt while inventories (intangible assets) shift financing from equity to short-term debt and long-term debt (Thies and Klock, 1992). Moreover, the value of tangible fixed assets is stronger in the long-run while in the short-run asset specificity reduces the collateral value and also increases operational risk and the probability of bankruptcy (Grossman and Hart, 1982). The liquidity risk hypothesis also suggests that financing long-term assets with long-term debt can reduce liquidity risk. All the above arguments imply that firms with long-term assets will have more long-term debt. Although short-term and long-term debts have the same priority in bankruptcy, short-term debt has a higher effective priority outside bankruptcy because it is paid first. Therefore, issuing short-term debt may offer benefits which are similar to using secured debt to control an underinvestment problem.

Firm Quality

Altman's Z-Score (Altman, 1984) is used as a proxy for credit quality (*QUA*).[66,67] It is taken as a prediction of the probability of bankruptcy. Higher scores indicate lower probability of bankruptcy (high quality firms). The signalling hypothesis predicts a negative relationship between firm quality and debt maturity. Due to the presence of information asymmetry, debt issues are valued as if they have average quality. Flannery (1986) and Kale and Noe (1990) examine the signalling implications of firms' debt maturity choices and suggest that debt maturity structure can be used as a signal of

[66] This measure is also used by Esho et al. (2002).
[67] A number of studies have separated the test of quality of firms from credit / default risk or credit rating. However, because firms with low default risk or high credit rating can also be considered as having high quality, the analysis of quality of firms, credit/ default risk and credit rating are combined in this chapter.

change in firm quality or future earnings anticipated by insiders when they are systematically better informed than outsiders. When level of asymmetric information is high, the market's required default premium is excessive which is unreasonable on long-term debt because of the outsider's perception of a higher profitability of credit quality deterioration than the firm's or insider's. Therefore, good quality firms should want to issue short-term debt in order to signal to the market that they do not fear scrutiny from the markets. Low-quality firms cannot mimic this behaviour because they cannot afford the high positive transaction costs of rolling over short-term debt. Therefore, they will self-select into long-term debt instead. Because pricing of long-term debt is more sensitive to changes in firm value than the pricing of short-term debt, mispricing problems of long-term debt are greater. If the market cannot distinguish between high- and low-quality firms, high (low) quality firms will issue less (more) underpriced or undervalued short-term (long-term) debt. Therefore, according to the adverse selection and signalling hypothesis, firm quality is negatively related to debt maturity. However, if there is no asymmetric information or transaction cost, the choice of debt maturity is indifferent between good and bad quality firms.

Diamond (1991, 1993) extend the signalling model and add several important elements to the analysis based on asymmetric information. He analyses a trade-off between the signalling incentive and a refinancing risk or liquidity risk. Liquidity risk is defined as the risk that borrowers will be forced into costly liquidation because creditors choose to liquidate the firm instead of refinancing their debt. While previous models end up with either short-term or long-term debt, they suggest that high quality firms would prefer a combination of short-term and long-term debt while bad firms will generally prefer long-term debt. Issuing only long-term debt will create disadvantages because there is no separation between good and bad borrowers while short-term debt comes with a cost of liquidation risk. Houston and Venkataraman (1994) also propose a model in which a high quality firm would prefer a mix of short-term and long-term debt. High quality firms prefer short-term debt because liquidity risk is irrelevant to them and because they would be able to take advantage of the revelation of future good news (the positive information effect).

Liquidity risk is crucial for the credit of medium quality firms with greater risk because creditors could refuse to extend the loan if the credit decreases and might try to take control or liquidate the firm. A small downgrade might result in liquidation of firms. Firms with greater risk (medium quality firms) would issue longer-term debt in order to prevent the exposure to liquidity risk. Similarly, low quality firms ideally would like to use longer-term debt as well to prevent liquidity risks but they are unable to do so because creditors would not want to lend money in the long term to low quality borrowers due to extreme adverse selection problems. Because bad news about the credit quality of firms may arrive at the refinancing date, investors would not want to extend credit to these firms. Also the rate of return required to compensate investors for bearing long-term credit risk might be too high for these firms, forcing them to be screened out of the long-term debt market. Because short-term debt can allow firms to reduce their debt's interest rate at refinancing due to revealed positive information, very low-risk firms should take this opportunity to borrow in the short term. Therefore, the liquidity risk hypothesis suggests a non-monotonic relationship between credit quality and debt maturity in that low and high quality firms would borrow short-term debt while long-term debt is preferable for intermediate quality firms.

It has been found that the relationship between debt maturity and quality of firms depends on the approaches applied in measuring debt maturity. Most studies that applied a balance sheet approach have found support for the predictions of a non-monotonic relationship suggested by the liquidity risk hypothesis and also for the predictions of the signalling hypothesis. Most studies that applied an incremental approach (new debt issues) do not have this sort of findings. Barclay and Smith (1995), Stohs and Mauer (1996), Guedes and Opler (1996), and Scherr and Hulburt (2001) among others find support for non-monotonic relationships and the signalling hypothesis that only high quality firms would issue short-term debt while Schiantarelli and Sembenelli (1997) find a positive relationship between debt maturity and firm quality.

4.3.2 Country-Specific Determinants

Corporate financing decisions are likely to be determined not only by a firm's characteristics but also by country-specific factors such as economic conditions, corporate governance and institutional environment as shown in the previous chapter.[68] This section focuses on how a country's corporate governance and institutional structures affect firms' debt maturity structure. A limited number of recent studies have documented this aspect. Since each country has a different institutional system, the observed debt maturity pattern in a cross-country sample should vary systematically across countries. Different market conditions can influence a firm's borrowing decisions by affecting the absolute level of long-term and short-term debt and by creating incentives for firms to alter the mix of long-term and short-term debt (Demirguc-Kunt and Maksimovic, 1999). Therefore, this section explores the extent to which cross-country differences in debt maturity choices can be explained by differences in economic conditions, corporate governance and institutional environment.

Similar to the analysis of country-specific determinants of capital structure in the previous chapter, the country-specific explanatory variables used in the chapter are also classified into two groups: (i) market-wide determinants, which include economic development, bank development, stock market development, term structure of interest

[68] Demirguc-Kunt and Maksimovic (1999); Booth et al. (2001); Fan et al. (2004); Antoniou et al. (2006)

rates and inflation; and (ii) legal and corporate governance determinants, which include quality of legal enforcement, legal protection, ownership concentration and information intermediary activity.[69] To test whether differences in economic conditions between countries have any effect on corporate debt maturity structure, the data for the four sample countries are pooled to create one panel. Equation (4.1) is then augmented with country dummies (*THDUM*, *MLDUM* and *SPDUM*) as in Chapter 3. Subsequently, equation (4.1) is re-estimated by replacing the country dummies with market-wide and legal and corporate governance variables, one at a time. Because the role of market-wide determinants may vary depending on how severely the crisis hit different countries, and thus estimating across all countries may be misleading as effects may cancel each other out, the data for the four sample countries are subsequently divided into two groups: (i) countries least affected and (ii) countries most affected by the Asian crisis as in the analysis of the determinants of capital structure in the previous chapter. Equation (4.1) is then augmented with market-wide factors, one at a time over the whole sample period. Table 4.1, Panels B and C, present the measurement for market-wide and legal and corporate governance variables. Table 4.2, Panels B and C, summarize the relationship postulated by different theories between these two groups of country-specific variables and debt maturity.

Economic Development

Fan et al. (2004) show evidence that firms in developing countries tend to use far less long-term debt than firms in developed countries. Therefore, a negative relationship between the economic development dummy and debt maturity is expected. In order to

[69] These factors are consistent with Fan et al. (2004) and Demirguc-Kunt and Maksimovic (1999). However, it should be noted that the legal and corporate governance factors are not time-varying. They are indicators calculated or collected by previous empirical studies and other organizations as averages of particular periods in those studies. As suggested by Demirguc-Kunt and Maksimovic (1999), significant changes in a country's legal system are infrequent, and indicators of the institutional environment, such as creditor rights and shareholder rights, are relatively stable over time. However, it should be also noted that these country-specific factors may be affected by the effect of the crisis. Due to data unavailability, no time-varying data can be applied; therefore, cautions must be made when interpreting the results.

test for this, a developing economic dummy (*EDEV*) variable is used. The dummy takes a value of 1 if the country is classified as a developing economy according to the World Bank classification based on countries' gross national income levels and 0 otherwise. This economic development dummy variable is included because it might be able to pick up an element of financial development that is not captured by other country-specific variables.

Bank Development

The size of banking sector, which is measured by the ratio of bank assets to GDP (*BKDEV*), is used as a proxy for bank development. The influence of banking sector on debt maturity is not as much as its influence on capital structure. Demirguc-Kunt and Maksimovic (1999) suggest that the implications of development of banking sectors for debt maturity are less clear. Financial intermediaries or banking sectors directly influence the financial structure of firms because they are main resources for financing. The prime function of such intermediaries is to monitor firms. They have greater incentives to use the collected information to discipline borrowers than other smaller investors due to the free-rider problem. Development of banking sectors should be inversely related to debt maturity because short-term debt enables intermediaries to use their comparative advantage in monitoring (Fan et al., 2004). Therefore, one might expect to see firms being financed with more short-term debt in countries where the banking sector is developed and large.

Demirguc-Kunt and Maksimovic (1999) argue in term of positive relationship between size of banking sector and debt maturity based on creditor rights. They suggest that size effect has some influence on the relationship between financial size of banking sector and debt maturity. There has been evidence that increase in creditors' protection raises the use of long-term debt indirectly by increasing the size of banking sectors. They argue that creditor rights are an important determinant of predicted value of bank lending to GDP. This provides some evidence that strong creditor rights can promote the use of long-term debt in small firms. They also suggest that the use of long-term debt for small firms is correlated with year-to-year changes in financial size of banking sector. On the other hand, the needs of large firms for borrowing can be satisfied even when the banking sector is underdeveloped. Therefore, a positive relationship is possible.

Stock Market Development

As in Demirguc-Kunt and Maksimovic (1999), the ratio of market capitalization to GDP (*MKDEV*) is used as a proxy for stock market development. Grossman (1976) shows that prices quoted in the market could partially reveal information from more informed-investors to the market. This makes lending to firms that have been quoted on the market less risky. Therefore, if the stock market is active, firms are more able to obtain long-term debt. However, a negative relationship can be expected. There is an incentive for firms in countries with developed stock markets to switch from long-term debt to equity (Demirguc-Kunt and Maksimovic, 1999). The additional liquidity of stock markets makes it easier for informed shareholders to escape the consequences of failed gamblers. This, therefore, encourages risk taking behaviour (Demirguc-Kunt and Maksimovic, 1999) and might lead the relationship to be negative instead because firms might want to use short-term debt to reduce the agency cost of debt.

Term Structure of Interest Rates

Based on the availability of data, term structure of interest rates (*TERM*) is defined as the month-end yields on long-term (10 years or more) government bond minus lending interest rate (short-term rate) matched to the month of firms' fiscal year-end. The expected value of the firm's tax liability depends on debt maturity structure whenever term structure of interest rates is not flat. Brick and Ravid (1985) show that different time patterns of interest payments can affect the choice of debt maturity of firms. Firms try to maximize or accelerate their interest payments in order to maximize the present value of interest tax shields. However, accelerating interest payments is more costly to firms than slowing down interest payment. Long-term debt pays more interest in early periods and less interest in later periods than short-term debt. Therefore, in order to slow down interest payments and enhance firms' value, firms prefer long-term debt when term structure of interest rates is upward sloping because the tax-shield value of long-term debt is higher (Kim et al., 1995; Ravid, 1996). In the early years the interest expense from issuing long-term debt is greater than from rolling over short-term debt. However, it is less in later years. Therefore, the tax hypothesis implies that firms issue more long-term debt (short-term debt) when term structure is upward (downward) sloping to increase the firm's market value. However, this will hold only when the benefits of tax shields are significant, such as when firms expect unshielded income. In addition, if term structure of interest rates is flat, debt maturity is irrelevant. Kim et al. (1995) also predict that firms will lengthen debt maturity as the term structure of interest rates increases. They demonstrate that issuing long-term debt could maximize investor tax-timing option value.

The market timing theory predicts a negative relationship between term structure of interest rates and debt maturity.[70] Graham and Harvey (2001) find that the interest yield curve appears to influence the maturity of new debt. When short-term interest rates are low in comparison to long-term interest rates, or when the term structure of interest rates is high, firms prefer to issue short-term debt while they are waiting for long-term interest rates to decline. This behaviour is consistent with the optimistic behaviour of managers discussed by Baker et al. (2005). However, Lewis (1990) argues that Brick and Ravid's (1985) model depends on the assumption that leverage is

[70] Baker et al. (2005) summarize some of the empirical studies related to debt maturity timing and term structure of interest rates.

selected before debt maturity. If they were selected simultaneously, tax would have no effect on optimal debt maturity structure; therefore, implying that the debt maturity structure is irrelevant and there should not be any significant relationship found between the term structure of interest rates and debt maturity.

Inflation

The change in consumer price index is used as a proxy for inflation (*INF*). Inflation is included in the model because debt contracts are generally nominal contracts and thus high inflation may increase the interest rate risk faced by firms. This will cause firms to prefer short-term debt in periods of high inflation because high inflation comes with high uncertainty about future inflation. There is also evidence showing that the increase in inflation rates reduces the use of long-term debt. Demirguc-Kunt and Maksimovic (1999) find that high average rate of inflation are negatively related with the use of long-term debt for both large and small firms. Therefore, inflation is expected to be inversely related to debt maturity.

Quality of Legal Enforcement

The quality of legal enforcement is measured by the level of corruption (*CORR*) which is inversely related to integrity; therefore, level of corruption should be negatively related to debt maturity (Fan et al., 2004). Fan et al. (2004) and Demirguc-Kunt and Maksimovic (1999) suggest that when the legal system has less integrity, and is inefficient or costly to use, debt would be used more than equity and short-term debt would be used more than long-term debt leading to a positive relationship between the efficiency and integrity of the legal system and debt maturity. Short-term debt is preferable to long-term because shorter maturity limits the potential for expropriating creditors' rights. In addition, Diamond (1991, 1993) and Rajan (1992) suggest benefits of short-term debt when the legal system is inefficient. Short-term debt makes it more difficult for firms to defraud creditors because the opportunity for firms to exploit their creditors is limited to a shorter period. In addition, creditors can review firms more often if short-term debt is issued. This allows creditors to vary the terms of financing choice because sufficient losses accumulate. Therefore, a positive relationship between efficiency of legal systems is suggested.

Legal Protection

The creditor rights (*CRR*) and shareholder rights (*SHR*) indexes calculated by La Porta et al. (1998) are used to measure legal protection. The creditor rights index aggregates different creditor rights and ranges from 0 to 4 whereas the shareholder rights index ranges from 0 to 6. Diamond (1991) argues that lenders who engage in monitoring have incentives for short-term lending. Demirguc-Kunt and Maksimovic (1999) also argue that strong creditor rights increase the incentive for banks to monitor firms. Therefore, creditor rights are expected to be negatively related to debt maturity. However, Demirguc-Kunt and Maksimovic (1999) find a positive relationship between creditor rights and debt maturity via the positive influence of financial size of banking sector. There is evidence that increase in creditor rights increases the use of long-term debt indirectly by increasing the size of banking sectors. However, they find no evidence that the index of creditor rights helps predict debt maturity directly. When the shareholders are protected, the agency cost of debt decreases. Therefore, in countries with strong shareholder rights, firms would need less short-term debt to mitigate agency cost problems. Therefore, a positive relationship is expected between shareholder rights and debt maturity.

Ownership Concentration

Ownership concentration (*OWN*) is proxied by the ownership by the three largest shareholders of the ten largest non-financial domestic firms from La Porta et al. (1998).

When managerial concentration is high, the interest of shareholders and managers aligns. This leads to a higher level of agency cost of debt as managers try to maximize the profit of shareholders. Underinvestment problems tend to occur because managers and shareholders bear the cost of investment while the profit is shared with debt holders. Therefore, the moral hazard and agency hypothesis predicts that firms in countries with high ownership concentrations (high agency cost problems) should issue more short-term debt in order to mitigate the problem, leading to the prediction of a negative relationship between ownership concentration and debt maturity.

Information Intermediary Activity

As in Fan et al. (2004), the big-5 auditors' market share (*AUD*) is used as a measure of the level of information intermediary activity. As with capital structure (discussed in the previous chapter), the debt maturity structure of a firm is also likely to be determined by corporate information. Therefore, the involvement of institutions such as auditors and analysts that participate in collecting and disseminating information should be considered as a main factor. Fan et al. (2004) suggest that markets that are characterized by a strong audit function should have lower leverage and longer maturity debt than markets with weaker audit roles, leading to a positive relationship between the role of auditors and debt maturity.

4.4 Data, Descriptive Statistics and Correlation Analysis

4.4.1 Data

This chapter studies the determinants of debt maturity structure of firms in Thailand, Malaysia, Singapore and Australia. The sample covers a cross section of developed and developing countries and the period of 1993 through 2001. Firms' financial data is obtained from Datastream. The panel data are constructed as follows. First, firms from the financial sector (such as banks, financial services, and insurance firms) are excluded because, due to capital requirements, decisions concerning the corporate capital structure and debt maturity structure of financial firms could be affected by other different factors (Barclay and Smith, 1995; Stohs and Mauer, 1996). Second, firms which have any missing observations for any variable in the model during the sample period are dropped. The final sample consists of 1,726 observations for Thai firms; 2,493 for Malaysian firms; 1,164 for Singaporean firms; and 807 for Australian firms. As in Chapter 3, the sample is also divided into pre- and post-crisis periods and into country groupings by how severely they were hit by the crisis.

4.4.2 Descriptive Statistics and Correlation Analysis

Table 4.3, Panel A, presents the average of the variables used to measure debt maturity, firm-specific and market-wide determinants, calculated over both the full sample period and the pre- and post-crisis periods by each country. We find that the proportion of long-term debt to total debt is 29%, 31%, 41% and 65% for Thailand, Malaysia, Singapore and Australia, respectively. This indicates that there are differences in debt maturity patterns for countries of different development levels. Australia has a considerably higher proportion of long-term debt to total debt than other sample countries. Bleakley and Cowan (2005) confirm that Asian firms were highly levered during the 1990s and most of their debt was short term. The low long-term debt ratio implies high use of short-term debt in Thailand and Malaysia. As Thailand and Malaysia were hit harder than Singapore and Australia, there might be some relationship between the use of debt maturity and the financial crisis. Several studies (i.e., Bleakley and Cowan, 2005) have shown that firms in Asia were highly levered and most of their debt was short term.

Table 4.3 : Averages of firm-specific and market-wide variables
Panel A : By each country

Variable	Thailand			Malaysia			Singapore			Australia		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
MAT	0.2874	0.2572	0.3061 ***	0.3080	0.3017	0.3035	0.4070	0.3852	0.4166 *	0.6506	0.6007	0.6822 ***
t-statistics			(-3.5340)			(-0.1631)			(-1.6989)			(-3.8726)
LEV	0.4436	0.2794	0.5644 ***	0.2697	0.1206	0.3582 ***	0.2412	0.1594	0.2882 ***	0.1856	0.1771	0.1996 **
t-statistics			(-23.6907)			(-33.4382)			(-12.8352)			(-2.0860)
SIZE	14.5149	14.2821	14.6532 ***	12.5064	12.4274	12.5365 **	12.0207	12.0794	11.9746	12.3413	12.1538	12.4751 ***
t-statistics			(-4.8411)			(-2.0663)			(1.3808)			(-2.6346)
GROW	1.3624	1.8323	1.0564 ***	2.0103	3.0202	1.3646 ***	1.5246	1.8255	1.3665 ***	-8.8308	-13.3568	-7.0530 **
t-statistics			(15.0168)			(13.4419)			(7.6598)			(-2.3233)
VOL	3.2767	3.1903	3.5682	2.6391	2.3152	2.7802	2.7773	2.3764	2.9758	4.0945	4.5257	3.4969
t-statistics			(-0.5484)			(-1.4068)			(-0.8962)			(0.9364)
LIQ	1.5333	1.5940	1.4966	1.8178	1.8800	1.7828	1.8629	1.9330	1.8301	2.9478	2.9285	2.9942
t-statistics			(1.1144)			(0.9199)			(1.3421)			(-0.1795)
PROF	0.1056	0.1386	0.0778 ***	0.0667	0.1180	0.0362 ***	0.0818	0.0980	0.0728 ***	0.0758	0.0460	0.0863
t-statistics			(9.5675)			(13.7852)			(5.2039)			(-1.3148)
SPP	-0.1996	-0.2363	-0.0060 ***	-0.0989	0.2817	-0.1777 ***	-0.1096	0.0902	-0.1586 ***	0.0408	0.1439	-0.0529 ***
t-statistics			(-9.0249)			(21.9094)			(8.6204)			(6.3621)
AMAT	0.4326	0.4177	0.4470 ***	0.3799	0.3663	0.3876 **	0.3512	0.3260	0.3630 ***	0.3342	0.3360	0.3350
t-statistics			(-2.8952)			(-2.5374)			(-3.2714)			(0.0854)
QUA	2.7349	4.0261	1.8508 ***	5.3732	10.4346	2.6308 ***	3.9792	5.3360	3.3088 ***	-5.9454	-5.7447	-6.0905
t-statistics			(9.6312)			(8.7408)			(7.2173)			(0.3933)
BKDEV	5.0553	4.3361	5.5344 ***	5.5927	4.8654	6.1798 ***	8.0553	7.1405	9.0215 ***	1.0101	0.9143	1.1060 ***
t-statistics			(-70.7353)			(-157.6413)			(-89.3294)			(-92.7513)
MKDEV	2.0826	3.1742	1.2704 ***	5.1284	6.3515	3.9978 ***	5.4856	5.8022	5.4075 ***	0.8061	0.6251	0.9848 ***
t-statistics			(89.8611)			(98.5270)			(9.9730)			(-103.5254)
TERM	-1.9810	-1.4994	-1.8623 ***	-1.8475	-1.8877	-1.6353 ***	-2.7007	-2.9655	-2.3517 ***	-16.4418	-18.9654	-13.9812 ***
t-statistics			(8.8561)			(-9.6550)			(-28.9208)			(-92.9741)
INF	4.0425	5.3272	1.8704 ***	3.0428	3.4767	2.6746 ***	5.6952	10.9602	1.5344 ***	2.5086	2.7899	2.7984
t-statistics			(54.5485)			(24.0199)			(24.8619)			(-0.1053)

Debt maturity (MAT) is the proportion of long-term debt to total debt. Leverage (LEV) is the debt to capital ratio. Firm size (SIZE) is the natural logarithm of total assets. Growth opportunity (GROW) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. Earnings volatility (VOL) is the absolute difference between annual percentage change in earnings before interest and taxes and the average of this change. Liquidity (LIQ) is the ratio of current assets to current liabilities. Profitability (PROF) is the ratios of earnings before interest, tax and depreciation to total assets. Share price performance (SPP) is the first difference of logs of annual share price. Asset Maturity (AMAT) is the ratio of total fixed assets to total assets. Firm quality (QUA) is Altman's Z-Score. Bank development (BKDEV) is the ratio of bank assets to GDP. Stock market development (MKDEV) is the ratio of market capitalization to GDP. Term structure of interest rates (TERM) is the difference between government bond yield and lending rate. Inflation (INF) is changes in consumer price index. T-Test in column (3) is used to test whether the differences of the averages of variables between sub-periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 4.3 : Averages of firm-specific and market-wide variables (continued)
Panel B : By country groupings

Variable	Countries Least Affected by the Crisis			Countries Most Affected by the Crisis		
	(1)	(2)	(3)	(4)	(5)	(6)
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
MAT	0.5162	0.4903	0.5290 ***	0.3000 ***	0.2801	0.3044 ***
t-statistics			(-2.6283)	(27.7018)		(-2.7814)
LEV	0.2146	0.1685	0.2478 ***	0.3342 ***	0.1930	0.4247 ***
t-statistics			(-10.5588)	(-22.8519)		(-34.1152)
SIZE	12.1741	12.1175	12.2026	13.2509 ***	13.2692	13.2202
t-statistics			(-1.1857)	(-27.4032)		(0.9552)
GROW	-2.9056	-4.3510	-2.3118 *	1.7701 ***	2.4793	1.2652 ***
t-statistics			(-1.7544)	(-9.2846)		(16.6497)
VOL	3.4567	3.6560	3.2256	2.8833	2.7336	3.0501
t-statistics			(0.6078)	(1.6085)		(-0.8973)
LIQ	2.3815	2.4432	2.3598	1.7119 ***	1.7495	1.6901
t-statistics			(0.4531)	(7.5631)		(0.8461)
PROF	0.0789	0.0713	0.0789	0.0811	0.1274	0.0496 ***
t-statistics			(-0.4834)	(-0.3513)		(17.2047)
SPP	-0.0344	0.1201	-0.1101 ***	-0.1349 ***	0.0716	-0.1222 ***
t-statistics			(10.8188)	(7.1901)		(11.3368)
AMAT	0.3431	0.3311	0.3502 **	0.3995 ***	0.3897	0.4068 ***
t-statistics			(-2.2973)	(-11.6291)		(-2.6642)
QUA	0.0505	1.1523	-0.4806 ***	4.3623 ***	7.3903	2.3712 ***
t-statistics			(3.6640)	(-16.6131)		(10.2228)
BKDEV	5.3197	4.7229	5.9479 ***	5.4288 **	4.7038	5.9828 ***
t-statistics			(-11.7609)	(-2.1736)		(-128.7655)
MKDEV	3.6686	3.7920	3.6902	4.1985 ***	5.3815	3.1652 ***
t-statistics			(1.3760)	(-13.2042)		(61.8787)
TERM	-8.0395	-9.1865	-6.8674 ***	-1.8880 ***	-1.7694	-1.7040 ***
t-statistics			(-11.3347)	(-63.0023)		(-2.9289)
INF	4.4598	7.7899	2.0238 ***	3.3465 ***	4.0405	2.4312 ***
t-statistics			(23.1601)	(9.2681)		(47.7391)

Debt maturity (MAT) is the proportion of long-term debt to total debt. Leverage (LEV) is the debt to capital ratio. Firm size (SIZE) is the natural logarithm of total assets. Growth opportunity (GROW) is the ratio of book value of total assets less book value of equity plus market value of equity to book value of total assets. Earnings volatility (VOL) is the absolute difference between annual percentage change in earnings before interest and taxes and the average of this change. Liquidity (LIQ) is the ratio of current assets to current liabilities. Profitability (PROF) is the ratios of earnings before interest, tax and depreciation to total assets. Share price performance (SPP) is the first difference of logs of annual share price. Asset Maturity (AMAT) is the ratio of total fixed assets to total assets. Firm quality (QUA) is Altman's Z-Score. Bank development (BKDEV) is the ratio of bank assets to GDP. Stock market development (MKDEV) is the ratio of market capitalization to GDP. Term structure of interest rates (TERM) is the difference between government bond yield and lending rate. Inflation (INF) is changes in consumer price index. T-Test in column (3) is used to test whether the differences of the averages of variables between two sub-periods are statistically significant or not while t-Test in column (4) is used to test whether the differences of the averages of variables between two country groupings are statistically significant or not.
*, **, *** Significant at 10%, 5% and 1% level, respectively.

Dadush et al. (2000) also suggest that the rapid increase in short-term debt in East Asia was a key factor in the financial crisis of 1997. The leverage ratio is lowest in Australia (18%) and highest in Thailand (44%).[71] This implies that the greater proportion of low debt that Australian firms issue are long term. The figures are consistent with the conclusion by Fan et al. (2004) and Demirguc-Kunt and Maksimovic (1999) that developing economies seem to dominate the low range of the use of long-

[71] The figures for the sample countries are quite similar to what is reported by Fan et al. (2004) that the mean long-term debt ratios for Thailand, Malaysia, Singapore and Australia are 33%, 35%, 32% and 67%, respectively. However, our figures are substantially lower than reported for other countries by Barclay and Smith (1995) (72% for US firms), Danisevska (2002) (79% for US firms) and Heyman et al. (2003) (48% for small Belgium firms).

term debt while developed economies tend to be at the higher range. Debt has longer maturities in more developed economies than in developing economies. According to Fan et al. (2004), Australia is in the top five countries with the highest long-term debt ratio while Thailand, Malaysia and Singapore are in the bottom five countries with the lowest long-term debt ratios. Greater reliance on long-term debt in more developed countries could be caused by the differences between asset types owned by firms in developed and developing countries (Demirguc-Kunt and Maksimovic, 1999). The average proportions of fixed assets to total assets are similar across countries: 43%, 38%, 35% and 33% for Thailand, Malaysia, Singapore and Australia, respectively. Australia uses the lowest proportion of long-term assets to total assets while the proportion of long-term debt to total debt is very high, implying the absence of the maturity matching principle. The average size of firms in the sample countries lies between 12 and 14. Thai firms are slightly bigger than firms in the other sample countries. As found by Stohs and Mauer (1996), debt maturity is always below asset maturity throughout the sample period for all sample countries except Australia. Firms in developing countries have higher asset maturity than firms in developed countries.

Table 4.3, Panel B, shows the average of the variables used to measure debt maturity, firm-specific and market-wide determinants, calculated over both the full sample period and the pre- and post-crisis sub-periods categorized by country groupings. There were significant differences over the sample period in both firm-specific and market-wide determinants between the two country groupings. The financial crisis had several significant effects on most determinants especially in the countries most affected by the crisis. The crisis led firms in this region to issue higher debt on average, as equity issues became more difficult in unstable markets. Growth opportunity, share price performance and firm quality significantly decreased after the crisis, while firm size and asset maturity increased. Profitability changed significantly after the crisis in the countries most affected. The market-wide factors in each country also changed considerably after the crisis. For both country groupings, banks' assets became larger relative to GDP. Only stock markets in countries most affected by the crisis were severely affected. In both country groupings, short-term interest rates became higher relative to long-term rates, and inflation decreased.

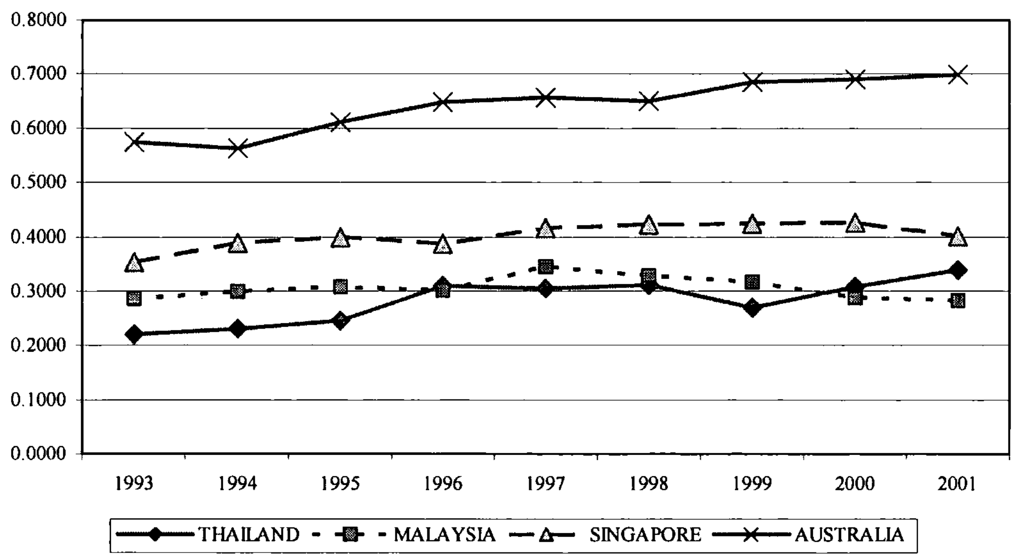
According to Dadush et al. (2000), short-term debt grew fastest in East Asia. They argue that the rapid increase in short-term debt was due to domestic policy changes such as accelerated financial deregulation, capital account liberalization without stronger prudential regulation and tax incentives to attract short-term flows which contributed to an increase in short-term debt maturity combined with distortions in international capital-adequacy regulations. Short-term debt was also encouraged by the government in order to support pegged exchange rates by sterilizing capital inflows leading to higher domestic borrowing costs. The excessive amount of short-term debt increased the vulnerability of several countries in East Asia.[72] In addition, Schmukler and Vesperoni (2006) suggest that the shortening of maturity structures could have played a crucial role in the financial crisis.

Figure 4.1 shows a comparison of debt maturity across sample countries. Differences in debt maturity patterns among the sample countries appear to be linked to levels of economic development. For example, Australian firms have a considerably higher proportion of long-term debt than the other sample firms, while Thai and Malaysian firms make more use of short-term debt. Australian firms have the lowest leverage ratio, while Thai firms have the highest. These observations are consistent with a number of studies that show that during the sample period Asian firms tended to be highly levered, with a high proportion of short-term debt, and that this contributed to the 1997 Asian crisis (Bleakley and Cowan, 2005; Schmukler and Vesperoni, 2006).

[72] It should be noted that the analysis based on long-term debt might have limited insights when there exists the predominance of short-term debt.

Differences in corporate governance across the sample countries can explain the variation of the level of debt maturity. One of the possible reasons why the use of short-term debt is high in Malaysia and Thailand relative to Australia is the higher creditor rights in Malaysia and Thailand. High creditor rights encourage the use of short-term debt because creditors have high monitoring power. Another possible explanation is the weak corporate governance in East Asia, which had been developed through the unhealthy relationships between firms and lenders and poor bank supervision. This leads creditors to issue unsound and unsupervised lending or excessive short-term debt to firms, which in turn could have been one of the triggers for the financial crisis. In addition, consistent to what is found by Beck et al. (2002), the use of lower level of long-term debt in Thailand may be related to the fact that Thailand's laws is mixed between civil and common laws.

Figure 4.1
Average debt maturity ratios (long-term debt / total debt)



Debt maturity structure of the sample countries is fairly stable over the sample period.[73] Although the economic crisis occurred in 1997, the proportion of long-term debt to total debt did not increase much after the crisis. Schiantarelli and Sembenelli

[73] Stohs and Mauer (1996) also find that debt maturity was stable over their sample period (1980 - 1989) with no systematic upward or downward drift in average debt maturity. Frank and Goyal (2003) also find that long-term debt was fairly stable over the period of 1970 to 2000.

(1997) find that the composition of debt became shorter during recession years. Although apparently stable, there is a pattern to the level of debt maturity among the four sample countries. After the 1997 crisis debt maturity continues to increase in the two more developed economies of Australia and Singapore. Schmukler and Vesperoni (2006) find that the maturity structure shortens to a lesser degree in countries with more developed financial markets after the liberalization. Developed countries are less sensitive and less affected by financial liberalization. Figure 4.1 is consistent with this finding as developed countries seem to be less affected by the crisis.

To examine the possible degree of collinearity among variables, the correlation matrix of dependent and independent variables is shown in Table 4.4. These correlations reveal some simple relations among the variables before moving to the regression results. It is observed that the correlations are generally not sufficiently large to cause multicollinearity problems in the regressions (with the exception of country-specific factors where multicollinearity issue will be dealt with in the empirical analysis section). It is also observed that the signs of the correlation between debt maturity and the explanatory variables are generally consistent with the empirical predictions especially between debt maturity and leverage, firm size, liquidity and asset maturity. However, there are also considerable variations in the correlations across countries. Consistent to liquidity risk hypothesis, correlation analysis shows significant positive relationship between maturity and leverage in all sample countries. For our sample countries, firm size has the strongest correlation with debt maturity among other explanatory variables, followed by leverage and asset maturity implying that large and heavily levered firms use more long-term debt and there also exists the presence of matching maturity hypothesis.

Table 4.4 : Correlation Matrix

Panel A : Thailand

	MAT	LEV	SIZE	GROW	VOL	LIQ	PROF	SPP	AMAT	QUA	BKDEV	MKDEV	TERM	INF
MAT	1.000													
LEV	0.162	1.000												
SIZE	0.309	0.187	1.000											
GROW	-0.015	-0.329	0.024	1.000										
VOL	-0.051	0.107	0.035	-0.018	1.000									
LIQ	0.053	-0.352	-0.077	0.017	-0.040	1.000								
PROF	-0.045	-0.383	-0.107	0.030	-0.052	0.102	1.000							
SPP	-0.017	0.060	-0.059	-0.055	0.006	0.027	0.086	1.000						
AMAT	0.109	0.080	-0.051	-0.110	0.080	-0.176	-0.004	0.031	1.000					
QUA	-0.162	-0.543	-0.149	0.468	-0.072	0.578	0.372	0.016	-0.098	1.000				
BKDEV	0.071	0.392	0.121	-0.346	-0.001	-0.044	-0.131	-0.101	0.030	-0.206	1.000			
MKDEV	-0.109	-0.393	-0.118	0.366	0.016	0.007	0.172	0.086	-0.038	0.227	-0.856	1.000		
TERM	-0.043	-0.117	-0.063	0.180	0.026	0.017	0.007	0.327	0.017	0.089	-0.699	0.511	1.000	
INF	-0.034	-0.231	-0.035	0.154	-0.038	-0.007	0.115	-0.365	-0.057	0.109	-0.094	0.317	-0.530	1.000

Panel B : Malaysia

	MAT	LEV	SIZE	GROW	VOL	LIQ	PROF	SPP	AMAT	QUA	BKDEV	MKDEV	TERM	INF
MAT	1.000													
LEV	0.061	1.000												
SIZE	0.318	0.228	1.000											
GROW	-0.077	-0.251	-0.282	1.000										
VOL	-0.035	0.076	-0.049	0.024	1.000									
LIQ	0.117	-0.288	-0.119	0.152	-0.029	1.000								
PROF	0.108	-0.348	0.068	-0.061	-0.224	0.088	1.000							
SPP	-0.007	-0.090	-0.015	0.022	-0.019	0.010	0.024	1.000						
AMAT	0.130	-0.013	-0.089	-0.033	-0.035	-0.166	0.041	0.014	1.000					
QUA	0.008	-0.329	-0.131	0.396	-0.026	0.323	0.186	0.041	-0.071	1.000				
BKDEV	0.023	0.341	0.035	-0.252	0.018	-0.013	-0.104	-0.317	0.018	-0.184	1.000			
MKDEV	-0.005	-0.302	-0.031	0.218	0.003	0.017	0.091	0.551	-0.034	0.160	-0.615	1.000		
TERM	-0.026	0.036	-0.020	-0.014	-0.002	-0.022	-0.115	0.294	0.037	-0.023	-0.151	-0.112	1.000	
INF	0.048	-0.060	0.018	0.042	-0.017	-0.011	0.114	-0.067	-0.046	0.063	-0.154	0.116	-0.262	1.000

Panel C : Singapore

	MAT	LEV	SIZE	GROW	VOL	LIQ	PROF	SPP	AMAT	QUA	BKDEV	MKDEV	TERM	INF
MAT	1.000													
LEV	0.195	1.000												
SIZE	0.243	0.258	1.000											
GROW	-0.101	-0.417	-0.111	1.000										
VOL	-0.077	0.033	-0.030	-0.040	1.000									
LIQ	0.067	-0.368	-0.120	0.102	-0.009	1.000								
PROF	0.013	-0.294	0.042	0.225	-0.113	0.045	1.000							
SPP	0.026	0.026	0.034	-0.102	0.005	-0.042	0.054	1.000						
AMAT	0.192	0.102	-0.170	-0.041	0.040	-0.266	0.057	0.013	1.000					
QUA	-0.067	-0.547	-0.111	0.628	-0.056	0.486	0.342	-0.051	-0.139	1.000				
BKDEV	0.025	0.253	-0.051	-0.219	-0.010	-0.001	-0.109	-0.109	0.046	-0.187	1.000			
MKDEV	-0.032	-0.023	-0.025	0.060	0.030	-0.004	-0.045	0.526	0.002	0.041	-0.172	1.000		
TERM	0.028	0.174	-0.019	-0.094	0.017	-0.022	-0.091	0.166	0.030	-0.115	0.415	0.178	1.000	
INF	-0.021	-0.172	0.020	0.231	-0.010	0.033	0.060	0.000	-0.064	0.172	-0.343	0.245	0.047	1.000

Panel D : Australia

	MAT	LEV	SIZE	GROW	VOL	LIQ	PROF	SPP	AMAT	QUA	BKDEV	MKDEV	TERM	INF
MAT	1.000													
LEV	0.345	1.000												
SIZE	0.401	0.373	1.000											
GROW	0.105	0.119	0.337	1.000										
VOL	0.016	0.007	-0.072	-0.011	1.000									
LIQ	-0.025	-0.194	-0.309	-0.370	0.086	1.000								
PROF	0.030	0.002	0.271	0.199	-0.051	-0.058	1.000							
SPP	0.019	-0.073	-0.049	0.015	0.003	-0.027	0.001	1.000						
AMAT	0.156	0.267	0.433	0.172	-0.001	-0.301	0.175	0.009	1.000					
QUA	0.045	0.099	-0.066	-0.015	0.060	0.158	0.165	-0.057	-0.077	1.000				
BKDEV	0.127	0.071	0.099	0.063	-0.025	-0.004	0.048	-0.137	0.003	-0.010	1.000			
MKDEV	0.131	0.065	0.095	0.068	-0.021	-0.003	0.042	-0.126	0.000	-0.015	0.982	1.000		
TERM	0.091	0.066	0.065	0.060	-0.020	0.002	0.006	-0.131	0.016	-0.012	0.760	0.773	1.000	
INF	0.040	0.067	0.055	-0.021	-0.020	0.012	0.001	-0.101	-0.006	0.005	0.272	0.209	-0.192	1.000

See Table 4.1 and 4.3 and Section 4.3 for the definition of variables

The observed positive association of debt maturity with firm size in all countries is supported by the theories. Another high correlation is between growth opportunity and quality of firms, implying that firms with high growth opportunity is considered to have lower probability of default. As leverage is strongly correlated with maturity and strongly negatively related with market to book ratio, leverage should be included in the model to prevent the downward bias in estimated coefficient of market to book ratios. In addition, the correlation between growth opportunity and leverage is mostly negative, indicating that firms with greater growth opportunities use less leverage. As suggested by Stohs and Mauer (1996), this negative relationship can imply that management of debt maturity may be of little importance to firms with large amounts of growth opportunities because these firms have little debt. In addition, although the mean level shows some evidence of matching maturity in this region, the correlation between asset maturity and debt maturity is quite low suggesting that firms match the maturities of their assets and liabilities to a certain degree.

4.5 Empirical Results

The empirical tests are performed in the following order. First, the debt maturity equation (equation (4.1)) is estimated in a pooled time-series cross-sectional framework using OLS based on full sample to find firms' characteristics that determine the debt maturity structure of firms in this region. Second, equation (4.1) is re-estimated using sub-samples of pre-crisis and post-crisis periods to investigate the effect of the financial crisis of 1997 on the firm-specific determinants of debt maturity structure. Then a panel dataset is formed by combining all firms from four sample countries. Country dummies are added into equation (4.1) using this panel dataset to find whether country-specific factors have any impact on the determinants of capital structure, and then country dummies are replaced with market-wide factors one at a time to find out which factor has significant influence on the determinants of debt maturity structure and which factor can explain the variation of the determinants across sample countries. Then, the effect of the financial crisis on market-wide determinants is investigated. Finally, equation (4.1) is augmented to include legal and corporate governance variables. Therefore, overall, we estimate corporate debt maturity as a function of firms' characteristics, economic conditions, corporate governance and institutional environment.

4.5.1 Firm-Specific Determinants

This section tests the hypotheses regarding the debt maturity structure and its firm-specific determinants to find out whether the maturity of debt can be explained by proxies for theoretically important firm characteristics. Table 4.5 presents results of estimating equation (4.1) for each sample country over the whole sample period using panel regressions of the percentage of a firm's debt payable in more than 1 year on firm-specific variables.

Table 4.5 : Panel analysis of firm-specific determinants of corporate debt maturity structure: Whole sample period

Equation	Thailand	Malaysia	Singapore	Australia
Constant	-0.5640 ***	-0.8712 ***	-0.5361 ***	-0.2086
t-statistics	(-3.6100)	(-6.6400)	(-3.4400)	(-1.4100)
LEV	0.2223 ***	0.1086 **	0.2142 ***	0.3598 ***
t-statistics	(5.2700)	(2.3500)	(3.0500)	(4.0000)
SIZE	0.0403 ***	0.0718 ***	0.0601 ***	0.0546 ***
t-statistics	(3.7000)	(9.6400)	(5.8300)	(4.8500)
GROW	0.0587 ***	0.0066	0.0147	0.0001
t-statistics	(3.7800)	(1.2200)	(0.6290)	(0.1220)
VOL	-0.0014 **	0.0002	-0.0017 ***	0.0005
t-statistics	(-2.3700)	(0.2940)	(-3.1100)	(0.8640)
LIQ	0.0554 ***	0.0280 ***	0.0544 **	0.0126 *
t-statistics	(5.2500)	(3.1100)	(2.1800)	(1.8500)
PROF	0.3574 ***	0.1268 ***	0.1289	-0.1081 ***
t-statistics	(4.4700)	(4.4400)	(0.8980)	(-3.4200)
SPP	-0.0074	0.0053	0.0274 **	0.0387 **
t-statistics	(-0.7180)	(0.8560)	(2.0400)	(2.2800)
AMAT	0.2489 ***	0.2218 ***	0.2789 ***	0.1096
t-statistics	(4.0100)	(4.6800)	(4.0000)	(1.2800)
QUA	-0.0277 ***	-0.0007	-0.0095	0.0023
t-statistics	(-4.7200)	(-1.0900)	(-1.3700)	(1.4100)
Adj R^2	0.2358	0.1701	0.2363	0.2769
No. of obs.	1726	2493	1164	809

$MAT_{i,t} = \beta_1 + \beta_2 LEV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROW_{i,t} + \beta_5 VOL_{i,t} + \beta_6 LIQ_{i,t} + \beta_7 PROF_{i,t} + \beta_8 SPP_{i,t} + \beta_9 AMAT_{i,t} + \beta_{10} QUA_{i,t} + \alpha_t + \mu_{i,t}$

The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 4.1 and Section 4.3.1 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Leverage

Leverage is found to be positively related to debt maturity and to be the strongest determinant of debt maturity structure as the coefficients are largest and highly significant.[74] The positive relationship found gives support to the liquidity risk hypothesis and the renegotiation argument. Higher leverage increases the threat of liquidation; thus, encourages firms to stay away from short-term debt. The results are consistent with most previous studies such as Barclay and Smith (1995), Stohs and Mauer (1996), Barclay et al. (1997), Johnson (1997), and Antoniou et al. (2006). It suggests that leverage and debt maturity are used as strategic complements to reduce underinvestment problems as suggested by Barclay et al. (1999) that these firms would issue long-term debt when they are heavily levered.

Firm size

Although evidence in the literature on the influence of firm size on debt maturity structure is mixed and both positive and negative relationships have been confirmed by previous empirical studies, the results show that the coefficients of firm size are uniformly positive and significant across our sample countries consistent with several previous empirical studies (Titman and Wessels, 1988; Mitchell, 1991; Barclay and Smith, 1995; Stohs and Mauer, 1996; Demirguc-Kunt and Maksimovic, 1999; Ozkan, 2000; Fan et al., 2004). The positive relationship confirms the prediction by the moral hazard and agency hypothesis that small firms are more prone to higher agency costs of debt and shortening their debt maturity would help to reduce these costs. Large firms

[74] Several studies find that inclusion of leverage in the model may influence the results because leverage is significantly correlated with other variables. Barclay et al. (2003) point out that the regression coefficients can be potentially biased and inconsistent when both leverage and investment opportunities are both included in the regression as independent variables. The problem from previous studies is mainly caused by the multicollinearity problem caused by the high correlation between leverage and growth opportunities. For example, when leverage is included in the model Stohs and Mauer (1996) find no significant relationship between growth opportunity and debt maturity. Therefore, an alternative formulation is performed by excluding leverage from the model (Equation (4.1)). Similar to Esho et al. (2002), the exclusion of leverage variable has little influence on other estimates.

have easier access to the markets and their cost of issuing long-term debt is lower. The results also confirm that small firms are generally precluded from accessing long-term debt because the proportion of their collaterizable assets to growth opportunities is relatively small. The results also give support to the signalling hypothesis because small firms seem to have higher levels of asymmetric information; therefore, they have high motivation to use short-term debt to signal to the market.

Growth Opportunity

Similar to the results found in the previous chapter on the determinants of capital structure, growth opportunities seem to have an inconclusive and puzzling relationship with debt maturity structure of firms in this region. The coefficients are uniformly insignificant for all sample countries except for the positive and significant relationship found for Thai firms.[75,76] The positive and significant level found for Thai firms is totally opposite to that expected. We expect to see a stronger negative relationship for Thai and Malaysian firms as developing countries face greater new growth opportunities. Therefore, they should issue more short-term debt to reduce underinvestment problems. This shows how little the agency hypothesis helps to explain and predict the observed pattern of debt maturity for firms in this region. Recalling the previous chapter on the determinants of capital structure, growth opportunity was found to be negatively associated with leverage ratio suggesting that Thai firms can reduce the agency costs of underinvestment by reducing their leverage. The results show that it is the leverage rather than debt maturity that is used by Thai firms as the vehicle to alleviate the underinvestment problem.

The result shows little support to the moral hazard and agency hypothesis. The insignificant relationship implies that the underinvestment problem is not as strong in

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[75] Fan et al. (2004) find slightly different results for the same sample countries in that a negative and significant relationship is found for Malaysia while the coefficients are insignificant for other sample countries.

[76] The result is in line with Esho et al. (2002) who also obtain similar results for Australian firms.

this region or that the combination of reducing leverage and shortening debt maturity is so effective that the effect of growth opportunity on debt maturity can be ignored. The insignificant relationship suggests that there might not be sufficient variation in growth opportunity within the sample to observe their effects or that most existing models have overestimated the effect of growth opportunity on debt maturity. This argument is supported by Mauer and Ott (2000) who show that shortening debt maturity can no longer alleviate the underinvestment problem once leverage is held constant. This is because, when debt maturity is shortened, shareholders choose to default sooner leading to an increase in expected bankruptcy costs which will in turn reduce the expected tax shield. If this is the case, firms will maximize total firm value by exercising growth options sooner to offset larger expected bankruptcy costs and a lower expected tax shield. However, because shareholders ignore the cost of bankruptcy when making these decisions, the conflict between shareholders and debtholders increases when debt maturity is shortened. Therefore, the lack of negative and significant relationship between growth opportunity and debt maturity is consistent with Mauer and Ott's (2000) model.

In addition, the insignificant relationship shows the presence of effective monitoring by banks. This might reduce the agency cost problem in the sample countries. It is thus unsurprising that debt maturity does not appear to be used to reduce the underinvestment problem because firms in the sample countries have highly concentrated ownership structures and close relationships with banks. Moreover, market to book ratio has been admitted as a noisy proxy for growth opportunities (Barclay and Smith, 1995). Antoniou et al. (2006) also find that the relationship between growth opportunities and debt maturity varied across their sample countries.[77] The findings from Stohs and Mauer (1996) and Johnson (1997) also show that the relationship

[77] Positive and significant relationship is found for the UK while insignificant relationship is found for France and Germany.

between growth opportunities and debt maturity is unclear and somehow puzzling because they find growth opportunity to be significantly related to debt maturity. However, when leverage is included in the model as a control factor, the relationship switches from significantly negative to statistically insignificant. This implies that there might be some bias in the model. Therefore, selecting variables to be included in the model can alter the quality of the results significantly.

Stohs and Mauer (1996) also find mixed support for growth opportunities. They suggest that the problem with growth opportunities is that it is highly correlated with leverage and therefore there is little incentive to use debt maturity to alleviate agency cost. They also find that the relationship varies depending on the proxy of growth opportunity. A significant and negative relationship is found when R&D expenses are used as the proxy, while when market to book value ratio is applied an insignificant relationship is found. They also find that the relationship might vary depending on the methodology applied. In their study, growth opportunity shows an expected negative and significant relation with debt maturity in cross-sectional regression but a positive and significant relation in fixed effects regression even after leverage is excluded from the model.[78]

Earnings Volatility

The results show mixed evidence of the effect of earnings volatility on debt maturity across countries. Earnings volatility is found to be negatively related to debt maturity at significance level for Thailand and Singapore. The negative relationship found is consistent with several studies including Guedes and Opler (1996) and Ozkan (2002). The negative relationship is consistent with the bankruptcy cost argument put forward by Kane et al. (1985). This implies that bankruptcy costs in Thailand and

[78] Alternative model excluding leverage is also tested. However, no significant relationship between growth opportunity and debt maturity is found. Therefore, the insignificant relationship is quite robust on the model specification.

Singapore are quite high and firms try to issue long-term debt when their earnings volatility is low to avoid the risk of bankruptcy. However, the results show that volatility of earnings has no effect on optimal debt maturity structure in Malaysia and Australia which is consistent with Johnson (1997) and Danisevska (2002). Using the same sample countries, Fan et al. (2004) find an insignificant relationship for the same sample countries. Antoniou et al. (2006) also find mixed evidence among their sample countries.[79] They suggest that corporate governance should be considered in the study to find the variation in the determinants of debt maturity across countries. On the other hand, Stohs and Mauer (1996) find that the relationship depends on the methodology used. Earnings volatility is found to be negatively related to debt maturity with substantial economic impact when pooled regression is used. However, the relationship switches to insignificant in cross-sectional regression.

Liquidity

Liquidity is uniformly found to be positively related to debt maturity at significance level across the sample countries. The results imply that firms in the Asia pacific region choose to issue more long-term debt while they are heavily liquid to avoid cash shortages and to lower their probability of bankruptcy. The positive relationship found is in line with Antoniou et al. (2006) for German firms.[80]

[79] A positive and significant relationship was found for France but the relationship in the UK and Germany are insignificant. The positive relationship found in France is consistent with the argument that firms with high earnings volatility prefer long-term debt to prevent liquidity risk.

[80] This is strongly supported by the fact that cost of bankruptcy and probability of being liquidated in Germany is quite high compared with their other sample countries (UK and France). Therefore, German firms are highly motivated to remain highly liquid when long-term debt is issued. On the other hand, they find that liquidity has no effect on debt maturity of UK and French firms. For French firms, the insignificant relationship is due to the fact that rehabilitation of firms through reorganization is applied instead of liquidation in French bankruptcy laws. Therefore, French firms have low motivation to remain highly liquid when issuing long-term debt. On the other hand, UK firms (being market-oriented) have better access to financing sources; therefore, their liquidity risk is lower compared with other sample countries leading to insignificant relationship between liquidity and debt maturity.

Profitability

The results show mixed evidence of the relationship between profitability and debt maturity across sample countries. The coefficients are positive for Thailand, Malaysia and Singapore while the coefficient is negative for Australia. The results are exactly the same as Fan et al. (2004) for the same sample countries. The positive relationship is consistent with previous studies such as Demirguc-Kunt and Maksimovic (1999) and with the tax hypothesis because highly profitably firms try to minimize their taxation by choosing long-term debt over short-term because long-term debt can create tax-timing options. This positive coefficient is consistent with firms' dominant role in fear of liquidation and loss of control which tend to be associated with short-term debt. The positive relationship is also highly consistent with the liquidation risk hypothesis developed by Fukada et al. (1998). However, the relationship is found to be negative and significant for Australian firms. Highly profitable firms in Australia still prefer to issue short-term debt instead of long-term debt even though long-term debt can help reduce taxation. It suggests that the cost of issuing long-term debt is quite high in Australia. This negative relationship is consistent to that found by Fukuda et al. (1998) where there exists a chance of renegotiation.

Share Price Performance

Mixed evidence is found for the relationship between share price performance and debt maturity across sample countries. Positive and significant relationships are found for Singapore and Australia which is consistent with the signalling hypothesis that undervalued firms would issue short-term debt to signal to the market and that overvalued firms would issue long-term debt that is more price-sensitive to a mis-estimation of future cash flow in order to exploit market mispricing. However, no significant relationship is found for Thailand and Malaysia implying that changes in share price does not affect the firm's debt maturity structure. This discrepancy may be due to the fact that, in countries with more developed financial markets, information and signalling play a more fundamental role in share price information than in countries with less developed and thus less efficient markets. Antoniou et al. (2006) also find mixed evidence across their sample countries.[81]

Asset Maturity

The results show that firms match the maturities of their assets and liabilities as asset maturity is positively related to debt maturity as expected for all countries; however, the relationship is insignificant for Australia. The results confirm the maturity matching of assets and liabilities hypothesis and are in line with previous studies (Stohs and Mauer, 1996; Demirguc-Kunt and Maksimovic, 1999; Ozkan, 2000, 2002; Fan et al., 2004). The positive relationship is consistent with the matching maturity and agency hypothesis that firms try to match their asset and liability maturity in order to reduce asset substitution and underinvestment problems. The insignificant relationship found confirms the descriptive statistics in the previous section which indicate the existence of mismatching maturity in Australia and also lends support to Guedes and Opler's (1996) view that the matching maturity does not seem to work universally. In their findings, the coefficients of asset maturity sometimes show reversed sign and sometimes are insignificant. Mitchell (1991) also finds no support for the proposition that firms choose maturity of debt to match their maturity of assets while Antoniou et al. (2006) find mixed evidence among their sample countries.[82]

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[81] A positive and significant relationship is found in the UK and Germany while insignificant relationship is found for France.

[82] A positive and significant relationship was found for the UK and France and an insignificant relationship found for Germany. The insignificant relationship found in Germany confirmed the argument by Claessens et al. (1999a) that there is a mismatch of the maturity of assets and liabilities in civil law countries such as Germany. It also implies the absence of underinvestment problems in Germany. Concentrated ownership structure and the close relationship between firms and their creditors might help to reduce agency problems. Therefore, there is less need to use matching maturity to mitigate these problems in countries like Germany. This contradicts a significant and positive relationship found for Thai, Malaysian and Singaporean firms where ownership structure is concentrated and there are close relationships with banks. It implies that underinvestment problems in the Asia Pacific region are more severe than in Europe.

Firm Quality

The results show mixed evidence for the effect of firm quality on debt maturity among our sample countries. The coefficients of firm quality are insignificant for all sample countries except for a negative effect found in Thailand.[83] This negative relationship is in line with previous studies (Guedes and Opler, 1996; Johnson, 1997) and gives support to the signalling hypothesis that low-risk (high quality) borrowers tend to have economically and statistically significantly shorter maturities than other borrowers. This suggests that low risk (high quality) firms try to separate themselves from high-risk (low quality) firms by choosing short-term maturity. It also reflects the willingness of financial markets to provide short-term debt to good quality firms only. The results show that firms with high quality prefer short-term debt because short-term debt is less undervalued than long-term debt. It shows that good quality firms use short-term debt to signal their value and to exploit market mispricing.

The significant relationship found between firm quality and debt maturity in Thailand is also a reflection of the low rating on accounting standards and on disclosure compared with other sample countries. As shown in Table 2.7, the ratings of accounting standards and disclosure are quite similar for Malaysia, Singapore and Australia while they are lower for Thailand. The lower ratings imply higher asymmetric information for Thai firms. Therefore, they have to try harder in order to signal to the markets.

According to the liquidity risk argument, when asymmetric information exists between firms and lenders, short-term debt lowers expected financial costs for good borrowers. Therefore, where there is no chance of liquidation risk, short-term debt is preferred by good quality firms. As a negative relationship is found for Thailand, this implies that liquidity risk is not as high for Thai firms.

[83] Berger et al. (2005) find mixed evidence when different risk class was investigated. A negative and significant relationship is found for their low-risk borrowers while an insignificant relationship is found for high-risk borrowers. This sheds light on the study of firm risk or quality that the effect of firm quality or risk on debt maturity might vary depending on the majority risk class of firms in the sample.

On the other hand, an insignificant relationship is found for other sample countries, in line with Ozkan (2002) and Esho et al. (2002) who find that there is no evidence of firms using debt maturity structure to signal their quality to the market. This implies that firms in these countries do not use debt maturity to signal their firm quality. However, Danisevska (2002) argues that insignificant relationships cannot be considered to be in conflict with the signalling hypothesis because a firm might have no incentive to signal by shortening its debt maturity unless it has both positive inside information and asymmetric information. Antoniou et al. (2006) find mixed and weak evidence among their sample countries.[84] They suggest several explanations for their insignificant relationships. First, as Diamond (1993) suggests, good quality firms might prefer the combination of short-term and long-term debt to short-term debt only as predicted by Diamond (1991) because short-term debt may cause inefficient liquidation. Second, as Ball et al. (2000) argue, close relationships between firms and lenders in civil law countries might help to reduce asymmetric information. Therefore, the relationship should be insignificant in Germany and France. Danisevska (2002) suggests that the empirical evidence on signalling is mixed and contradictory because of measuring problems as there are several measurements that can be used as proxy for asymmetric information.

Barclay and Smith (1995) suggest that the relationship between firm's quality and debt maturity might vary depending on the methodology applied. Because firm's quality tends to be unstable over time, the relationship might not be captured by cross-sectional analysis or the signalling hypothesis should be more difficult to test by examining the cross-sectional variation compared with time-series analysis where the signalling hypothesis should be more relevant. Ozkan (2000) finds a mixed evidence for the signalling hypothesis depending on the definition of debt maturity. When debt maturity

[84] They find a weak support of negative relationship in the UK. However, no significant relationship is found for Germany and France.

is defined to include all loans maturing in more than 1 year, a negative and significant relationship is found. However, when debt maturity structure is defined to include debt with longer maturity (more than 5 years), no evidence of a significant negative relationship is found. The relationship between credit quality and debt maturity can also vary due to the proxy applied. For example, an insignificant relationship is found by Danisevska (2002) when future abnormal earnings are used as a proxy for credit quality. However, when bond rating is applied, the results support the non-monotonic relationship predicted by Diamond (1991).

In summary, the results presented in Table 4.5 show that some determinants are more powerful and consistent than others in explaining the choice of debt maturity.[85] The results lend some support to the liquidity risk and adverse selection and signalling hypotheses and provide mixed support for the moral hazard and agency hypothesis. Although small firms use short-term debt to mitigate agency cost of debt and firms match their maturity of assets and liability, the relationship between growth opportunity and maturity is mixed leading to moderate support for the moral hazard and agency hypothesis. There is also a variation in the determinants of debt maturity structure across the sample countries in line with previous studies. The mixed result for the moral hazard and agency hypothesis might be due to the nature of the sample. Several firm-specific variables are identified as important determinants of debt maturity but their importance varies between countries. Some variations can be explained by the concentration of ownership structures and close relationships between firms and lenders

[85] Further tests were also conducted to ensure the robustness of the results. Equation (4.1) was re-estimated using cross-sectional regressions. Although cross-sectional analysis does not exploit any time-series variation in the observations, it preserves the dispersion across firms and eliminates the serial correlation problem in residuals, which may tend to inflate the t-statistics of the coefficient estimated in pooled and fixed effects regressions. Furthermore, equation (4.1) was also re-estimated using fixed company effects, where the firm-specific time-series mean for each variable is subtracted from each observation. A fixed effects regression is used as an alternative method for dealing with the problem of serially correlated errors. The main difference between pooled and fixed effects regressions is that the fixed effects model allows for firm-specific regression intercepts (Stohs and Mauer, 1996). The results from both the cross-sectional and fixed company effects estimations are consistent with the results presented here.

in this region. Therefore, differences in financial institutions and corporate governance can be important factors in determining debt maturity structure thus it is necessary to investigate details of the effects of country-specific factors.

4.5.2 The Effect of the Financial Crisis on Firm-Specific Determinants

As the sample period has a structural break in 1997, the variation among the sample countries might be explained by taking the financial crisis into account. A clearer pattern of the determinants of debt maturity across countries is expected for pre- and post-crisis periods. Although Figure 4.1 shows that the financial crisis did not affect the level of debt maturity structure of firms much, there is the possibility that the factors that firms consider when they determine their debt maturity structure might be influenced by the effect of the crisis. The East Asian financial crisis of 1997 should have some significant impact on the determinants of debt maturity structure as the crisis affects the availability of credit to firms. Moreover, there has been evidence of Asian firms making excessive use of short-term debt which could be considered as one of the causes of the financial crisis in Asia because lenders can withdraw the fund quickly with short-term debt. The crisis has also increased risk and volatility of earnings. Because the evidence found in the previous section is mixed, and some do not support by the main hypotheses, it is possible that this is due to the effect of the financial crisis in 1997, in the middle of the sample period. Splitting the sample into two sub-samples should give clearer results. Therefore, this section will examine the effect of the financial crisis on corporate debt maturity. The purpose of this section is to examine whether the theoretical hypotheses are supported more significantly by the data after the crisis than before. As in Chapter 3, the empirical analysis is done by dividing the full sample into pre- and post-crisis periods. Except for differences in sample periods, the data, source and estimation methods are the same as those explained in the previous section.

The results for pre- and post-crisis periods for each country are summarized in Table 4.6, Panel A. There are variations in the effects of the East Asian financial crisis on debt maturity structure across countries. The effects from the crisis can be divided into three different patterns: (i) significant effects, (ii) no effect, (iii) mixed effects across sample countries.

First, the financial crisis is found to significantly affect the relationship between debt maturity and leverage, earnings volatility and profitability. Although found to be positively and significantly related to debt maturity, ***leverage*** seems to have different effects on debt maturity during the pre- and post-crisis periods. In Thailand, where the crisis originally started, liquidity risk is at the highest. Therefore, after the crisis, firms are more concerned about their liquidity risk and tend to use more long-term debt when leverage is high to offset the higher probability of being liquidated because long-term debt can help delay the exposure to bankruptcy risk. On the other hand, Singapore and Australia are not affected as severely as other countries by the crisis. Liquidity risk in Singapore and Australia should not be much higher after the crisis. The results confirm this because the effect of leverage on debt maturity decreases after the crisis for Singaporean and Australian firms. However, the relationship found in Malaysia is totally opposite to other countries. Before the crisis, leverage has a significant and positive impact on debt maturity but the relationship becomes insignificant after the crisis.

Table 4.6 : Panel analysis of the firm-specific determinants of corporate debt maturity structure: Pre- and post-crisis periods

Panel A : By each country

Equation	Thailand Pre-Crisis (1993 - 1996)	Thailand Post-Crisis (1998 - 2001)	Malaysia Pre-Crisis (1993 - 1996)	Malaysia Post-Crisis (1998 - 2001)	Singapore Pre-Crisis (1993 - 1996)	Singapore Post-Crisis (1998 - 2001)	Australia Pre-Crisis (1993 - 1996)	Australia Post-Crisis (1998 - 2001)
Constant	-0.5138 ***	-0.5191 ***	-0.6418 ***	-0.9071 ***	-0.6383 ***	-0.4972 ***	-0.7003 ***	-0.0614
t-statistics	(-2.5800)	(-3.3200)	(-3.1700)	(-8.7200)	(-2.7600)	(-2.7100)	(-3.6800)	(-0.3570)
LEV	0.1479 *	0.2689 ***	0.3661 ***	0.0735	0.3713 **	0.1627 **	0.6495 ***	0.2569 **
t-statistics	(1.8000)	(5.4600)	(2.7300)	(1.5900)	(2.0200)	(2.0200)	(3.4400)	(2.3500)
Wald Test		<6.0357> **		<40.2278> ***		<6.7147> ***		<12.9323> ***
SIZE	0.0339 **	0.0405 ***	0.0493 ***	0.0806 ***	0.0589 ***	0.0596 ***	0.0962 ***	0.0494 ***
t-statistics	(2.4400)	(3.8800)	(3.6100)	(10.8000)	(3.3600)	(5.0200)	(6.0100)	(3.8500)
Wald Test		<0.3943>		<17.4693> ***		<0.0039>		<13.3548> ***
GROW	0.1020 ***	0.0227	0.0015	0.0130	0.0741 **	-0.0062	-0.0026 ***	0.0008
t-statistics	(5.0500)	(0.9000)	(0.2800)	(1.6000)	(2.4200)	(-0.2290)	(-3.1900)	(0.4590)
Wald Test		<9.9525> ***		<2.5524>		<8.7940> ***		<3.9254> **
VOL	0.0011	-0.0027 ***	-0.0003	0.0005	-0.0047	-0.0013 **	0.0015 **	-0.0012
t-statistics	(0.7550)	(-3.6300)	(-0.2530)	(0.4680)	(-0.9790)	(-1.9900)	(2.3300)	(-0.6320)
Wald Test		<13.1735> ***		<0.2191>		<3.9767> **		<1.9569>
LIQ	0.0768 ***	0.0456 ***	0.0813 ***	0.0248 ***	0.1134 ***	0.0382	0.0071	0.0203 ***
t-statistics	(3.8600)	(3.6500)	(3.8100)	(3.3600)	(3.5500)	(1.5500)	(0.9590)	(2.8300)
Wald Test		<6.2087> **		<58.6761> ***		<9.2542> ***		<6.8414> ***
PROF	-0.0680	0.2687 ***	-0.1505	0.1430 ***	-0.0140	0.0391	-0.1723 ***	-0.1303
t-statistics	(-0.3770)	(3.1300)	(-0.5180)	(3.8700)	(-0.0540)	(0.2320)	(-6.4000)	(-1.5500)
Wald Test		<9.7854> ***		<14.9759> ***		<0.0540>		<0.2484>
SPP	0.0374	-0.0108	0.0418	0.0010	0.1310 ***	0.0041	0.0220	0.0293
t-statistics	(1.5600)	(-0.6570)	(1.1500)	(0.1210)	(3.3900)	(0.2680)	(0.4010)	(1.2500)
Wald Test		<0.4320>		<0.0146>		<68.6444> ***		<1.5529>
AMAT	0.3862 ***	0.1903 ***	0.2030 **	0.2361 ***	0.2970 ***	0.2592 ***	-0.1536	0.2321 **
t-statistics	(5.0700)	(2.7600)	(2.2900)	(4.8500)	(2.6200)	(3.0100)	(-1.0300)	(2.3200)
Wald Test		<8.0711> ***		<0.4638>		<0.1917>		<5.3968> **
QUA	-0.0469 ***	-0.0122 *	-0.0001	-0.0018	-0.0334 ***	0.0038	0.0038	0.0014
t-statistics	(-4.9200)	(-1.7900)	(-0.0966)	(-0.8720)	(-4.1500)	(0.3820)	(1.6100)	(0.7920)
Wald Test		<25.6680> ***		<0.7598>		<13.8181> ***		<0.6277>
Adj R^2	0.3129	0.2019	0.1245	0.2149	0.2987	0.2071	0.3954	0.2301
No. of obs.	516	981	467	1731	302	730	225	502

Panel B : By country groupings

Equation	Countries least affected by the crisis: Pre-Crisis (1993 - 1996)	Countries least affected by the crisis: Post-Crisis (1998 - 2001)	Country most affected by the crisis: Pre-Crisis (1993 - 1996)	Country most affected by the crisis: Post-Crisis (1998 - 2001)
Constant	-0.5849 ***	-0.3916 ***	-0.3423 **	-0.3843 ***
t-statistics	(-3.8000)	(-3.0300)	(-2.2900)	(-4.9000)
LEV	0.5456 ***	0.0788	0.1405 **	0.1071 ***
t-statistics	(4.7700)	(1.2800)	(2.0500)	(3.0100)
Wald Test		<57.3207> ***		<0.8827>
SIZE	0.0734 ***	0.0642 ***	0.0366 ***	0.0408 ***
t-statistics	(6.3200)	(7.2900)	(4.0900)	(7.7200)
Wald Test		<1.0918>		<0.6213>
GROW	-0.0025 ***	-0.0017	0.0052	0.0071
t-statistics	(-2.6100)	(-0.8260)	(0.6980)	(0.8860)
Wald Test		<0.1534>		<0.7857>
VOL	0.0007	-0.0020 ***	0.0006	-0.0010
t-statistics	(0.9250)	(-2.9500)	(0.5200)	(-0.9720)
Wald Test		<8.7112> ***		<0.9438>
LIQ	0.0126	0.0317 ***	0.0155	0.0248 ***
t-statistics	(1.4600)	(4.1200)	(0.9650)	(3.7800)
Wald Test		<17.0074> ***		<14.2762> ***
PROF	-0.1200 ***	0.0312	-0.2819 *	0.1326 ***
t-statistics	(-2.7500)	(0.3500)	(-1.7900)	(3.7100)
Wald Test		<2.8733> *		<134.2670> ***
SPP	0.0751 *	0.0195	0.0692 ***	-0.0035
t-statistics	(1.9200)	(1.3900)	(3.4600)	(-0.4570)
Wald Test		<15.5827> ***		<91.5075> ***
AMAT	0.0862	0.2007 ***	0.1994 ***	0.1757 ***
t-statistics	(0.9300)	(3.0900)	(3.0600)	(4.2900)
Wald Test		<9.5535> ***		<0.3341>
QUA	-0.0030	-0.0045	-0.0005	-0.0022
t-statistics	(-0.8920)	(-1.3300)	(-0.5380)	(-0.9510)
Wald Test		<0.4091>		<0.9040>
Adj R^2	0.2672	0.2426	0.1261	0.1525
No. of obs.	527	1232	983	2712

$MAT_{i,t} = \beta_1 + \beta_2 LEV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROW_{i,t} + \beta_5 VOL_{i,t} + \beta_6 LIQ_{i,t} + \beta_7 PROF_{i,t} + \beta_8 SPP_{i,t} + \beta_9 AMAT_{i,t} + \beta_{10} QUA_{i,t} + \alpha_t + \varepsilon_{i,t}$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 4.1 and 4.3 and Section 4.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

An explainable relationship is found for the effect of the financial crisis on the relationship between ***earnings volatility*** and debt maturity. A negative but insignificant relationship is found for the pre-crisis period but the relationship is significant after the crisis for Thailand and Singapore. Before the crisis, the volatility was not so high that it could affect the optimal debt maturity structure; therefore, an insignificant relationship is found. However, the crisis increased risk and volatility, especially in Thailand where the crisis originated; therefore, Thai firms were more concerned and tried to reduce those risks by issuing short-term instead of long-term debt when earnings volatility was high. Singaporean firms also picked up similar effect to Thai firms. However, the relationship is consistently found to be insignificant for Malaysia. This implies that the crisis did not affect the volatility of firms enough to drive firms to consider earnings volatility when they determined their optimal debt maturity structure. The results show that the crisis has no significant influence on the risk of Malaysian firms. On the other hand, the results show opposite effect of earnings volatility on debt maturity in Australia. Before the crisis, a positive relationship is found implying that Australian firms were concerned about liquidation and that firms that have difficulties in repaying debt might prefer to use long-term debt when earnings volatility is high. However, the relationship switches to negative but insignificant after the crisis. This implies that, compared with other sample countries, especially Thailand, earnings of Australian firms are not volatile enough to affect their debt maturity structure. This also confirms that Australian firms have not been affected by the financial crisis as have other sample countries.

There is a variation of the effect of the crisis on the relationship between ***liquidity*** and debt maturity across sample countries. For Australia, before the crisis, liquidity is found to be positively but insignificantly related to debt maturity. However, the relationship later becomes significant. This implies that after the crisis highly liquid

Australian firms chose to issue long-term debt to avoid cash shortages. However, the opposite pattern is found for firms in other sample countries. The role of liquidity appears to decrease for the post-crisis period for Thailand, Malaysia and Singapore. There are also some certain patterns in the effect of financial crisis on the relationship between ***profitability*** and debt maturity especially among Thailand and Malaysia. The relationship is found to be insignificant for these countries for the pre-crisis period but switches to positive and significant for the post-crisis period. This implies that the financial crisis raises more concern about firms' taxation. However, the crisis does not affect the profitability of Australian firms severely enough to change the sign of the relationship between profitability and debt maturity. As in the full sample, profitability is still found to be insignificant for both pre- and post-crisis periods.

Second, the results reveal that the financial crisis does not have as much influence on the effects of firm size, growth opportunity and share price performance on debt maturity as on capital structure as shown in the previous chapter. The relationships between ***firm size*** and debt maturity seem to be fairly stable for both the pre- and post-crisis periods. Similar to findings for the full sample and for the effect on capital structure, no clear pattern of relationship between ***growth opportunity*** and debt maturity is found even when the sample is split into pre- and post-crisis periods showing little support to the moral hazard and agency hypothesis. A few significant relationships are picked up across sample countries; however, the sign is not as expected and no conclusive pattern in the relationship is observed. Moreover, the relationship between ***share price performance*** and debt maturity remains insignificant in Thailand, Malaysia and Australia while a positive and significant relationship is found in Singapore for the pre-crisis period but this becomes insignificant after the crisis.

Finally, the results reveal some variations in the effect of the financial crisis on the relationship between both ***asset maturity*** and ***firm quality*** and debt maturity. A positive relationship between asset maturity and debt maturity is consistently found for Thailand, Malaysia and Singapore for both pre- and post-crisis periods. On the other hand, the crisis affects Australian firms differently. There is no evidence of matching maturity before the crisis but a significant relationship is found after the crisis. Australian firms tend to rely more on the maturity matching hypothesis after the crisis. The results show some support to the signalling hypothesis. The relationship between ***firm quality*** and debt maturity is found to be negative for Thailand, Malaysia and Singapore. However, they are significant only for Thailand and Singapore. The signalling hypothesis is most supported in Thailand as the relationship is found to be negative and significant for both before and after the crisis. However, the significance level reduces after the crisis. For Singapore, there is a similar pattern. The signalling hypothesis is less supported after the crisis. On the other hand, as in the full sample, there is no evidence supporting the signalling hypothesis in Malaysia and Australia for either sub-sample.

In summary, from the aggregate results in Table 4.6, Panel A, it is shown that financial crisis had a few obvious significant effects on the determinants of debt maturity structure especially for Thailand where the crisis originated. There are similarities and differences in the pattern of the effects across countries. The results also reveal that the crisis does not affect Australian firms as severely as firms in other sample countries. However, splitting the sample into pre- and post-crisis periods does not help much in explaining the variation across countries. Because the sample countries were hit by the financial crisis to different degrees, the sample countries are grouped into (i) countries most affected by the crisis and (ii) countries least affected by the crisis, as in the previous chapter. Equation (4.1) is re-estimated based on country groupings for both pre- and post-crisis periods and the results are presented in Table 4.6, Panel B. The results show that between two country groupings the crisis has had three different patterns of effects on firm-specific determinants of debt maturity structure: (i) opposite significant effects; (ii) same significant effects; and (iii) no significant effect.

First, the Asian crisis appears to have had different effects between the country groupings on the relationship between debt maturity and leverage, earnings volatility, profitability and asset maturity. ***Leverage*** is positively related to debt maturity in both the pre- and post-crisis periods. However, the role of long-term debt in offsetting the higher probability of liquidity risk and in delaying the exposure to bankruptcy reduced substantially after the crisis especially in the countries least affected by the crisis. ***Earnings volatility*** plays no role in the most affected countries in both pre- and post-crisis periods, whereas it became a significant negative factor in the least affected countries after the crisis. This negative relationship implies a stronger agency effect in the more developed markets and it is consistent with several studies of developed markets, including Guedes and Opler (1996) and Ozkan (2002). On the contrary, the relationship between ***profitability*** and debt maturity in the most affected countries became significantly positive in the post-crisis period, implying that the financial crisis might have raised the firm's awareness of tax effects. While the crisis had no impact on the role of ***asset maturity*** in the most affected countries, the relationship between debt maturity and asset maturity became significantly positive after the crisis for the least affected countries, implying that maturity matching became important only after the crisis. Second, the crisis appears to have had similar effects on the relationship between debt maturity and liquidity and share price performance in both country groupings, regardless of how severely they were hit by the crisis. Although before the crisis ***liquidity*** played no significant role, after the crisis it became a significant positive factor in determining debt maturity. This implies that after the crisis firms with higher levels of liquidity chose to issue long-term debt to avoid cash shortages. ***Share price***

performance became insignificant after the crisis, as stock market uncertainty increased in both country groupings. Third, the results also reveal that the financial crisis did not have much influence on the effects of ***firm size***, ***growth opportunity*** and ***firm quality***, in line with previous evidence on the pre- and post-crisis effects of these variables on leverage in the same sample countries as found in Chapter 3.

4.5.3 Country-Specific Determinants

As with the analysis of the determinants of capital structure in the previous chapter, there are variations found among firm-specific determinants of debt maturity structure in this region and the effects of the crisis on these determinants also differ. These differences may be due to the differences in economic conditions, corporate governance and legal setting among the sample countries. Therefore, equation (4.1) is augmented by including country dummies which will then be replaced by country-specific factors one at a time. There are two groups of country-specific factors in the analysis: (i) market-wide and (ii) legal and corporate governance. The first analysis will focus on market-wide determinants and then move on to legal and corporate governance determinants. Due to the nature of the data, the investigation on the effects of the crisis and country groupings can only be performed on market-wide determinants.

4.5.3.1 Market-Wide Determinants

Table 4.7 presents the results of estimating equation (4.1) with the inclusion of country dummies and market-wide determinants, using panel data that combine all firms across all sample countries over the whole sample period. The coefficients of the firm-specific variables are consistent with the ones presented in Section 4.5.1.

Table 4.7 : Panel analysis of firm-specific and market-wide determinants of corporate debt maturity structure: Whole sample period

Equation	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6
Constant	-0.3099 ***	-0.1879 ***	0.0228	-0.0739	-0.4249 ***	-0.0710
t-statistics	(-3.5600)	(-2.6600)	(0.3010)	(-0.8780)	(-6.2400)	(-0.9650)
LEV	0.1731 ***	0.0915 ***	0.0536 *	0.0364	0.0839 ***	0.0354
t-statistics	(6.1600)	(3.2300)	(1.7800)	(1.1800)	(2.9200)	(1.1600)
SIZE	0.0571 ***	0.0456 ***	0.0296 ***	0.0326 ***	0.0371 ***	0.0323 ***
t-statistics	(9.6900)	(10.2000)	(6.8700)	(7.1400)	(8.7400)	(7.4200)
GROW	-0.0006	-0.0010	-0.0011	-0.0018	0.0000	-0.0018
t-statistics	(-0.5120)	(-0.8800)	(-0.9550)	(-1.4400)	(-0.0380)	(-1.4400)
VOL	-0.0008 **	-0.0009 **	-0.0008 **	-0.0008 **	-0.0009 **	-0.0008 **
t-statistics	(-1.9600)	(-1.9900)	(-2.2800)	(-2.0800)	(-2.3700)	(-2.0800)
LIQ	0.0222 ***	0.0207 ***	0.0204 ***	0.0219 ***	0.0179 ***	0.0218 ***
t-statistics	(3.9200)	(3.8500)	(3.7200)	(3.8500)	(3.3200)	(3.8700)
PROF	0.0358	0.0414	0.0576 *	0.0811 **	0.0146	0.0800 **
t-statistics	(1.1000)	(1.3200)	(1.8200)	(2.2800)	(0.5150)	(2.3100)
SPP	0.0097 **	0.0156 ***	0.0184 ***	0.0218 ***	0.0176 ***	0.0224 ***
t-statistics	(1.9900)	(3.1200)	(3.6200)	(3.7200)	(3.5400)	(4.2400)
AMAT	0.2137 ***	0.1719 ***	0.1311 ***	0.1244 ***	0.1667 ***	0.1243 ***
t-statistics	(6.6800)	(5.2000)	(3.7000)	(3.5100)	(4.9200)	(3.5100)
QUA	0.0004	-0.0016	-0.0027 **	-0.0044 **	0.0003	-0.0044 ***
t-statistics	(0.5700)	(-1.5700)	(-2.1600)	(-2.5500)	(0.3350)	(-2.6500)
THDUM	-0.5041 ***					
t-statistics	(-17.9000)					
MLDUM	-0.3504 ***					
t-statistics	(-14.9000)					
SPDUM	-0.2218 ***					
t-statistics	(-8.4000)					
EDEV		-0.2446 ***				
t-statistics		(-14.7000)				
BKDEV			-0.0232 ***			
t-statistics			(-5.1600)			
MKDEV				0.0008		
t-statistics				(0.1650)		
TERM					-0.0241 ***	
t-statistics					(-14.5000)	
INF						0.0009
t-statistics						(0.8430)
Adj R^2	0.2723	0.2237	0.1520	0.1362	0.2110	0.1363
No. of obs.	6192	6192	6192	6192	6192	6192

$MAT_{i,t} = \beta_1 + \beta_2 LEV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROW_{i,t} + \beta_5 VOL_{i,t} + \beta_6 LIQ_{i,t} + \beta_7 PROF_{i,t} + \beta_8 SPP_{i,t} + \beta_9 AMAT_{i,t} + \beta_{10} QUA_{i,t} + \beta_{11}$ *Maket-wide factors* $_{i,t} + \alpha_t + \mu_{i,t}$

Market-wide determinants replace country dummies one at a time. The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 4.1 and 4.3 and Section 4.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

All ***country dummies*** coefficients are significantly different from zero. This shows that country-specific factors play important roles in corporate debt maturity decisions of firms in this region. This implies that in addition to a firm's characteristics, the location of the country in which a firm operates is also an important determinant of its debt maturity structure, consistent with Fan et al. (2004). ***Economic Development*** is also found to play a significant role in determining debt maturity structure of firms in this region. The results show that developing countries tend to issue less long-term debt. This confirms the descriptive statistics from Section 4.4. Consistent with Fan et al. (2004), the results show that ***bank development*** (size of banking sector) is negatively associated with debt maturity. This implies that banks exploit their benefits of monitoring in this region by issuing more short-term debt. The results support the monitoring role of banks. However, although found to be positive, the results show that ***stock market development*** (stock market activity) has no significant effect on the choice of debt maturity in this region. This is consistent with the insignificant relationship found by Fan et al. (2004) and Demirguc-Kunt and Maksimovic (1999). Because size of banking sector shows a significant effect on debt maturity, it can be implied that banks have a stronger effect on debt maturity than stock markets in this region and that stock market development does not help explain differences in the usage of long-term debt.

The results show that the coefficients of ***term structure of interest rates*** are negative and significant giving support to the market timing theory and in line with the findings of Guedes and Opler (1996) and Johnson (1997). This result shows some evidence of less than fully rational behaviour of managers (optimism) as discussed in Baker et al. (2005) that managers may time their debt maturity decisions by issuing short-term debt when term spread is high in order to wait for the decline of long-term rates in the future to reduce the overall cost of debt. The negative and insignificant relationship found suggests that widening of the yield spread between short- and long-term debt does not encourage firms to issue longer-term debt in order to take advantage of the tax shield. On the other hand, firms in this region are encouraged to use short-term debt when term structure of interest rates is increasing. Therefore, similar to Barclay and Smith (1995), Stohs and Mauer (1996) and Guedes and Opler (1996), the results fail to support the tax hypothesis that predicts a positive relationship between debt maturity and the slope of the yield curve. Barclay and Smith (1995) find that the relationship between term structure of interest rates and debt maturity depends on the methodology applied while Antoniou et al. (2006) find mixed influence of term structure of interest rates on debt maturity.[86,87]

Since the findings in Table 4.7 reflect the aggregate effects across sample countries, it is possible that the estimated coefficients may hide the conflicting country-specific influence that some determinants may have on debt maturity. In particular, given that the sample countries were at different stages of economic development and were hit by the crisis to different degrees, some of the true market-wide effects may have been washed out when estimated over the full set of sample countries as in Table 4.7. It is an important question whether the market-wide determinants had a different impact on sample countries depending upon their stage of development and vulnerability to the crisis. Table 4.8 presents the findings from estimating equation (4.1) for the pooled panels of the two groups of countries, least and most affected by the crisis. The results reveal an opposite pattern in the relationships between bank development, stock market development and the term structure of interest rates and debt maturity among the two country groupings.

[86] Barclay and Smith (1995) find a negative and significant relationship when panel data was applied in pooled OLS and fixed effects regression but found an insignificant relationship when cross-sectional data is used providing no support for tax hypothesis.
[87] Antoniou et al. (2006) find a positive and significant relationship in the UK lending strong support to the tax hypothesis. However, an insignificant relationship is found for France and Germany implying that the tax effect does not influence debt maturity of French and German firms.

Table 4.8 : Panel analysis of firm-specific and market-wide determinants of corporate debt maturity structure by country groupings: Whole sample period

Equation	Panel A : Countries Least Affected by the Crisis				Panel B : Countries Most Affected by the Crisis			
	Model-1	Model-2	Model-3	Model-4	Model-1	Model-2	Model-3	Model-4
Constant	-0.2041 *	-0.2283 **	-0.6081 ***	-0.4095 ***	-1.0499 ***	-0.8244 ***	-0.3194 ***	-0.3484 ***
t-statistics	(-1.8300)	(-2.0500)	(-5.7900)	(-3.4900)	(-5.8300)	(-5.3500)	(-2.8900)	(-3.1200)
LEV	0.2687 ***	0.2476 ***	0.2355 ***	0.1681 ***	0.1353 ***	0.1686 ***	0.1231 ***	0.1154 ***
t-statistics	(5.1900)	(4.7800)	(4.5700)	(3.0100)	(4.1300)	(5.0600)	(3.7500)	(3.5200)
SIZE	0.0541 ***	0.0560 ***	0.0576 ***	0.0641 ***	0.0457 ***	0.0513 ***	0.0401 ***	0.0388 ***
t-statistics	(7.5100)	(7.8200)	(8.1000)	(8.1700)	(7.5700)	(7.3600)	(7.5000)	(7.4200)
GROW	-0.0003	-0.0003	-0.0003	-0.0013	0.0112 *	0.0080	0.0090	0.0086
t-statistics	(-0.2760)	(-0.3440)	(-0.3630)	(-1.0900)	(1.8700)	(1.4900)	(1.5100)	(1.4500)
VOL	-0.0005	-0.0005	-0.0005	-0.0008	-0.0006	-0.0007	-0.0005	-0.0006
t-statistics	(-1.1400)	(-1.0800)	(-1.0900)	(-1.1400)	(-1.0300)	(-1.0900)	(-0.8420)	(-1.0300)
LIQ	0.0181 **	0.0181 **	0.0177 **	0.0213 ***	0.0259 ***	0.0285 ***	0.0251 ***	0.0248 ***
t-statistics	(2.4800)	(2.4400)	(2.3600)	(2.6300)	(3.5900)	(3.8100)	(3.6400)	(3.6000)
PROF	-0.0940 ***	-0.0939 ***	-0.0932 ***	-0.0265	0.1292 ***	0.1502 ***	0.1229 ***	0.1121 ***
t-statistics	(-2.8300)	(-2.8900)	(-2.8100)	(-0.6590)	(4.4400)	(5.0000)	(4.1900)	(3.8700)
SPP	0.0355 ***	0.0508 ***	0.0330 ***	0.0471 ***	0.0083	-0.0131 **	-0.0028	0.0035
t-statistics	(3.2800)	(4.5400)	(3.0300)	(4.0200)	(1.5700)	(-2.1100)	(-0.4820)	(0.6470)
AMAT	0.1946 ***	0.1915 ***	0.1936 ***	0.1542 ***	0.1961 ***	0.2137 ***	0.1828 ***	0.1818 ***
t-statistics	(3.7800)	(3.7200)	(3.7400)	(2.6900)	(4.9900)	(5.4800)	(4.6200)	(4.5800)
QUA	0.0023	0.0019	0.0020	-0.0041 **	-0.0012	-0.0015 *	-0.0013	-0.0013
t-statistics	(1.4900)	(1.2300)	(1.3100)	(-2.2500)	(-1.5900)	(-1.7000)	(-1.6100)	(-1.6200)
BKDEV	-0.0375 ***				0.1188 ***			
t-statistics	(-9.3900)				(5.3500)			
MKDEV		-0.0562 ***				0.0402 ***		
t-statistics		(-9.0800)				(6.4000)		
TERM			-0.0203 ***				0.0346 ***	
t-statistics			(-8.8200)				(4.4300)	
INF				-0.0008				-0.0115 ***
t-statistics				(-0.5240)				(-2.9400)
Adj R^2	0.3235	0.3157	0.3154	0.2422	0.1481	0.1634	0.1407	0.1374
No. of obs.	1973	1973	1973	1973	4219	4219	4219	4219

$MAT_{i,t} = \beta_1 + \beta_2 LEV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROW_{i,t} + \beta_5 VOL_{i,t} + \beta_6 LIQ_{i,t} + \beta_7 PROF_{i,t} + \beta_8 SPP_{i,t} + \beta_9 AMAT_{i,t} + \beta_{10} QUA_{i,t} + \beta_{11}\ \textit{Market-wide Factors}_{i,t} + \alpha_t + \mu_{i,t}$

Market-wide determinants replace country dummies one at a time. The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 4.1 and 4.3 and Section 4.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

The negative and highly significant coefficient of ***bank development*** for the sample of countries least affected by the crisis supports the findings of Fan et al. (2004). In developed economies banks are able to take full advantage of their monitoring power and act as information providers to other creditors. Thus, the larger the banking sector, the more firms are encouraged to issue short-term debt. In the countries most affected by the crisis, a positive and significant relationship shows that a larger banking sector leads to more long-term debts. This finding is consistent with Demirguc-Kunt and Maksimovic's (1999) argument that in developing countries with weaker legal systems, a larger banking sector will be associated with longer-maturity debts, as creditor's rights are strengthened by the size of the banking sector. In addition, the closer relationship between firms and their banks in developing countries, and the lack of an efficient equity market, may also encourage banks to grant relatively more long-term debt.

In line with Demirguc-Kunt and Maksimovic (1999), the results show a significant role of ***stock market development*** in determining debt maturity structure that stock markets in countries least affected by the crisis are quite developed and since firms can more easily raise long-term finance from equity, they will hold relatively shorter maturity debts. The reverse is true for firms in countries most affected by the crisis as their stock markets are less developed. Consistent with the tax hypothesis, firms in countries most affected by the crisis employ more long-term debt when ***term structure of interest rates*** has a positive slope. On the other hand, the market timing theory dominates the effect for firms in countries least affected by the crisis which is in line with the findings of Guedes and Opler (1996). This result shows some evidence of less than fully rational behaviour of managers (optimism) as discussed in Baker et al. (2005). Finally, in line with Demirguc-Kunt and Maksimovic's (1999) findings, the results show that high ***inflation*** is negatively related to the use of long-term debt.

However, the coefficient is not significant for firms in countries least affected by the crisis.

Table 4.8 shows that market-wide determinants have different effects on different country groupings. As the developed countries are least affected by the crisis while developing countries are most affected by the crisis, it is important to further investigate whether the role of market-wide determinants changes as a results of the crisis. Table 4.9 presents the results relating to market-wide factors for the pre- and post-crisis periods for the two country groupings identified. While the crisis changed the relationship between debt maturity and a number of firm-specific factors, it does not appear to have affected the direction of the effect of all market-wide factors, apart from inflation.

All the coefficients of the market-wide factors are highly significant in both country groupings in the pre- and post-crisis periods, in line with the findings for the whole sample period presented earlier in Table 4.8 which shows that market-wide factors play opposite roles in the two country groupings and the crisis did not change this contrasting behaviour. Overall however, the crisis changed the size of the impact of market factors, especially in the less developed countries. Similar effects on bank development and market development are found between country groupings. Although remaining in opposite directions between country groupings, the role of ***bank development*** in determining debt maturity structure reduces for both country groupings after the crisis because banks also were hit by the crisis which led to a less effective monitoring role while the role of ***stock market development*** increased for both country groupings after the crisis.

Table 4.9 : Panel analysis of firm-specific and market-wide determinants of corporate debt maturity structure by country groupings: Pre- and post-crisis periods

Equation	Panel A : Countries Least Affected by the Crisis								Panel B : Countries Most Affected by the Crisis							
	Model-1		Model-2		Model-3		Model-4		Model-1		Model-2		Model-3		Model-4	
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	-0.4345 ***	-0.0966	-0.4547 ***	-0.1290	-0.7568 ***	-0.4629 ***	-0.5652 ***	-0.3940 ***	-1.2788 ***	-1.2677 ***	-0.5882 ***	-0.7615 ***	-0.2793 *	-0.3414 ***	-0.3184 **	-0.7332 ***
t-statistics	(-2.8500)	(-0.7670)	(-3.0200)	(-1.0300)	(-5.3600)	(-3.9700)	(-3.7200)	(-3.1400)	(-3.3300)	(-6.5100)	(-3.0300)	(-6.7200)	(-1.8900)	(-4.2800)	(-2.0600)	(-6.6700)
LEV	0.5412 ***	0.1854 ***	0.5371 ***	0.1763 ***	0.5381 ***	0.1756 ***	0.5390 ***	0.0832	0.2083 ***	0.1274 ***	0.2212 ***	0.1510 ***	0.1610 **	0.1108 ***	0.2109 ***	0.1258 ***
t-statistics	(4.6400)	(3.1400)	(4.6100)	(2.9900)	(4.6100)	(2.9800)	(4.7200)	(1.3600)	(2.9100)	(3.5300)	(3.0200)	(4.1400)	(2.3500)	(3.1100)	(3.0400)	(3.5500)
Wald Test		<36.2574> ***		<37.3417> ***		<37.9178> ***		<55.4039> ***		<5.0125> **		<3.7031> *		<1.9866>		<5.7682> **
SIZE	0.0701 ***	0.0536 ***	0.0706 ***	0.0538 ***	0.0711 ***	0.0540 ***	0.0734 ***	0.0617 ***	0.0410 ***	0.0499 ***	0.0421 ***	0.0566 ***	0.0394 ***	0.0416 ***	0.0429 ***	0.0453 ***
t-statistics	(6.4800)	(6.3600)	(6.5700)	(6.3900)	(6.5800)	(6.4200)	(6.4600)	(7.1500)	(4.1600)	(8.3000)	(4.1100)	(8.2400)	(4.1600)	(7.7900)	(4.2000)	(8.0700)
Wald Test		<3.8473> **		<3.9926> **		<4.1347> **		<1.8458>		<2.2036>		<4.4591> **		<0.1724>		<0.1959>
GROW	-0.0017 **	-0.0002	-0.0017 **	-0.0002	-0.0017 **	-0.0002	-0.0023 **	-0.0014	0.0060	0.0069	0.0057	0.0057	0.0051	0.0069	0.0049	0.0080
t-statistics	(-2.2400)	(-0.1220)	(-2.2300)	(-0.1120)	(-2.2300)	(-0.1030)	(-2.5300)	(-0.7220)	(0.8770)	(0.8780)	(0.8140)	(0.7390)	(0.6750)	(0.8570)	(0.6880)	(0.9900)
Wald Test		<0.7607>		<0.7872>		<0.8188>		<0.2072>		<0.7717>		<0.5463>		<0.7341>		<0.9808>
VOL	0.0010	-0.0016 ***	0.0010	-0.0015 ***	0.0010	-0.0015 ***	0.0008	-0.0019 ***	0.0005	-0.0010	0.0006	-0.0010	0.0008	-0.0009	0.0008	-0.0009
t-statistics	(1.4200)	(-2.6900)	(1.4000)	(-2.6800)	(1.4700)	(-2.6700)	(1.0800)	(-3.1000)	(0.4660)	(-0.9910)	(0.5380)	(-0.9930)	(0.7330)	(-0.9130)	(0.7320)	(-0.9080)
Wald Test		<7.2333> ***		<7.1867> ***		<7.1300> ***		<9.6005> ***		<0.9816>		<0.9853>		<0.8330>		<0.8242>
LIQ	0.0099	0.0277 ***	0.0102	0.0282 ***	0.0100	0.0273 ***	0.0122	0.0298 ***	0.0187	0.0264 ***	0.0197	0.0280 ***	0.0166	0.0252 ***	0.0193	0.0252 ***
t-statistics	(1.2400)	(3.8700)	(1.2600)	(3.9700)	(1.2500)	(3.8600)	(1.4500)	(3.9000)	(1.1400)	(3.8300)	(1.1900)	(3.9800)	(1.0500)	(3.8200)	(1.1900)	(3.8500)
Wald Test		<14.9628> ***		<15.7635> ***		<14.9081> ***		<15.1951> ***		<14.6693> ***		<15.8793> ***		<14.6250> ***		<14.8423> ***
PROF	-0.1575 ***	-0.0738	-0.1538 ***	-0.0812	-0.1556 ***	-0.0806	-0.1175 ***	0.0136	-0.1986	0.1403 ***	-0.1764	0.1581 ***	-0.2506	0.1388 ***	-0.1895	0.1439 ***
t-statistics	(-5.3000)	(-0.9150)	(-5.0400)	(-1.0100)	(-5.0700)	(-0.9980)	(-2.8000)	(0.1560)	(-1.2800)	(3.8400)	(-1.1300)	(4.1700)	(-1.5900)	(3.7900)	(-1.2200)	(4.0000)
Wald Test		<1.0787>		<0.8194>		<0.8659>		<2.2749>		<14.7733> ***		<17.4249> ***		<14.3704> ***		<16.0084> ***
SPP	0.0639 *	0.0157	0.0739 *	0.0321 **	0.0666 *	0.0141	0.0703 *	0.0112	0.0438 **	0.0006	0.0342 *	-0.0100	0.0687 ***	-0.0123	0.0546 ***	0.0041
t-statistics	(1.6800)	(1.2000)	(1.9200)	(2.3900)	(1.7400)	(1.0700)	(1.8300)	(0.7830)	(2.2000)	(0.0852)	(1.6700)	(-1.2900)	(3.4400)	(-1.4100)	(2.9000)	(0.5330)
Wald Test		<13.5884> ***		<9.6664> ***		<15.8179> ***		<17.2043> ***		<34.0127> ***		<32.4277> ***		<86.4760> ***		<43.5409> ***
AMAT	0.1117	0.2433 ***	0.1102	0.2422 ***	0.1120	0.2465 ***	0.0859	0.2078 ***	0.2166 ***	0.1953 ***	0.2222 ***	0.2074 ***	0.2055 ***	0.1755 ***	0.2204 ***	0.1869 ***
t-statistics	(1.3100)	(4.0200)	(1.2900)	(3.9900)	(1.3000)	(4.0500)	(0.9410)	(3.2800)	(3.2800)	(4.8700)	(3.3500)	(5.2100)	(3.1700)	(4.2900)	(3.3800)	(4.6400)
Wald Test		<16.1455> ***		<15.9151> ***		<16.4239> ***		<10.7776> ***		<0.2811>		<0.1390>		<0.5362>		<0.6937>
QUA	0.0027	0.0017	0.0024	0.0012	0.0024	0.0018	-0.0023	-0.0031 *	-0.0006	-0.0021	-0.0006	-0.0022	-0.0005	-0.0023	-0.0006	-0.0019
t-statistics	(1.1200)	(0.9890)	(0.9400)	(0.7300)	(0.9610)	(1.0200)	(-0.7040)	(-1.7000)	(-0.6400)	(-0.9090)	(-0.6650)	(-0.9620)	(-0.6270)	(-0.9960)	(-0.6670)	(-0.8340)
Wald Test		<0.9789>		<0.5327>		<1.0477>		<2.8767> *		<0.8268>		<0.9260>		<0.9921>		<0.6949>
BKDEV	-0.0431 ***	-0.0352 ***							0.1858 ***	0.1178 ***						
t-statistics	(-5.9300)	(-8.1800)							(2.7900)	(5.2100)						
Wald Test		<3.3674> *								<9.0569> ***						
MKDEV			-0.0498 ***	-0.0576 ***							0.0250 ***	0.0478 ***				
t-statistics			(-5.4800)	(-8.2500)							(2.7500)	(6.2700)				
Wald Test				<1.2744>								<8.9428> ***				
TERM					-0.0159 ***	-0.0240 ***							0.0429 ***	0.0230 **		
t-statistics					(-5.5600)	(-8.1200)							(3.0700)	(2.2600)		
Wald Test						<7.5096> ***								<3.8724> **		
INF							-0.0034 **	0.0410 ***							-0.0354 ***	0.0543 ***
t-statistics							(-2.2100)	(5.0100)							(-3.8500)	(5.2300)
Wald Test								<29.4336> ***								<74.4934> ***
Adj R^2	0.3368	0.3232	0.3294	0.3185	0.3309	0.3238	0.2719	0.2569	0.1350	0.1683	0.1364	0.1815	0.1327	0.1540	0.1424	0.1653
No. of obs.	527	1232	527	1232	527	1232	527	1232	983	2712	983	2712	983	2712	983	2712

$MAT_{i,t} = \beta_1 + \beta_2 LEV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROW_{i,t} + \beta_5 VOL_{i,t} + \beta_6 LIQ_{i,t} + \beta_7 PROF_{i,t} + \beta_8 SPP_{i,t} + \beta_9 AMAT_{i,t} + \beta_{10} QUA_{i,t} + \beta_{11}\ \textit{Market-wide Factors}_{i,t} + \alpha_i + \mu_{i,t}$

Market-wide determinants replace country dummies one at a time. The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 4.1 and 4.3 and Section 4.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

On the other hand, the crisis affected the role of ***term structure of interest rates*** differently between country groupings. The role increased for countries least affected by the crisis while it decreased for the countries most affected. This implies that the concern for tax is lowered for countries most affected by the crisis. The market timing theory still continues to dominate the effect for firms in countries least affected by the crisis with a negative relationship found. The coefficient of ***inflation*** changes sign after the crisis and becomes positive for both country groupings. This may explain why inflation appears insignificant in the previous aggregate analysis of the whole sample period, as negative and positive effects cancel each other out.

4.5.3.2 Legal and Corporate Governance Determinants

Table 4.10 presents the results of estimating equation (4.1) with the inclusion of legal and corporate governance determinants. Consistent with Fan et al. (2004), the results show that corruption level is negatively associated with debt maturity implying a positive relationship between ***quality of legal enforcement*** and debt maturity. This suggests that the higher the quality of legal enforcement, the greater the proportion of long-term debt financing showing support to the monitoring function of short-term debt. ***Legal protection*** is also found to be a significant factor in determining a firm's debt maturity choice. In particular, firms in countries with superior creditor rights use more short-term debt than firms in countries with low creditor rights implying that the ability of firms to use short-term debt is higher when creditors are better protected because banks as a main creditor have advantages of monitoring.

Table 4.10 : Panel analysis of firm-specific and legal and corporate governance determinants of corporate debt maturity structure: Whole sample period

Equation	Model-1	Model-2	Model-3	Model-4	Model-5
Constant	-0.2630 ***	0.1378 *	-0.8488 ***	0.3888 ***	-0.9190 ***
t-statistics	(-3.4800)	(1.7500)	(-7.3400)	(4.5000)	(-9.8300)
LEV	0.1290 ***	0.0480	0.1320 ***	0.0634 **	0.1000 ***
t-statistics	(4.4900)	(1.6200)	(4.3000)	(2.1900)	(3.4700)
SIZE	0.0556 ***	0.0277 ***	0.0551 ***	0.0302 ***	0.0501 ***
t-statistics	(10.6000)	(6.5400)	(9.1200)	(7.2600)	(10.4000)
GROW	-0.0015	-0.0005	-0.0023 *	-0.0002	-0.0016
t-statistics	(-1.2100)	(-0.5000)	(-1.7100)	(-0.1640)	(-1.2400)
VOL	-0.0009 *	-0.0009 **	-0.0007 *	-0.0009 **	-0.0009 *
t-statistics	(-1.7700)	(-2.4000)	(-1.6600)	(-2.4200)	(-1.8300)
LIQ	0.0234 ***	0.0184 ***	0.0263 ***	0.0176 ***	0.0226 ***
t-statistics	(4.1300)	(3.4800)	(4.2900)	(3.3800)	(4.0500)
PROF	0.0629 *	0.0328	0.1052 ***	0.0162	0.0620 *
t-statistics	(1.8200)	(1.1300)	(2.6900)	(0.5800)	(1.8300)
SPP	0.0148 ***	0.0176 ***	0.0178 ***	0.0153 ***	0.0167 ***
t-statistics	(2.9600)	(3.4800)	(3.4400)	(3.0600)	(3.2900)
AMAT	0.1913 ***	0.1345 ***	0.1784 ***	0.1476 ***	0.1752 ***
t-statistics	(5.8600)	(3.8100)	(5.2500)	(4.2700)	(5.3000)
QUA	-0.0020 *	-0.0015	-0.0039 ***	-0.0004	-0.0026 **
t-statistics	(-1.8400)	(-1.5300)	(-2.6100)	(-0.5260)	(-2.0700)
CORR	-0.0561 ***				
t-statistics	(-15.0000)				
CRR		-0.0718 ***			
t-statistics		(-8.0300)			
SHR			0.1149 ***		
t-statistics			(10.6000)		
OWN				-1.1820 ***	
t-statistics				(-12.0000)	
AUD					0.7215 ***
t-statistics					(13.7000)
Adj R^2	0.2385	0.1681	0.1943	0.1941	0.2192
No. of obs.	6192	6192	6192	6192	6192

$$MAT_{i,t} = \beta_1 + \beta_2 LEV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GROW_{i,t} + \beta_5 VOL_{i,t} + \beta_6 LIQ_{i,t} + \beta_7 PROF_{i,t} + \beta_8 SPP_{i,t} + \beta_9 AMAT_{i,t} + \beta_{10} QUA_{i,t} + \beta_{11}\ \textit{Legal and corporate governance Factors}_{i,t} + \alpha_t + \mu_{i,t}$$

Legal and corporate governance determinants replace country dummies one at a time. The t-statistics are the t-values adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 4.1 and 4.3 and Section 4.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

On the contrary, firms in countries with higher shareholder protection use more long-term debt, in line with Demirguc-Kunt and Maksimovic (1999). The results confirm that when shareholders feel protected, the agency cost of debt reduces and firms have less need to shorten their debt maturity. This suggests that the indexes of investor protection help explain differences in the usage of long-term debt. A negative relationship between debt maturity and ***ownership concentration*** shows support for the moral hazard and agency hypothesis. In support of Fan and Wong's (2002) argument, the results show a positive relationship between ***information intermediary activity*** and debt maturity highlighting the role of auditors in facilitating information circulation. In countries with high big-5 auditors' market share or with a substantial role for auditors, firms tend to use longer debt maturity.

In summary, the results are highly consistent with the findings of a number of previous studies that examine how corporate debt maturity structure differs across countries. The ratio of long-term debt is strongly related to both market-wide and legal and corporate governance factors in the expected signs. The results reveal that market-wide determinants not only influence the maturity of firm's borrowing, but also affect firm's debt maturity in different ways depending on the country's economic development and how severely they were hit by the crisis. It confirms the significant roles of corporate governance and institutional environments in determining debt maturity structure for firms in this region. Therefore, similar to capital structure decision, the debt maturity structure decisions of a firm are not only the product of its own characteristics but also the results of the environment in which it operates.

4.6 Summary

Decisions concerning debt maturity structure are as important as the capital structure decisions of a firm's capital structure. This chapter has investigated what types of non-financial firms in Thailand, Malaysia, Singapore and Australia over the period of 1993 to 2001 chooses long-term debt. The results show the conditions under which firms prefer long-term debt. Four main leading theoretical models (namely the moral hazard and agency hypothesis, the adverse selection and signalling hypothesis, the tax hypothesis and the liquidity risk hypothesis), their empirical test, financial crisis and the effect of differences in corporate governance and institutional settings have raised significant academic and policy interest relating to debt maturity decisions.

The descriptive statistics show that there are variations among debt maturity structure of firms in the sample countries. These variations seem to be related to the level of market development. Debt appears to be at longer maturity in more developed economies such as Singapore and Australia but at shorter maturity in less developed economies as in Thailand and Malaysia. The high use of short-term debt in Thailand and Malaysia is consistent to the belief that excessive use of short-term debt may be one of the factors that triggered the financial crisis.

This chapter aims to explore the effects of both firm-specific determinants and country-specific determinants (market-wide and legal and corporate governance) on corporate debt maturity choices. The results presented in this chapter are consistent with the hypotheses and the results from previous empirical studies that examine corporate debt maturity structure decisions and how it may differ across countries. The ratio of long-term debt to total debt is found to be strongly related to a number of firm-specific factors. In particular, firms with high leverage and growth would prefer long-term debt in order to offset the higher probability of a liquidity risk and to delay their exposure to bankruptcy risk giving support to liquidity risk hypothesis. In support to signalling hypothesis, the results show that undervalued and high quality firms prefer short-term debt because these firms have high asymmetric information and want to signal to the market or want to be revealed as high quality at the re-contract time. Firms with high quality would also want to issue short-term debt to avoid paying the market premium that is too high than their quality because the premium reflects the average probability of default. However, the results provide mixed support for agency hypothesis. On one hand, small firms and firms with high volatility prefer short-term debt because these firms are likely to have higher agency cost; therefore, they have incentive to mitigate the problem by shortening their debt maturity. Firms match maturity of assets and liabilities to reduce agency cost because debt repayments are scheduled to correspond with the value of assets. On the other hand, the relationship between debt maturity and growth opportunity is mixed. However, there is little support for the tax hypothesis. Firms with high profitability prefer long-term debt to minimize tax expenses but this is not robust for all sample countries. Therefore, among firm-specific determinants, long-term debt is used more by firms with higher leverage, larger size, higher liquidity, and longer asset maturity. Firms consider these factors in particular in order to offset the higher probability of a liquidity risk, to delay their exposure to bankruptcy risk, to signal to the markets and to reduce agency cost.

The results also confirm that market-wide factors are as important as firm-specific characteristics in determining debt maturity structure. These market-wide factors not only influence the maturity of firm's borrowing but also appear to have different effects depending on the country's economic development. For example, in developed economies, banks can take full advantage of their monitoring power and act as information providers to other creditors. In less developed economies, the closer relationship between firms and their banks and the lack of an efficient market may encourage banks to grant relatively more long-term debt. In countries least affected by the crisis, where stock markets are relatively more developed and firms can more easily raise long-term finance through equity issues, firms will hold relatively shorter maturity debts. In countries most affected by the crisis, investors rely on the role of market prices in transmitting information. Thus, lending to quoted firms can be less risky leading to higher long-term debt capacity. Consistent with tax hypothesis, firms in countries most affected by the crisis employ more long-term debt when term structure has a positive slope. In contrast, managers in least affected countries time their debt maturity choice by issuing short-term debt when term spread is high in order to wait for the expected decline of long-term rates.

Similar to market-wide determinants, legal and corporate governance factors have also found to play significant role in determining corporate debt maturity structure. The results show that firms in countries that are viewed as more corrupt tend to use more short-term debt. This suggests that the higher the degree of legal enforcement, the greater the proportion of long-term debt financing supporting the monitoring function of short-term debt. It is also found that in countries with high creditor rights, firms use more short-term debt. When creditors are protected effectively, the capacity of firms in using short-term debt is higher because banks as a main creditor have advantages of monitoring. In contrast, when shareholders feel protected, the agency cost of debt reduces and firms have less need to shorten their debt maturity. Also firms in countries with high ownership concentration prefer to use more short-term debt to reduce agency problem. The presence of auditors also helps to diminish the role of short-term debt in mitigating information problems; therefore, once auditors are involved, firms have less need for shortening their debt maturity to signal to the market. In sum, firms use higher long-term debt in countries with efficient legal system, strong shareholder rights, and high big 5 auditors' market share while firms prefer short-term debt in countries with developing economy, strong creditor rights and high ownership concentration.

Finally, the results also show that the financial crisis of 1997 has had several significant effects on both firm-specific and market-wide determinants of debt maturity structure. As expected, there are variations in how the crisis has impact on debt maturity because different countries have been affected by the crisis to different degree. I n Thailand where the crisis originated, the effects detected are mostly due to higher risk and more concern on tax effects after the crisis. The relationship between debt maturity structure and its determinants changed significantly after the crisis either in size or direction or both. For example, high-levered firms have higher probability of bankruptcy; therefore, banks as main creditors are more cautious about lending to these firms leading them to issue less long-term debt or more short-term debt to firms after the crisis so that they can review or monitor firms more often and to avoid being caught up in a payment suspension. This reflects in the reduction in the significance or the coefficients. The relationship in the most affected countries became significantly positive in the post-crisis period, implying that the financial crisis might have raised the firm's awareness of tax effects. High profitable firms seem to be more concerned about their tax expenses after the crisis leading to a change from negative relationship to a positive and significant relationship after the crisis

In sum, the results show that the inclusion of country-specific factors into the model helps to improve the explanatory power of firm-specific variables. The variation between the determinants of corporate debt maturity structure across countries can be explained by differences in economic conditions, corporate governance and institutional environments across countries in the region. Therefore, it can be concluded that similar to capital structure decisions, debt maturity decisions of a firm are not only the product of its own characteristics but also the results of the economic conditions and institutional environment in which it operates.

Chapter 5

Is There Still a Pecking Order in Corporate Financing Decisions?

5.1 Introduction

In the previous two chapters, the focus of the analysis was on investigating the determinants of capital structure and debt maturity structure based on firm-specific and country-specific factors identified by previous theoretical and empirical studies. We have learnt that choices of both capital structure and debt maturity structure are likely to be determined by a combination of factors that are related to the characteristics of firms as well as to the institutional environment in which firms operate. The findings also reveal that the financial crisis of 1997 has had several significant effects on firms' financing decisions. However, still puzzling is whether the behaviour of firms in this region has favoured any particular capital structure theories in particular. Several theories have been put forward on the subject and a vast number of studies have been performed to empirically test the dominance of capital structure theories. The results so far have suggested that firms in this region behave according to a combination of capital structure theories drawn from trade-off, market timing, signalling and pecking order theories. In the literature, trade-off and pecking order theories are the two leading but contradictory capital structure theories.[88] The research in the capital structure field has been dominated by these two rival theories which are particularly interesting because they predict the firm's financing behaviour in an opposing pattern. However, it should be noted that the existing theories are not necessarily mutually exclusive. They can complement each other and jointly explain the observed financing behaviour of firms.

[88] See Harris and Raviv (1991) and Frank and Goyal (2005) for the comprehensive review and evaluations of capital structure theories.

5.1.1 The Trade-off Theory and The Pecking Order Theory at a Glance[89]

The trade-off theory emerged in the process of relaxing the perfect capital market assumptions on which the irrelevancy theorem of Modigliani and Miller (1958) relied. Derived from the models based on market imperfections such as taxes and agency cost argument, the trade-off theory predicts that each firm has a well-defined optimal capital structure which can be reached by balancing a number of marginal costs against a number of benefits of additional debt. The chosen optimal capital structure is in the form that equates these marginal costs and benefits. The benefits of debt include tax deductibility of interest paid, the use of debt to indicate firms' high quality performance (signalling) and the use of debt to reduce the amount of firms' resources that are free for managers to waste for their own benefits or for unprofitable projects (free cash flow problem) and agency cost of equity. The costs of debt include the cost of inefficient liquidation, bankruptcy costs, agency costs of debt due to suboptimal investment behaviour and underinvestment problems and an increase in monitoring and contracting costs that comes with a higher level of debt. An optimal capital structure occurs when the benefit of the last dollar of issuing debt offsets the cost. The trade-off theory, therefore, suggests the existence of an optimal capital structure and mean reverting debt ratios. It asserts that firms have a predetermined capital structure and from time to time they might deviate from this target but eventually try to move towards it. Firms will try to use external finance strategically in order to reach the target. Several previous studies find evidence showing that firms rebalance their debt ratios to achieve an optimal capital structure.[90] While the trade-off theory has a solid ground, it fails to explain several commonly observed practices such as a negative relationship between profitability and debt. Therefore, attention is drawn towards the pecking order theory.

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[89] More detailed reviews of the theories are summarized in Section 3.2.
[90] Auerbach (1985); Hovakimian et al. (2001); Korajczyk and Levy (2003)

In contrast to the trade-off theory, the pecking order theory provides a theory of the dynamics of corporate financing and contradicts the existence of financial targets as proposed by the trade-off theory. In the pecking order theory, firms do not have leverage targets and leverage is not mean-reverting but instead firms follow a pecking order. There is no optimal capital structure mix in the prediction of the pecking order theory because there are two kinds of equity which are at different ends of the financing order, internal equity (retained earnings) and external equity. The pecking order theory asserts that firms are concerned about transaction costs and costs associated with asymmetric information between managers and investors. These costs overwhelm the costs and benefits of debt proposed by the trade-off theory. The pecking order theory predicts that the capital structure of a firm is driven by financing deficit instead of the marginal cost and benefit of debt. The observed and actual debt ratios will respond to the differences between investment and retained earnings and will reflect the cumulative requirements of financing decisions over time.

The pecking order theory predicts that firms will choose to finance their new investments in a specific order of financing hierarchy with internal funds at the top of the order and equity issues at the bottom due to the costs from asymmetric information between managers and the market. When financing is needed, firms would prefer the safest source of finance such as internal sources and then riskier sources such as debt. The final resort would be equity which would be preferred only if the marginal costs of debt are very high such as when firms are highly levered or have low debt capacity. Therefore, two firms can both follow the pecking order theory and each can end up with totally different capital structures, depending on the availability of their internally generated funds.

5.1.2 The Predictions of the Trade-off Theory and the Pecking Order Theory

Theoretically, although these two competing theories are motivated by different driving forces, the trade-off theory and the pecking order theory do share a number of common predictions including (i) firms with more volatile earnings should have less debt and (ii) firms with high profitability, with fewer growth opportunities, or with lower earnings and cash flow volatilities (assuming that large firms have lower volatilities) are expected to have higher dividend payout ratios. These common predictions make it more difficult to test the dominance of each theory and it cannot be concluded from the findings of the determinants of capital structure whether the results are due to the driving forces of the pecking order theory or the trade-off theory. Therefore, it is still uncertain which theory is the best for describing the reality of firms' financing.

However, there are a few conflicting predictions of these two competing theories. First, the pecking order theory predicts that firms with high profitability will have lower debt, and there is no need to increase debt when profit exceeds the need of investment because it is not necessary for firms to issue debt when their retained earnings are enough to fund their investments. On the other hand, the trade-off theory predicts that debt increases when firms are profitable because profitable firms are expected to have higher levels of debt to exploit the tax benefits of interest deductibility. Second, trade-off theory predicts that growth opportunity is inversely related to debt due to agency considerations. Firms with high growth opportunity for a given amount of cash flow should have less need for debt, especially firms with large amounts of free cash flow. This is because once there is high investment, there is less need to use debt as a means of constraining the interests of managers in spending for their own benefit. In contrast, the pecking order theory predicts that for a given amount of cash flow, debt should increase when investment increases because firms need to seek external finance when internal finance is insufficient and debt is less risky than equity. Third, when firms have sufficient profits to fund all their investments using internal finance, the pecking order theory suggests firms use less debt to stockpile their debt capacity. However, the trade-off theory predicts that firms with large and persistent cash flows relative to their financing needs will increase their use of debt in order to reduce agency costs or free cash flow problems.

5.1.3 Failures of the Trade-off Theory and the Pecking Order Theory

Empirically, although there has been ongoing research and debate on the dominance of both theories, there are still no clear-cut answers to why firms make financing decisions the way they do. Each capital structure theory has its successes and failures when empirically tested. The conflicting evidence in the large body of literature poses a puzzle for the existence and the dominance of each theory. In spite of the fact that it has been suggested that trade-off considerations such as bankruptcy and agency costs of debt play an important role in capital structure, little empirical support exists for other aspects of the trade-off theory such as (i) there are still doubts as to the existence of a capital structure optimal target[91]; (ii) a negative relationship is empirically found between profitability and leverage by previous studies, which is consistent with the predictions of the pecking order theory, while other capital structure theories, including the trade-off theory, cannot explain this negative relationship[92]; (iii) firms do not issue equity very often; (iv) large positive abnormal returns for the firm's shareholders are associated more with debt increasing events than debt decreasing events; and (v) managers consider share prices to be a key factor in their issuance decisions and they

[91] Huang (2004) proposes a new dynamic model that unifies the trade-off theory with asymmetric information. This model predicts instead that firms have target ranges and there is no precise target as predicted by the trade-off theory.

[92] Huang (2004) suggests that there are two possibilities why profitable firms have less debt. First, there may be free cash flow problems where managers prefer to keep cash flow for their own use. Second, there are several costs that lead firms to prefer internal finance such as asymmetric information, transaction cost, costs of revealing information to the public, cost of time, freedom and efficiency. This is consistent with the prediction of the pecking order theory.

normally issue equity when their share prices increase while the trade-off theory predicts that an increase in the firm's share price which effectively lowers the leverage ratio should lead to debt issuance to revert back to their optimal capital structure.[93]

Like the trade-off theory, the pecking order theory suffers from a lack of compelling evidence for certain aspects. Firms do not always issue debt before equity. Equity is not always the last resort and it is quite common for firms to issue equity even when they could issue debt. Helwege and Liang (1996) show that equity is issued by firms that could have obtained debt in the form of bank loans while Choe et al. (1993) report that firms are likely to issue equity over debt in economic expansion periods when investors have a favourable outlook on the economy. In practice, equity issues are more common than the pecking order theory would suggest. The pecking order theory also fails to explain how taxes, bankruptcy, and agency costs, as well as other factors, affect capital structure. Previous studies find that young and small firms, which are believed to have high asymmetric information and would be expected to rely more on internal finance or debt issues, tend to issue equity more often than the pecking order theory would predict. The observed pattern that firms with high levels of asymmetric information, such as small and young firms, tend to issue equity is consistent with the predictions of trade-off and market timing theories. These firms issue equity in order to (i) avoid the bankruptcy costs of debt; (ii) escape a debt overhang problem; and (iii) time the market when they are overvalued. In addition, previous studies such as Smith and Watts (1992) and Barclay et al. (2001) find that firms with high growth opportunities have a higher proportion of equity than debt. This is in contrast with the prediction of the pecking order theory that firms with high growth opportunities should have large financing needs; therefore, these firms should have high debt ratios considering debt is safer than equity.

[93] Several studies (Marsh, 1982; Jung et al., 1996; Baker and Wurgler, 2002) find that firms issue equity rather than debt when share prices are high. They do not try to reach their optimal capital structure by issuing debt when prices increase.

5.1.4 Empirical Tests of the Pecking Order Theory

The direct test of pecking order theory can be found in Shyam-Sunder and Myers (1999), Fama and French (2002) and Frank and Goyal (2003), in particular to test how firms fund their financing deficit. Different tests can be done including regressing financing deficit on net debt issues or nesting the financing deficit in a conventional model. The pecking order theory seems to work where it should not and does not perform well where it should. For example, Shyam-Sunder and Myers (1999) find support for the pecking order theory in large and matured firms that have little asymmetric information. On the other hand, it cannot explain why young and small firms, which face large asymmetric information problems, issue equity. Galpin (2004) argues that the pecking order theory works well only with firms that have debt rating and access to public debt, such as large firms. Frank and Goyal (2003) and Fama and French (2002) find less support for the pecking order theory, as their sample firms relied more on equity from the 1990s. They also find that small firms issue more equity and are less levered which is in contrast to the prediction of the pecking order theory. Also Frank and Goyal (2003) show that net equity issues track financing deficit more closely than net debt issues.

In addition to the traditional method of testing the pecking order hypothesis of Shyam-Sunder and Myers (1999), several studies have also suggested that additional factors should be included in the model, as they have been shown to be important factors. These studies include those by Lemmon and Zender (2004), Chang and Dasgupta (2003) and Agca and Mozumdar (2004) that focus on debt capacity, and Chen and Zhao (2004) who study bankruptcy risk, while Autore and Kovacs (2005) and Leary and Roberts (2005a) suggest that time-varying adverse selection costs play an important role in firms' financing behaviour. Because there is mixed evidence on the prediction of the pecking order theory, it is important to test further whether the pecking order theory is widely applicable in countries with different economic and social environments. More specifically, this chapter aims to test whether the pecking order theory is supported by the evidence from the Asia Pacific region or not.

5.1.5 Objectives and Contributions

The objective of this chapter is to test the extent to which the pecking order theory accounts for the financing behaviour of a broader sample of firms in the Asia Pacific region for the period 1993 - 2001. It aims to test whether the pecking order theory is best supported by the sample or whether the pecking order theory dominates other capital structure theories and to find out whether firms in this region exhibit stronger or weaker pecking order behaviour than firms in developed countries. In addition, the objective is also to find out whether empirical support for the pecking order theory varies depending on the financial institutional environment or economic conditions and whether the financial crisis has any influence on this behaviour or not.

This chapter contributes to the literature firstly by focusing on firms in the Asia Pacific region. In this field of research, a number of previous studies have concentrated on developed economies, mostly in a single country context.[94] Little empirical work has been conducted in other countries.[95] This chapter presents empirical evidence to examine whether the pecking order hypothesis can be applied to firms in the Asia Pacific region or not and to what extent firms in this region follow the pecking order in their financing decision making. The results will shed light on the dominant financing behaviour of firms in the Asia Pacific region. Second, the effect of the financial crisis of 1997 is investigated by splitting the full sample into pre- and post-crisis periods.

[94] Previous studies include Shyam-Sunder and Myers (1999), Fama and French (2002), and Frank and Goyal (2003) on US firms; Adedeji (2002) and Dang (2005) on UK firms; and Medeiros and Daher (2005) on Brazilian firms.
[95] There are some capital structure studies in developing countries such as Wiwattanakantang (1999), Booth et al. (2001), Prasad et al. (2003) and Deesomsak et al. (2004). However, these studies focus mainly on the determinants of capital structure not on the tests of capital structure theories.

Because the crisis has increased risk, it has potential effects on firms' financing decisions and how the predictions of the pecking order theory might be affected by the crisis. Firms are expected to follow different financing policies between pre- and post-crisis periods due to the variation in financing constraints. Firms that face financing constraints should exhibit stronger pecking order behaviour due to higher risk and asymmetric information and reduced access to the markets.[96] Therefore, the purpose is to examine whether firms exhibit stronger pecking order behaviour in the post-crisis period than in the pre-crisis period.

Third, an extension of the empirical framework of Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) is suggested by incorporating corporate governance and economic condition indicators into the models. The results show that country-specific factors play an important role in financing decisions and they are the main driving forces that lead firms in each country to move toward or away from the predictions of the pecking order theory or lead firms to behave differently from firms in other countries. Finally, further unique methodologies including logistic regression and non-linear quantile regression are employed to provide alternative ways to test the predictions of pecking order theory and to provide evidence for robustness tests of the results. Logistic regression is used to find the deviation from the pecking order theory in mild and strong forms while non-linear quantile regression is applied to capture the non-linearity of the relationship between financing deficit and net debt issues.

This chapter is organised as followed. The next section briefly reviews the pecking order theory and summarizes the empirical evidence of the pecking order theory tests in the literature. Section 3 presents methodologies and section 4 presents hypotheses and variable identifications. Section 5 summarizes data and descriptive statistics. Section 6 discusses the estimation results and section 7 concludes the chapter.

[96] Vogt (1994) finds that the degree of financing constraints a firm faces can determine the dominance of firms' financing behaviour.

5.2 The Pecking Order Theory and Related Empirical Evidence

5.2.1 The Original Pecking Order Theory

The single-period pecking order theory (the original pecking order theory) was formalised by Myers and Majluf (1984) and Myers (1984). Managers have a preference ranking over their choice of financing source, which is a consequence of asymmetric information making up a substantial portion of adverse selection and transaction costs. The asymmetric information problem arises because managers normally know more and better about firm value and their growth opportunities than outside investors. The hierarchy of the pecking order starts with internal finance, then debt issuance and finally equity issuance. If firms have enough financial slack, they will carry out all available positive NPV projects. Internal funds come with no flotation costs and require no additional disclosure of financial information; therefore, they are preferable to external funds. The requirement of additional disclosure that comes with external finance could lead to more severe market discipline and possible loss of competitive advantages. The pecking order theory argues that the availability of internal finance determines (i) the amount and type of external finance used to fund firms' investment and (ii) the amount of investment taken. Therefore, the implication of the pecking order theory is that firms' external finance and the amount of investment spending are the residual of firms' available internal funds. If external funds are required, the safest security will be issued first. Debt will be preferred to equity because equity issues are interpreted by investors as the shares being overvalued and thus investors will discount the share price. Therefore, firms will issue equity only when the profitable projects cannot be postponed, or cannot be financed through debt, or the overvaluation is large enough that the existing shareholders can tolerate the market penalty in order to gain from the overvaluation. Any internal funds in excess of financing needs will be used to repurchase debt before equity due to adverse selection problems.

5.2.2 Factors that Lead to Financing Hierarchy

There are a number of factors that are the consequences of asymmetric information and can lead to the financing hierarchy. These factors include (i) adverse selection problems; (ii) the existence of transaction costs and floatation costs; and (iii) inevitably negative market reactions to an announcement of a new equity issue. Adverse selection problems arise when firms with low value have an incentive to issue securities in order to imitate firms with high value. Because managers have better information than investors, they have opportunities to issue equity when the securities are overvalued, assuming that managers normally act in the interest of existing shareholders. However, investors are aware of this; therefore, they will rationally adjust or discount the price that they are willing to pay to reflect the adverse selection costs leading to mispricing problems. Mispricing can be so severe that the net present value of the new project is captured by new investors leading to a loss to existing shareholders. Thus, managers might forego any new value-added or profitable investment if they have to be financed by risky funds such as equity, leading to underinvestment problems. The adverse selection problem can be mitigated if firms follow a pecking order hierarchy by using the source of finance in the order of severity of underpricing to finance the project. The source of finance that has least risk and is least sensitive to mispricing and valuation errors is preferred. Therefore, internally generated funds with no risk are preferred to external finance because firms can avoid informational problems entirely. Among external finance, debt that has its prior claim and is less severely affected by mispricing than equity is preferred.

Second, the pecking order can be explained by the existence of transaction costs and floatation costs associated with external finance. Firms prefer debt to equity because transaction and floatation costs for debt are lower than those for equity issues.[97,98] Therefore, equity should not be issued unless firms have exhausted other alternatives. Myers (1984) suggests that the asymmetric information and transaction costs dominate the driving forces that are suggested by the trade-off theory. To minimize these financing costs, firms will follow the financing hierarchy. Third, how the capital markets treat the announcement of new equity issues can lead firms to prefer debt to equity. Debt decreasing events such as new stock offerings or equity-for-debt exchange schemes are associated with the decline in share price while no such drop occurs with debt issues. One of the explanations for this decline is the information asymmetry cost. Announcements of new equity issues are normally treated as a signal that managers feel that firms' stocks are overvalued and that they want to take advantage of this overvaluation. The belief in overvaluation implies that earnings are likely to decline in the future. Therefore, firms should conduct debt decreasing events only when they are forced to do so. On the other hand, a debt increasing event is interpreted as a sign of managers being confident about firms' future prospects and their ability to service debt into the future. Investors might view the high use of leverage as willingness by managers to take on more risk. Therefore, the market normally perceives debt increasing events as good news.

In addition to the above factors, there are other explanations that can lead to a financing order that is similar to the pecking order but not necessarily due to asymmetric information.[99] This makes it difficult for any capital structure theory to explain firms' behaviour by itself. Other incentives for firms to favour debt over equity include tax incentives (Modigliani and Miller, 1963; DeAngelo and Masulis, 1980), signalling (Ross, 1977), and manager-shareholder agency conflict (Myers, 1977). In

[97] Donaldson (1961); Baskin (1989)
[98] Galpin (2004) shows that this is not always the case. It is likely that transaction costs of debt issues can exceed transaction costs of equity issues.
[99] Several papers including Myers (2003) show how mechanisms other than asymmetric information such as taxes and agency costs can lead to the same pattern of pecking order. Halov and Heider (2005) also suggest that the financing order like the one predicted by the pecking order theory is not necessary a product of asymmetric information.

addition, there are other reasons why firms prefer internal to external finance. Managers might prefer to use free cash flow for their own benefits; therefore, they try to avoid monitoring from outside by using internal finance. Debt issues can lead to unwanted monitoring and equity issues lead to both unwanted monitoring and control dilution. Concern about the control or the discipline of the market can play an important role and can encourage firms to stay away from external finance. Managers, especially the owners-managers of firms, do not want to lose control over firms; therefore, they hesitate to accept new shareholders. They avoid this loss of control by trying to finance with internal funds as much as possible first and then moving on to debt issues which is the next safest choice. Narayanan (1988) shows that debt is always preferred to equity under information asymmetry as firms use debt financing as a barrier to discriminate inferior firms while Heinkel and Zechner (1990) show that issuing debt helps to resolve overinvestment problems. Although there are some rational justifications to the prediction of the preference of debt to equity, there are also some other incentives that tend to favour the use of equity (Quan, 2002). The incentives that lead firms toward equity include bankruptcy costs (Kraus and Litzenberger, 1973) and agency costs such as asset-substitution problems (Jensen and Meckling, 1976). Due to these factors, it is important that the evidence we find is not misleading and is interpreted with caution and, in order for the pecking order theory to be supported, there must exist asymmetric information.

5.2.3 Extensions of the Original Pecking Order Theory (The Modified Pecking Order Theory)

There are several subsequent extensions of Myers and Majluf's (1984) pecking order theory. Myers (1984) proposes a dynamic or modified version of the pecking order theory that takes into account not only asymmetric information and transaction costs but also costs of financial distress and debt capacity. The modified pecking order predicts that when concern over bankruptcy risk is modest, firms will follow the financing order of the original pecking order theory. But when it increases, the support to the pecking order theory is weakened and firms will try to reduce bankruptcy risks by lowering their use of debt. If there are fixed costs to external finance or added cost for firms that operate near their limit of debt capacity, firms might decide to break the original pecking order by financing their investment with new equity issues instead of new debt issues. Firms have financial slack and can stockpile this amount of cash for future use. Therefore, if the cost of issuing equity is favourable, firms might issue equity instead of debt in order to reserve their debt capacity for future use or to retain their financial flexibility. The predictions of the modified version of the pecking order theory appear able to explain several financing behaviours of firms giving more empirical support in the literature. Firms may have to issue equity because (i) they have already used up their debt capacity and cannot issue any more debt to finance current investments or (ii) they anticipate the need for new external finance for future investment and this requirement might not be reachable because the required debt would make the future debt ratio exceed debt capacity. Financing in these circumstances is not believed to violate the modified pecking order theory.

Viswanath (1993) extends the single-period pecking order framework of Myers and Majluf (1984) to a multi-period pecking order framework where adverse selection costs vary over time. In this framework, firms might prefer equity to debt even if cash or debt capacity is available. Equity issuance will be optimal only when the expected level of information asymmetry in the future is high and when the dilution of equity issue is small compared with the cost of passing up the investments. It is predicted that when adverse selection costs are low, firms will issue equity in order to save cash to ensure future investment. Chang and Dasgupta (2003) extend Myers and Majluf's

(1984) model into a two-period setting in order to derive new testable implications of how adverse selection costs and debt capacity constraints interact in order to determine the capital structure of firms. In their model, firms invest in the projects at the beginning of each period. Although equity issues come with adverse selection costs, issuing equity in the first period can help firms to pledge more of their future cash flow to the second period lenders. Issuing debt in the first period can be costly as it reduces firms' debt capacity. Their model predicts that the probability of debt issues is not a linear but rather a non-monotonic function of the size of financing deficit due to the variation in adverse selection costs of equity or the loss of debt capacity from issuing debt. When the financing deficit is small, the costs associated with issuing debt and the loss of debt capacity increases at a slower rate compared with the increase in adverse selection costs of issuing equity. The cost is larger at the peak point when the size of financing deficit gradually increases but will diminish again when financing deficit becomes larger beyond the critical level. At this point the loss of debt capacity is no longer a concern as the available growth opportunities should already have been exhausted. The probability of issuing debt will therefore increase at first when adverse selection costs of issuing equity outweigh the cost that comes with the loss of debt capacity. However, once debt capacity becomes more important, the probability of issuing debt decreases and will increase again when financing deficit is large.

5.2.4 Related Empirical Evidence

The pecking order theory has received a significant amount of attention in the literature; however, the empirical findings are far from reaching a consensus. The early studies of the predictions of the pecking order theory start in the form of the survey of firms' financing policies by Pinegar and Wilbricht (1989). They find that managers are much more likely to follow a financing hierarchy as suggested by the pecking order theory than a target capital structure as suggested by the trade-off theory. Holmes and Kent (1991) later survey SME firms and find that they also follow a financing hierarchy similar to the predictions of pecking order theory and that SME firms follow a stricter pecking order than larger firms. Ang and Jung (1993) analyse mail responses for Korean firms which fail to support the predictions of the pecking order theory. Their evidence shows that Korean firms with high asymmetric information rank their order of financing preference as debt and equity before retained earnings. They also suggest that firms might follow a financing order that is similar to the predictions of the pecking order theory but their reasons are not due to asymmetric information problems. The pecking order can be seen to contribute to other explanations such as taxes and agency costs. They find that asymmetry of information is lower than previously expected. The majority of the responses show that their lenders do not underestimate their future prospects and if there is an asymmetric information problem, disclosure cannot help to resolve the problem much. This implies that asymmetric information (if there is any) is not due to the lack of information but to the differences in belief or expectations between managers and outside investors. Thus they note that caution should be used when finding evidence in support of the role of asymmetric information in forming the pecking order. On the other hand, recent surveys on the pecking order theory find some support for the theory. For example, Mota and Nakamura (2004) find that there is a clear preference for the use of retained earnings as the first choice of financing of Brazilian firms while the second choice is debt, and equity issue is the last resort.

In addition to the survey, there are a number of other empirical studies that have tested the implications of the pecking order theory. However, the findings of these tests are contradictory. Current empirical tests of this theory are quite weak as there is still a large debate whether the pecking order theory holds and to what extent. The evidence has been mixed so far ranging from support of the pecking order to evidence suggesting that the pecking order theory is dead because the model does not fit the evidence. Support for the pecking order theory has recently faded. Studies appear to find no conclusive evidence in support of one particular capital structure theory. Several recent studies have instead suggested either that (i) modified pecking order that takes account of debt capacity and financial distress as well as future investment can explain the observed financing patterns better than the original one; or (ii) the pecking order theory and the trade-off theory are both necessary and compatible. These two rival theories individually only explain part of firms' financing behaviour; therefore, firms' financing decisions are not explained by any capital structure theory in isolation but instead by a combination of different theories as an integrated model.

There are only a handful of studies that find evidence in support of pecking order behaviour. Shyam-Sunder and Myers (1999) refine the predictions of the pecking order theory into a testable prediction by regressing net debt issues on the financing deficit, constructed from an aggregation of dividends, investment, changes in working capital and internal cash flows. If firms follow the pecking order theory strictly, the coefficient of the financing deficit should be 1 which means that the financing deficit of firms should be matched dollar-to-dollar with the change of debt issues. Using a sample of continuous data over their sample period for relatively large and matured US firms, they find a coefficient of financing deficit of 0.75. Although this coefficient is statistically different from 1, it is economically close to 1. Their results show that firms' external finance is made up substantially more by debt than by equity. Medeiros and Daher (2005) test the pecking order theory for firms in a different setting and find that the estimated coefficient for the financing deficit is very close to 1 for Brazilian firms. Their results show that their sample firms issue debt to cover their financing deficits and repay debt when there is financial surplus. Equity issues are hardly utilized.

On the other hand, evidence that goes against the pecking order theory is plenteous. Chirinko and Singha (2000) comment on Shyam-Sunder and Myers' (1999) regression results that there might be some bias in the test due to the inability to discriminate the pecking order theory from competing theories such as the trade-off theory. They raise and discuss an issue of statistical power problems in the tests of the pecking order theory; however, they do not propose any solution. In addition, given that firms in the sample do not only issue debt to cover financing deficits as predicted by the pecking order theory but also issue equity during the sample period, the predicted coefficient of financing deficit should be less than 1. They argue that in contrast to the pecking order theory firms do have a fixed proportion of the use of debt and equity. Helwege and Liang (1996) examine a sample of IPO firms and show that the financing decisions of firms are weakly related to financing deficit.

Fama and French (2002) examine (i) target leverage, (ii) the mean reversion of leverage and (iii) short-term response of dividends and debt to variation in earnings and investment. Although they find that short-term variation in earnings and investment are mostly absorbed by debt as predicted by the pecking order theory, small growth firms tend to issue equity significantly. Their results suggest that firms' financing behaviour is influenced by both the trade-off theory and the pecking order theory. They promote a unified understanding of both theories. Consistent with Shyam-Sunder and Myers (1999), they find that debt is used to fill the variation in short-term investment and earnings. However, they find a large amount of equity issues when firms had maximized their debt capacity which is in contrast to the original pecking order theory suggesting that this behaviour might be more consistent with a more complex version of the pecking order theory. Their results also show that firms that issue large amounts of equity are mostly small and high growth firms. This is also in contrast to the pecking order theory because small and high growth firms tend to have high asymmetric information; therefore, pecking order theory should perform well in high asymmetric information environments.

Frank and Goyal (2003) argue that the results of Shyam-Sunder and Myers (1999) do not hold for broader samples of smaller size with recent data. They apply the same test as in Shyam-Sunder and Myers (1999) to a much larger sample of firms over a longer period of time and then include conventional factors identified by previous studies (Harris and Raviv, 1991; Rajan and Zingales, 1995) as being important in the choice of the capital structure of firms in the model. They find that (i) the use of equity issuance has significantly increased; (ii) net equity issues track the financing deficit better than net debt issues; (iii) the power of the pecking order theory seems to fade through time as equity issues were quite common in the 1990s; and (iv) equity is often issued by small firms while the pecking order theory works well with large firms which is in contrast to the prediction of the pecking order theory because small firms tend to have higher adverse selection costs; therefore, the pecking order theory should perform better among small firms. In addition, when financing deficit is put in a nested model that also includes conventional factors predicted by the competing trade-off theory, coefficients of the conventional variables remain statistically significant but the financing deficit has lower explanatory power. More importantly, the effect of financing deficit does not wipe out the effect of conventional variables. The results suggest that the pecking order theory fails to dominate the trade-off theory. They conclude that financing deficit is found to be just another additional factor that firms trade off and that the pecking order theory is just the generalization version of the trade-off theory.

Mayer and Sussman (2004) suggest that there is no single capital structure theory that provides explanations for all aspects of the data or is an adequate description on its own. Their results show that in the short term, projects are funded with debt especially for large and profitable firms as predicted by the pecking order theory. However, in the long run firms show the trend of reverting back to their initial capital structure which is consistent with the trade-off theory. They not only find strong support for leverage reversion but also find that firms revert by issuing equity and they issue equity even when they are not close to insolvency. Galpin (2004) focuses on transaction costs and shows that the predictions of the pecking order theory about the transaction costs of debt being lower relatively to the transaction costs of equity do not hold. First, costs of issuing equity are not always larger than costs of issuing debt as assumed by the pecking order theory. He finds that the cost of issuing debt is often higher than the cost of issuing equity especially for firms without access to public debt.[100] Also the prediction of transaction costs of equity being higher than that of debt did not hold over their sample periods. The results show that transaction costs of equity fell below transaction costs of debt for a relatively long period of time especially from 1997 onward. These are driven by the lack of debt rating for the sample firms. Second, although asymmetric information is significant in influencing access to debt and equity, he finds no evidence that asymmetric information leads firms to behave according to the pecking order theory. Third, highly profitable firms use lower debt but not lower equity. He suggests that the capital structure model would be able to explain more of the observed pattern of financing decisions if asymmetric information were incorporated into the trade-off theory.

Fama and French (2005) examine how often and under what circumstances firms issue and repurchase equity. Their findings reveal several aspects that violate the pecking order theory. First, the evidence shows that firms have issued large amounts of equity on average and with high frequency even when they are not under duress or concerned about their debt capacity. Equity issuances occur too often to be consistent with the pecking order theory. Second, apart from seasoned equity offerings, firms can

[100] Galpin (2004) suggests that only the largest firms can issue public debt and firms in large size deciles have debt rating.

issue equity in several other forms which do not involve high asymmetric information problems and transaction costs.[101] Third, there are also occasions when the cost of issuing equity is ignored leading firms to issue equity more often than predicted by the pecking order theory.[102] Fourth, share price responses to some forms of equity issues are not always negative.[103] Finally, repurchases are not limited only to firms with low demand for outside financing. Therefore, they suggest that the pecking order theory is no longer an applicable and practical model for capital structure because equity issues are not the last resort of finance and asymmetric information is not the main driver of capital structure. They conclude that both the trade-off theory and the pecking order theory have their own serious problems as stand alone models of capital structure and they should in fact be regarded as stablemates of capital structure models because the predictions from each model can help to explain different aspects of firms' financing behaviour.

Leary and Roberts (2005a, 2005b) develop a model that captures the order of financing choice between internal versus external finance and debt issues versus equity issues and that quantifies the degree to which firms adhere to or violate pecking order hierarchy. Their results show that the pecking order theory by itself performs poorly in determining the choice of debt and equity. First, the violation of external finance choice is not due to either debt capacity or leverage targeting concerns because equity issuing firms appear to have enough internal funds and strong financial profiles with sufficient debt capacity. Second, firms issue or retire equity more often than predicted by the

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[101] Fama and French (2005) suggest that there are at least seven other forms of equity issues apart from SEOs including (i) mergers via an exchange of stock, (ii) employee stock options, grants and other employee benefit plans, (iii) subscription right, (iv) warrants, (v) convertible debt, (vi) dividend reinvestment or other direct purchase plans and (vii) private placements. Some of these equity issues come with low transaction cost and asymmetric information problem such as direct purchase plan and employee stock option, grants and other benefit plan.

[102] In some cases, agency cost might lead managers to ignore the high cost of equity issues (Jung et al. 1996) or equity issues can provide benefits that are higher than their costs and also offsets asymmetric information costs such as the tax benefits that come with equity issues in merger (Fama and French, 2005).

[103] Share price response to private placements is positive (Hertzel et al., 2002) while no evidence of negative response is found for announcement of right issues (Eckbo and Masulis, 1992).

pecking order theory. Third, firms do actively rebalance their debt ratios toward the target ranges. Fourth, the observed financing decisions are more in line with the integration of the pecking order theory and the trade-off theory. In addition, they find that what drives the pecking order theory is still empirically unanswered because their results reveal that asymmetric information is not the main driving force that leads to pecking order behaviour. They find no evidence of improvement in the fit of the model when asymmetric information level increases; therefore, they question the link between information asymmetry and the pecking order theory. However, this does not weaken the importance of asymmetric information in influencing firms' financing behaviour. They instead suggest that there are other driving forces that relate to the trade-off theory such as taxes and agency costs which might contribute to such behaviour. They also examine the deviation from the pecking order by looking at the variation in information asymmetry. If information asymmetry varies across firms or time, it is possible that deviating from the pecking order might not be as costly to firms as previously expected or firms might be able to avoid adverse selection problems by going through other channels of equity issuances as suggested in Fama and French (2005). They find no relation between deviation from the pecking order theory and the degree of asymmetric information and they find no improvement in model fit when the degree of asymmetric information changes. Overall, their results suggest that the concern over debt capacity and the variation in asymmetric information do not appear to be one of the main reasons why firms violate the pecking order theory by issuing equity. They conclude that the motivation to issue equity comes from sources other than debt capacity concern and the adherence to the pecking order hierarchy based on asymmetric information.

Dittmar and Thakor (2005) develop and test a new theory of why firms issue equity when their share prices are high and suggest that equity will be issued only if firms have a project to be financed. Their prediction is inconsistent with both the trade-off theory and the pecking order theory. The decision to issue equity in their model is based on the high share price due to the market agreement whereas in the pecking order theory equity issue occurs when asymmetric information is low. Their model predicts that managers' financing decisions will be based on degree of agreement. Managers will issue equity when they believe that there is agreement about the projects between themselves and investors. Therefore, the model predicts that firms will issue equity when share prices and agreement are high and will issue debt when share prices and agreement are low.

While the findings of the tests of the pecking order theory by previous studies are far from conclusive, there are a growing number of studies that try to compromise the assumptions of the pecking order theory by introducing some related factors to augment the pecking order and the factors that can explain the conflicting evidence in the literature. The factors that have received the most attention recently and are also considered as part of the modified pecking order theory are market misevaluation, debt capacity, time-varying adverse selection costs and bankruptcy risk. Elliott et al. (2004) use a multi-period valuation model to examine the impact of market misvaluation on firms' chosen method of covering their financing deficit. They extend the models of Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) by adding the interaction term between over/undervaluation dummy variables and financing deficit. The results show that misvaluation of firms' equity is one of the important factors that plays a crucial role in the choice of source of fund that firms choose to cover their financing deficit and that the impact of the overvaluation varies over time. The results reveal that the coefficient of financing deficit varies depending on the level of misevaluation. When equity is overvalued and the implied cost of capital is relatively low, firms will fund their financing deficit with equity rather than debt. On the other hand, firms that are undervalued tend to issue more debt. In addition, they show evidence suggesting that market timing theory and the differences in sample selection criteria can explain the variation in the coefficients of financing deficit from previous studies. Their results show that the contradictory results of Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) are due to (i) high market overvaluation in the 1990s leading firms to prefer equity to debt which explain why recent studies have found firms issuing more equity in contradiction to the pecking order theory and (ii) the fact that Shyam-Sunder and Myers (1999) require firms to have continuous data while Frank and Goyal (2003) do not impose this requirement.

Lemmon and Zender (2004) examine the impact of debt capacity. When firms' debt capacity is controlled, firms do follow the pecking order financing hierarchy by starting with internal finance first. If external finance is needed, debt is preferable to equity if there is no concern about debt capacity. They suggest that firms will issue equity when they have limited debt capacity because additional debt issues can increase bankruptcy costs or can force firms to pass up future investments. They provide evidence to reconcile some of the contrasting findings in the literature by focusing on the role of debt capacity. Previous studies including, Frank and Goyal (2003) and Fama and French (2002), argue that the pecking order theory does not perform well where it should. While small, young and high growth firms should have greater incentives to follow the pecking order, they find that the pecking order theory performs best among large and matured firms. Therefore, their results appear to be in contrast to the pecking order theory. However, Lemmon and Zender (2004) argue that the evidence from the announcement effects of new equity issues shows that small, young and high growth firms in fact face lower adverse selection costs than large and matured firms when they issue equity. Therefore, the findings of previous studies of young and high growth firms issuing more equity are not in contrast to the pecking order theory. In addition, similar to Frank and Goyal (2003), they also find it difficult to find support for the pecking order theory in the 1990s. This is due to the fact that there were a number of small and high growth firms emerging during that period. These firms have one common characteristic, a concern over debt capacity. Therefore, the weak support for the pecking order theory during this period is expected and should not be considered as evidence against the pecking order theory once debt capacity is controlled.

Like Lemmon and Zender (2004), Agca and Mozumdar (2004) argue that firms might be forced to issue equity instead of debt due to debt capacity. In particular, they focus on the differences of firms' behaviour between small and large firms. They divide their sample into deciles based on firm size due to different practices between large and small firms. Their conclusions can help to reconcile the contrasting results of Shyam-Sunder and Myers (1999) and Frank and Goyal (2003). The pecking order theory was found to perform badly for small firms because they have low debt capacity which is quickly exhausted. This leaves small firms with no choice but to issue equity. That is why Frank and Goyal (2003) did not find much support for the theory from their sample, which consists mostly of small firms, while Shyam-Sunder and Myers (1999) find support for pecking order theory because their sample consists mostly of large firms. Agca and Mozumdar (2004) conclude that the debt level depends on the lower amount between (i) how much firms need to borrow and (ii) how much firms can borrow (how large is their debt capacity).

Chang and Dasgupta (2003) not only perform empirical tests to examine the role of debt capacity in firms' capital structure but also extend the original pecking order model by deriving and testing new implications about the interaction of adverse selection costs and debt capacity and how they affect firms' financing behaviour. They focused on how the size of financing deficit can affect firms' financing choice and find strong evidence of the significant relevance of debt capacity concern. The probability of debt issuances varies depending on the size of financing deficit and debt capacity.

However, Autore and Kovacs (2005) find that debt capacity is not the main explanation why firms tend to move toward equity issuance. They provide evidence that can reconcile the mixed evidence in the literature by allowing time-variation in adverse selection costs.[104] They argue that previous studies find mixed evidence because they fail to control for time-varying adverse selection costs which are the key factor in distinguishing the pecking order theory from other capital structure theories. Their results are in favour of multi-period pecking order theory where time-varying adverse selection costs accommodate the issue of equity even when firms have sufficient debt capacity and internal cash flow.

In addition to debt capacity and time-varying adverse selection costs, bankruptcy risk is also considered as an important factor. Chen and Zhao (2004) focus on the modified version of the pecking order theory and study the effect of different classes of bankruptcy risks. They argue that the pattern of firms having high proportion of equity to debt is not due to the fact that equity finance exceeds debt finance but rather to the debt reduction issue that comes with the concern over bankruptcy costs. Firms are more likely to reduce the use of debt when bankruptcy costs increase which seems to be consistent with the trade-off theory. However, once taking account of bankruptcy costs, they find other evidence leading to a conclusion in support of the modified pecking order theory. First, they find that firms with lowest bankruptcy risks who are supposed to gain most tax advantages by using debt according to the trade-off theory appear to be using debt conservatively. Second, there is a clear preference of debt over equity which is consistent with the pecking order theory. Their sample firms not only prefered debt to equity but also issued debt in large proportions. Third, the deviation from the capital structure target plays an insignificant role. Therefore, they conclude that the modified pecking order theory predicts that as long as bankruptcy costs are moderate the optimal

[104] Previous studies (including Korajczyk et al., 1991; Choe et al., 1993; Bayless and Chaplinsky,1996) have also identified and discussed the impact of time-variation in adverse selection costs on security issuance decisions.

target debt ratios, predicted by the trade-off theory, are outweighed by the concerns of financing costs, as predicted by the pecking order theory. Their results reveal that the strength of the pecking order theory varies depending on the concern over bankruptcy risk and costs of external financing. In addition to bankruptcy risk, they also suggest that the market timing hypothesis of Baker and Wurgler (2002) should be considered as an additional factor in the modified pecking order theory because market timing can arise either by a rational dynamic version of the pecking order theory or by an irrational equity market mispricing. Because both rational and irrational issues that affect market timing can also affect the relative costs of debt and equity financing, they should be considered as part of the modified pecking order theory.

Halov and Heider (2005) suggest that the pecking order theory applies only if risk plays no role and should work well only for firms that have smallest adverse selection costs of debt. If risk matters, debt can be mispriced to a greater extent than equity and the adverse selection costs of debt relative to that of equity could be so large that equity will be a better choice of finance. This is due to the fact that the outside capital market knows less about firms' future investment risks leading to higher adverse selection costs of issuing debt. In order to take account of the role of risk in asymmetric information, they rank firms into deciles and run a similar regression to that of Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) separately in each risk decile. They find that firms in higher risk deciles issue more equity and less debt to finance their financing deficit. Therefore, they suggest that the pecking order theory is a special case that works well when there is no risk.

As there is mixed evidence in the tests of the pecking order theory, it is important to broaden the tests to firms in other countries where the institutional environment is different and to take into account other firm-specific and country-specific factors that might potentially affect the validity of the pecking order theory across countries.

5.3 Methodology

In this section, the empirical analysis consists of three main elements. The first examines the linear function of the financing order and the factors that can affect this order using panel analysis with Ordinary Least Squares (OLS).[105] As most previous studies perform the tests with no sense of order among firms' financing decision[106], the analysis starts with the examination of factors that influence firms to prefer internal to external financing. Then, the disaggregation of financing deficit is test for justification where the relationship between each component of financing deficit and net debt issues is analysed. The implication of the pecking order theory similar to that of Shyam-Sunder and Myers' (1999) model will be examined to find the factors that drive firms to prefer debt to equity. In addition, the relation between firm-specific characteristics and the source of external financing is tested. Then, the focus turns to the effect of country-specific factors on influencing firms' financing decisions in both tiers of financing. The second element involves the application of logistic regressions to test the deviation from the pecking order theory as suggested by Autore and Kovacs (2005). Finally, non-linear quantile regressions are applied to test the predictions of pecking order with the aspects of different size and decile of financing deficit.

In order to test the pecking order theory, we use panel regressions where all year-firm combinations are treated as equally important independent observations. Panel data analysis makes it possible to capture the behaviour of variables in both time-series and cross-section dimensions. Similar to the previous chapters, where applicable, the full

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[105] A number of previous studies such as Lemmon and Zender (2004), Autore and Kovacs (2005), and Halov and Heider (2005) suggest the use of fixed-effect to emphasize time-series relationship between dependent and independent variables. Firm dummy has been used as a set of indicator variables to account for fixed firm effects in Frank and Goyal (2003) and other studies. However, Agca and Mozumdar (2004) argue that the use of fixed firm effects in a first-differenced model specification is inappropriate because the effects will be cancelled out when examining changes in leverage. They argue that the assumption of the existence of fixed effects while explaining leverage changes is not realistic because it implies that a firm's leverage ratio increase or decrease indefinitely from year to year. This is explored further by re-estimating the regressions with fixed firm effects and the results support Agca and Mozumdar's (2004) argument that coefficients become insignificant.

[106] Except for Autore and Kovacs (2005)

sample will be divided into pre- and post-crisis periods to investigate the effect of the financial crisis. It is expected that firms' financing deficits will be filled in different ways between pre- and post-crisis periods. Wald-statistics are estimated to examine whether there have been any significant changes in the role of the explanatory variables due to the financial crisis.

5.3.1 Linear Regressions

5.3.1.1 Internal versus External Financing

Previous studies such as Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) base their tests on how firms finance their need for external capital by focusing on the factors that drive firms to prefer debt to equity. However, one key implication of the pecking order theory is missing in their frames, the order of financing decision. The pecking order theory predicts that firms will adopt a hierarchy of financing. Internal finance will be given preference over external finance. Therefore, the analysis begins with a focus on the choice between internal versus external finance. The aim is to analyse what factors drive firms to prefer internal to external financing by estimating the linear regression of financing deficit on a set of firm-specific variables as follows.[107]

$$DEF_{i,t} = \alpha + \sum_{k=1} \beta_k FS_{k,i,t} + \varepsilon_{i,t} \qquad (5.1)$$

FS represents the vector of k firm-specific factors including the conventional factors of tangibility, growth opportunity, firm size and profitability to control for debt capacity, suggested to be one of the most important aspects of the pecking order theory. In addition to these conventional variables, there are other variables that might influence the financing deficit because they reflect the differences in the level of adverse selection

[107] Autore and Kovacs (2005) also study similar specification of internal vs external finance but their main objective is to focus on time-varying adverse selection costs.

cost and asymmetric information including firm age (AGE), asymmetric information level (BIG4), management team (PMGMT), adverse selection cost (SIGMA) and trading activity (TURN). Financing deficit ($DEF_{i,t}$) is the difference between investments in fixed and working capital and cash generated. Following Shyam-Sunder and Myers (1999) and Frank and Goyal (2003), $DEF_{i,t}$ is represented by an accounting identify as followed[108],

$$DEF_{i,t} = DIV_{i,t} + I_{i,t} + \Delta W_{i,t} - C_{i,t} = \Delta D_{i,t} + \Delta E_{i,t} \tag{5.2}$$

where $DIV_{i,t}$ is cash dividends in year t, $I_{i,t}$ is net investment in year t, $\Delta W_{i,t}$ is change in working capital in year t, $C_{i,t}$ is cash flow or cash generated after interest and taxes, $\Delta D_{i,t}$ is net debt issued in year t and $\Delta E_{i,t}$ is net equity issued in year t. All variables are scaled by total assets.[109] Although the pecking order theory does not require scaling, we do so to control for differences in firm size.

5.3.1.2 Debt versus Equity Issues for External Financing

5.3.1.2.1 Disaggregation of Financing Deficit

As aggregation of the accounting data is used to test the pecking order theory, it is important to investigate whether the aggregation step is justified or not. Frank and Goyal (2003) suggest that some of the components of financing deficit might behave in different ways from those hypothesized by the pecking order theory and can still help to account for debt issuance. Therefore, in this section financing deficit is disaggregated into cash dividend, investment, changes in working capital and cash flow as in equation

[108] Shyam-Sunder and Myers (1999) include the current portion of long-term debt as part of the financing deficit. However, Frank and Goyal (2003) find that the current portion of long-term debt does not appear to belong as one of the components of financing deficit and excluding the current portion of long-term debt does not affect their main conclusion.
[109] Frank and Goyal (2003) suggest that it is conventional to scale the variables by assets or sales. They replicate all tests by scaling variables by total book assets, the sum of book debt plus market equity and sales. Their main results are not affected.

(5.2). The use of disaggregation allows us to analyse the impact of each component on debt. The way to check whether the components of financing deficit behave in the manner predicted by the pecking order theory is to run the regression on a disaggregation basis similar to Frank and Goyal (2003) using the following specification,

$$\Delta D_{i,t} = \alpha + \beta_{DIV} DIV_{i,t} + \beta_I I_{i,t} + \beta_W \Delta W_{i,t} - \beta_C C_{i,t} + \varepsilon_{i,t} \qquad (5.3)$$

According to the pecking order theory, a unit increase in $DEF_{i,t}$ should have a unit impact on $\Delta D_{i,t}$. Therefore, each of the components of $DEF_{i,t}$ should also have a unit impact on $\Delta D_{i,t}$. Therefore, the original pecking order theory predicts that $\beta_{DIV} = \beta_I = \beta_W = \beta_C = 1$.

After making sure that all components of financing deficit relate to net debt issues in the predicted manner, the choice between debt and equity as the external source of finance is now examined as to how firms finance their financing deficit, which is the need for external finance and should be met only by debt or by equity issues. The analysis starts with the basic model that investigates the relationship between financing deficit and net debt issues in the aggregated form of financing deficit. Then financing deficit is disaggregated and the relationship between the components of financing deficit and net debt issues is analysed. Then we focus on other factors that might influence net debt issue decisions by adding other firm-specific variables into the model.

5.3.1.2.2 Basic Net Debt Issues Model

Similar to Shyam-Sunder and Myers (1999) and Frank and Goyal (2003), it is assumed that the adverse selection problem of external financing automatically leads to the original pecking order in which debt dominates equity.

The relationship between financing deficit and net debt issues is tested by using the following specification.[110,111]

$$\Delta D_{i,t} = \alpha + \beta_{PO}^{D} DEF_{i,t} + \varepsilon_{i,t} \qquad (5.4)$$

This test is based on the prediction of the pecking order theory that firms' deficit will be filled entirely with new debt issue. Changes in the net debt issues should be driven only by the financing deficit not by the attempt to reach an optimal capital structure. The simple or original pecking order theory predicts that $\alpha = 0$ and $\beta_{PO}{}^{D} = 1$ while in the modified pecking order theory $\beta_{PO}{}^{D}$ can be less than but close to 1 due to the concern over debt capacity and bankruptcy risk. Rejection of the modified pecking order theory implies rejection of the original pecking order theory. It is obvious that the pecking order theory cannot explain firms' behaviour or the observed pattern in financing decisions by itself because there are other reasons why firms need to issue equity. For example, when firms have limited debt capacity, they are forced to find alternative or costly sources of finance. Firms also try to look forward and forecast by implementing the policies that will allow them to have enough debt capacity to finance future investments; therefore, they might still issue equity even though they have enough debt capacity at that time. Also in case of IPOs, firms would issue equity. There

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[110] This specification is originally developed by Shyam-Sunder and Myers (1999) and modified by Frank and Goyal (2003). Although this specification has been interpreted as having statistical power problem, it has been a popular tool for testing the pecking order theory in the literature.

[111] Previous studies such as Shyam-Sunder and Myers (1999), Frank and Goyal (2003) and Dang (2005) have explored different definitions of dependent variables including the first differenced debt ratios, net debt issued and gross debt issued ratio and find the same conclusions that net debt issued yields the better fit.

are also other forms of equity issues that are not related to asymmetric information (Fama and French, 2005). In addition, the discount of new equity issues is not only due to transaction costs based on asymmetric information. There are also market timing, risk aversions and direct costs that can represent other transaction costs that can influence firms' financing decisions about the new capital (Galpin, 2004). Moreover, because the equity market was relatively overvalued during the 1990s leading firms to prefer more equity than debt, financing deficit coefficient is expected to be lower than found by the previous studies that focus on an earlier sample period.[112] In addition, in the 1990s there were a number of young, small and high growth firms who had limited debt capacity. These conditions force them to issue equity. Therefore, due to the above reasons, $\beta_{PO}{}^{D}$ is expected to be less than 1.

5.3.1.2.3 Basic Net Equity Issues Model

Following Halov and Heider (2005), we investigate further by running the basic regression on net equity issues with financing deficit to test the extent to which equity is issued to finance the deficit. The specification is as follows:

$$\Delta E_{i,t} = \alpha + \beta_{PO}^{E} DEF_{i,t} + \varepsilon_{i,t} \qquad (5.5)$$

To prove the accuracy of the cash-flow data, $\beta_{PO}{}^{D}$ in equation (5.4) and $\beta_{PO}{}^{E}$ in equation (5.5) should add up to 1 because equation (5.2) is an accounting identity.

[112] Elliott et al. (2004) show that the overvaluation in the 1990s is one of the explanations why recent studies that focus on the 1990s sample period find the coefficient of financing deficit to be lower than expected.

5.3.1.2.4 The Second-Order Term of Financing Deficit in Net Debt Issues Model

Chirinko and Singha (2000) and Agca and Mozumdar (2004) point out that it is difficult to make reliable inferences based on the estimated coefficient from a regression of new debt on the deficit because we cannot distinguish between the following options: i) firms prefer to issue new debt before new equity as predicted by the pecking order theory; ii) firms prefer to issue new equity before new debt; and iii) firms do not have any particular preferences in issuing debt and equity but instead issue both together in a certain relative ratio. They argue that the debt-financing deficit relation will be concave if the first scenario is correct but will be convex for the second scenario and linear under the third. Therefore, the nature of the second-order term of financing deficit in the debt-financing deficit relation is examined to indicate whether the pecking order theory as in the first scenario is valid or not by estimating the following regression as a concavity function:

$$\Delta D_{i,t} = \alpha + \beta_1 DEF_{i,t} + \beta_2 DEF_{i,t}^{\ 2} + \varepsilon_{i,t} \qquad (5.6)$$

The pecking order hypothesis predicts that firms will prefer less risky funds to riskier sources; therefore, debt should be issued before equity. If firms prefer to issue new debt before new equity as predicted by the pecking order hypothesis, the net debt issues will be a concave function of the financing deficit.

5.3.1.2.5 Using Other Information to Account for Leverage: Conventional Model

In addition to the pecking order theory, the trade-off theory is also frequently used to explaining the observed patterns of financing decisions of firms. Harris and Raviv (1991) review the relationship between the conventional set of variables (tangibility, growth opportunity, firm size and profitability) and the use of debt. Then a number of empirical studies including Rajan and Zingales (1995) incorporate these variables into a simple model. These conventional variables have been tested in different contexts by several empirical studies. Booth et al. (2001) point out that it is difficult to distinguish between trade-off and pecking order models because the variables used in each model are normally relevant to each other. Although these variables can make the pecking order theory more difficult to test, excluding these variables from the model might be a significant omission (Frank and Goyal, 2003).

Since the pecking order theory makes predictions about incremental financing decisions, the first difference term is applied.[113] The conventional regression is used to explain the leverage in level terms while pecking order regression aims to explain the change in, rather than the level of, leverage. First difference terms can be used to account for the impact of changes in the variables. Frank and Goyal (2003) suggest that as long as the shocks are uncorrelated across years, the specification in first differences of conventional variables can be applied.[114] Therefore, the relationship between firm characteristics and the source of external financing is examined further by running net debt issue regression in the aspect of the trade-off theory where net debt issues are regressed on firm-specific variables which include both conventional variables and additional variables to verify that the conventional determinants of net debt issues have the expected sign in our first-difference specification.

[113] There are other alternative specifications that have been applied by previous studies. These include (i) the use of level term by Frank and Goyal (2003) and Adedeji (2002); (ii) the use of lag 1 period of firm-specific variables by Adedeji (2002); (iii) the use of interaction term between financing deficit and level term of firm-specific variables by Lemmon and Zender (2004) and Autore and Kovacs (2005); and (iv) the use of interaction terms between financing deficit and first difference terms of firm-specific variables by Autore and Kovacs (2005).

[114] However, Frank and Goyal (2003) point out that the R^2 is likely to be lower with first difference term and we expect to lose some accuracy. In addition, it is possible that the coefficients might be biased toward zero but this bias is not large enough to affect their main results. They also note that this assumption is unlikely to be held. Therefore, the results must be interpreted with caution.

The specification used is as follows.[115]

$$\Delta D_{i,t} = \alpha + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \varepsilon_{i,t} \qquad (5.7)$$

The next step is to analyse how the financing deficit fits into this conventional model and how the financing deficit performs as an additional explanatory variable for the new debt issues by adding financing deficit into equation (5.7). By doing this, it helps us to investigate how well the financing deficit works in the conventional context or to see whether the pecking order theory model falsely omits the conventional determinants of net debt issues. In addition, the conventional factors can also be used as control factors for debt capacity which is the main concern in the modified pecking order theory. Therefore, we add financing deficit as an additional factor to equation (5.7) which is simply a modified version of the trade-off theory or an extension of equation (5.4) by adding firm-specific variables in first differences. However, it should be noted that this specification cannot be used as a model to distinguish between the pecking order theory and the trade-off theory because if the conventional variables are correlated with financing deficit, the explanatory power of financing deficit will be lower (Lemmon and Zender, 2004). The specification used is as follows[116,117]

$$\Delta D_{i,t} = \alpha + \beta_{DEF1} DEF_{i,t} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \varepsilon_{i,t} \qquad (5.8)$$

[115] This specification is also applied by Frank and Goyal (2003) and Halov and Heider (2005) among others

[116] This specification is suggested by Frank and Goyal (2003) and followed by Agca and Mozumdar (2004) and Halov and Heider (2005)

[117] Dang (2005) employs a unified framework that embeds both trade-off and pecking order theories but in a different specification by including cash flow deficit in the partial adjustment model to nest the pecking order theory.

The second-order term of financing deficit is added to equation (5.8) to take account of the concavity function. The specification used is as follows.[118]

$$\Delta D_{i,t} = \alpha + \beta_{DEF1} DEF_{i,t} + \beta_{DEF2} DEF_{i,t}^{\;2} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \varepsilon_{i,t} \qquad (5.9)$$

Frank and Goyal (2003) also include lagged dependent variables in equation (5.7). Therefore, equations (5.7), (5.8) and (5.9) are re-estimated with lagged dependent variables as additional explanatory variables as followed.

$$\Delta D_{i,t} = \alpha + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t} \qquad (5.10)$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF1} DEF_{i,t} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t} \qquad (5.11)$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF1} DEF_{i,t} + \beta_{DEF2} DEF_{i,t}^{\;2} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t} \qquad (5.12)$$

5.3.1.3 Country-Specific Effects on Internal versus External Financing and Debt versus Equity Issues

There are few studies that incorporate the impact of country-specific factors in tests of the pecking order theory mainly because most previous empirical studies focus on a single country context. Because the sample countries differ in term of corporate governance, economic development and financial institutions, it is possible that these differences may affect the way firms adhere to or violate the pecking order theory. The findings from the previous two chapters have shown several significant effects of country-specific factors that influence capital structure and debt maturity structure. Therefore, it is highly likely that the variations found among the sample countries when testing the pecking order hypothesis might be due to differences in country-specific

[118] Agca and Mozumdar (2004) also examine the concavity function of financing deficit.

factors. Country-specific factors are grouped into five categories: (i) economic development; (ii) legal enforcement; (iii) legal protection; (iv) ownership structure and (v) accounting and asymmetric information. Some of the factors in these groups might seem to be more related to firm level. However, country level data is applied in this section. The examination of country-specific factors starts by re-estimating equations (5.1),(5.4),(5.6) and (5.9) using a data set that combines all firms from all sample countries over the sample period. Then country dummies are added to find whether there are any country-specific effects. As in Chapters 3 and 4, country dummies are *THDUM*, *MLDUM* and *SPDUM* which are then replaced one at a time with country-specific factors to avoid possible multicollinearity.

5.3.2 Predictive Logistic Regressions

Autore and Kovacs (2005) suggest that there is a potential problem with equation (5.4) because net debt issues (ΔD) are not related to financing deficit when ΔD and net equity issues (ΔE) have opposite signs. This is due to the fact that firms can use the funds from issuing equity to reduce their debt. Therefore, predictive logistic regressions are applied instead of linear regressions to test how the probability of firms deviating from the pecking order is affected by firm-specific characteristics and country-specific factors. The test of deviation from the pecking order can also be used as an indirect test of the financing order among the financial decisions that have been overlooked by previous studies. The deviation is grouped into two forms, mild and strong deviations. Mild deviation is defined as when firms need to access external finance or when financing deficit is more than zero (DEF>0). Strong deviation is defined as when firms issue equity or when net equity issues are more than zero (ΔE >0).

The specifications for mild and strong deviations are as follows;

$$LOG(DEF_{i,t} > 0) = \alpha + \sum_{k=1} \beta_k FS_{k,i,t} + \varepsilon_{i,t} \qquad (5.13)$$

$$LOG(\Delta E_{i,t} > 0) = \alpha + \sum_{k=1} \beta_k FS_{k,i,t} + \varepsilon_{i,t} \qquad (5.14)$$

where LOG ($DEF_{i,t}$ >0) equals 1 when deficit is more than zero and 0 otherwise. LOG ($\Delta E_{i,t}$ >0) equals 1 when net equity issues are more than zero and 0 otherwise. FS is a set of firm-specific variables.

5.3.3 Non-Linear Quantile Regressions

Chang and Dasgupta (2003) point out that the positive relationship between net debt issues and financing deficit does not indicate that a firm is more likely to issue debt if its financing deficit becomes larger. They suggest that the probability of debt issuance varies depending on the size of financing deficit. Their findings imply that the relationship between debt issues and financing deficit should be non-monotonic due to the non-monotonic relationship between the size of financing deficit and the costs associated with the loss of debt capacity when firms finance their additional deficit with debt. The probability of issuing debt increases initially with the increase in deficit size because at this point adverse selection costs of issuing equity outweigh the loss of debt capacity. This probability decreases when the loss of debt capacity becomes more important and goes up again when financing deficit is very large.

Qiu and Smith (2005) suggest the use of a non-linear quantile regression to test pecking order models and to reconcile the evidence of the previous empirical studies. They show that the conflicting results from previous studies are in fact consistent with each other after taking into account nonlinearity. Their results suggest that financial decisions of firms are consistent with the pecking order theory when financing deficit is low. They find an opposite pattern of financing behaviour between firms with financing deficit and firms with financial surplus. Their results show that most firms use debt to cover their financing deficit when financing deficit is below 20% of total assets while most firms use both debt and equity to fund financing deficits when financing deficits exceed 20% of total assets. However, when the financing deficit is large (exceeds 50% of total assets), most firms use only equity to fund their financing deficit. On the other hand, firms use financial surplus to repay debt no matter how big the size of the financial surplus is. In addition, they find that conventional factors such as firm size, tangibility, growth opportunity and profitability affect firms' behaviour regarding financing deficit and financial surplus. Therefore, they reject the original pecking order theory and support the modified pecking order theory where the role of bankruptcy costs is primary and the role of conventional factors is secondary.

As suggested by Qiu and Smith (2005), the non-linear quantile regression should be applied for several reasons. First, the original pecking order model predicts that all financing deficits will be covered by net debt issues. However, there has been evidence rejecting this prediction that firms would prefer equity issues when they have high debt levels because it is likely that bankruptcy costs will be severe. Therefore, it is expected that the relationship between financing deficit and net debt issues should vary depending on the size of financing deficit. Second, it is very likely that the relationship between financing deficit and net debt issues differs from the relationship between financial surplus and net debt issues because the relative cost of issuing debt versus equity differs from the relative cost between repaying debt versus repurchasing stock.

Therefore, a method of a non-linear quantile regression is employed as an alternative estimation technique compared to the use of linear regression using OLS, as in Section 5.3.1, when the distribution of the error term is asymmetric or when the assumption of a normally distributed error term is in question. This technique is applied to account for nonlinearity in the relationship between financing deficit and net debt issues and to allow for the dependency of the effect of financing deficit on net debt issues on size of the financing deficit. The use of non-linear quantile regression helps to (i) improve understanding of the type of firms for which the pecking order theory is appropriate; (ii) identify the proportion of firms that do not use net debt issues to cover financing deficits on some certain given financing deficit level; and (iii) to measure how the distribution of net debt issues changes with the change in size of financing deficit.

Because the firm's financing behaviour regarding financing deficit and financial surplus might be different, the analysis is divided into two parts, financing deficit and financial surplus.

Financing deficit

Financing deficit is defined as financing deficit that exceeds zero or positive financing deficit. Positive financing deficit will be divided into several bands depending on the maximum value of financing deficit in each country. For simplicity, assuming that there are few observations of firms that have financing deficit that exceed 0.2, financing deficit will be divided into three bands and three explanatory variables will be created to capture the nonlinear effect of financing deficits on net debt issues. If this is the case, the following specification would be used:

BAND 1 : $DEF_{i,t}$ (0.0 to 0.1)	$= DEF_{i,t}$	if $0 \leq DEF_{i,t} \leq 0.1$,
	$= 0.1$	if $DEF_{i,t} \geq 0.1$;
BAND 2 : $DEF_{i,t}$ (0.1 to 0.2)	$= 0$	if $DEF_{i,t} \leq 0.1$,
	$= DEF_{i,t} - 0.1$	if $0.1 \leq DEF_{i,t} \leq 0.2$,
	$= 0.1$	if $DEF_{i,t} \geq 0.2$;
BAND 3 : $DEF_{i,t}$ (over 0.2)	$= 0$	if $DEF_{i,t} \leq 0.2$,
	$= DEF_{i,t} - 0.2$	if $DEF_{i,t} \geq 0.2$

For example, when the financing deficit equals to 0.295, we would have $DEF_{i,t}$ (0.0 to 0.1) equal to 0.1, $DEF_{i,t}$ (0.1 to 0.2) equal to 0.1 and $DEF_{i,t}$ (over 0.2) equal to 0.095. Specifically, we use the variables in Table 5.1, Panel A, to estimate the piecewise linear regressions for firms with positive financing deficits in each sample country. For instance, the maximum positive financing deficit for Thai firms is 1.1390. As there are only few observations with financing deficit above 1.0, the range of positive financing deficit is divided into eleven bands creating eleven explanatory variables to capture the nonlinear effect of financing deficits on debt issues, $DEF_{i,t}$ (j to j+0.1), where j = 0, 0.1, 0.2,...0.9 and $DEF_{i,t}$ (over 1.0). Therefore, the basic piecewise linear regression for Thailand would be as follows:

$$\Delta D_{i,t} = \alpha + \sum_{j=0}^{0.9} \beta_i DEF_{i,t}(j\ to\ j+0.1) + \beta_0 DEF_{i,t}(over\ 1.0) + \varepsilon_{i,t} \quad (5.15)$$

The estimated coefficients of β_i to β_0 will indicate the marginal effect of changes in financing deficit on net debt issues in different positive financing deficit ranges.

Table 5.1 : The specifications of variables to estimate the piecewise linear regressions

Panel A : Financing Deficit

Thailand : Maximum of DEF = 1.1390 (11 positive bands)

DEF	Value	Condition
DEF_{it} (0.0 to 0.1)	$= DEF_{i,t}$ 0.1	If $0 \le DEF_{it} \le 0.1$ If $DEF_{it} \ge 0.1$
DEF_{it} (0.1 to 0.2)	0 $= DEF_{it} - 0.1$ 0.1	If $DEF_{it} \le 0.1$ If $0.1 \le DEF_{it} \le 0.2$ If $DEF_{it} \ge 0.2$
DEF_{it} (0.2 to 0.3)	0 $= DEF_{it} - 0.2$ 0.2	If $DEF_{it} \le 0.2$ If $0.2 \le DEF_{it} \le 0.3$ If $DEF_{it} \ge 0.3$
DEF_{it} (0.3 to 0.4)	0 $= DEF_{it} - 0.3$ 0.3	If $DEF_{it} \le 0.3$ If $0.3 \le DEF_{it} \le 0.4$ If $DEF_{it} \ge 0.4$
DEF_{it} (0.4 to 0.5)	0 $= DEF_{it} - 0.4$ 0.4	If $DEF_{it} \le 0.4$ If $0.4 \le DEF_{it} \le 0.5$ If $DEF_{it} \ge 0.5$
DEF_{it} (0.5 to 0.6)	0 $= DEF_{it} - 0.5$ 0.5	If $DEF_{it} \le 0.5$ If $0.5 \le DEF_{it} \le 0.6$ If $DEF_{it} \ge 0.6$
DEF_{it} (0.6 to 0.7)	0 $= DEF_{it} - 0.6$ 0.6	If $DEF_{it} \le 0.6$ If $0.6 \le DEF_{it} \le 0.7$ If $DEF_{it} \ge 0.7$
DEF_{it} (0.7 to 0.8)	0 $= DEF_{it} - 0.7$ 0.7	If $DEF_{it} \le 0.7$ If $0.7 \le DEF_{it} \le 0.8$ If $DEF_{it} \ge 0.8$
DEF_{it} (0.8 to 0.9)	0 $= DEF_{it} - 0.8$ 0.8	If $DEF_{it} \le 0.8$ If $0.8 \le DEF_{it} \le 0.9$ If $DEF_{it} \ge 0.9$
DEF_{it} (0.9 to 1.0)	0 $= DEF_{it} - 0.9$ 0.9	If $DEF_{it} \le 0.9$ If $0.9 \le DEF_{it} \le 1.0$ If $DEF_{it} \ge 1.0$
DEF_{it} (over 1.0)	0 $= DEF_{it} - 1.0$	If $DEF_{it} \le 1.0$ If $DEF_{it} \ge 1.0$

Table 5.1 : The specifications of variables to estimate the piecewise linear regressions (continued)

Malaysia : Maximum of DEF = 1.5937 (15 positive bands)

DEF	Value	Condition
DEF_{it} (0.0 to 0.1)	= DEFi,t 0.1	If $0 \le DEF_{it} \le 0.1$ If $DEF_{it} \ge 0.1$
DEF_{it} (0.1 to 0.2)	0 $= DEF_{it} - 0.1$ 0.1	If $DEF_{it} \le 0.1$ If $0.1 \le DEF_{it} \le 0.2$ If $DEF_{it} \ge 0.2$
DEF_{it} (0.2 to 0.3)	0 $= DEF_{it} - 0.2$ 0.2	If $DEF_{it} \le 0.2$ If $0.2 \le DEF_{it} \le 0.3$ If $DEF_{it} \ge 0.3$
DEF_{it} (0.3 to 0.4)	0 $= DEF_{it} - 0.3$ 0.3	If $DEF_{it} \le 0.3$ If $0.3 \le DEF_{it} \le 0.4$ If $DEF_{it} \ge 0.4$
DEF_{it} (0.4 to 0.5)	0 $= DEF_{it} - 0.4$ 0.4	If $DEF_{it} \le 0.4$ If $0.4 \le DEF_{it} \le 0.5$ If $DEF_{it} \ge 0.5$
DEF_{it} (0.5 to 0.6)	0 $= DEF_{it} - 0.5$ 0.5	If $DEF_{it} \le 0.5$ If $0.5 \le DEF_{it} \le 0.6$ If $DEF_{it} \ge 0.6$
DEF_{it} (0.6 to 0.7)	0 $= DEF_{it} - 0.6$ 0.6	If $DEF_{it} \le 0.6$ If $0.6 \le DEF_{it} \le 0.7$ If $DEF_{it} \ge 0.7$
DEF_{it} (0.7 to 0.8)	0 $= DEF_{it} - 0.7$ 0.7	If $DEF_{it} \le 0.7$ If $0.7 \le DEF_{it} \le 0.8$ If $DEF_{it} \ge 0.8$
DEF_{it} (0.8 to 0.9)	0 $= DEF_{it} - 0.8$ 0.8	If $DEF_{it} \le 0.8$ If $0.8 \le DEF_{it} \le 0.9$ If $DEF_{it} \ge 0.9$
DEF_{it} (0.9 to 1.0)	0 $= DEF_{it} - 0.9$ 0.9	If $DEF_{it} \le 0.9$ If $0.9 \le DEF_{it} \le 1.0$ If $DEF_{it} \ge 1.0$
DEF_{it} (1.0 to 1.1)	0 $= DEF_{it} - 1.0$ 1	If $DEF_{it} \le 1.0$ If $1.0 \le DEF_{it} \le 1.1$ If $DEF_{it} \ge 1.1$
DEF_{it} (1.1 to 1.2)	0 $= DEF_{it} - 1.1$ 1.1	If $DEF_{it} \le 1.1$ If $1.1 \le DEF_{it} \le 1.2$ If $DEF_{it} \ge 1.2$
DEF_{it} (1.2 to 1.3)	0 $= DEF_{it} - 1.2$ 1.2	If $DEF_{it} \le 1.2$ If $1.2 \le DEF_{it} \le 1.3$ If $DEF_{it} \ge 1.3$
DEF_{it} (1.3 to 1.4)	0 $= DEF_{it} - 1.3$ 1.3	If $DEF_{it} \le 1.3$ If $1.3 \le DEF_{it} \le 1.4$ If $DEF_{it} \ge 1.4$
DEF_{it} (over 1.4)	0 $= DEF_{it} - 1.4$	If $DEF_{it} \le 1.4$ If $DEF_{it} \ge 1.4$

Singapore : Maximum of DEF = 1.2274 (10 positive bands)

DEF	Value	Condition
DEF_{it} (0.0 to 0.1)	= DEFi,t 0.1	If $0 \le DEF_{it} \le 0.1$ If $DEF_{it} \ge 0.1$
DEF_{it} (0.1 to 0.2)	0 $= DEF_{it} - 0.1$ 0.1	If $DEF_{it} \le 0.1$ If $0.1 \le DEF_{it} \le 0.2$ If $DEF_{it} \ge 0.2$
DEF_{it} (0.2 to 0.3)	0 $= DEF_{it} - 0.2$ 0.2	If $DEF_{it} \le 0.2$ If $0.2 \le DEF_{it} \le 0.3$ If $DEF_{it} \ge 0.3$
DEF_{it} (0.3 to 0.4)	0 $= DEF_{it} - 0.3$ 0.3	If $DEF_{it} \le 0.3$ If $0.3 \le DEF_{it} \le 0.4$ If $DEF_{it} \ge 0.4$
DEF_{it} (0.4 to 0.5)	0 $= DEF_{it} - 0.4$ 0.4	If $DEF_{it} \le 0.4$ If $0.4 \le DEF_{it} \le 0.5$ If $DEF_{it} \ge 0.5$
DEF_{it} (0.5 to 0.6)	0 $= DEF_{it} - 0.5$ 0.5	If $DEF_{it} \le 0.5$ If $0.5 \le DEF_{it} \le 0.6$ If $DEF_{it} \ge 0.6$
DEF_{it} (0.6 to 0.7)	0 $= DEF_{it} - 0.6$ 0.6	If $DEF_{it} \le 0.6$ If $0.6 \le DEF_{it} \le 0.7$ If $DEF_{it} \ge 0.7$
DEF_{it} (0.7 to 0.8)	0 $= DEF_{it} - 0.7$ 0.7	If $DEF_{it} \le 0.7$ If $0.7 \le DEF_{it} \le 0.8$ If $DEF_{it} \ge 0.8$
DEF_{it} (0.8 to 0.9)	0 $= DEF_{it} - 0.8$ 0.8	If $DEF_{it} \le 0.8$ If $0.8 \le DEF_{it} \le 0.9$ If $DEF_{it} \ge 0.9$
DEF_{it} (over 0.9)	0 $= DEF_{it} - 0.9$	If $DEF_{it} \le 0.9$ If $DEF_{it} \ge 0.9$

Table 5.1 : The specifications of variables to estimate the piecewise linear regressions (continued)
Australia : Maximum of DEF = 1.8843 (18 positive bands)

DEF	Value	Condition
DEF_{it} (0.0 to 0.1)	= DEFi,t 0.1	If $0 \le DEF_{it} \le 0.1$ If $DEF_{it} \ge 0.1$
DEF_{it} (0.1 to 0.2)	0 $= DEF_{it} - 0.1$ 0.1	If $DEF_{it} \le 0.1$ If $0.1 \le DEF_{it} \le 0.2$ If $DEF_{it} \ge 0.2$
DEF_{it} (0.2 to 0.3)	0 $= DEF_{it} - 0.2$ 0.2	If $DEF_{it} \le 0.2$ If $0.2 \le DEF_{it} \le 0.3$ If $DEF_{it} \ge 0.3$
DEF_{it} (0.3 to 0.4)	0 $= DEF_{it} - 0.3$ 0.3	If $DEF_{it} \le 0.3$ If $0.3 \le DEF_{it} \le 0.4$ If $DEF_{it} \ge 0.4$
DEF_{it} (0.4 to 0.5)	0 $= DEF_{it} - 0.4$ 0.4	If $DEF_{it} \le 0.4$ If $0.4 \le DEF_{it} \le 0.5$ If $DEF_{it} \ge 0.5$
DEF_{it} (0.5 to 0.6)	0 $= DEF_{it} - 0.5$ 0.5	If $DEF_{it} \le 0.5$ If $0.5 \le DEF_{it} \le 0.6$ If $DEF_{it} \ge 0.6$
DEF_{it} (0.6 to 0.7)	0 $= DEF_{it} - 0.6$ 0.6	If $DEF_{it} \le 0.6$ If $0.6 \le DEF_{it} \le 0.7$ If $DEF_{it} \ge 0.7$
DEF_{it} (0.7 to 0.8)	0 $= DEF_{it} - 0.7$ 0.7	If $DEF_{it} \le 0.7$ If $0.7 \le DEF_{it} \le 0.8$ If $DEF_{it} \ge 0.8$
DEF_{it} (0.8 to 0.9)	0 $= DEF_{it} - 0.8$ 0.8	If $DEF_{it} \le 0.8$ If $0.8 \le DEF_{it} \le 0.9$ If $DEF_{it} \ge 0.9$
DEF_{it} (0.9 to 1.0)	0 $= DEF_{it} - 0.9$ 0.9	If $DEF_{it} \le 0.9$ If $0.9 \le DEF_{it} \le 1.0$ If $DEF_{it} \ge 1.0$
DEF_{it} (1.0 to 1.1)	0 $= DEF_{it} - 1.0$ 1	If $DEF_{it} \le 1.0$ If $1.0 \le DEF_{it} \le 1.1$ If $DEF_{it} \ge 1.1$
DEF_{it} (1.1 to 1.2)	0 $= DEF_{it} - 1.1$ 1.1	If $DEF_{it} \le 1.1$ If $1.1 \le DEF_{it} \le 1.2$ If $DEF_{it} \ge 1.2$
DEF_{it} (1.2 to 1.3)	0 $= DEF_{it} - 1.2$ 1.2	If $DEF_{it} \le 1.2$ If $1.2 \le DEF_{it} \le 1.3$ If $DEF_{it} \ge 1.3$
DEF_{it} (1.3 to 1.4)	0 $= DEF_{it} - 1.3$ 1.3	If $DEF_{it} \le 1.3$ If $1.3 \le DEF_{it} \le 1.4$ If $DEF_{it} \ge 1.4$
DEF_{it} (1.4 to 1.5)	0 $= DEF_{it} - 1.4$ 1.4	If $DEF_{it} \le 1.4$ If $1.4 \le DEF_{it} \le 1.5$ If $DEF_{it} \ge 1.5$
DEF_{it} (1.5 to 1.6)	0 $= DEF_{it} - 1.5$ 1.5	If $DEF_{it} \le 1.5$ If $1.5 \le DEF_{it} \le 1.6$ If $DEF_{it} \ge 1.6$
DEF_{it} (1.6 to 1.7)	0 $= DEF_{it} - 1.6$ 1.6	If $DEF_{it} \le 1.6$ If $1.6 \le DEF_{it} \le 1.7$ If $DEF_{it} \ge 1.7$
DEF_{it} (over 1.7)	0 $= DEF_{it} - 1.7$	If $DEF_{it} \le 1.7$ If $DEF_{it} \ge 1.7$

Panel B : Financing Surplus
Thailand : Minimum of DEF = -0.4044 (4 negative bands)

DEF	Value	Condition
DEF_{it} (0.0 to -0.1)	= DEFi,t -0.1	If $-0.1 \le DEF_{it} \le 0.0$ If $DEF_{it} \le -0.1$
DEF_{it} (-0.1 to -0.2)	0 = DEFi,t + 0.1 -0.1	If $-0.1 \le DEF_{it} \le 0.0$ If $-0.2 \le DEF_{it} \le -0.1$ If $DEF_{it} \le -0.2$
DEF_{it} (-0.2 to -0.3)	0 = DEFi,t + 0.2 -0.2	If $-0.2 \le DEF_{it} \le 0.0$ If $-0.3 \le DEF_{it} \le -0.2$ If $DEF_{it} \le -0.3$
DEF_{it} (below -0.3)	0 = DEFi,t + 0.3	If $-0.3 \le DEF_{it} \le 0.0$ If $DEF_{it} \le -0.3$

Table 5.1 : The specifications of variables to estimate the piecewise linear regressions (continued)

Malaysia : Minimum of DEF = -0.4247 (4 negative bands)

DEF	Value	Condition
DEF_{it} (0.0 to -0.1)	$= DEF_{i,t}$ -0.1	If $-0.1 \le DEF_{it} \le 0.0$ If $DEF_{it} \le -0.1$
DEF_{it} (-0.1 to -0.2)	0 $= DEF_{i,t} + 0.1$ -0.1	If $-0.1 \le DEF_{it} \le 0.0$ If $-0.2 \le DEF_{it} \le -0.1$ If $DEF_{it} \le -0.2$
DEF_{it} (-0.2 to -0.3)	0 $= DEF_{i,t} + 0.2$ -0.2	If $-0.2 \le DEF_{it} \le 0.0$ If $-0.3 \le DEF_{it} \le -0.2$ If $DEF_{it} \le -0.3$
DEF_{it} (below -0.3)	0 $= DEF_{i,t} + 0.3$	If $-0.3 \le DEF_{it} \le 0.0$ If $DEF_{it} \le -0.3$

Singapore : Minimum of DEF = -0.3932 (3 negative bands)

DEF	Value	Condition
DEF_{it} (0.0 to -0.1)	$= DEF_{i,t}$ -0.1	If $-0.1 \le DEF_{it} \le 0.0$ If $DEF_{it} \le -0.1$
DEF_{it} (-0.1 to -0.2)	0 $= DEF_{i,t} + 0.1$ -0.1	If $-0.1 \le DEF_{it} \le 0.0$ If $-0.2 \le DEF_{it} \le -0.1$ If $DEF_{it} \le -0.2$
DEF_{it} (below -0.2)	0 $= DEF_{i,t} + 0.2$	If $-0.2 \le DEF_{it} \le 0.0$ If $DEF_{it} \le -0.2$

Australia : Minimum of DEF = -0.4467 (4 negative bands)

DEF	Value	Condition
DEF_{it} (0.0 to -0.1)	$= DEF_{i,t}$ -0.1	If $-0.1 \le DEF_{it} \le 0.0$ If $DEF_{it} \le -0.1$
DEF_{it} (-0.1 to -0.2)	0 $= DEF_{i,t} + 0.1$ -0.1	If $-0.1 \le DEF_{it} \le 0.0$ If $-0.2 \le DEF_{it} \le -0.1$ If $DEF_{it} \le -0.2$
DEF_{it} (-0.2 to -0.3)	0 $= DEF_{i,t} + 0.2$ -0.2	If $-0.2 \le DEF_{it} \le 0.0$ If $-0.3 \le DEF_{it} \le -0.2$ If $DEF_{it} \le -0.3$
DEF_{it} (below -0.3)	0 $= DEF_{i,t} + 0.3$	If $-0.3 \le DEF_{it} \le 0.0$ If $DEF_{it} \le -0.3$

Financial Surplus

Financial surplus is defined as financing deficit that is below zero, or negative financing deficit. It is expected that firms will behave differently when they have positive financing deficit from when they have negative financing deficit (financial surplus). One possibility is that financial distress comes with net debt issues if firms fund their large financing deficit with debt. However, when firms use financial surplus to repay debt, there is no such adverse effect. In order to test the impact of financial surplus, a similar process is applied as in financing deficit test.

For example, if there are few observations in which negative financing deficit is below –0.2, three bands of financing deficits will be divided and three explanatory variables will be created. In this case, the following variables will be used to estimate the piecewise linear regression for firms with financial surplus

BAND 1 : $DEF_{i,t}$(0 to –0.1)	$= DEF_{i,t}$	if $-0.1 \leq DEF_{i,t} \leq 0$;
	= -0.1	if $DEF_{i,t} \leq -0.1$
BAND 2 : $DEF_{i,t}$(-0.1 to –0.2)	= 0	if $-0.1 \leq DEF_{i,t} \leq 0$;
	$= DEF_{i,t} + 0.1$	if $-0.2 \leq DEF_{i,t} \leq -0.1$;
	= -0.1	if $DEF_{i,t} \leq -0.2$
BAND 3 : $DEF_{i,t}$(below –0.2)	= 0	if $-0.2 \leq DEF_{i,t} \leq 0$;
	$= DEF_{i,t} + 0.2$	if $DEF_{i,t} \leq -0.2$

For example, if the financing deficit is equal to –0.295, we would have $DEF_{i,t}$ (0 to –0.1) equal to –0.1, $DEF_{i,t}$ (-0.1 to –0.2) equal to –0.1 and $DEF_{i,t}$ (below –0.2) equal to –0.095. A similar process as for financial deficit (positive deficit) is applied for the sample countries and the variables created for negative financing deficit (financial surplus) are summarized in Table 5.1, Panel B. Therefore, the basic piecewise linear regression for financial surplus for Thailand would be as follows:

$$\Delta D_{i,t} = \alpha + \sum_{j=0}^{-0.2} \beta_i DEF_{i,t}(j\ to\ j-0.1) + \beta_0 DEF_{i,t}(below\ -0.3) + \varepsilon_{i,t} \quad (5.16)$$

5.4 Hypotheses Development and Variable Identification

5.4.1 Aggregation of Financing Deficit

The definitions of each aggregation of financing deficit are summarized in Table 5.2. The trade-off theory predicts that ***cash dividend*** (*DIV*) should be negatively related to debt because DIV is used as an alternative method to help mitigate free cash flow problems. However, DIV is a component of financing deficit. Thus, according to the pecking order theory, the relationship should be positive. The pecking order theory also predicts a positive relationship between ***changes in working capital*** (*ΔW*) and debt issues. After controlling for internal cash flow and investment, ΔW should be matched with net debt issues. ***Internal cash flow*** (*C*) is expected to be negatively related to debt issues because the pecking order theory predicts that firms should use internal finance before external finance.[119] After controlling for C and ΔW, ***investment*** (I) should be matched positively with net debt issues.[120]

Table 5.2 : Indicators of the aggregations of financing deficit and firm-specific variables

Variables		Proxy
Financing Deficit	DEF	= Dividend + Net Investment + Changes in Working Capital + Cash flow = net debt issues + net equity issues
Dividend	DIV	=Cash dividends paid
Net Investment	I	=Capital expenditure + net assets-acquisition + addits to other assets + increases in investment + other use/source-inv + other uses – decreases in investment – other source/use-fin
Changes in Working Capital	ΔW	=-(increases / decrease in short term debt + changes in Cash or liq)
Cash Flow	C	=net income + Depre, deple & amort + Defer tax & ITC + other Cash flow + funds from operation + extraordinary items + funds-other oper act + disposal fix assets + EFFECT-exch on Cash + other sources
Net Debt Issues	ΔD	=Long term borrowing – reduction in long term debt – com/PFD PURCH RTRD
Net Equity Issues	ΔE	= Proceed sale/iss stk + stock option proceeds + other stock sales
Tangibility	TANG	= Net fixed assets / Total assets
Growth Opportunity	GROW	= (MV of equity + BV of total assets – BV of equity) / BV of assets
Firm Size	SIZE	= Ln (assets)
Profitability	PROF	= Operating income / Total assets
Firm Age	AGE	= Ln (the number of years starting from when the firms are listed in the national stock market)
Level of Asymmetric Information	BIG4	= Equal to 1 if the auditors of the firms are among Big 4 auditors
Management Involvement	PMGMT	= Number of management team with the same family name / Total number of management team
Adverse Selection Cost	SIGMA	= Residual standard deviation calculated from a market model
Trading Activity	TURN	= Average of (daily trading volume / daily total number of shares)

[119] If cash flow is a proxy for growth opportunity, trade-off theory also predicts a negative relationship.
[120] The trade-off theory also predicts a positive relationship because high investments lead to higher debt capacity.

5.4.2 Firm-Specific Variables

The definitions of firm-specific variables are summarized in Table 5.2. Several empirical studies used sub-samples regarding differences in adverse selection costs such as firm size, growth opportunity, profitability, firm age, volatility and sigma.[121] However, due to the size of the sample, it is difficult to divide the sample into different sub-groups and to find a pattern among the sub-groups according to differences in adverse selection cost. Therefore, instead of separating the data into different deciles, these variables are included in the regressions instead. For each variable, the hypotheses are set for the two financing orders: (i) internal versus external finance (relationship between variables and financing deficit) and (ii) debt versus equity (relationship between variables and net debt issues). The predictions of the role of each variable are raised from the points of view of both the trade-off and pecking order theories.

Tangibility

Tangibility (*TANG*) is defined as the ratio of net fixed assets to total assets. Tangible assets can be used as collateral. Therefore, firms with high tangible assets have higher debt capacity. Firms with few tangible assets have greater asymmetric information; therefore, they should prefer internal to external finance leading to the prediction of a positive relationship for between tangibility and financing deficit. On the other hand, predictions of the relationship between tangibility and net debt issues are not as conclusive as between tangibility and financing deficit. Firms with few tangible assets would have greater asymmetric information; therefore, they tend to accumulate more debt over time and are likely to be highly levered because equity issues will be under-priced. Firms with high tangibility are also normally large in size; therefore, they

[121] Frank and Goyal (2003) focus on different size and levels of growth opportunity sub-samples. Agca and Mozumdar (2004) also focus on different size sub-samples. Autore and Kovacs (2005) also focus on different adverse selection cost and levels of profitability sub-samples. Lemmon and Zender (2004) also focus on different age sub-samples. Halov and Heider (2005) apply SIGMA as the proxy for volatility and they also focus on different risk sub-samples.

can issue equity at fair prices and have less need to issue debt to finance their new investments. Titman and Wessels (1988) suggest that firms with less tangible or collateralized assets should employ more debt because debt can help to limit or monitor managers' use of fund. Therefore, the pecking order theory predicts a negative relationship between debt issues and tangibility. On the other hand, the trade-off theory predicts a positive relationship because tangible assets can be used as (i) collateral which can increase firms' debt capacity and reduce bankruptcy costs and (ii) security to reduce agency costs of debt and to avoid asset substitution problems.

Growth opportunity

Growth opportunity (*GROW*) is proxied using market to book ratio which is defined as the market value of equity plus book value of total assets minus book value of equity then divided by total assets. Firms with high growth opportunities are likely to be in need of external finance. Therefore, it is expected that firms with high growth opportunities should have high financing deficits leading to the prediction of a positive relationship between growth opportunities and financing deficits. Both the trade-off and pecking order theories predict a negative relationship between growth opportunities and net debt issues. It is argued that high growth opportunities can help mitigate dilution costs to existing shareholders when their stocks are overvalued. Therefore, firms with high growth opportunities can issue more equity with less risk of dilution of control. The modified pecking order theory predicts that firms with high growth opportunity will issue equity to build financial slack or to preserve their debt capacity for future finance. Therefore, firms with high growth opportunities are more likely to issue equity. The trade-off theory also predicts a negative relationship between debt issues and growth opportunity because there is a concern that debt exposes firms to the 'debt overhang' problem which can limit the firm's ability for future growth (Myers, 1977). Also, because higher growth is associated with greater bankruptcy risks, firms with high growth opportunities will try to avoid the use of debt to reduce bankruptcy risk. In addition to the trade-off theory and the pecking order theory, market timing theory also predicts a negative relationship between debt issues and growth opportunity. Market to book ratio is not only a proxy for growth opportunity but also a proxy for overvaluation. Market timing theory predicts that managers time over-valued equity markets irrationally. Firms with high growth opportunities are usually overvalued; therefore, firms will try to issue equity to take advantage of this. Therefore, firms with high growth opportunities should be associated more with equity issuance than debt issuance because overvaluation induces managers to issue equity.

Firm size

Firm size (*SIZE*) is measured by the natural logarithm of total assets. It is expected that the larger the firm, the higher internal funding they will have generated. Therefore, large firms should have less need for external finance leading to a negative relationship between firm size and financing deficit. In addition, if firm size is a proxy for asymmetric information, a negative relationship between firm size and financing deficit is also expected. Large firms can be viewed as complex organisations with less transparency leading to higher costs of asymmetric information. The higher the level of asymmetric information, the harder it is for firms to get access to external finance.

There is a consensus in the literature on the relationship between firm size and the use of debt. Firm size is expected to be positively related to debt issuance according to the trade-off theory because larger firms are usually more diversified, have easier access to debt, have lower financial distress costs, and are less likely to go bankrupt. Large firms are often regarded as 'too big to fail'. Large firms also have lower agency and transaction costs relative to smaller firms. The pecking order theory also predicts a positive relationship between debt issues and firm size because larger firms have higher reputations and they face lower information costs when borrowing. In addition, larger firms are less vulnerable to informational asymmetries and adverse selection problems. Therefore, large firms can rely more on debt financing compared with small firms. Because both the trade-off theory and the pecking order theory predict a positive relationship, it is difficult to suggest which theory is supported by the results. The pecking order theory should work particularly well for small firms or firms that are unlisted for several reasons: (i) small firms tend to face more severe adverse selection problems than large firms; (ii) small firms have limited access to capital markets forcing them to use their retained earnings first and then obtain private finance from banks if necessary; and (iii) managers and shareholders have the motivation to retain control of firms leading them to be reluctant to issue equity.

Profitability

Profitability (*PROF*) is defined as the proportion of operating income to total assets. Firms with high profitability are expected to be less reliant on external finance leading to an expected negative relationship between profitability and financing deficit giving support to the pecking order hypothesis. On the other hand, the relationship between profitability and net debt issues is not as conclusive. The trade-off theory predicts that highly profitable firms should use more debt in order to take the advantage of tax shields. In addition, bankruptcy costs increase when earnings decline; therefore, less profitable firms should have lower levels of debt. Because highly profitable firms have lower risks of bankruptcy, they have higher debt capacities. Moreover, large amounts of free cash flow lead to agency costs of equity. Therefore, firms should issue more debt as a disciplinary device to diminish free cash flow problems by preventing managers from using free cash flow for their own benefit. Besides, less profitable firms provide low shareholder returns. The increase in debt for these firms would result in higher levels of bankruptcy risk and costs of borrowing which in turn will lower shareholder returns even more. Therefore, less profitable firms will try to avoid using external finance, especially debt financing.

However, most empirical studies have found profitability to be negatively related to debt, which is consistent with the pecking order theory. Larger earnings lead to an increase in the use of internal sources of finance to cover financing deficits. Because retained earnings do not produce information asymmetry, firms can use retained earnings promptly to finance their investments. However, Fama and French (2002) point out that the negative relationship found between profitability and debt must be interpreted with cautions when testing the pecking order theory because the pecking order theory is not the only explanation for such a relationship. First, profitability can be used as a signal for growth opportunity in which agency theory also predicts a negative relationship. Second, firms may face fixed costs of adjustment that lead firms to use profits in paying off debt resulting in a negative relationship even when the trade-off theory is in place.

Firm Age

Firm age (*AGE*) is defined as the natural logarithm of the number of years from when firms were listed on the national stock market. Firm age is expected to be negatively related to financing deficit because young firms need more external funds to help them set up at the early stage of the business and they also have high growth opportunities and lower internally generated funds. A positive relationship is expected between firm age and net debt issues because young firms are not normally well known, have lower tangibility and have less access to debt markets. Older firms have a higher reputation or are safer so they should be able to borrow more. Therefore, young firms might rely more on equity issuance than debt issuance at the early stages of business because they have high growth but lower internally generated funds with limited debt capacity compared with older firms.

The Level of Asymmetric Information

The level of asymmetric information (*BIG4*) is measured by the use of Big 4 auditors.[122] The value equals 1 when the auditors of firms are Big 4 and 0 otherwise. When Big 4 auditors are involved, the level of asymmetric information is reduced. Therefore, firms can make more use of external finance leading to a positive relationship between BIG4 and financing deficit. When the level of asymmetric information is low, the adverse selection cost is low. Firms find it cheaper to deviate from the pecking order when adverse selection cost is low because they expect the cost to be higher in the future. Fan and Wong (2005) suggest that controlling owners try to employ reputable, independent auditors from big audit firms in order to signal to the market that their financial statements provide reliable information. They also find that the employment of good quality auditors is positively related to entrenchment problems and is negatively related to lower discounts in share prices. Therefore, the use of good quality auditors leads to lower levels of asymmetric information. According to the pecking order hypothesis, when asymmetric information levels are high, firms prefer less risky finance such as debt to riskier sources such as equity, leading to the prediction of a negative relationship between BIG4 and net debt issues.

Management Team Involvement

Management team involvement (*PMGMT*) is measured by the ratio of the number of management team members from the same family to the total number in the management team.[123] If PMGMT is high, it is expected that internal funds should be used before external finance to avoid control dilution and to keep the control of firms amongst themselves. Therefore, a negative relationship between management team involvement and financing deficit is expected. A positive relationship with net debt

[122] Due to the lack of historical information, the most up-to-date information from Extel is used. The estimation is based on the assumption that firms do not change their auditors over the past 10 years.
[123] Similar to BIG4, PMGMT is obtained from Extel using the most up-to-date data for each firm.

issues is expected because firms would try to use little equity to avoid facing control dilution problems.

Adverse Selection Cost

Adverse selection cost should not be left out of the test of the pecking order theory because it is the main factor that distinguishes the pecking order theory from other capital structure theories. Autore and Kovacs (2005) argue that previous empirical studies fail to find evidence in favour of the pecking order theory because their tests fail to account for time-varying adverse selection cost. In the multi-period pecking order theory by Viswanath (1993), equity can be an optimal choice for firms even when debt capacity and internal cash flow is sufficient. Therefore, it is important to include the level of adverse selection cost in the model. Autore and Kovacs (2005) suggest that it is preferable if the proxy for adverse selection cost can reflect dispersion of opinion among investors because it is the best approximation of the market's reaction to an equity issuance. Due to data unavailability, adverse selection cost is measured as the standard deviation of the error term from a market model in which daily returns are regressed in a given period (*SIGMA*). This measure can be used to capture risk and cash flow volatility.[124] The multi-period pecking order theory predicts that firms rely more on external finance when adverse selection cost is low leading to the prediction of a negative relationship between adverse selection cost and financing deficit. On the other hand, when external finance is required, the multi-period pecking order theory predicts that firms rely more on equity when adverse selection cost is low leading to the prediction of a positive relationship between adverse selection cost and net debt issues. Firms issue equity when adverse selection cost is low to ensure financing for future

[124] SIGMA is also used by Autore and Kovacs (2005) as a proxy for volatility. They argue that the best proxy for adverse selection cost is the dispersion of investor belief. They use dispersion in analysts' earnings forecasts as a proxy for adverse selection cost. However, previous studies have identified several proxies to measure adverse selection costs such as residual standard deviation and trading volume. However, these alternative measures are noisier estimates of dispersion of investors' opinion.

projects that become available when adverse selection cost is expected to be higher in the future (Autore and Kovacs, 2005).

Trading Activity

Trading activity (*TURN*) is defined as the average ratio of daily trading volume to daily number of shares. High turnover reflects the capacity of external finance. Therefore, the relationship between trading activity and financing deficit is expected to be positive. Firms should also have easier access to equity markets when trading activity is high leading to the prediction of a negative relationship between trading activity and net debt issues.

5.4.3 Country-Specific Variables

Table 5.3 summarizes the major aspects of economic condition, corporate governance and financial institution of the sample countries and also presents the definitions and sources of these country-specific variables.[125]

Table 5.3 : Indicators of country-specific variables

Variables		Thailand	Malaysia	Singapore	Australia	Definition	Source
Economic Development	EDEV	1	1	0	0	See Table 2.2	Fan et al. (2004)
Legal Enforcement							
Law and Order	LAW	4.31	3.69	5.19	6	See Table 2.4	Demirguc-Kunt and Maksimovic (2002)
Efficiency of Judicial System	EFF	3.25	9	10	10	See Table 2.4	La Porta et al. (1998)
Rule of Law	RULE	6.25	6.78	8.57	10	See Table 2.4	La Porta et al. (1998)
Corruption	CORR1	5.18	7.38	8.22	8.52	See Table 2.4	La Porta et al. (1998)
	CORR2	6.95	4.9	0.87	1.45	See Table 2.4	Fan et al. (2004)
Risk of Expropriation	EXP	7.42	7.95	9.3	9.27	See Table 2.4	La Porta et al. (1998)
Legal Protection							
Creditor Rights	CRR	3	4	4	1	See Table 2.5	La Porta et al. (1998)
Shareholder Rights	SHR	2	4	4	4	See Table 2.5	La Porta et al. (1998)
Ownership Concentration	OWN	0.47	0.54	0.49	0.28	See Table 2.8	La Porta et al. (1998)
Accounting and Asymmetric							
Big-5 Auditors' Market Share	AUD	0.58	0.66	0.99	0.89	See Table 2.7	Fan et al. (2004)
Rating on Accounting Standard	ACC	64	76	78	75	See Table 2.8	La Porta et al. (1998)
Analyst Activity	ANA	13.34	23.55	22.05	13.61	See Table 2.7	Fan et al. (2004)

[125] It should be noted that the country-specific factors are not time-varying. They are indicators calculated or collected by previous empirical studies and other organizations as averages of particular periods in those studies. Therefore, we might not be able to detect some of the time-varying effects due to this limitation. As suggested by Demirguc-Kunt and Maksimovic (1999), significant changes in a country's legal system are infrequent, and indicators of the institutional environment, such as creditor rights and shareholder rights, are relatively stable over time. However, it should be noted that these country-specific factors may be affected by the effect of the crisis. Due to data unavailability, no time-varying data can be applied; therefore, cautions must be made when interpreting the results.

Economic Development

Economic development (*EDEV*) is a 0-1 dummy and equals 1 when the country is classified as developing and 0 otherwise, according to the World Bank classification. Firms in developed countries are expected to have higher growth opportunities leading to more need for external finance. Also, when there is a choice among sources of external finance, firms in developed countries would be able to issue more equity than firms in developing countries.

Legal Enforcement

There are five measures of legal enforcement included in the analysis: (i) law and order (*LAW*), (ii) efficiency of judicial system (*EFF*), (iii) rule of law (*RULE*), (iv) corruption (*CORR1, CORR2*) and (v) risk of expropriation (*EXP*). These factors measure how strong, sound or efficient legal enforcement is in each country. The higher scores indicate sound and efficient systems, lower risk and lower corruption for all measures except CORR2 where a large value means more severe corruption. Out of these five measures, Thailand is at the bottom and Australia appears to be at the top. Firms in countries with sound and efficient systems such as Australia should have higher need of external finance or they should have higher capacities to get external finance because investors and lenders are more protected by efficient legal systems. It is also expected that firms in countries with high legal enforcement scores would be able to issue more equity than debt when there is a need for external finance, leading to a prediction of a negative relationship between the legal enforcement variable and net debt issues.

Legal Protection

There are two legal protection measures, creditor rights (*CRR*) and shareholder rights (*SHR*). Among the sample countries, Australia has the lowest creditor rights score while Thailand has the lowest shareholder rights score. Because SHR is quite similar among the sample countries, a clear pattern in terms of shareholder rights might not be detected. When considering the choice of debt or equity for external finance, it is expected that firms in countries with higher CRR have higher debt capacity while firms in countries with higher SHR have higher equity.

Ownership Structure

The ownership by the three largest shareholders of the ten largest non-financial domestic firms collected by La Porta et al. (1998) is used as a proxy for ownership structure (*OWN*). The ownership structure for firms in our sample countries appears to be highly concentrated except for Australian firms. The ownership concentration is expected to be negatively related to financing deficits. It is expected that firms in countries that have highly concentrated ownership will prefer to use internal finance to avoid control dilution. When there is a choice between debt and equity, firms with highly concentrated ownership structures are expected to issue more debt to avoid control dilution from issuing equity, leading to a predicted positive relationship between OWN and net debt issues. In addition, concentration of ownership comes with a cost of agency problems. Concentrated control allows controlling shareholders to engage in self-dealing activities for their own benefits. Investors anticipate these problems; therefore, they discount firms' share price. Due to the above reasons, firms with high ownership concentrations are expected to move closer to the prediction of the pecking order theory.

Accounting and Asymmetric Information

One of the measures in this category is Big-5 auditors' market share (*AUD*) which is the share of assets of listed firms audited by Big-5 auditors. The sample countries vary in terms of this measure. Firms in Singapore and Australia have the highest involvement of good quality auditors. AUD is expected to be positively related to financing deficit because once there is high involvement of auditors, levels of asymmetric information and adverse selection costs should be lower. In addition, the multi-period pecking order theory implies that firms in markets that are characterized by a strong audit function should have lower debt issues. Once the level of adverse selection cost is low, firms prefer to go for riskier types of finance because they expect the adverse selection costs to be higher in the future.

Another measure in this category is rating on accounting standards (*ACC*). Thailand is found to have the lowest accounting standards and Singapore is at the top of the list. The fewer important items included in the annual report, the higher asymmetric information and adverse selection costs leading firms in countries with low ratings to rely more on internal finance, and if firms have to choose between types of external finance, debt should be preferred to equity. The last measure in this category is analyst activity (*ANA*) which is the average number of analysts per firm. Among the sample countries, Malaysian firms appear to have the highest number of analysts while Thai firms have the lowest. Firms in countries that have higher average numbers of analysts are expected to have higher information asymmetries and adverse selection costs because of higher dispersion of opinion, leading to a negative relationship with financing deficits.

5.5 Data, Descriptive Statistics and Correlation Analysis

5.5.1 Data

Financial variables were obtained from Worldscope and Extel, via Thompson Research, and Datastream. The sample covers the period of 1993 to 2001. Due to the financial crisis in 1997, the full sample will be divided into sub-samples where the pre-crisis period covers the period of 1993 to 1996 and the post-crisis period covers the period of 1998 to 2001. In addition, following the standard practice in capital structure studies, financial firms are excluded from the sample. Variables are scaled by total assets. Missing values require careful treatment especially for cash flow data. Therefore, it is ensured that all records add-up so that the missing values do not mean 'unaccounted for'. In some cases, the data were aggregated into some other items when they were imported into the database. Or sometimes when firms did not report a particular item, the data was coded as missing from the database. Similar to Frank and Goyal (2003), the accounting identities and missing values on these items are determined as zero where appropriate. A large number of observations were lost due to the use of cash flow variables. Shyam-Sunder and Myers (1999) and Frank and Goyal (2003) test the pecking order theory based on several restrictions. One of these is the requirement that firms report continuously on the relevant variables. Although they do find significant differences between a sample of firms with gaps permitted and a sample of firms without gaps permitted, this restriction cannot be put on the tests in this chapter due to the size of the sample countries and the number of firms in each country. Therefore when comparing the results from this chapter with results from previous studies, the comparisons should be made only for the set of the sample with gaps permitted.

5.5.2 Descriptive Statistics and Correlation Analysis

Table 5.4 presents cash flows in an aggregated form. There is a substantial variation in the financing sources variables (net debt issue, net equity issue and financing deficit). This table shows that there are variations in the movement of financing deficit in this region depending on economic conditions and economic development. For crisis-affected countries, financing deficit and external finance reduce over time especially after the crisis but the opposite is found for Australian firms.

Table 5.4 : Average cash flow and financing as a fraction of total assets

Panel A : Thailand

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of Obervations	122	140	152	167	186	180	174	229	228
Cash Dividends	0.0378	0.0341	0.0276	0.0234	0.0202	0.0101	0.0137	0.0170	0.0221
Net Investments	0.1626	0.1471	0.1420	0.1238	0.1067	0.0518	0.0541	0.0524	0.0601
ΔWorking Capital	-0.0255	-0.0295	-0.0352	-0.0138	-0.0132	0.0353	0.0271	0.0020	0.0202
Internal Cash Flow	0.0342	0.0137	0.0400	0.0541	0.0828	0.1005	0.0871	0.0711	0.1007
Financing Deficit	0.1407	0.1379	0.0944	0.0793	0.0308	-0.0032	0.0078	0.0003	0.0017
Net Debt Issues	0.0220	0.0325	0.0566	0.0303	0.0142	-0.0280	-0.0239	-0.0206	-0.0130
Net Equity Issues	0.1187	0.1055	0.0377	0.0490	0.0166	0.0248	0.0317	0.0209	0.0147
Net External Finance	0.1407	0.1379	0.0944	0.0793	0.0308	-0.0032	0.0078	0.0003	0.0017
Net Debt Issues (median)	0.0000	0.0000	0.0158	0.0000	0.0000	-0.0039	-0.0017	-0.0011	-0.0014
Net Equity Issues (median)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Panel B : Malaysia

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of Obervations	26	146	216	253	282	287	306	471	561
Cash Dividends	0.0254	0.0202	0.0175	0.0167	0.0144	0.0138	0.0124	0.0139	0.0125
Net Investments	0.0941	0.1292	0.1152	0.1351	0.1183	0.0802	0.0413	0.0647	0.0528
ΔWorking Capital	-0.0098	-0.0050	-0.0202	-0.0050	-0.0264	-0.0129	0.0109	-0.0003	0.0038
Internal Cash Flow	0.0577	0.0619	0.0315	0.0149	0.0106	0.0528	0.0549	0.0336	0.0474
Financing Deficit	0.0520	0.0825	0.0810	0.1319	0.0957	0.0283	0.0097	0.0447	0.0217
Net Debt Issues	-0.0036	0.0296	0.0118	0.0435	0.0278	0.0112	-0.0078	-0.0045	-0.0087
Net Equity Issues	0.0555	0.0528	0.0693	0.0883	0.0679	0.0171	0.0175	0.0492	0.0304
Net External Finance	0.0520	0.0825	0.0810	0.1319	0.0957	0.0283	0.0097	0.0447	0.0217
Net Debt Issues (median)	0.0000	0.0000	0.0000	0.0000	0.0005	0.0000	-0.0016	-0.0009	-0.0019
Net Equity Issues (median)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Panel C : Singapore

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of Obervations	13	62	104	126	141	147	165	276	314
Cash Dividends	0.0144	0.0131	0.0131	0.0119	0.0103	0.0113	0.0116	0.0107	0.0122
Net Investments	0.1633	0.1363	0.1313	0.1256	0.1245	0.0842	0.0624	0.0949	0.0807
ΔWorking Capital	0.0410	0.0101	-0.0053	-0.0010	-0.0100	0.0053	0.0111	0.0056	-0.0007
Internal Cash Flow	0.1051	0.0197	0.0196	0.0464	0.0398	0.0595	0.0266	-0.0455	0.0353
Financing Deficit	0.1136	0.1399	0.1195	0.0901	0.0850	0.0413	0.0585	0.1567	0.0570
Net Debt Issues	0.0345	0.0054	0.0383	0.0351	0.0357	-0.0038	-0.0157	-0.0052	0.0005
Net Equity Issues	0.0791	0.1344	0.0812	0.0550	0.0493	0.0451	0.0742	0.1619	0.0565
Net External Finance	0.1136	0.1399	0.1195	0.0901	0.0850	0.0413	0.0585	0.1567	0.0570
Net Debt Issues (median)	0.0000	0.0000	0.0042	0.0056	0.0011	-0.0007	-0.0014	-0.0007	-0.0013
Net Equity Issues (median)	0.0025	0.0075	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000

Panel D : Australia

Year	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of Obervations	8	86	113	132	156	174	223	378	390
Cash Dividends	0.0343	0.0248	0.0249	0.0274	0.0327	0.0278	0.0276	0.0245	0.0259
Net Investments	0.0460	0.1038	0.1564	0.1408	0.1336	0.1258	0.1161	0.1437	0.1369
ΔWorking Capital	0.0261	0.0015	0.0004	-0.0041	-0.0012	0.0031	-0.0038	-0.0017	-0.0035
Internal Cash Flow	0.0145	0.0042	0.0427	0.0521	0.0167	0.0216	-0.0611	-0.2097	-0.1189
Financing Deficit	0.0919	0.1259	0.1391	0.1119	0.1484	0.1352	0.2011	0.3762	0.2782
Net Debt Issues	0.0109	-0.0488	0.0168	0.0018	0.0032	0.0022	0.0031	-0.0126	0.0071
Net Equity Issues	0.0810	0.1747	0.1223	0.1101	0.1452	0.1330	0.1980	0.3888	0.2711
Net External Finance	0.0919	0.1259	0.1391	0.1119	0.1484	0.1352	0.2011	0.3762	0.2782
Net Debt Issues (median)	0.0000	-0.0043	0.0000	0.0089	0.0000	0.0000	0.0000	0.0000	0.0000
Net Equity Issues (median)	0.0000	0.0037	0.0015	0.0017	0.0039	0.0056	0.0041	0.0378	0.0090

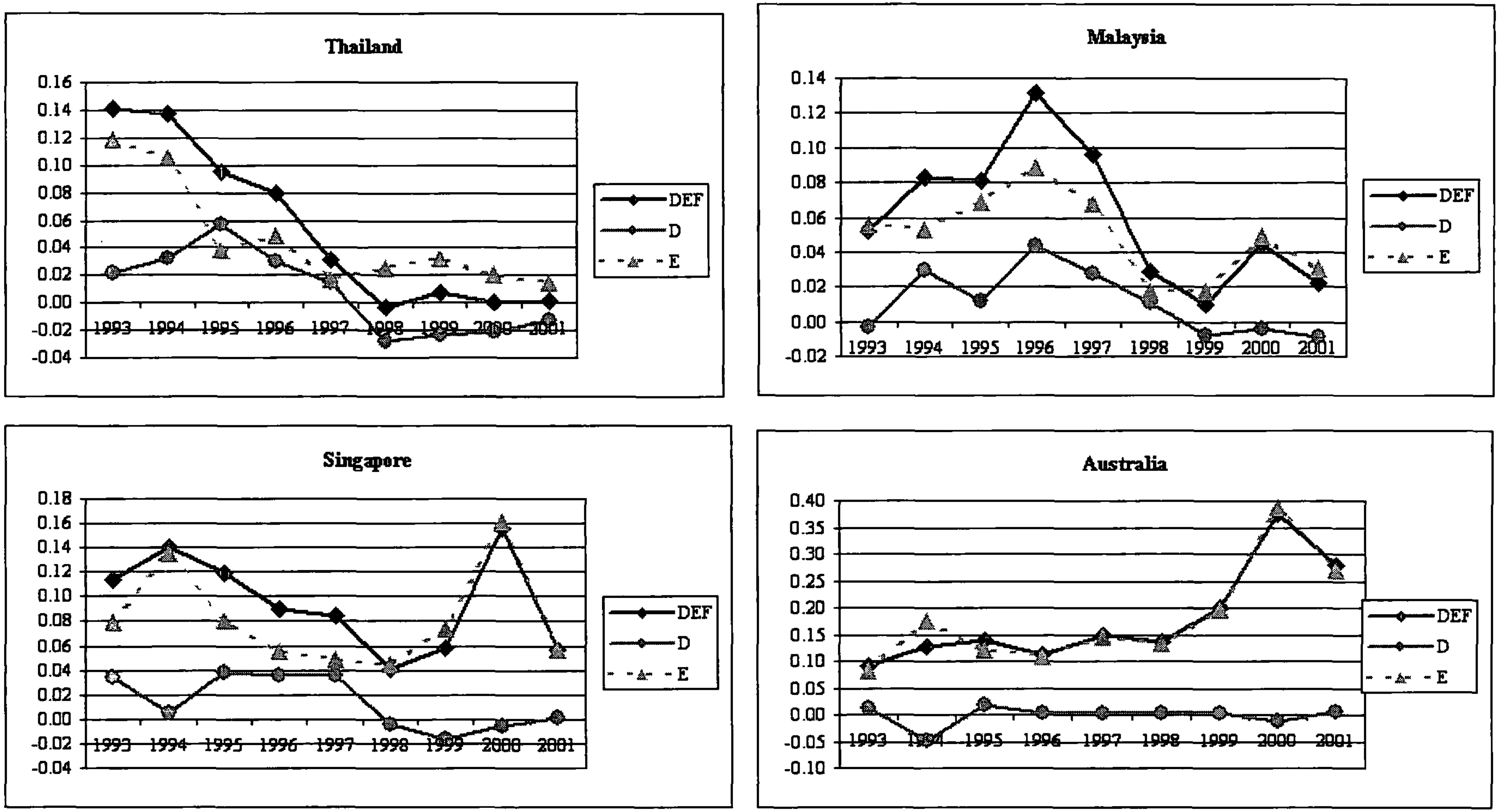
Net equity issues reduce at a slower rate than net debt issues for firms in all sample countries except in Australia where net equity issues increase over time. The number of public firms also grows a little over the sample period.[126] There is a big gap between mean and median of net debt issues and net equity issues. The median of both net debt issues and net equity issues are very close to zero while their means are larger

[126] Frank and Goyal (2003) look into the IPO effect by removing the data for each firm for the first year that it appeared in their database. However, the results do not show a major effect.

suggesting that many firms remain out of debt and equity markets most of the time and enter these markets only occasionally. In general, external financing of firms in this region takes the form of equity more often than debt. Equity plays an important role in financing the deficit which on the surface contradicts the pecking order argument that debt financing should be used as the first resort of external finance.

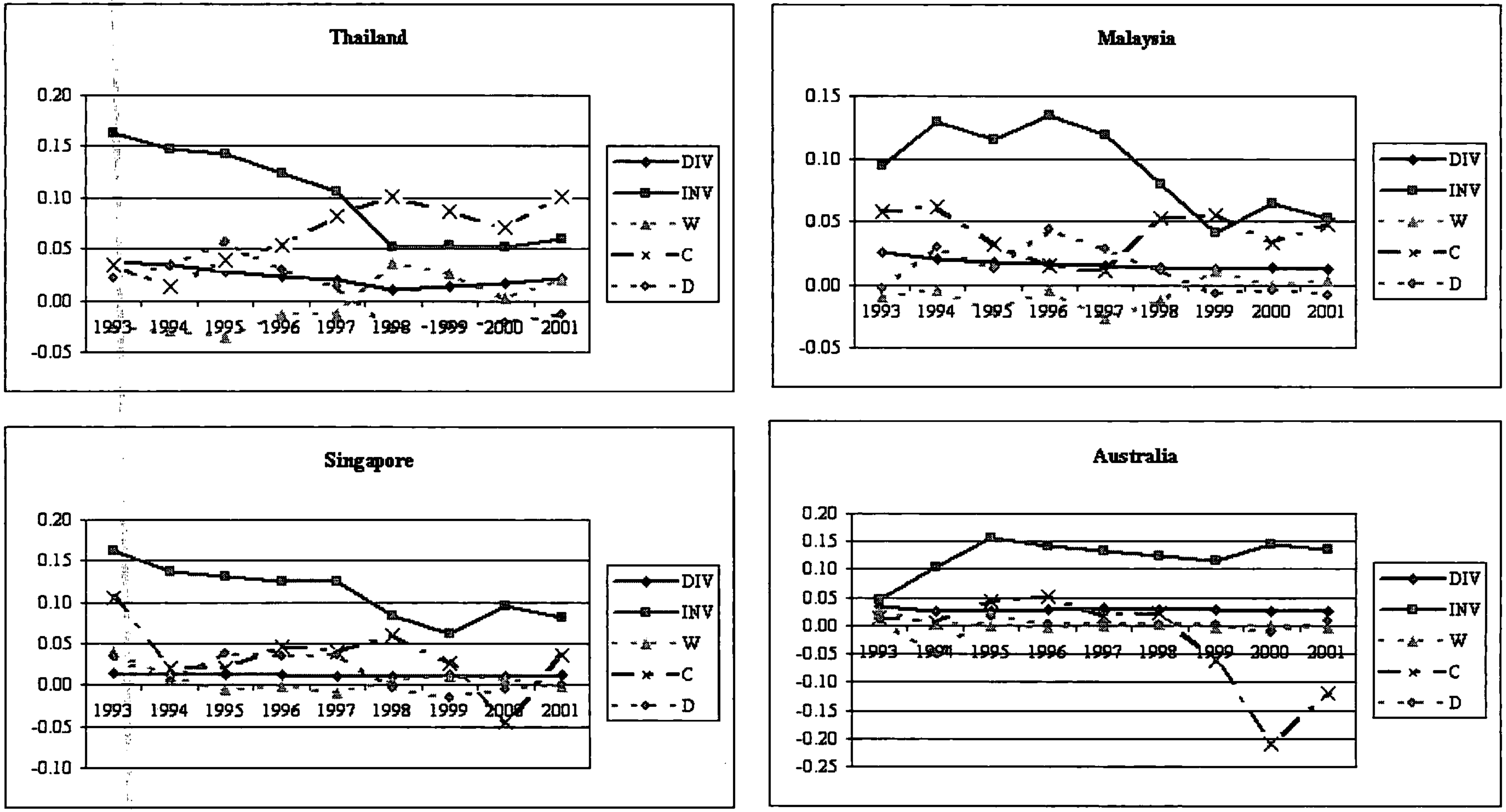
Figure 5.1 shows the changes in roles of net debt issues and net equity issues relative to financing deficits over total assets for the period of 1993 to 2001. Net equity issues track more closely to financing deficits than net debt issues do especially in Australia where net equity issues track financing deficit nearly perfectly which is in contrast to the predictions of the pecking order theory. This is consistent with the fact that firms in this region are young and most of them started in the early 1990s; therefore, they need to use equity issues as their main financing. A one-to-one relationship between net debt issue and financing deficit is not found because there might be some firms that are restricted by some factors and thus cannot follow the pecking order theory strictly and because firms may issue both debt and equity at the same time. In addition, the figure shows some effects of the financial crisis in that firms, in countries most affected by the crisis, use less external finance in the late 1990s. After the crisis, firms tend to use debt reduction instead of net debt issues. These factors necessitate further investigation of the effects of the financial crisis. Although we would expect to see equity issues reduced due to the effect of the financial crisis, the figures still show that firms are still able to issue equity and the level of equity issues depends on the level of financing deficit. Figure 5.2 shows the changes in roles of the components of financing deficits relative to net debt issues over total assets for the period 1993 to 2001. The figure shows that investment tracks closest to the use of debt in terms of direction. Cash dividend is quite stable for all sample countries suggesting that firms do not change their dividends to match their financing need for investments.

Figure 5.1 : Average financing deficit to net assets, net debt issued to net assets, and net equity issued to net assets



The financing deficit (DEF) is calculated as cash dividends plus investments plus change in working capital minus internal cash flow. Net debt issued (D) is long-term debt issuance minus long-term debt redemption. Net equity issued (E) is the issue of stock minus the repurchase of stock. The variables are constructed using data from cash flow statements via Worldscope, Thompson Research. The definitions are summarized in Table 5.2.

Figure 5.2 : Average dividend to net assets, net investment to net assets, changes in working capital to net assets, cash flow to net assets, and net debt issues



DIV is cash dividend. INV is net investment. W is changes in working capital. C is cash flow. D is net debt issued. The variables are constructed using data from cash flow statements via Worldscope, Thompson Research.

Table 5.5 shows correlation matrix for variables used in this chapter. The correlation between net debt issues and other variables are quite consistent to the predictions of pecking order theory. Firms with high investment or high financing deficits have higher need for external finance. Smaller firms need more external finance. The correlations among explanatory variables are very small suggesting that multicollinearity is not a major issue here.

Table 5.5 : Correlation Matrix

Panel A : Thailand

	ΔD	ΔE	DIV	INV	ΔW	C	DEF	TANG	GROW	SIZE	PROF	AGE	BIG4	PMGMT	SIGMA	TURN
ΔD	1.000															
ΔE	-0.077	1.000														
DIV	0.053	0.037	1.000													
INV	0.415	0.288	0.154	1.000												
ΔW	0.131	0.087	-0.061	-0.201	1.000											
C	-0.160	-0.586	0.255	0.156	0.280	1.000										
DEF	0.531	0.804	0.063	0.492	0.152	-0.594	1.000									
TANG	-0.019	-0.048	-0.097	0.028	0.025	0.070	-0.052	1.000								
GROW	0.091	0.288	0.273	0.245	-0.043	-0.086	0.297	-0.148	1.000							
SIZE	0.003	-0.023	-0.079	0.042	0.005	0.035	-0.018	-0.170	0.110	1.000						
PROF	-0.035	-0.002	0.490	0.157	0.073	0.309	-0.023	-0.044	0.174	0.113	1.000					
AGE	-0.241	-0.154	-0.099	-0.285	0.168	0.149	-0.287	0.039	-0.321	-0.038	-0.027	1.000				
BIG4	0.083	0.082	-0.070	0.124	0.014	-0.028	0.122	0.063	0.067	0.244	-0.009	0.005	1.000			
PMGMT	-0.009	-0.050	-0.031	-0.014	0.008	0.037	-0.047	-0.027	-0.016	-0.076	-0.008	-0.085	-0.270	1.000		
SIGMA	-0.205	-0.050	-0.248	-0.270	0.138	-0.007	-0.168	0.067	-0.196	-0.110	-0.249	0.113	-0.034	0.054	1.000	
TURN	-0.003	0.214	-0.001	0.053	-0.020	-0.162	0.177	-0.194	0.218	0.013	-0.024	-0.036	0.017	0.012	0.023	1.000

Panel B : Malaysia

	ΔD	ΔE	DIV	INV	ΔW	C	DEF	TANG	GROW	SIZE	PROF	AGE	BIG4	PMGMT	SIGMA	TURN
ΔD	1.000															
ΔE	-0.058	1.000														
DIV	-0.018	-0.042	1.000													
INV	0.289	0.266	-0.019	1.000												
ΔW	0.025	0.128	0.007	-0.274	1.000											
C	-0.185	-0.618	0.187	0.291	0.152	1.000										
DEF	0.424	0.880	-0.046	0.379	0.128	-0.648	1.000									
TANG	0.037	-0.033	0.001	0.136	-0.003	0.123	-0.012	1.000								
GROW	-0.037	-0.003	0.101	0.009	0.029	0.058	-0.020	-0.049	1.000							
SIZE	0.039	-0.030	0.110	0.085	0.021	0.106	-0.008	-0.042	-0.249	1.000						
PROF	0.037	0.016	0.290	0.125	0.098	0.163	0.032	-0.037	-0.120	0.281	1.000					
AGE	-0.062	-0.190	-0.037	-0.137	0.069	0.122	-0.201	-0.058	0.005	0.211	-0.153	1.000				
BIG4	-0.006	-0.030	0.127	0.020	0.043	0.085	-0.030	0.005	-0.044	0.186	0.130	0.103	1.000			
PMGMT	-0.011	0.036	-0.032	-0.013	0.003	-0.041	0.027	-0.032	0.024	-0.050	-0.073	-0.077	-0.055	1.000		
SIGMA	-0.036	0.040	-0.220	-0.050	-0.025	-0.106	0.019	-0.013	-0.002	-0.320	-0.251	-0.177	-0.120	0.033	1.000	
TURN	0.015	0.118	-0.055	0.041	-0.009	-0.095	0.114	-0.020	0.173	-0.150	0.010	-0.201	-0.058	0.020	0.152	1.000

Panel C : Singapore

	ΔD	ΔE	DIV	INV	ΔW	C	DEF	TANG	GROW	SIZE	PROF	AGE	BIG4	PMGMT	SIGMA	TURN
ΔD	1.000															
ΔE	-0.128	1.000														
DIV	0.000	-0.077	1.000													
INV	0.379	0.220	0.036	1.000												
ΔW	0.014	0.170	0.024	-0.129	1.000											
C	-0.047	-0.810	0.189	0.177	0.051	1.000										
DEF	0.260	0.924	-0.075	0.360	0.172	-0.807	1.000									
TANG	0.079	-0.157	-0.085	0.161	0.001	0.220	-0.122	1.000								
GROW	-0.069	0.195	0.242	0.076	0.085	-0.082	0.162	-0.124	1.000							
SIZE	0.049	-0.212	0.209	-0.028	0.011	0.203	-0.187	-0.102	0.032	1.000						
PROF	0.059	-0.016	0.340	0.116	0.001	0.089	0.007	-0.035	0.215	0.296	1.000					
AGE	-0.028	-0.294	0.016	-0.128	0.051	0.255	-0.295	0.121	-0.189	0.275	-0.112	1.000				
BIG4	0.035	0.021	0.058	0.067	0.006	0.011	0.034	0.013	0.101	0.155	0.063	-0.014	1.000			
PMGMT	0.036	-0.010	-0.063	0.012	-0.038	-0.014	0.004	0.021	0.027	-0.110	-0.038	-0.059	-0.011	1.000		
SIGMA	-0.114	0.083	-0.211	-0.075	-0.020	-0.107	0.037	-0.014	-0.167	-0.363	-0.275	-0.216	-0.068	0.075	1.000	
TURN	-0.023	0.237	-0.056	0.082	-0.050	-0.207	0.221	-0.048	0.225	-0.114	-0.021	-0.174	-0.015	-0.052	0.127	1.000

Panel D : Australia

	ΔD	ΔE	DIV	INV	ΔW	C	DEF	TANG	GROW	SIZE	PROF	AGE	BIG4	PMGMT	SIGMA	TURN
ΔD	1.000															
ΔE	-0.158	1.000														
DIV	0.008	-0.067	1.000													
INV	0.252	0.241	-0.028	1.000												
ΔW	0.037	-0.028	-0.036	-0.030	1.000											
C	-0.086	-0.898	0.181	0.031	0.101	1.000										
DEF	0.178	0.944	-0.064	0.325	-0.016	-0.923	1.000									
TANG	0.074	-0.164	-0.019	0.128	0.016	0.193	-0.139	1.000								
GROW	0.028	0.134	0.188	0.088	-0.030	-0.094	0.144	-0.126	1.000							
SIZE	-0.014	-0.433	0.130	-0.099	0.053	0.431	-0.433	0.200	-0.152	1.000						
PROF	0.061	-0.362	0.268	-0.012	0.146	0.397	-0.340	0.100	0.024	0.382	1.000					
AGE	0.030	-0.318	-0.015	-0.138	-0.004	0.265	-0.308	0.232	-0.174	0.323	0.090	1.000				
BIG4	-0.006	-0.226	0.099	-0.009	0.006	0.243	-0.225	0.084	0.017	0.395	0.226	0.197	1.000			
PMGMT	0.001	-0.059	0.178	-0.027	-0.010	0.071	-0.058	0.007	-0.008	0.036	0.111	-0.070	-0.125	1.000		
SIGMA	-0.041	0.370	-0.216	-0.008	-0.003	-0.403	0.357	-0.123	0.070	-0.594	-0.490	-0.192	-0.390	-0.086	1.000	
TURN	0.002	0.156	-0.020	0.036	-0.002	-0.154	0.157	-0.046	0.156	-0.082	-0.062	-0.117	0.014	-0.044	0.091	1.000

See Table 5.2 and Section 5.3 for the definition of variables

5.6 Empirical Results

Three regression methodologies are explored to test the predictions of the pecking order theory: (i) linear, (ii) predictive logistic and (iii) non-linear quantile. Within linear analysis, the focus is firstly on the firm-specific effects of internal versus external financing where financing deficit is regressed on firm-specific variables. Second, the focus is moved to the investigation of disaggregation of financing deficits. Third, firm-specific effects on the choice between debt and equity issues are examined. In this investigation, different models are explored including, basic net debt issue with and without second-order terms of financing deficit, basic net equity issue, and the conventional model with and without first- and second-order terms of financing deficit. Fourth, country-specific factors are introduced with similar regression models as in firm-specific effects. Within predictive logistic regressions, two forms of the deviation from the pecking order theory are tested, mild and strong deviations. Within non-linear quantile regressions, different deciles of financing deficit and financing surplus are analysed separately.

5.6.1 Linear Regressions

5.6.1.1 Internal versus External Financing

The results of equation (5.1) are reported in Table 5.6 for the full sample and sub-samples. The relationship between ***tangibility*** and financing deficit is significant only in Thailand. Support for the pecking order theory is found only for Thai firms but the significance reduces after the crisis. In most cases, the results show that tangibility does not have any significant effect on the choice between internal and external finance.

Table 5.6 : Panel analysis of internal versus external financing decisions

Equation	Thailand			Malaysia			Singapore			Australia		
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	0.1322 **	0.1039	0.0309	0.1756 ***	0.2455 **	0.0708 *	0.4167 ***	0.0686	0.5318 ***	0.7964 ***	0.8212 ***	0.8625 ***
t-statistics	(2.3000)	(0.8040)	(0.4170)	(4.5800)	(2.1100)	(1.7300)	(4.1700)	(0.4680)	(4.4200)	(6.6600)	(5.2100)	(6.2900)
TANG	0.0374 *	0.0872 **	0.0441	-0.0094	0.0315	0.0027	-0.0496	0.0878	-0.0665	-0.0374	-0.0312	-0.0610
t-statistics	(1.8200)	(2.4900)	(1.5800)	(-0.5530)	(0.6570)	(0.1650)	(-1.3100)	(1.5900)	(-1.6100)	(-0.6660)	(-0.2720)	(-0.8820)
Wald Test			<2.3905>			<0.0272>			<2.5803>			<0.7784>
GROW	0.0246 ***	0.0285 ***	0.0123	-0.0083 ***	-0.0109 **	0.0008	0.0224	0.0005	0.0478	-0.0003	0.0137	-0.0024
t-statistics	(3.4600)	(2.8200)	(1.5900)	(-3.0600)	(-2.2200)	(0.2770)	(1.1700)	(0.0496)	(1.6100)	(-0.0649)	(0.5810)	(-0.4570)
Wald Test			<4.3883> **			<16.2198> ***			<2.5801>			<0.2093>
SIZE	-0.0025	0.0010	-0.0036	0.0018	-0.0020	0.0017	-0.0202 ***	0.0064	-0.0323 ***	-0.0411 ***	-0.0362 ***	-0.0437 ***
t-statistics	(-0.7510)	(0.1380)	(-0.7740)	(0.8330)	(-0.3370)	(0.6660)	(-2.6000)	(0.6550)	(-3.4900)	(-6.1600)	(-3.2400)	(-5.4400)
Wald Test			<0.5995>			<0.4440>			<12.1744> ***			<0.8532>
PROF	-0.1455 ***	-0.3931 ***	-0.1168 **	-0.0427	-0.3028 **	0.0312	-0.0652	-0.1686	-0.0573	-0.2423 **	-0.0203	-0.2435 *
t-statistics	(-2.7000)	(-2.9100)	(-2.1500)	(-1.0600)	(-2.4200)	(0.8060)	(-0.5820)	(-0.9850)	(-0.4240)	(-2.1300)	(-0.0991)	(-1.9400)
Wald Test			<25.8306> ***			<74.2074> ***			<0.1795>			<3.7444> *
AGE	-0.0328 ***	-0.0478 ***	0.0012	-0.0358 ***	-0.0371 **	-0.0337 ***	-0.0451 ***	-0.0586 ***	-0.0405 ***	-0.0776 ***	-0.0227	-0.0903 ***
t-statistics	(-2.9300)	(-2.6300)	(0.0631)	(-6.4100)	(-2.1900)	(-5.3200)	(-5.7000)	(-2.6400)	(-4.2600)	(-5.2200)	(-0.9010)	(-5.1300)
Wald Test			<6.2366> **			<0.2857>			<3.5900> *			<26.3198> ***
BIG4	0.0182 *	0.0102	0.0259 **	-0.0134	-0.0127	-0.0110	0.0079	0.0310	0.0023	-0.0270	-0.1830 *	-0.0067
t-statistics	(1.8500)	(0.5350)	(2.0600)	(-1.6100)	(-0.5610)	(-1.4200)	(0.5540)	(0.9360)	(0.1320)	(-0.6560)	(-1.8700)	(-0.1540)
Wald Test			<4.2344> **			<2.0082>			<0.0173>			<16.5558> ***
PMGMT	-0.0765 ***	-0.2088 ***	-0.0053	0.0298	0.0680	-0.0094	-0.0237	-0.1099	-0.0083	0.0164	-0.1486	0.0371
t-statistics	(-2.6100)	(-3.5700)	(-0.1880)	(0.7610)	(0.6560)	(-0.2430)	(-0.4210)	(-0.8970)	(-0.1090)	(0.1910)	(-1.1100)	(0.3560)
Wald Test			<51.6444> ***			<0.2857>			<0.0118>			<0.1269>
SIGMA	-0.3476 *	-0.6226	-0.2512	-0.1935	0.0871	-0.3791	-0.9136 **	-0.7196	-0.8823 *	0.1102	-3.4873 ***	0.4566
t-statistics	(-1.8200)	(-0.4770)	(-1.2200)	(-0.7460)	(0.0612)	(-1.3500)	(-2.0600)	(-0.2900)	(-1.6900)	(0.0895)	(-3.3200)	(0.3330)
Wald Test			<1.4817>			<1.8147>			<2.8714> *			<8.2540> ***
TURN	-0.0503	0.2468	-0.1732	1.1780 ***	0.8308 *	1.8593 **	3.1356 ***	1.4833	3.9864 ***	6.8341	-0.0828	8.8343
t-statistics	(-0.2060)	(0.3230)	(-1.1000)	(2.6600)	(1.7600)	(1.9900)	(3.7600)	(1.5000)	(2.6900)	(1.4700)	(-0.0190)	(1.4600)
Wald Test			<1.2041>			<2.0082>			<7.2491> ***			<2.1259>
Adj R^2	0.1525	0.1243	0.0251	0.0768	0.0428	0.0759	0.1789	0.0333	0.2479	0.2714	0.1045	0.2962
No. of obs.	885	315	461	2313	577	1476	1045	244	693	1361	288	940

$$DEF_{i,t} = \alpha + \sum_{k=1} \beta_k FS_{k,i,t} + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

The results show a mixed relationship between ***growth opportunity*** and financing deficit in that high values of market to book ratio are associated with more external funds only in Thailand. High growth firms have limited available internal funds; therefore, they will look for more funding leading to high financing deficits. However, growth opportunity does not seem to have any influence in Australia and Singapore. On the other hand, Malaysian firms with low growth prefer to use more external finance, in contrast to the pecking order theory. When considering sub-samples, growth opportunities do not appear to have any effect during the post-crisis period for all sample countries.

Consistent with Autore and Kovacs (2005), financing deficit is significantly affected by ***firm size***. Larger firms in developed countries such as Singapore and Australia use less external finance. Firm size seems to have no effect on the choice between internal and external finance in developing countries such as in Thailand and Malaysia. The results suggest two possible explanations: (i) firm size has no effect on the choice of internal versus external finance for firms in developing countries which does not support the pecking order hypothesis; and (ii) large firms in developing countries may not have higher internal finance than smaller firms. Therefore, support for the pecking order theory is not found for Thailand and Malaysia. Although not severely affected by the crisis, the crisis had significant effects on how firm size influenced the choice of internal versus external finance in Singapore. Before the crisis, as in Thailand and Malaysia, no significant relationship is found. However, the crisis led firms to be more concerned about future adverse selection costs. Therefore, large firms who have higher internal funds would prefer to use their internal funds first to reduce the risk. This leads to the negative and significant relationship found after the crisis.

The results also show that ***profitability*** can significantly affect the need for external finance. Highly profitable firms rely less on external finance as expected (although the coefficients are insignificant for Malaysia and Singapore). The effect of the crisis seems to vary depending on how severely the country was hit by the crisis. In Thailand and Malaysia where the crisis had the most influence, firms still prefer to use internal finance first when available. However, the impact of profitability is less after the crisis due to lower internal finance. The same tendency towards reduction in significance level after the crisis is also found in Singapore but the coefficients are insignificant. On the other hand, Australia was affected the least by the crisis and firms rely more on internal finance than external finance in the post-crisis period. In line with Autore and Kovacs (2005), ***firm age*** is one of the significant influences on financing deficit. The results show that older firms use less external finance, and this was particularly the case before the crisis, as predicted by the pecking order hypothesis, because older firms have been trading for a long time and have enough slack to finance their projects. However, the significance reduces after the crisis except in Australia where a higher negative relationship is found.

On the other hand, the relationship between BIG4 as a proxy for ***the level of asymmetric information*** and financing deficit is found to be significant only in Thailand.[127] The results suggest that firms with BIG4 auditors use more external finance because they have low levels of asymmetric information; thus, they can afford to go for riskier options than internal finance. The results also show that BIG4 auditors play a larger role in Thailand after the crisis. There is also a significant relationship found between ***management team involvements*** and financing deficit. The number of management team members from the same family has a strong and significant effect on

[127] The results might not show the significant relationship as expected because of the limitation in the data for this variable. Due to the lack of historical data, we have not managed to get the time-varying variations over the sample period.

the choice of external and internal financing in Thailand only.[128] Thai firms with high proportions of their management teams from the same family rely more on internal finance to avoid facing the dilution of existing shareholders. However, the relationship is not significant after the crisis. This might be because managers no longer have that much control over firms during the financial distress period and are forced to rely more on external finance. Consistent with Autore and Kovacs (2005), the results show a negative relationship between ***adverse selection cost*** and financing deficit. This is in line with the prediction by Viswanath (1993) that low adverse selection costs provide incentives for firms to issue risky security or rely more heavily on external finance. However, since the crisis adverse selection costs no longer influence the financing choices of Thai and Malaysian firms due to uncertainty rising from the crisis. The results also show that firms tend to rely more on external finance when ***trading activity*** is high. Trading activity also has higher impact for Malaysia and Singapore after the crisis.

In summary, there is evidence showing support to the pecking order hypothesis when considering the choice of internal and external finance for firms in the Asia Pacific region. Although not statistically significant for all sample countries, the results show that small firms, highly profitable firms, young firms, firms with high proportions of management in the same family, high adverse selection costs, and low trading activity prefer internal to external finance as suggested by the pecking order hypothesis. The results also reveal that the financial crisis has some significant effects on the choice of financing. The crisis led most of the factors to have less significant relationships especially in Thailand and Malaysia where the crisis originated.

[128] Similar to BIG4, the lack of historical data might lead to insignificant relationships in sample countries. We strongly believe that this variable is a value added factor that should not be omitted if proper data is obtained.

5.6.1.2 Debt versus Equity Issues for External Financing

5.6.1.2.1 Disaggregation of Financing Deficit

The results of equation (5.3) are reported in Table 5.7. The results for the full sample show support for the pecking order theory especially for Thailand and Malaysia where the coefficients of each component are higher than those in Singapore and Australia. The coefficients for each component have the predicted sign; however, they are not significantly close to 1 as predicted by the pecking order theory. The evidence seems to move towards support of the pecking order aggregation hypothesis after the crisis as all components are found to have more significant relationships with debt issues for the post-crisis period especially for crisis affected countries. In general, the coefficients of each component and the adjusted R^2 are higher than reported by Frank and Goyal (2003) for their sample when gaps are permitted.

The results for the full sample show a positive relationship between net debt issues and ***cash dividends*** implying that dividend-paying firms might issue debt in order to keep paying dividends. When considering sub-samples, dividend plays a greater role after the crisis. One of the explanations is that during and after the crisis period, the reduction of dividend to keep firms going might give negative signals to the market. Therefore, in order to retain the investors' confidence, firms prefer to borrow more debt to keep dividend payments stable rather than reducing dividends. The expected relationship is also found for ***investment***. Although the estimated coefficients are not close to 1 as predicted by the pecking order theory, they are the highest among the other components of financing deficit. Investment appears to have strong effects for both pre- and post-crisis periods for all sample countries. The effect also reduces after the crisis. This is because during and after the crisis, the investment opportunities are lower.

Table 5.7 : Panel analysis of disaggregation of financing deficit

Equation	Thailand Full Sample (1993 - 2001)	Thailand Pre-Crisis (1993 - 1996)	Thailand Post-Crisis (1998 - 2001)	Malaysia Full Sample (1993 - 2001)	Malaysia Pre-Crisis (1993 - 1996)	Malaysia Post-Crisis (1998 - 2001)	Singapore Full Sample (1993 - 2001)	Singapore Pre-Crisis (1993 - 1996)	Singapore Post-Crisis (1998 - 2001)	Australia Full Sample (1993 - 2001)	Australia Pre-Crisis (1993 - 1996)	Australia Post-Crisis (1998 - 2001)
Constant	-0.0117 *	-0.0052	-0.0347 ***	-0.0079	-0.0100	-0.0209 ***	0.0035	-0.0006	-0.0216 ***	-0.0436 **	-0.0892 **	-0.0211 *
t-statistics	(-1.6800)	(-0.4870)	(-5.0000)	(-1.3000)	(-1.0400)	(-3.8800)	(0.4390)	(-0.0658)	(-2.8300)	(-2.3200)	(-2.5700)	(-1.7600)
DIV	0.1690 ***	-0.1183	0.4880 ***	0.1504 **	-0.0456	0.2542 ***	0.0946	-0.0292	0.1106	0.0960	0.9561 **	-0.0097
t-statistics	(2.6200)	(-1.3100)	(4.4700)	(2.2800)	(-0.2150)	(3.1600)	(0.8330)	(-0.0933)	(0.8610)	(1.4800)	(2.1700)	(-0.1290)
Wald Test			<20.0208> ***			<9.9992> ***			<0.7406>			<163.6450> ***
I	0.4152 ***	0.3791 ***	0.5111 ***	0.2623 ***	0.2956 ***	0.3375 ***	0.2895 ***	0.2545 ***	0.2915 ***	0.2447 ***	0.2811 ***	0.2038 ***
t-statistics	(10.4000)	(7.9700)	(6.8800)	(7.2300)	(5.3800)	(5.7500)	(6.4300)	(4.1700)	(5.3600)	(5.5600)	(4.0000)	(3.7500)
Wald Test			<3.1545> *			<0.5108>			<0.4628>			<2.0249>
ΔW	0.3702 ***	0.2786 ***	0.5728 ***	0.1931 ***	0.1480 ***	0.3056 ***	0.0994	0.0958	0.0901	0.1938	-0.1794	0.2469
t-statistics	(7.7700)	(5.1400)	(7.4000)	(5.7900)	(3.4700)	(5.5000)	(1.6000)	(1.0900)	(0.9580)	(0.8530)	(-0.4420)	(0.9640)
Wald Test			<14.4603> ***			<8.0542> ***			<0.9180>			<0.9294>
C	-0.2187 ***	-0.0963 ***	-0.4101 ***	-0.1714 ***	-0.0707	-0.2624 ***	-0.0631 ***	-0.0660	-0.0511 ***	-0.0425 *	-0.1665	-0.0169
t-statistics	(-6.0000)	(-2.7400)	(-5.3000)	(-4.6700)	(-1.3000)	(-4.1100)	(-3.6500)	(-1.4600)	(-2.8700)	(-1.8600)	(-1.4700)	(-0.8950)
Wald Test			<16.4227> ***			<16.8886> ***			<8.2146> ***			<0.8007>
Adj R^2	0.3313	0.2501	0.3652	0.2013	0.1980	0.2511	0.1832	0.1776	0.1678	0.0748	0.1995	0.0500
No. of obs.	1578	581	811	2548	641	1625	1310	303	868	1660	339	1165

$$\Delta D_{i,t} = \alpha + \beta_{DIV} DIV_{i,t} + \beta_I I_{i,t} + \beta_W \Delta W_{i,t} - \beta_C C_{i,t} + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

The results show a positive relationship between ***changes in working capital*** and net debt issues as expected. The coefficient increases sharply after the crisis for crisis-affected or developing countries because firms have more working capital expenses during and after the crisis in order to recover from the crisis. The results show a significant and negative relationship between ***cash flow*** and net debt issues as expected for all sample countries. The coefficients increase substantially after the crisis for developing and crisis-affected countries while reducing substantially for developed countries.

In general, the results prove that the aggregation step is justified because all components of financing deficit are related to net debt issues with the predicted relationship at significance levels. The results show that firms in this region in general behave in the manner that the original pecking order theory predicts to some extent. In addition, the results reveal that the financial crisis and financial development are creating a tendency for firms to behave as predicted by the pecking order theory. The results broadly show evidence of more support to the pecking order hypothesis for firms in crisis-affected countries or developing countries but less support for less crisis-affected, or more developed economies. The results reveal the evidence against the trade-off theory such as the positive relationship between net debt issues and dividends and the negative relationship between net debt issues and cash flow. However, it has been noted that the trade-off theory also predicts the negative and positive relationships between financing deficit or external finance with cash flow and investment respectively. Therefore, it cannot be concluded for certain at this stage whether the data give more support to the trade-off theory or the pecking order theory. As each component is related to net debt issues in the predicted manner by the pecking order theory, the analysis can now move on to test the relationship between financing deficit and net debt issues in the next section.

5.6.1.2.2 Basic Net Debt Issues Model

The results of equation (5.4) are presented in Table 5.8. The results show that the relationship between financing deficits and debt issuance is far less than 1 leading to little support for the pecking order theory at this point. The coefficient of financing deficit is highest for Thailand and at the lowest for Australia. The coefficients are substantially lower than reported by Shyam-Sunder and Myers (1999). The model performs a lot better than that used by Frank and Goyal (2003) for their set of data where gaps is permitted for the period of 1990 to 1998 (their coefficient is 0.148 and their R^2 is 0.120).[129] One explanation is that Shyam-Sunder and Myers (1999) impose the criterion of continuous data while Frank and Goyal (2003) do not.[130] Due to data limitation, such restrictions cannot be imposed; therefore, sample firms are included even if only one year of data is available. The results reveal that the support for the pecking order theory is quite weak in the 1990s for firms in the Asia Pacific region. Financing hierarchy predicted by the pecking order offers a seemingly poor description of debt-equity choice of firms in this region especially for Australia where the relationship is nearly close to zero. The results also confirm the findings of Frank and Goyal (2003) that the original pecking order in Shyam-Sunder and Myers (1999) does not carry over to a broader sample of firms and to firms in other institutional environments.

[129] Adedeji (2002) finds the coefficient of financing deficit to be 0.222 for similar sample period while Shyam-Sunder and Myers (1999) report high coefficient of 0.75 for US firms during the period of 1971 to 1989. On the other hand, Halov and Heider (2005) report the coefficient of 0.865 for their lowest risk decile and conclude that pecking order theory works well in the lowest risk decile.

[130] Elliott et al. (2004) suggest that the differences in sample selection between that of Shyam-Sunder and Myers (1999) and that of Frank and Goyal (2003) are the main reason that leads to the different results.

5.6.1.2.3 Basic Net Equity Issues Model

The results for equation (5.5) are shown in Table 5.9. Financing deficit explains the large proportion of equity issues especially in Australia where the coefficient is nearly 1 which support the results from the net debt issue regression that firms in this region do not follow the pecking order hypothesis in the predicted manner. The estimated coefficients of the financing deficit from the net debt and the net equity regressions add up to 1 indicating no any cash-flow data are missing. The results for both net debt issues and net equity issues are specific to a particular time period; the support for the pecking order theory is stronger over time in that Thai and Malaysian firms behave more in accordance with the predictions of the pecking order theory after the crisis. The results are mainly driven by the effect of the financial crisis.

There is also a decrease in reliance on equity after the crisis for crisis-affected countries. This should be due to the fact that investors lost confidence in firms in these countries after the crisis; therefore, firms are less able to make equity issuance. On the other hand, firms relied more on debt issuing after the crisis, implying that it was easier for firms to issue debt than equity after the crisis. Banks, as main creditors of firms, allowed firms to continue issuing debt after the crisis. The result shows that the crisis had two opposite effects for severely affected countries. The crisis pulled firms to behave according to pecking order predictions. However, Singaporean firms behave differently from Thai and Malaysian firms because the economy in Singapore has recovered quickly. This fast recovery led Singaporean firms to behave more like firms in the unaffected and developed countries such as Australia.

Table 5.8 : Panel analysis of basic net debt issues model

$$\Delta D_{i,t} = \alpha + \beta_{i,t} DEF_{i,t} + \varepsilon_{i,t}$$

Equation	Thailand			Malaysia			Singapore			Australia		
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	0.0010	0.0091	-0.0252	0.0011	0.0073	-0.0167	0.0234	0.0097	-0.0061	-0.0210	-0.0599	-0.0038
t-statistics	(0.1680)	(1.2200)	(-3.9900)	(0.1760)	(0.8750)	(-2.8100)	(3.4300)	(1.3700)	(-0.8980)	(-1.1100)	(-1.5000)	(-0.3310)
DEF	0.2995 ***	0.2004 ***	0.4647 ***	0.1993 ***	0.1543 ***	0.2836 ***	0.1098 ***	0.1336 ***	0.0907 ***	0.0661 ***	0.1791 *	0.0351 **
t-statistics	(8.6300)	(5.8700)	(6.2600)	(6.3800)	(3.9000)	(4.9900)	(5.3700)	(3.4700)	(4.3200)	(3.3800)	(1.8900)	(2.3200)
Wald Test			<12.6538> ***			<5.1849> **			<4.1829> **			<90.3515> ***
Adj R^2	0.2892	0.1650	0.3410	0.1842	0.1372	0.2407	0.0975	0.1353	0.0611	0.0330	0.1497	0.0068
No. of obs.	1578	581	811	2548	641	1625	1310	303	868	1660	339	1165

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.9 : Panel analysis of basic net equity issues model

$$\Delta E_{i,t} = \alpha + \beta_{i,t} DEF_{i,t} + \varepsilon_{i,t}$$

Equation	Thailand			Malaysia			Singapore			Australia		
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	-0.0010	-0.0091	0.0252	-0.0011	-0.0073	0.0167	-0.0234	-0.0097	0.0061	0.0210	0.0599	0.0038
t-statistics	(-0.1680)	(-1.2200)	(3.9900)	(-0.1760)	(-0.8750)	(2.8100)	(-3.4300)	(-1.3700)	(0.8980)	(1.1100)	(1.5000)	(0.3310)
DEF	0.7005 ***	0.7996 ***	0.5353 ***	0.8007 ***	0.8457 ***	0.7164 ***	0.8902 ***	0.8664 ***	0.9093 ***	0.9339 ***	0.8209 ***	0.9649 ***
t-statistics	(20.2000)	(23.4000)	(7.2100)	(25.6000)	(21.4000)	(12.6000)	(43.5000)	(22.5000)	(43.3000)	(47.8000)	(8.6700)	(63.7000)
Wald Test			<12.6538> ***			<5.1849> **			<4.1829> **			<90.3515> ***
Adj R^2	0.6496	0.7592	0.4092	0.7751	0.8312	0.6816	0.8591	0.8323	0.8838	0.8904	0.7858	0.9135
No. of obs.	1578	581	811	2548	641	1625	1310	303	868	1660	339	1165

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

5.6.1.2.4 The Second-Order Term of Financing Deficit in Net Debt Issues Model

The results of equation (5.6) are reported in Table 5.10. The estimated coefficient of the second order term of financing deficit is negative and highly significant indicating strong support for the concavity hypothesis and the pecking order theory. Similar to findings in the previous section, the results show that firms in crisis affected countries or developing countries seem to move toward the pecking order hypothesis after the crisis. Consistent with Agca and Mozumdar (2004), the coefficient of financing deficit on the first-order term is moving closer to 1 and the adjusted R^2 becomes higher than the coefficients from basic net debt issue regression equation (5.4) from Table 5.8. The evidence therefore is stronger for the support of the pecking order theory when account is taken of the concavity in the debt-financing deficit relation.

Thailand is found to show the strongest trend toward the predictions of pecking order theory compared with other sample countries. This can be explained by the differences in corporate governance and level of market development across sample countries. Thailand has the weakest rule of law (as shown in Table 2.4). Consistent with Beck et al. (2002) and Khan (2003), firms in Thailand where legal and financial systems are weak and inefficient and level of market development is low will find it more difficult to obtain external finance. Therefore, Thai firms lean more toward the predictions of the pecking order theory.

Overall, the results from net debt issue regressions (equation (5.4)) and net equity issue regressions (equation (5.5)) show that firms issue more equity and less debt to finance their deficit leading to little support for the pecking order hypothesis. However, when considering the concavity function using equation (5.6), the evidence shows stronger support for the pecking order hypothesis. The results also reveal that there are variations among sample countries based on the effect of the crisis and the development of the economy.

Table 5.10 : Panel analysis of basic net debt issues model with the second-order term of financing deficit

$$\Delta D_{it} = \alpha + \beta_1 DEF_{it} + \beta_2 DEF_{it}^2 + \varepsilon_{it}$$

Equation	Thailand			Malaysia			Singapore			Australia		
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	-0.0078	-0.0055	-0.0148	0.0025	0.0045	-0.0097	0.0074	-0.0013	-0.0134	-0.0320	-0.0353	-0.0208
t-statistics	(-1.6800)	(-0.8930)	(-2.7000)	(0.6880)	(0.7040)	(-2.3500)	(1.2000)	(-0.1970)	(-2.2900)	(-2.3000)	(-2.9400)	(-1.8400)
DEF	0.6895 ***	0.6212 ***	0.6990 ***	0.5010 ***	0.4518 ***	0.5285 ***	0.3423 ***	0.4278 ***	0.3199 ***	0.2803 ***	0.4546 ***	0.1949 ***
t-statistics	(22.6000)	(13.3000)	(17.4000)	(19.3000)	(7.7900)	(18.6000)	(9.0700)	(6.9100)	(6.8200)	(5.3400)	(8.9100)	(4.0400)
Wald Test			<3.7579> *			<7.3307> ***			<5.2871> **			<28.9380> ***
DEF^2	-0.7420 ***	-0.6572 ***	-0.9657 ***	-0.4148 ***	-0.3483 ***	-0.5496 ***	-0.2150 ***	-0.3864 ***	-0.1922 ***	-0.1341 ***	-0.3007 ***	-0.0915 ***
t-statistics	(-15.2000)	(-9.6000)	(-6.3600)	(-10.0000)	(-5.1200)	(-9.5800)	(-6.9700)	(-3.9800)	(-5.9200)	(-4.1900)	(-6.9000)	(-3.5100)
Wald Test			<4.1350> **			<12.3147> ***			<35.8658> ***			<64.4071> ***
Adj R^2	0.4887	0.3573	0.4808	0.4800	0.3700	0.5947	0.2675	0.3026	0.2399	0.2061	0.5491	0.1010
No. of obs.	1578	581	811	2548	641	1625	1310	303	868	1660	339	1165

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

5.6.1.2.5 Using Other Information to Account for Leverage: Conventional Model

Although the results so far show that firms in this region do not behave strictly in the manner predicted by the pecking order theory (the coefficient of financing deficit is not equal to 1), it cannot be ruled out that the pecking order does not apply to firms in this region. Firms' financing decisions may be best explained by a combination of different capital structure theories. Therefore, we start the examination by running a net debt issue regression in the aspect of the trade-off theory where net debt issues are regressed on firm-specific variables which include both conventional variables and additional variables. Then in order to see how financing deficit fits into the conventional model, both first- and second-order terms of financing deficit are added (equations (5.8) and (5.9)). Table 5.11, Column (1) for each country, presents the results of the conventional model as in equation (5.8) for the full sample while Table 5.12, Column (1) and (2) for each country, presents the results for sub-samples. Consistent with Agca and Mozumdar (2004), the adjusted R^2 are quite low ranging from 1.3% in Australia to 11.4% in Thailand for the full sample, substantially lower than the values reported by Frank and Goyal (2003). Agca and Mozumdar (2004) suggest that the high values in Frank and Goyal (2003) are due to the inclusion of fixed firm effects which was not appropriate due to the doubtful existence of fixed-firm effect.

Table 5.11 : Panel analysis of nesting first- and second-order of financing deficit conventional model: Whole sample period

	Thailand			Malaysia			Singapore			Australia		
Column	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**	**(1)**	**(2)**	**(3)**
Equation	**(5.7)**	**(5.8)**	**(5.9)**	**(5.7)**	**(5.8)**	**(5.9)**	**(5.7)**	**(5.8)**	**(5.9)**	**(5.7)**	**(5.8)**	**(5.9)**
Constant	0.0163	-0.0232 *	-0.0159	0.0353 ***	0.0037	0.0053	0.0141	-0.0024	-0.0198 **	0.0130	-0.0395	-0.0538 ***
t-statistics	(0.9250)	(-1.8300)	(-1.3400)	(3.4400)	(0.3730)	(0.8520)	(1.0500)	(-0.1740)	(-2.0900)	(0.5410)	(-1.5600)	(-3.2500)
ATANG	-0.1061 **	-0.0125	-0.0324	0.0859 *	0.0939 **	0.0377 *	0.0196	0.0380	0.0849 **	0.0210	0.0428	0.0329
t-statistics	(-2.1800)	(-0.3230)	(-0.9540)	(1.8900)	(2.4200)	(1.9000)	(0.3560)	(0.6920)	(2.3300)	(0.3140)	(0.7220)	(0.8870)
AGROW	-0.0171 ***	-0.0084 *	-0.0064	-0.0008	0.0027	-0.0005	-0.0124 **	-0.0045	-0.0026	-0.0014	0.0022	0.0035
t-statistics	(-2.8700)	(-1.7100)	(-1.3400)	(-0.2880)	(1.1500)	(-0.5920)	(-2.0300)	(-0.8380)	(-0.6050)	(-0.7370)	(1.1000)	(1.5800)
ASIZE	0.0399 ***	0.0215 *	0.0168	0.0292 ***	0.0131 **	-0.0002	0.0273 **	0.0159	0.0074	0.0183 **	0.0181 ***	0.0053
t-statistics	(2.8800)	(1.8500)	(1.6400)	(3.0600)	(2.0800)	(-0.0447)	(2.1100)	(1.1400)	(0.6430)	(2.5100)	(2.5900)	(0.9480)
APROF	-0.2142 ***	-0.1078 **	-0.0653	-0.0363	0.0046	0.0146	-0.1244 **	-0.0927 **	-0.0683 *	0.0152	0.0575 **	-0.0288
t-statistics	(-3.3000)	(-2.3400)	(-1.5500)	(-0.7190)	(0.1410)	(0.7870)	(-2.5500)	(-2.0900)	(-1.8400)	(0.7580)	(2.0200)	(-0.7610)
AGE	-0.0042	0.0096	0.0062	-0.0065 **	-0.0037	-0.0019	-0.0022	-0.0005	0.0024	-0.0026	0.0058	0.0060
t-statistics	(-0.4870)	(1.4800)	(1.0300)	(-2.0100)	(-1.3400)	(-0.9040)	(-0.6680)	(-0.1510)	(0.9390)	(-0.4160)	(1.0300)	(1.6400)
BIG4	0.0109	0.0007	-0.0034	-0.0073 *	-0.0020	0.0007	0.0105	0.0096	0.0078	-0.0129	0.0065	0.0185
t-statistics	(1.4400)	(0.1540)	(-0.9110)	(-1.6700)	(-0.5210)	(0.2580)	(1.3400)	(1.2400)	(1.1900)	(-1.0200)	(0.5250)	(1.5200)
PMGMT	0.0031	0.0290 **	0.0104	-0.0165	-0.0261	0.0053	0.0068	-0.0014	0.0172	0.0309	0.0600 **	0.0500 **
t-statistics	(0.1570)	(2.2400)	(0.9620)	(-0.8680)	(-1.1200)	(0.4620)	(0.2290)	(-0.0484)	(0.8430)	(1.0200)	(2.0800)	(2.1000)
ASIGMA	0.2065	0.2332 *	0.1860	0.5964 ***	0.4014 **	0.3162 **	0.1404	0.1750	0.0175	0.4970	0.4046	0.1842
t-statistics	(1.3100)	(1.7300)	(1.5300)	(4.1600)	(2.5200)	(2.4200)	(0.8770)	(1.0500)	(0.1250)	(1.2700)	(1.0900)	(0.6370)
ATURN	-0.1102	0.0095	0.0207	-0.0534	-0.1447	-0.0739	0.2746	0.1858	0.1238	3.8818	3.7637	3.6308 *
t-statistics	(-0.6850)	(0.0820)	(0.1840)	(-0.4750)	(-0.7430)	(-0.4020)	(0.7830)	(0.4970)	(0.3950)	(1.4900)	(1.2600)	(1.6800)
DEF		0.4367 ***	0.7498 ***		0.3413 ***	0.5869 ***		0.1825 ***	0.4829 ***		0.1901 ***	0.4755 ***
t-statistics		(6.8300)	(17.7000)		(5.7600)	(23.1000)		(4.2900)	(10.9000)		(4.9100)	(13.3000)
DEF^2			-0.9196 ***			-0.4937 ***			-0.3480 ***			-0.2665 ***
t-statistics			(-7.1700)			(-11.4000)			(-5.8000)			(-7.3800)
Adj R^2	0.1139	0.4118	0.5398	0.0452	0.3299	0.6187	0.0333	0.1656	0.4367	0.0130	0.1817	0.4942
No. of obs.	749	749	749	1767	1767	1767	788	788	788	1020	1020	1020

$$\Delta D_{i,t} = \alpha + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF1} DEF_{i,t} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF1} DEF_{i,t} + \beta_{DEF2} DEF_{i,t}^2 + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.12 : Panel analysis of nesting first- and second-order of financing deficit conventional model: Pre- and post-crisis periods

	Thailand						Malaysia					
Equation	(5.7)		(5.8)		(5.9)		(5.7)		(5.8)		(5.9)	
Column	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	0.0238	-0.0852 **	-0.0095	-0.0872 ***	-0.0014	-0.0667 **	0.0202	0.0143	0.0039	-0.0029	0.0128	-0.0020
t-statistics	(0.8250)	(-2.5600)	(-0.5390)	(-2.9400)	(-0.0826)	(-2.5200)	(0.7500)	(1.3000)	(0.1780)	(-0.3140)	(0.6820)	(-0.3060)
ATANG	-0.1698 **	-0.0518	-0.0623	0.0252	-0.0744	0.0021	0.0594	0.0792	0.0967	0.0820 **	0.0766	0.0259
t-statistics	(-2.4600)	(-0.7410)	(-1.0500)	(0.4170)	(-1.4800)	(0.0421)	(0.6970)	(1.1900)	(1.2900)	(2.2500)	(1.2300)	(1.3200)
Wald Test		<2.8445> *		<0.1743>		<0.0018>		<1.4108>		<5.0831> **		<1.7348>
AGROW	-0.0106 *	-0.0431 ***	-0.0026	-0.0342 **	-0.0006	-0.0318 **	0.0026	-0.0051	0.0049 *	0.0064	0.0007	-0.0008
t-statistics	(-1.6800)	(-2.8300)	(-0.5030)	(-2.0200)	(-0.1290)	(-2.1100)	(0.8590)	(-1.4100)	(1.8800)	(1.1000)	(0.5130)	(-0.3790)
Wald Test		<4.5709> **		<4.0955> **		<4.4579> **		<1.9753>		<0.0614>		<0.1433>
ASIZE	0.0619 **	0.0200	0.0448 **	0.0094	0.0249	0.0113	0.0663 **	0.0196 *	0.0413 **	0.0056	0.0173	-0.0036
t-statistics	(2.4500)	(1.5400)	(2.0300)	(0.9220)	(1.3400)	(1.1700)	(2.5600)	(1.9400)	(2.0900)	(0.9660)	(1.1500)	(-1.1800)
Wald Test		<10.4734> ***		<11.9890> ***		<1.3656>		<21.3708> ***		<37.6214> ***		<1.3987>
APROF	-0.4334 **	-0.1306 **	-0.2654 *	-0.0730	-0.1787 *	-0.0431	-0.6969 ***	0.0014	-0.5120 ***	0.0132	-0.0988	0.0002
t-statistics	(-2.3500)	(-2.0800)	(-1.7800)	(-1.6300)	(-1.8200)	(-1.0100)	(-2.7600)	(0.0346)	(-2.8800)	(0.6220)	(-1.1400)	(0.0216)
Wald Test		<23.3036> ***		<18.4272> ***		<10.1094> ***		<314.4910> ***		<615.5890> ***		<0.0005>
AGE	-0.0124	0.0248 *	0.0038	0.0270 **	-0.0005	0.0236 **	-0.0024	-0.0097 **	-0.0002	-0.0055	-0.0041	-0.0022
t-statistics	(-1.0400)	(1.7000)	(0.4230)	(2.0600)	(-0.0615)	(2.0300)	(-0.2250)	(-2.3400)	(-0.0277)	(-1.5900)	(-0.5250)	(-0.9790)
Wald Test		<2.8753> *		<4.2373> **		<4.1212> **		<5.4606> **		<2.5227>		<0.9590>
BIG4	0.0198	0.0066	0.0108	-0.0046	0.0025	-0.0070	-0.0107	-0.0066	-0.0090	0.0034	-0.0052	0.0011
t-statistics	(1.5000)	(0.6530)	(1.1200)	(-0.6910)	(0.3390)	(-1.3000)	(-0.8830)	(-1.1800)	(-0.8980)	(0.8040)	(-0.5830)	(0.3160)
Wald Test		<0.4270>		<0.4778>		<1.6831>		<1.3827>		<0.6458>		<0.0999>
PMGMT	-0.0478	0.0540 **	-0.0040	0.0603 ***	-0.0046	0.0312 *	0.0636	-0.0304	0.0722	-0.0266	0.0978 **	0.0046
t-statistics	(-0.9650)	(2.2700)	(-0.1270)	(3.1800)	(-0.1980)	(1.9200)	(0.9380)	(-1.1700)	(1.4600)	(-1.0300)	(2.2600)	(0.3680)
Wald Test		<5.1437> **		<10.1413> ***		<3.6981> *		<1.3733>		<1.0558>		<55.0291> ***
ASIGMA	0.1132	0.1676	0.0081	0.1845	0.2208	0.1606	0.2431	0.4771 ***	0.0383	0.4097 **	0.2940	0.3785 **
t-statistics	(0.1590)	(0.9230)	(0.0108)	(1.2400)	(0.2970)	(1.1600)	(0.3810)	(2.8100)	(0.0699)	(2.1500)	(0.6170)	(2.5400)
Wald Test		<0.8513>		<1.5316>		<1.3530>		<7.9188> ***		<4.6214> **		<6.4388> **
ATURN	0.2290	-0.3505 *	0.2649	-0.1647	0.2130	-0.1297	-0.1320	0.3820 *	-0.3572	0.3080	-0.3608	0.1457
t-statistics	(1.4200)	(-1.6800)	(1.5300)	(-1.2300)	(1.0800)	(-0.9530)	(-0.6970)	(1.7900)	(-1.3500)	(1.1100)	(-1.1900)	(0.7170)
Wald Test		<2.8082> *		<1.5046>		<0.9076>		<3.1914> *		<1.2341>		<0.5142>
DEF			0.3652 ***	0.4282 ***	0.8374 ***	0.6693 ***			0.2181 ***	0.5234 ***	0.5245 ***	0.6187 ***
t-statistics			(4.2300)	(4.1400)	(10.9000)	(10.8000)			(4.2600)	(5.7100)	(10.1000)	(16.0000)
Wald Test				<0.3698>		<7.3632> ***				<11.1122> ***		<5.9240> **
DEF^2					-1.1520 ***	-0.8797 ***					-0.5019 ***	-0.4966 ***
t-statistics					(-4.9400)	(-5.8500)					(-6.9700)	(-9.5200)
Wald Test						<3.2822> *						<0.0105>
Adj R^2	0.1205	0.0377	0.4061	0.3109	0.5473	0.4609	0.2138	0.0238	0.3691	0.4847	0.5525	0.6942
No. of obs.	239	414	239	414	239	414	348	1190	348	1190	348	1190

$$\Delta D_{i,t} = \alpha + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + e_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{i,t-1} DEF_{i,t} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + e_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{i,t-1} DEF_{i,t} + \beta_{i,t-2} DEF_{i,t}^{2} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + e_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.12 : Panel analysis of nesting first- and second-order of financing deficit conventional model: Pre- and post-crisis periods (continued)

	Singapore						Australia					
Equation	(5.7)		(5.8)		(5.9)		(5.7)		(5.8)		(5.9)	
Column	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	-0.0004	-0.0147	-0.0045	-0.0217	-0.0191	-0.0291 **	-0.0011	0.0298 *	-0.0591	-0.0249	0.0373	-0.0581 ***
t-statistics	(-0.0137)	(-1.0800)	(-0.1750)	(-1.6300)	(-0.8850)	(-2.5600)	(-0.0126)	(1.7200)	(-0.7210)	(-1.4900)	(1.1500)	(-3.8200)
ΔTANG	-0.1661 *	0.0698	-0.1214	0.0928 *	-0.0073	0.1311 ***	0.0908	-0.0069	0.1320	0.0278	-0.0660	0.0298
t-statistics	(-1.6500)	(1.2500)	(-1.4100)	(1.7400)	(-0.0987)	(3.1100)	(0.4870)	(-0.0986)	(0.9250)	(0.4370)	(-1.1700)	(0.6320)
Wald Test		<17.8110> ***		<3.0140> *		<9.6700> ***		<0.0097>		<0.1911>		<0.4001>
ΔGROW	-0.0052	-0.0067	-0.0010	0.0021	-0.0038	0.0027	-0.0086	-0.0008	-0.0286 *	0.0022	-0.0138	0.0037 *
t-statistics	(-0.3320)	(-1.1000)	(-0.0781)	(0.3470)	(-0.3650)	(0.4950)	(-0.5050)	(-0.4280)	(-1.7000)	(1.1300)	(-1.2500)	(1.6800)
Wald Test		<1.2034>		<0.1204>		<0.2448>		<0.1830>		<247.3990> ***		<2.8155> *
ΔSIZE	-0.0148	0.0492 ***	-0.0257 **	0.0415 ***	-0.0154	0.0225 **	0.1007 **	0.0114 *	0.0358	0.0126	0.0284 **	0.0043
t-statistics	(-0.9580)	(3.8000)	(-2.1300)	(3.2500)	(-0.7820)	(2.2500)	(2.3300)	(1.6500)	(1.2200)	(1.6300)	(2.1400)	(0.6230)
Wald Test		<14.4289> ***		<27.6831> ***		<5.0703> **		<168.0410> ***		<2.6501>		<12.2364> ***
ΔPROF	-0.1444	-0.1283 **	-0.2634 *	-0.0886 *	-0.1427	-0.0665 *	0.1637 *	0.0153	0.1034	0.0513 *	0.0601	-0.0308
t-statistics	(-1.0100)	(-2.3300)	(-1.7900)	(-1.7600)	(-1.0100)	(-1.7500)	(1.6500)	(0.6920)	(1.2600)	(1.8200)	(1.3900)	(-0.7890)
Wald Test		<5.4292> **		<12.0253> ***		<3.0726> *		<44.9820> ***		<3.3057> *		<0.6229>
AGE	-0.0001	-0.0015	0.0024	-0.0006	0.0025	0.0018	0.0127	-0.0073	0.0029	0.0009	-0.0066	0.0049
t-statistics	(-0.0050)	(-0.4250)	(0.2340)	(-0.1970)	(0.2990)	(0.6340)	(0.6660)	(-1.1700)	(0.3760)	(0.1660)	(-1.2600)	(1.0600)
Wald Test		<0.1807>		<0.0387>		<0.4017>		<1.3668>		<0.0277>		<1.1255>
BIG4	0.0195	0.0123	0.0094	0.0125	0.0115	0.0103	-0.0245	-0.0125	0.0468	0.0038	-0.0077	0.0189
t-statistics	(1.2400)	(1.4400)	(0.6640)	(1.4500)	(1.0300)	(1.2900)	(-0.4730)	(-0.9020)	(0.6630)	(0.2910)	(-0.2440)	(1.5300)
Wald Test		<2.0790>		<2.0947>		<1.6527>		<0.8139>		<0.0846>		<2.3426>
PMGMT	-0.1136 *	0.0156	-0.0999 *	0.0041	-0.0709 *	0.0232	0.0936	0.0201	0.0098	0.0494	0.0116	0.0475 *
t-statistics	(-1.7200)	(0.4730)	(-1.9000)	(0.1280)	(-1.8400)	(1.1200)	(1.4700)	(0.5270)	(0.1130)	(1.3500)	(0.2340)	(1.6500)
Wald Test		<15.3722> ***		<10.4344> ***		<20.5533> ***		<0.2781>		<1.8185>		<2.7128> *
ΔSIGMA	-1.0697	0.0902	-1.5058 *	0.1675	-1.4663 *	0.0432	2.1836 **	0.1802	1.4138 **	0.0754	1.4473 ***	-0.0525
t-statistics	(-1.3700)	(0.5000)	(-1.6700)	(0.9590)	(-1.9000)	(0.2930)	(2.3900)	(0.5500)	(2.3700)	(0.2100)	(4.3700)	(-0.1560)
Wald Test		<0.2502>		<91.7409> ***		<104.7240> ***		<37.3766> ***		<13.9523> ***		<19.9442> ***
ΔTURN	0.5871 *	0.4820	0.8901 ***	0.1049	0.8167 **	0.0350	21.8290 *	3.2958	13.4669 ***	3.1277	6.7541 **	3.5642
t-statistics	(1.7700)	(1.0200)	(2.6900)	(0.2340)	(2.3200)	(0.0961)	(1.7000)	(1.2800)	(2.7200)	(1.0500)	(2.3800)	(1.5300)
Wald Test		<0.0499>		<3.0697> *		<4.6207> **		<51.7910> ***		<12.0410> ***		<1.8703>
DEF			0.1486 ***	0.1757 ***	0.4345 ***	0.4618 ***			0.5057 ***	0.1617 ***	0.4028 ***	0.4666 ***
t-statistics			(3.6100)	(3.5700)	(6.4300)	(8.1000)			(3.6100)	(4.4000)	(9.0700)	(9.5000)
Wald Test				<0.3032>		<0.2295>				<87.7118> ***		<1.6864>
DEF^2					-0.3249 ***	-0.3128 ***					-0.4486 ***	-0.2526 ***
t-statistics					(-4.6000)	(-6.4400)					(-9.4200)	(-5.8600)
Wald Test						<0.0618>						<20.7174> ***
Adj R2	0.0653	0.0369	0.2095	0.1577	0.4122	0.4227	0.1171	0.0011	0.5782	0.1368	0.8233	0.4204
No. of obs.	148	544	148	544	148	544	178	732	178	732	178	732

$$\Delta D_{i,t} = \alpha + \sum_{i=1} \beta_i \Delta FS_{i,t-1} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{i,t-1} DEF_{i,t} + \sum_{i=1} \beta_i \Delta FS_{i,t-1} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{i,t-1} DEF_{i,t} + \beta_{i,t-2} DEF_{i,t}^{2} + \sum_{i=1} \beta_i \Delta FS_{i,t-1} + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

It has been suggested that the use of first-differences instead of level terms increases standard errors and biases the estimators toward zero (Halov and Heider, 2005). However, the results confirm the standard signs on the conventional variables in a regression. Although the effects are not stable across sample countries for some factors, the findings confirm the significance of these traditional factors in explaining new debt issues. The coefficient signs are negative on tangibility, growth opportunity, and profitability and positive on tangibility, and firm size. Although the additional variables can be theoretically related to net debt issues, once controlled for the conventional determinants of net debt issues the additional variables do not appear to have significant impact on net debt issues in most cases.

The ***tangibility*** coefficient is found to be significant and negative in Thailand as predicted by the pecking order theory while a positive relationship is found in other sample countries as predicted by the trade-off theory. However, tangibility no longer has a significant effect on leverage changes after the crisis as the estimated coefficients of tangibility become insignificant implying that, due to higher risk, collateral is no longer a main issue when firms borrow and it does not guarantee higher or lower leverage after the crisis. The results show that ***growth opportunity*** is negatively related to debt issue as predicted by the pecking order, trade-off and market timing theories (the estimated coefficients are significant only in Thailand and Singapore) suggesting that firms with greater growth opportunities are associated with greater financial distress and therefore face limited debt capacity. However, taking account of sub-samples, the relationship is significant only in Thailand and the magnitude of the coefficient is higher after the crisis. Thai firms have less debt capacity after the crisis because the cost of financial distress becomes higher. Thus, when growth opportunities arise, the available source of finance is equity. On the other hand, growth opportunity has no significant effect for either sub-sample in other countries. The results show that ***firm size*** is the strongest determinant of leverage changes. Highly significant and positive relationships are found. However, when the full sample is divided into sub-samples, the role of firm size reduces substantially after the crisis in which large size no longer guarantees easier access to the debt market.

The results show that ***profitability*** is negatively related to debt as expected except in Australia. The negative relationship favours the pecking order theory over the trade-off theory that more profitable firms rely more on internal finance; therefore, they have less need to issue debt. The negative relationship also represents evidence against the trade-off theory. However, when looking into the sub-samples, the results show that the significance of profitability reduces substantially after the crisis. Profitability played a greater role before the crisis. For Thailand and Singapore, the evidence of the support of the pecking order theory is still detected after the crisis. However, for Malaysia and Australia, the estimated coefficients are no longer significant.

In general, ***firm age*** does not appear to have any significant effect on debt issuance which is not that surprising. Lemmon and Zender (2004) argue that the financing policies of young and old firms are different. However, they also find that the average use of debt financing is very similar between old and young firms. They suggest that it is the equity part that makes the financing policies of young and old firms differ from each other. Young firms make extensive use of external equity while old firms obtain internal equity. When the full sample is split into pre- and post-crisis periods, firm age has no significant effect on leverage change before the crisis. However, in Thailand where the crisis originated, old firms could access debt markets due to their better reputation than younger firms after the crisis. The opposite pattern is found in Malaysia where young firms were able to access debt markets better than older firms after the crisis. A negative and significant relationship between ***level of asymmetric information*** and net debt issues found in Malaysia gives support to the pecking order hypothesis. However, the results from sub-samples show that the involvement of BIG4 auditors does not influence the leverage changes.

The results show that the coefficients of ***management involvement*** are positive but insignificant in most cases. However, a positive and significant relationship is found for Thai firms for the post-crisis period showing that the control dilution problem is more severe when firms face high risk leading them to rely more on debt than equity. Giving support to the pecking order theory, the coefficients of ***adverse selection cost*** are positive for all sample countries. When considering the sub-samples, no significant effect is found for the post-crisis period in most cases implying that adverse selection costs do not seem to have any effect on leverage. However, the results show that ***trading activity*** does not have any influence on the net debt issue choice for the full sample. When considering sub-samples, there are two different patterns. In developed markets, no significant effect on leverage is found for the post-crisis period while in developing markets the coefficients are not significant before the crisis but become significant afterwards.

Overall, the results of equation (5.7) show support to both the trade-off theory and the pecking order theories. However, there are variations across the sample countries partly due to the differences in the institutional structures of each sample country and the effect of the financial crisis. The effect of the crisis has been most obvious in Thailand where the crisis originated. The crisis has made certain variables, such as GROW, AGE and PMGMT, become significant in the expected direction after the crisis.

Table 5.11, column (2) for each country, presents the results of the conventional model with added first order of financing deficit as in equation (5.8) for the full sample while Table 5.12, columns (3) and (4) for each country, presents the results for sub-samples. If the pecking order theory were the main factor of firms' financing behaviour, the effect of financing deficit should wipe out the effects of the conventional variables. Frank and Goyal (2003) find that financing deficit is just one factor among many factors that firms trade off.[131] Therefore, what is left is a generated version of the trade-off theory. However, the results show that financing deficit does have significant effects on other conventional variables. Although the effects of other conventional variables are not totally wiped out by financing deficit, the significance of the conventional variables declines when financing deficit is added into the model. Also, adjusted R^2 is substantially and significantly increased after adding financing deficit.

In addition, in contrast to Agca and Mozumdar (2004), including the firm-specific variables as explanatory variables in a regression along with the financing deficit does materially alter the estimated debt-financing deficit sensitivity coefficient compared with the regression where the financing deficit is used alone as the explanatory variable (equation (5.4)). The coefficient of financing deficit becomes higher in the nested conventional trade-off theory model suggesting that (i) the pecking order theory does play some significant role in firms' financing decisions in this region once controlled for debt capacity and (ii) firm-specific variables that have been found useful in explaining leverage changes in the trade-off theory framework do in fact help to explain debt issues better and can also be used to control for debt capacity concern. Therefore, the findings give support to the modified pecking order theory with respect to debt capacity concern as raised by Lemmon and Zender (2004). Once financing deficit is added, there is a pattern of the effect of financial crisis among sample countries. In Australia, the coefficient of financing deficit reduces substantially after the crisis, confirming the pattern in Figure 5.1 that net equity issue tracks closer to financing

[131] Lemmon and Zender (2004) suggest that the lower explanatory power of financing deficit found by Frank and Goyal (2003) might not lead to the conclusion of the evidence against the pecking order theory because the power can be lower if other variables are correlated with financing deficit even when firms do follow the pecking order theory directly.

deficit than net debt issue. On the other hand, financing deficit is funded more by net debt issues after the crisis for the other sample countries.

Table 5.11, Column (3) for each country, presents the results of the conventional model with added first and second order terms of financing deficit as in equation (5.9) for the full sample and Table 5.12, Columns (5) and (6) for each country, presents the results for sub-samples. The second-order of financing deficit is added to test the concavity function of financing deficit. The results show that the coefficients of the second-order term of financing deficit are negative and highly significant for all sample countries showing strong support to the pecking order theory. The inclusion of the second-order term of financing deficit has substantially altered the debt-financing deficit relationship. The estimated coefficients of financing deficit increase dramatically to be closer to 1 as predicted by the pecking order theory especially for Thailand.

The differences in corporate governance across sample countries can help to explain why Thai firms tend to move toward more of the predictions of the pecking order theory than firms in other sample countries. Investors need to feel protected because they are more vulnerable to expropriation than insiders. Therefore, in order for them to fund the firms' investments, they need to seek some protection. Without strong investor protection, investors are at risk of not being paid back; therefore, this makes it more difficult for firms in low investor protection environment to raise external finance. As shown in Table 2.5, Thailand has the lowest investor protection level (lowest Shareholder rights) which explains why the pecking order theory appears to perform better in Thailand.

Extending the model to include the second-order term of financing deficit leads to a significant improvement in the explanatory ability of the model. The introduction of financing deficit and its second order has added a large amount of additional explanatory power to the trade-off framework; the adjusted R^2 is substantially higher for all sample countries. Most importantly, the effect of financing deficit on both first- and second-order terms wipes out most of the effects of the conventional variables especially in Thailand where all of the estimated coefficients of firm-specific variables become insignificant for the full sample. However, when considering the effect of the financial crisis, the results show that Thai firms move away from the pecking order theory slightly with the evidence of the reduction in the coefficient of financing deficit while the coefficients of financing deficit become higher for other sample countries. Although the debt-financing deficit relationship is not perfectly 1, the evidence shows that the pecking order theory is actually the main driving force of financing behaviour for firms in this region.

Table 5.13 presents the results of conventional models with lagged net debt issues as in equation (5.10), Column (1), and with added first order terms of financing deficit as in equation (5.11), Column (2), and with added second order terms of financing deficit as in equation (5.12), Column (3), for the full sample and Table 5.14 presents the results for sub-samples. The results show that the coefficients on lagged dependent variable are statistically significant in most sample countries and especially for the post-crisis period for Thai and Malaysian firms. However, opposite to the evidence of mean reversion found by Frank and Goyal (2003), the results show a positive and significant relationship. The inclusion of lagged dependent variables does not affect the sign and significance of most of other variables in the regressions. However, once financing deficit is added into the model (equation (5.11)), the significance of lagged dependent variables reduces and its effect is wiped out by the inclusion of the second-order term of financing deficit in most cases suggesting stronger support to the pecking order theory.

Table 5.13 : Panel analysis of nesting first- and second-order of financing deficit into conventional model with lagged dependent variable: Whole sample period

	Thailand			Malaysia			Singapore			Australia		
Column	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Equation	(5.10)	(5.11)	(5.12)	(5.10)	(5.11)	(5.12)	(5.10)	(5.11)	(5.12)	(5.10)	(5.11)	(5.12)
Constant	0.0079	-0.0269 **	-0.0176	0.0328 ***	0.0028	0.0049	0.0132	-0.0040	-0.0194 **	0.0168	-0.0372	-0.0543 ***
t-statistics	(0.4890)	(-2.1600)	(-1.4800)	(3.3000)	(0.2840)	(0.7940)	(1.0200)	(-0.3200)	(-2.0100)	(0.7460)	(-1.5100)	(-3.2500)
ATANG	-0.1089 **	-0.0162	-0.0337	0.0853 *	0.0936 **	0.0377 *	0.0184	0.0367	0.0868 **	0.0239	0.0440	0.0327
t-statistics	(-2.2000)	(-0.4180)	(-0.9900)	(1.8600)	(2.4100)	(1.8900)	(0.3350)	(0.6670)	(2.4000)	(0.3570)	(0.7430)	(0.8830)
AGROW	-0.0190 ***	-0.0097 **	-0.0070	-0.0005	0.0028	-0.0005	-0.0122 **	-0.0041	-0.0029	-0.0014	0.0022	0.0035
t-statistics	(-3.2800)	(-1.9600)	(-1.4400)	(-0.1650)	(1.2000)	(-0.5500)	(-1.9900)	(-0.7680)	(-0.6470)	(-0.7190)	(1.0700)	(1.5800)
ASIZE	0.0332 ***	0.0182 *	0.0155	0.0280 ***	0.0127 **	-0.0003	0.0261 **	0.0141	0.0082	0.0152 **	0.0166 **	0.0056
t-statistics	(2.5800)	(1.6500)	(1.5300)	(2.9900)	(2.0300)	(-0.0765)	(1.9900)	(1.0100)	(0.7220)	(2.0800)	(2.2700)	(0.9550)
APROF	-0.1995 ***	-0.1020 **	-0.0635	-0.0289	0.0074	0.0155	-0.1197 **	-0.0855 **	-0.0715 **	0.0184	0.0587 **	-0.0292
t-statistics	(-3.1800)	(-2.2200)	(-1.4900)	(-0.5620)	(0.2210)	(0.8170)	(-2.4200)	(-1.9600)	(-1.9600)	(0.8900)	(2.0500)	(-0.7670)
AGE	-0.0015	0.0108 *	0.0067	-0.0062 **	-0.0035	-0.0017	-0.0022	-0.0003	0.0024	-0.0035	0.0053	0.0061
t-statistics	(-0.1910)	(1.7000)	(1.1200)	(-2.0300)	(-1.3100)	(-0.8590)	(-0.6680)	(-0.1140)	(0.9130)	(-0.5900)	(0.9530)	(1.6100)
BIG4	0.0083	-0.0005	-0.0038	-0.0071 *	-0.0020	0.0007	0.0102	0.0092	0.0081	-0.0130	0.0064	0.0186
t-statistics	(1.2600)	(-0.1020)	(-1.0500)	(-1.7500)	(-0.5340)	(0.2530)	(1.3700)	(1.2500)	(1.1900)	(-1.0400)	(0.5150)	(1.5200)
PMCMT	0.0049	0.0295 **	0.0108	-0.0172	-0.0262	0.0052	0.0070	-0.0013	0.0178	0.0324	0.0605 **	0.0498 **
t-statistics	(0.2880)	(2.4300)	(1.0300)	(-0.9600)	(-1.1500)	(0.4640)	(0.2450)	(-0.0464)	(0.8520)	(1.0600)	(2.0900)	(2.1000)
ASIGMA	0.0901	0.1676	0.1586	0.5629 ***	0.3895 **	0.3133 **	0.1186	0.1451	0.0305	0.4354	0.3750	0.1902
t-statistics	(0.5490)	(1.2500)	(1.3100)	(3.8800)	(2.4200)	(2.3900)	(0.7390)	(0.9070)	(0.2220)	(1.2200)	(1.0500)	(0.6550)
ATURN	-0.1082	0.0079	0.0199	-0.0620	-0.1478	-0.0752	0.2474	0.1464	0.1436	3.9959	3.8210	3.6187 *
t-statistics	(-0.6770)	(0.0694)	(0.1770)	(-0.5230)	(-0.7500)	(-0.4070)	(0.6970)	(0.3840)	(0.4570)	(1.5500)	(1.2800)	(1.6600)
AD_{-1}	0.1739 ***	0.0971 **	0.0417	0.1104 ***	0.0483 *	0.0159	0.0616	0.0859	-0.0460	0.0736 *	0.0363	-0.0076
t-statistics	(4.4300)	(2.5700)	(1.5300)	(3.7900)	(1.8900)	(0.7440)	(1.6400)	(1.6300)	(-1.2800)	(1.8900)	(1.0900)	(-0.3160)
DEF		0.4270 ***	0.7408 ***		0.3384 ***	0.5856 ***		0.1856 ***	0.4883 ***		0.1884 ***	0.4762 ***
t-statistics		(6.6200)	(16.7000)		(5.7000)	(23.0000)		(4.6700)	(11.4000)		(4.8900)	(13.3000)
DEF^2			-0.9052 ***			-0.4929 ***			-0.3562 ***			-0.2668 ***
t-statistics			(-7.1600)			(-11.5000)			(-6.4800)			(-7.4100)
Adj R^2	0.1391	0.4191	0.5406	0.0547	0.3315	0.6187	0.0361	0.1725	0.4381	0.0179	0.1823	0.4937
No. of obs.	749	749	749	1766	1766	1766	787	787	787	1020	1020	1020

$$\Delta D_{i,t} = \alpha + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF1} DEF_{i,t} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF1} DEF_{i,t} + \beta_{DEF2} DEF_{i,t}^2 + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.14 : Panel analysis of nesting first- and second-order of financing deficit into conventional model with lagged dependent variable: Pre- and post-crisis periods

	Thailand						Malaysia					
Equation	(5.10)		(5.11)		(5.12)		(5.10)		(5.11)		(5.12)	
Column	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	0.0242	-0.0919 ***	-0.0091	-0.0906 ***	-0.0011	-0.0670 **	0.0203	0.0122	0.0038	-0.0041	0.0128	-0.0029
t-statistics	(0.8720)	(-2.9600)	(-0.5340)	(-3.0400)	(-0.0630)	(-2.4900)	(0.7520)	(1.1400)	(0.1770)	(-0.4420)	(0.6880)	(-0.4530)
ΔTANG	-0.1699 **	-0.0500	-0.0626	0.0242	-0.0748	0.0021	0.0636	0.0748	0.0965	0.0797 **	0.0768	0.0242
t-statistics	(-2.4300)	(-0.7180)	(-1.0400)	(0.4060)	(-1.4700)	(0.0422)	(0.7480)	(1.1100)	(1.2900)	(2.1600)	(1.2400)	(1.2400)
Wald Test		<2.9630> *		<0.1652>		<0.0018>		<1.2259>		<4.6680> **		<1.5333>
ΔGROW	-0.0112 *	-0.0434 ***	-0.0030	-0.0346 **	-0.0010	-0.0318 **	0.0026	-0.0037	0.0049 *	0.0071	0.0007	-0.0002
t-statistics	(-1.8000)	(-2.7300)	(-0.5980)	(-1.9900)	(-0.2380)	(-2.1000)	(0.8620)	(-1.1700)	(1.8800)	(1.2500)	(0.5100)	(-0.1240)
Wald Test		<4.0956> **		<3.9609> **		<4.4242> **		<1.3591>		<0.1432>		<0.0153>
ΔSIZE	0.0587 **	0.0180	0.0428 *	0.0087	0.0228	0.0112	0.0662 ***	0.0187 *	0.0413 **	0.0053	0.0173	-0.0039
t-statistics	(2.3400)	(1.5100)	(1.9300)	(0.8840)	(1.2100)	(1.1700)	(2.5800)	(1.8700)	(2.0900)	(0.9110)	(1.1500)	(-1.2600)
Wald Test		<11.6451> ***		<12.0728> ***		<1.3591>		<22.4464> ***		<38.9800> ***		<1.5943>
ΔPROF	-0.4386 **	-0.1208 *	-0.2693 *	-0.0694	-0.1827 *	-0.0430	-0.6907 ***	0.0089	-0.5121 ***	0.0171	-0.0986	0.0033
t-statistics	(-2.3800)	(-1.9100)	(-1.7900)	(-1.4900)	(-1.8500)	(-0.9910)	(-2.7900)	(0.2080)	(-2.8800)	(0.7460)	(-1.1500)	(0.2660)
Wald Test		<25.3299> ***		<18.3081> ***		<10.3987> ***		<269.8000> ***		<534.6010> ***		<0.0709>
AGE	-0.0128	0.0294 **	0.0035	0.0293 **	-0.0009	0.0237 **	-0.0030	-0.0092 **	-0.0002	-0.0053	-0.0041	-0.0020
t-statistics	(-1.1000)	(2.2200)	(0.3920)	(2.2000)	(-0.1010)	(2.0100)	(-0.2750)	(-2.3800)	(-0.0239)	(-1.5600)	(-0.5390)	(-0.9070)
Wald Test		<4.9063> **		<4.8282> **		<4.0210> **		<5.6464> **		<2.4223>		<0.8230>
BIG4	0.0181	0.0054	0.0097	-0.0049	0.0013	-0.0071	-0.0113	-0.0063	-0.0090	0.0034	-0.0052	0.0012
t-statistics	(1.4700)	(0.5940)	(1.0400)	(-0.7720)	(0.1890)	(-1.3000)	(-0.9440)	(-1.1800)	(-0.8970)	(0.8360)	(-0.5930)	(0.3340)
Wald Test		<0.3524>		<0.5963>		<1.6922>		<1.3826>		<0.6996>		<0.1117>
PMGMT	-0.0463	0.0502 **	-0.0031	0.0581 ***	-0.0037	0.0312 *	0.0623	-0.0276	0.0723	-0.0251	0.0977 **	0.0057
t-statistics	(-0.9530)	(2.3300)	(-0.1020)	(3.2600)	(-0.1640)	(1.9300)	(0.9290)	(-1.1300)	(1.4600)	(-1.0000)	(2.2500)	(0.4710)
Wald Test		<5.4360> **		<10.6189> ***		<3.7146> *		<1.2675>		<1.0056>		<56.9998> ***
ΔSIGMA	0.0633	0.0846	-0.0241	0.1407	0.1872	0.1579	0.2989	0.4581 ***	0.0346	0.4005 **	0.2984	0.3718 **
t-statistics	(0.0878)	(0.4470)	(-0.0321)	(0.9430)	(0.2500)	(1.1800)	(0.4640)	(2.6300)	(0.0625)	(2.0700)	(0.6170)	(2.4500)
Wald Test		<0.1995>		<0.8892>		<1.3849>		<6.8938> ***		<4.2764> **		<5.9921> **
ΔTURN	0.2276	-0.3356	0.2639	-0.1617	0.2119	-0.1296	-0.1522	0.3200	-0.3564	0.2752	-0.3618	0.1207
t-statistics	(1.4900)	(-1.6000)	(1.6000)	(-1.1800)	(1.1200)	(-0.9510)	(-0.8040)	(1.5800)	(-1.3500)	(1.0300)	(-1.2000)	(0.6140)
Wald Test		<2.5742>		<1.3973>		<0.9042>		<2.4831>		<1.0621>		<0.3764>
ΔD_{-1}	0.0604	0.1764 ***	0.0394	0.0922	0.0412	0.0058	0.0767	0.1216 ***	-0.0045	0.0648 **	0.0055	0.0499 **
t-statistics	(0.9930)	(2.9600)	(1.0300)	(1.5100)	(1.1500)	(0.1110)	(1.4900)	(3.5400)	(-0.0963)	(2.3600)	(0.1090)	(2.5200)
Wald Test		<8.7349> ***		<2.2929>		<0.0122>		<12.5267> ***		<5.5488> **		<6.3296> **
DEF			0.3642 ***	0.4170 ***	0.8366 ***	0.6678 ***			0.2184 ***	0.5201 ***	0.5241 ***	0.6160 ***
t-statistics			(4.2000)	(4.0500)	(11.0000)	(10.6000)			(4.2000)	(5.6700)	(9.8300)	(16.0000)
Wald Test				<0.2620>		<7.1167> ***				<10.8227> ***		<5.6996> **
DEF^2					-1.1526 ***	-0.8771 ***					-0.5020 ***	-0.4952 ***
t-statistics					(-4.9800)	(-5.6100)					(-7.0200)	(-9.5400)
Wald Test						<3.1099> *						<0.0171>
Adj R^2	0.1199	0.0634	0.4048	0.3167	0.5469	0.4595	0.2153	0.0341	0.3672	0.4874	0.5511	0.6958
No. of obs.	239	414	239	414	239	414	348	1189	348	1189	348	1189

$$\Delta D_{i,t} = \alpha + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF} DEF_{i,t} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF} DEF_{i,t} + \beta_{DEF^2} DEF_{i,t}^2 + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta D} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.14 : Panel analysis of nesting first- and second-order of financing deficit into conventional model with lagged dependent variable: Pre- and post-crisis periods (continued)

	Singapore						Australia					
Equation	(5.10)		(5.11)		(5.12)		(5.10)		(5.11)		(5.12)	
Column	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	0.0009	-0.0152	-0.0036	-0.0232 *	-0.0203	-0.0286 **	-0.0138	0.0301 *	-0.0622	-0.0254	0.0343	-0.0598 ***
t-statistics	(0.0364)	(-1.1200)	(-0.1390)	(-1.8800)	(-0.9580)	(-2.4600)	(-0.1330)	(1.7300)	(-0.7230)	(-1.4900)	(0.9730)	(-3.8400)
ΔTANG	-0.1698 *	0.0698	-0.1244	0.0938 *	-0.0017	0.1313 ***	0.0370	-0.0058	0.1108	0.0263	-0.0824	0.0259
t-statistics	(-1.6900)	(1.2500)	(-1.4400)	(1.7600)	(-0.0226)	(3.1700)	(0.2070)	(-0.0846)	(0.7610)	(0.4200)	(-1.3700)	(0.5570)
Wald Test		<18.4183> ***		<3.1116> *		<10.0603> ***		<0.0072>		<0.1761>		<0.3097>
ΔGROW	-0.0049	-0.0067	-0.0008	0.0024	-0.0041	0.0025	-0.0120	-0.0008	-0.0293 *	0.0022	-0.0145	0.0038 *
t-statistics	(-0.3050)	(-1.0900)	(-0.0621)	(0.4150)	(-0.3960)	(0.4470)	(-0.7510)	(-0.4270)	(-1.7900)	(1.1400)	(-1.3500)	(1.7000)
Wald Test		<1.1923>		<0.1722>		<0.1997>		<0.1823>		<260.1900> ***		<2.8753> *
ΔSIZE	-0.0176	0.0488 ***	-0.0276 **	0.0399 ***	-0.0136	0.0230 **	0.0806 **	0.0112	0.0302	0.0129 *	0.0238 *	0.0050
t-statistics	(-1.0800)	(3.7700)	(-2.1100)	(3.2800)	(-0.7150)	(2.2600)	(2.2700)	(1.5800)	(1.0800)	(1.6500)	(1.7300)	(0.7240)
Wald Test		<14.2374> ***		<30.7670> ***		<5.1263> **		<96.2695> ***		<2.7153> *		<7.3151> ***
ΔPROF	-0.1277	-0.1266 **	-0.2505 *	-0.0809 *	-0.1506	-0.0712 *	0.2076 *	0.0156	0.1214	0.0510 *	0.0749 *	-0.0318
t-statistics	(-0.8470)	(-2.3500)	(-1.6500)	(-1.6900)	(-1.0500)	(-1.9300)	(1.9100)	(0.7040)	(1.4300)	(1.8100)	(1.6900)	(-0.8190)
Wald Test		<5.5343> **		<12.5313> ***		<3.7262> *		<75.5571> ***		<3.2733> *		<7.5621> ***
AGE	-0.0009	-0.0015	0.0018	-0.0004	0.0031	0.0016	0.0077	-0.0074	0.0014	0.0010	-0.0078	0.0052
t-statistics	(-0.0830)	(-0.4180)	(0.1730)	(-0.1220)	(0.3720)	(0.5610)	(0.4650)	(-1.1800)	(0.1800)	(0.1840)	(-1.5800)	(1.1000)
Wald Test		<0.1750>		<0.0149>		<0.3150>		<1.3813>		<0.0340>		<1.2002>
BIG4	0.0188	0.0125	0.0089	0.0125	0.0120	0.0107	0.0062	-0.0125	0.0563	0.0039	0.0002	0.0193
t-statistics	(1.2300)	(1.4700)	(0.6460)	(1.4900)	(1.0600)	(1.2800)	(0.0784)	(-0.9110)	(0.7450)	(0.2990)	(0.0064)	(1.5500)
Wald Test		<2.1529>		<2.2331>		<1.6355>		<0.8304>		<0.0893>		<2.3927>
PMGMT	-0.1118 *	0.0157	-0.0988 *	0.0030	-0.0711 *	0.0251	0.0760	0.0203	0.0056	0.0492	0.0082	0.0467
t-statistics	(-1.7700)	(0.4780)	(-1.9300)	(0.0944)	(-1.8000)	(1.1900)	(1.3200)	(0.5340)	(0.0655)	(1.3400)	(0.1680)	(1.6200)
Wald Test		<15.0786> ***		<10.1375> ***		<20.7202> ***		<0.2849>		<1.8047>		<2.6240>
ΔSIGMA	-1.0671	0.0861	-1.4995 *	0.1517	-1.4706 *	0.0526	1.4270	0.1771	1.1531 *	0.0796	1.2350 ***	-0.0415
t-statistics	(-1.4100)	(0.4830)	(-1.6800)	(0.8950)	(-1.8900)	(0.3650)	(1.5500)	(0.5400)	(1.8400)	(0.2220)	(3.8100)	(-0.1230)
Wald Test		<0.2333>		<95.0530> ***		<111.6630> ***		<0.2921>		<8.9478> ***		<14.3907> ***
ΔTURN	0.5477	0.4694	0.8595 **	0.0406	0.8409 **	0.0785	22.6501 *	3.3078	14.0046 ***	3.1101	7.2212 **	3.5181
t-statistics	(1.5900)	(0.9880)	(2.5100)	(0.0895)	(2.3400)	(0.2150)	(1.8000)	(1.2800)	(2.8400)	(1.0400)	(2.5400)	(1.5000)
Wald Test		<0.9768>		<3.2595> *		<4.3756> **		<56.3794> ***		<13.3204> ***		<2.4890>
ΔD_{t-1}	0.0930	0.0181	0.0651	0.0706	-0.0555	-0.0492	0.2878 **	0.0085	0.1072 *	-0.0123	0.0873 **	-0.0328
t-statistics	(0.9580)	(0.4060)	(0.7410)	(1.0600)	(-0.9390)	(-1.3200)	(2.2100)	(0.2380)	(1.8800)	(-0.3620)	(2.2200)	(-1.2100)
Wald Test		<0.1648>		<1.1133>		<1.7512>		<61.6048> ***		<12.4617> ***		<19.6797> ***
DEF			0.1471 ***	0.1822 ***	0.4434 ***	0.4649 ***			0.4916 ***	0.1621 ***	0.3918 ***	0.4683 ***
t-statistics			(3.6200)	(4.0200)	(6.5200)	(8.3800)			(3.5100)	(4.3900)	(8.8700)	(9.6000)
Wald Test				<0.6015>		<0.1502>				<79.8463> ***		<2.4587>
DEF^2					-0.3335 ***	-0.3211 ***					-0.4467 ***	-0.2533 ***
t-statistics					(-4.7800)	(-7.1600)					(-9.3300)	(-5.9200)
Wald Test						<0.0762>						<20.4327> ***
Adj R^2	0.0653	0.0355	0.2068	0.1623	0.4099	0.4245	0.1652	-0.0003	0.5827	0.1357	0.8269	0.4208
No. of obs.	148	543	148	543	148	543	178	732	178	732	178	732

$$\Delta D_{i,t} = \alpha + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta,i} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF} DEF_{i,t} + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta,i} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \beta_{DEF} DEF_{i,t} + \beta_{DEF^2} DEF_{i,t}^2 + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \beta_{\Delta,i} \Delta D_{i,t-1} + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

5.6.1.3 Country-Specific Effects on Internal versus External Financing and Debt versus Equity Issues

Although there is some evidence to support the pecking order theory, there are still some variations across the sample countries that cannot be explained by the effect of the financial crisis and firm-specific characteristics. Therefore, country-specific factors will now be introduced into the main models by adding country dummies which are then replaced by country-specific factors one at a time in the following order: (i) internal versus external financing model as in equation (5.1) (the results are reported in Table 5.15); (ii) basic net debt issue model as in equation (5.4) (the results are presented in Table 5.16); (iii) basic net debt issue model with the second order term of financing deficit as in equation (5.6) (the results are shown in Table 5.17); and (iv) conventional model with the nesting of first- and second-order terms of financing deficit as in equation (5.9) (the results are shown in Table 5.18). The estimated coefficients of ***country dummies*** in all models are highly significant implying that country-specific factors do have major influence on how firms follow the pecking order theory. Therefore, the nature of this finding is investigated further by replacing country dummies with additional country-specific factors one at a time.

Economic development is found to be a significant factor in determining financing sources of firms in this region. The results from Table 5.15 show that developed countries have higher financing deficits as expected. This is also supported by the descriptive statistics shown in Table 5.4 that firms in developed economies such as Singapore and Australia have higher financing deficits than firms in developing economies. Also, when there is a choice of external finance of debt and equity, firms in developed countries would be able to issue more equity than firms in developing countries. This is supported by the results in Tables 5.16 to 5.18.

Table 5.15 : Panel analysis of internal versus external financing decisions with firm-specific and country-specific effects: Whole sample period

Equation	Country Dummies	Economic Development	Legal Enforcement						Legal Protection		Ownership Structure	Accounting and Asymmetric Information		
	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6	Model-7	Model-8	Model-9	Model-10	Model-11	Model-12	Model-13	Model-14
Constant	0.5797 ***	0.5139 ***	0.3491 ***	0.5228 ***	0.2985 ***	0.3968 ***	0.5203 ***	0.2459 ***	0.6122 ***	0.5801 ***	0.6653 ***	0.4253 ***	0.7643 ***	0.7068 ***
t-statistics	(10.9000)	(11.0000)	(7.3900)	(7.9100)	(5.5700)	(5.3300)	(11.2000)	(3.3000)	(12.3000)	(8.2500)	(12.6000)	(7.3700)	(6.6100)	(12.0000)
TANG	-0.0470 ***	-0.0554 ***	-0.0510 ***	-0.0654 ***	-0.0475 ***	-0.0589 ***	-0.0451 ***	-0.0557 ***	-0.0474 ***	-0.0682 ***	-0.0463 ***	-0.0603 ***	-0.0695 ***	-0.0582 ***
t-statistics	(-2.8300)	(-3.2400)	(-3.0200)	(-3.7500)	(-2.8300)	(-3.4200)	(-2.7000)	(-3.2500)	(-2.8500)	(-3.9000)	(-2.7900)	(-3.4900)	(-3.9600)	(-3.4200)
GROW	0.0002	0.0015	0.0011	0.0014	0.0010	0.0013	0.0006	0.0015	0.0001	0.0014	0.0003	0.0016	0.0013	0.0006
t-statistics	(0.0535)	(0.4370)	(0.3330)	(0.3890)	(0.2880)	(0.3730)	(0.1730)	(0.4250)	(0.0202)	(0.3950)	(0.0920)	(0.4580)	(0.3650)	(0.1810)
SIZE	-0.0219 ***	-0.0191 ***	-0.0200 ***	-0.0219 ***	-0.0176 ***	-0.0189 ***	-0.0165 ***	-0.0184 ***	-0.0223 ***	-0.0238 ***	-0.0211 ***	-0.0197 ***	-0.0254 ***	-0.0263 ***
t-statistics	(-6.6100)	(-6.6900)	(-7.3400)	(-6.3300)	(-6.1900)	(-5.6300)	(-5.6500)	(-6.1200)	(-8.2200)	(-6.9300)	(-7.8300)	(-6.5800)	(-7.3700)	(-9.0000)
PROF	-0.2247 ***	-0.2373 ***	-0.2311 ***	-0.2417 ***	-0.2338 ***	-0.2423 ***	-0.2347 ***	-0.2395 ***	-0.2246 ***	-0.2402 ***	-0.2256 ***	-0.2410 ***	-0.2379 ***	-0.2250 ***
t-statistics	(-3.0100)	(-3.1500)	(-3.0800)	(-3.1900)	(-3.1200)	(-3.2100)	(-3.1300)	(-3.1800)	(-3.0100)	(-3.1700)	(-3.0200)	(-3.1900)	(-3.1400)	(-2.9900)
AGE	-0.0597 ***	-0.0590 ***	-0.0590 ***	-0.0588 ***	-0.0599 ***	-0.0595 ***	-0.0607 ***	-0.0593 ***	-0.0598 ***	-0.0583 ***	-0.0597 ***	-0.0589 ***	-0.0581 ***	-0.0582 ***
t-statistics	(-10.2000)	(-9.9700)	(-10.1000)	(-9.7900)	(-10.2000)	(-9.9300)	(-10.2000)	(-9.9800)	(-10.2000)	(-9.7200)	(-10.2000)	(-9.8700)	(-9.7000)	(-9.9400)
BIG4	-0.0045	-0.0087	-0.0082	-0.0011	-0.0118	-0.0067	-0.0125	-0.0093	-0.0035	0.0020	-0.0061	-0.0064	0.0047	0.0034
t-statistics	(-0.5120)	(-1.0000)	(-0.9540)	(-0.1180)	(-1.3600)	(-0.7560)	(-1.4400)	(-1.0600)	(-0.4120)	(0.2260)	(-0.7200)	(-0.7240)	(0.5270)	(0.3920)
PMGMT	-0.0584 **	-0.0485 **	-0.0545 **	-0.0555 **	-0.0394	-0.0409	-0.0298	-0.0428 *	-0.0589 **	-0.0655 **	-0.0554 **	-0.0490 **	-0.0734 ***	-0.0823 ***
t-statistics	(-2.3100)	(-1.9600)	(-2.2100)	(-2.1500)	(-1.6000)	(-1.6000)	(-1.2000)	(-1.7200)	(-2.4000)	(-2.5100)	(-2.2600)	(-1.9600)	(-2.8200)	(-3.2200)
SIGMA	0.0427	0.1087	0.0924	-0.0501	0.2132	0.1052	0.2721	0.1395	0.0280	-0.1407	0.0794	0.0605	-0.2126	-0.1959
t-statistics	(0.0884)	(0.2310)	(0.1980)	(-0.1020)	(0.4530)	(0.2160)	(0.5740)	(0.2930)	(0.0605)	(-0.2870)	(0.1710)	(0.1270)	(-0.4340)	(-0.4180)
TURN	0.7453 ***	0.6968 ***	0.7212 ***	0.5868 **	0.7935 ***	0.6853 **	0.8413 ***	0.7100 ***	0.7407 ***	0.5342 **	0.7609 ***	0.6508 **	0.5006 *	0.5791 **
t-statistics	(2.6700)	(2.5800)	(2.6600)	(2.1600)	(2.8800)	(2.4900)	(2.9900)	(2.6200)	(2.6600)	(1.9800)	(2.7500)	(2.4200)	(1.8600)	(2.1100)
THDUM	-0.0588 ***													
t-statistics	(-3.8800)													
MLDUM	-0.0875 ***													
t-statistics	(-7.9400)													
SPDUM	-0.0791 ***													
t-statistics	(-6.2100)													
EDEV		-0.0464 ***												
t-statistics		(-6.2600)												
LAW			0.0319 ***											
t-statistics			(7.7900)											
EFF				0.0006										
t-statistics				(0.3220)										
RULE					0.0214 ***									
t-statistics					(7.2500)									
CORR1						0.0123 ***								
t-statistics						(2.8400)								
CORR2							-0.0162 ***							
t-statistics							(-6.6800)							
EXP								0.0276 ***						
t-statistics								(5.2600)						
CRR									-0.0282 ***					
t-statistics									(-7.8500)					
SHR										-0.0077				
t-statistics										(-1.2700)				
OWN											-0.3432 ***			
t-statistics											(-7.9800)			
AUD												0.0950 ***		
t-statistics												(3.9500)		
ACC													-0.0026 ***	
t-statistics													(-2.6800)	
ANA														-0.0067 ***
t-statistics														(-7.5600)
Adj R^2	0.2041	0.1951	0.2001	0.1891	0.1992	0.1906	0.1988	0.1935	0.2043	0.1893	0.2042	0.1913	0.1903	0.2014
No. of obs.	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604

$$DEF_{i,t} = \alpha + \sum_{i=1} \beta_i FS_{i,t} + \beta_{+} country - specific\ factors + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2, Table 5.3 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.16 : Panel analysis of basic net debt issues model with firm-specific and country-specific effects: Whole sample period

	Country Dummies	Economic Development	Legal Enforcement						Legal Protection		Ownership Structure	Accounting and Asymmetric Information		
Equation	**Model-1**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**	**Model-8**	**Model-9**	**Model-10**	**Model-11**	**Model-12**	**Model-13**	**Model-14**
Constant	-0.0065	0.0027	0.0452 ***	0.0125 **	0.0441 ***	0.0252 ***	-0.0053	0.0551 ***	-0.0126	0.0104 *	-0.0302 **	0.0240 ***	0.0007	-0.0141
t-statistics	(-0.7720)	(0.3910)	(5.6400)	(2.3200)	(5.1700)	(3.2500)	(-00.6040)	(3.6900)	(-01.3800)	(1.7100)	(-02.3400)	(3.6000)	(0.0433)	(-1.5700)
DEF	0.1063 ***	0.1037 ***	0.1052 ***	0.1016 ***	0.1052 ***	0.1024 ***	0.1051 ***	0.1033 ***	0.1059 ***	0.1013 ***	0.1063 ***	0.1025 ***	0.1011 ***	0.1030 ***
t-statistics	(7.3200)	(7.2400)	(7.3100)	(7.1700)	(7.2600)	(7.1700)	(7.2400)	(7.2100)	(7.3700)	(7.1800)	(7.3600)	(7.2000)	(7.1900)	(7.3300)
THDUM	0.0170 ***													
t-statistics	(3.0600)													
MLDUM	0.0220 ***													
t-statistics	(4.2800)													
SPDUM	0.0204 ***													
t-statistics	(3.8400)													
EDEV		0.0104 ***												
t-statistics		(3.2000)												
LAW			-0.0078 ***											
t-statistics			(-3.9900)											
EFF				-0.0005										
t-statistics				(-0.9590)										
RULE					-0.0046 ***									
t-statistics					(-3.5300)									
CORR1						-0.0023 *								
t-statistics						(-1.8900)								
CORR2							0.0032 ***							
t-statistics							(3.3100)							
EXP								-0.0056 ***						
t-statistics								(-2.7400)						
CRR									0.0071 ***					
t-statistics									(4.3500)					
SHR										-0.0004				
t-statistics										(-0.3000)				
OWN											0.0864 ***			
t-statistics											(4.2800)			
AUD												-0.0202 **		
t-statistics												(-2.2800)		
ACC													0.0001	
t-statistics													(0.5210)	
ANA														0.0013 ***
t-statistics														(4.4500)
Adj R^2	0.0835	0.0805	0.0822	0.0787	0.0817	0.0792	0.0815	0.0800	0.0837	0.0786	0.0837	0.0793	0.0786	0.0814
No. of obs.	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096

$$\Delta D_{it} = \alpha + \beta_1 DEF_{it} + \beta_2 country-specific\ factors + \varepsilon_{it}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2, Table 5.3 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.17 : Panel analysis of basic net debt issues model with second-order of financing deficit with firm-specific and country-specific effects: Whole sample period

	Country Dummies	Economic Development	Legal Enforcement						Legal Protection		Ownership Structure	Accounting and Asymmetric Information		
Equation	**Model-1**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**	**Model-8**	**Model-9**	**Model-10**	**Model-11**	**Model-12**	**Model-13**	**Model-14**
Constant	-0.0189 ***	-0.0117 **	0.0334 ***	0.0021	0.0335 ***	0.0174 ***	-0.0191 ***	0.0529 ***	-0.0236 ***	0.0007	-0.0411 ***	0.0167 ***	0.0031	-0.0235 ***
t-statistics	(-3.1200)	(-2.2400)	(5.0000)	(0.4500)	(4.7800)	(2.6600)	(-03.0300)	(4.4100)	(-03.6000)	(0.1350)	(-04.4900)	(2.9100)	(0.2370)	(-3.5400)
DEF	0.3274 ***	0.3260 ***	0.3269 ***	0.3235 ***	0.3271 ***	0.3244 ***	0.3267 ***	0.3257 ***	0.3262 ***	0.3230 ***	0.3270 ***	0.3248 ***	0.3227 ***	0.3236 ***
t-statistics	(9.5700)	(9.4600)	(9.5300)	(9.3400)	(9.5300)	(9.3800)	(9.5200)	(9.4300)	(9.5400)	(9.3200)	(9.5700)	(9.3900)	(9.3100)	(9.4000)
DEF^2	-0.1664 ***	-0.1669 ***	-0.1667 ***	-0.1667 ***	-0.1668 ***	-0.1668 ***	-0.1667 ***	-0.1669 ***	-0.1662 ***	-0.1667 ***	-0.1663 ***	-0.1669 ***	-0.1666 ***	-0.1662 ***
t-statistics	(-5.7600)	(-5.7400)	(-5.7600)	(-5.7100)	(-5.7600)	(-5.7200)	(-5.7500)	(-5.7400)	(-5.7500)	(-5.7000)	(-5.7600)	(-5.7300)	(-5.7000)	(-5.7100)
THDUM	0.0177 ***													
t-statistics	(4.3400)													
MLDUM	0.0212 ***													
t-statistics	(5.6100)													
SPDUM	0.0161 ***													
t-statistics	(3.8900)													
EDEV		0.0122 ***												
t-statistics		(4.9400)												
LAW			-0.0081 ***											
t-statistics			(-5.6100)											
EFF				-0.0008 **										
t-statistics				(-2.1300)										
RULE					-0.0049 ***									
t-statistics					(-5.1700)									
CORR1						-0.0030 ***								
t-statistics						(-3.2700)								
CORR2							0.0033 ***							
t-statistics							(4.7400)							
EXP								-0.0069 ***						
t-statistics								(-4.4400)						
CRR									0.0064 ***					
t-statistics									(5.2700)					
SHR										-0.0015				
t-statistics										(-1.2600)				
OWN											0.0813 ***			
t-statistics											(5.4800)			
AUD												-0.0282 ***		
t-statistics												(-3.9600)		
ACC													-0.0001	
t-statistics													(-0.5590)	
ANA														0.0011 ***
t-statistics														(4.6500)
Adj R^2	0.2669	0.2650	0.2663	0.2628	0.2660	0.2635	0.2656	0.2645	0.2665	0.2626	0.2670	0.2639	0.2625	0.2644
No. of obs.	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096	7096

$$\Delta D_{it} = \alpha + \beta_1 DEF_{it} + \beta_2 DEF_{it}^{\,2} + \beta_3 country-specific\ factors + \varepsilon_{it}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2, Table 5.3 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.18 : Panel analysis of nesting first- and second-order of financing deficit conventional model with firm-specific and country-specific effects: Whole sample period

Equation	Country Dummies	Economic Development	Legal Enforcement						Legal Protection		Ownership Structure	Accounting and Asymmetric Information		
	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6	Model-7	Model-8	Model-9	Model-10	Model-11	Model-12	Model-13	Model-14
Constant	-0.0232 ***	-0.0210 ***	0.0080	-0.0154 ***	0.0061	-0.0073	-0.0241 ***	0.0196	-0.0276 ***	-0.0196 ***	-0.0382 ***	-0.0019	-0.0356 *	-0.0325 ***
t-statistics	(-3.6600)	(-3.7500)	(1.2300)	(-2.6700)	(0.8710)	(-0.8520)	(-03.5500)	(1.5300)	(-04.2500)	(-2.8600)	(-04.5700)	(-0.2960)	(-1.8900)	(-4.6400)
DTANG	0.0406 **	0.0412 **	0.0408 **	0.0419 **	0.0410 **	0.0418 **	0.0411 **	0.0414 **	0.0406 **	0.0419 **	0.0406 **	0.0416 **	0.0419 **	0.0410 **
t-statistics	(2.4400)	(2.4800)	(2.4500)	(2.5100)	(2.4600)	(2.5000)	(2.4700)	(2.4900)	(2.4400)	(2.5200)	(2.4400)	(2.5000)	(2.5100)	(2.4600)
DGROW	0.0019	0.0019	0.0019	0.0018	0.0019	0.0019	0.0019	0.0019	0.0019	0.0018	0.0019	0.0019	0.0018	0.0019
t-statistics	(1.3500)	(1.3200)	(1.3400)	(1.2700)	(1.3300)	(1.2800)	(1.3200)	(1.3100)	(1.3400)	(1.2700)	(1.3500)	(1.3000)	(1.2700)	(1.3200)
DSIZE	0.0044	0.0042	0.0044	0.0039	0.0043	0.0040	0.0043	0.0041	0.0045	0.0039	0.0045	0.0041	0.0039	0.0043
t-statistics	(1.0900)	(1.0400)	(01.0800)	(0.9650)	(01.0700)	(0.9830)	(01.0500)	(1.0200)	(01.1000)	(0.9610)	(01.1000)	(1.0000)	(0.9660)	(1.0600)
DPROF	-0.0357	-0.0365	-0.0361	-0.0367	-0.0365	-0.0369	-0.0367	-0.0367	-0.0360	-0.0365	-0.0360	-0.0367	-0.0364	-0.0356
t-statistics	(-1.0600)	(-1.0800)	(-1.0700)	(-1.0900)	(-1.0900)	(-1.0900)	(-1.0900)	(-1.0900)	(-1.0700)	(-1.0800)	(-1.0700)	(-1.0900)	(-1.0800)	(-1.0600)
AGE	0.0027 *	0.0026	0.0027 *	0.0025	0.0027 *	0.0026	0.0027 *	0.0026	0.0028 *	0.0025	0.0028 *	0.0026	0.0025	0.0026
t-statistics	(1.6700)	(1.6400)	(1.6800)	(1.5800)	(1.6900)	(1.6100)	(1.6900)	(1.6400)	(1.7200)	(1.5600)	(1.7200)	(1.6100)	(1.5700)	(1.6400)
BIG4	0.0037	0.0045 *	0.0044 *	0.0029	0.0047 *	0.0036	0.0045	0.0044	0.0037	0.0025	0.0040	0.0041	0.0024	0.0026
t-statistics	(1.3500)	(1.6900)	(1.7000)	(1.0400)	(1.7500)	(1.2800)	(1.6300)	(1.6200)	(1.4300)	(0.8990)	(1.5700)	(1.5400)	(0.8620)	(0.9950)
PMGMT	0.0160 *	0.0119	0.0134 *	0.0144 *	0.0109	0.0121	0.0103	0.0110	0.0146 *	0.0161 *	0.0139 *	0.0118	0.0166 **	0.0189 **
t-statistics	(1.8700)	(1.5000)	(1.6800)	(1.7200)	(1.3600)	(1.4700)	(1.2900)	(1.3800)	(1.8300)	(1.9100)	(1.7400)	(1.4700)	(1.9600)	(2.2500)
DSIGMA	0.2324 ***	0.2275 ***	0.2304 ***	0.2220 ***	0.2246 ***	0.2205 ***	0.2204 ***	0.2240 ***	0.2259 ***	0.2242 ***	0.2272 ***	0.2248 ***	0.2244 ***	0.2315 ***
t-statistics	(2.8700)	(2.8100)	(2.8500)	(2.7400)	(2.7800)	(2.7200)	(2.7300)	(2.7700)	(2.8000)	(2.7700)	(2.8100)	(2.7800)	(2.7700)	(2.8600)
DTURN	-0.0540	-0.0641	-0.0587	-0.0665	-0.0641	-0.0686	-0.0666	-0.0671	-0.0566	-0.0640	-0.0569	-0.0672	-0.0631	-0.0525
t-statistics	(-0.5050)	(-0.6050)	(-0.5520)	(-0.6260)	(-0.6050)	(-0.6480)	(-0.6300)	(-0.6340)	(-0.5310)	(-0.6010)	(-0.5340)	(-0.6350)	(-0.5920)	(-0.4890)
DEF	0.5078 ***	0.5074 ***	0.5080 ***	0.5055 ***	0.5079 ***	0.5061 ***	0.5075 ***	0.5071 ***	0.5077 ***	0.5052 ***	0.5081 ***	0.5067 ***	0.5052 ***	0.5066 ***
t-statistics	(20.3000)	(20.3000)	(20.3000)	(20.1000)	(20.4000)	(20.2000)	(20.3000)	(20.3000)	(20.3000)	(20.0000)	(20.4000)	(20.2000)	(20.0000)	(20.2000)
DEF^2	-0.3127 ***	-0.3133 ***	-0.3129 ***	-0.3136 ***	-0.3131 ***	-0.3136 ***	-0.3132 ***	-0.3135 ***	-0.3126 ***	-0.3136 ***	-0.3126 ***	-0.3136 ***	-0.3136 ***	-0.3128 ***
t-statistics	(-8.7100)	(-8.7200)	(-8.7200)	(-8.6900)	(-8.7200)	(-8.7100)	(-8.7200)	(-8.7200)	(-8.7100)	(-8.6900)	(-8.7100)	(-8.7200)	(-8.6900)	(-8.6900)
THDUM	0.0061													
t-statistics	(1.4000)													
MLDUM	0.0131 ***													
t-statistics	(4.2800)													
SPDUM	0.0072 *													
t-statistics	(1.9500)													
EDEV		0.0080 ***												
t-statistics		(3.5000)												
LAW			-0.0052 ***											
t-statistics			(-4.3200)											
EFF				0.0000										
t-statistics				(0.0722)										
RULE					-0.0029 ***									
t-statistics					(-3.3700)									
CORR1						-0.0012								
t-statistics						(-0.9770)								
CORR2							0.0018 **							
t-statistics							(2.5600)							
EXP								-0.0043 ***						
t-statistics								(-2.6800)						
CRR									0.0038 ***					
t-statistics									(3.8500)					
SHR										0.0014				
t-statistics										(0.8330)				
OWN											0.0485 ***			
t-statistics											(4.0700)			
AUD												-0.0187 **		
t-statistics												(-2.5100)		
ACC													0.0003	
t-statistics													(1.0900)	
ANA														0.0009 ***
t-statistics														(4.0300)
Adj R^2	0.4991	0.4983	0.4990	0.4969	0.4984	0.4970	0.4979	0.4978	0.4989	0.4970	0.4991	0.4976	0.4971	0.4988
No. of obs.	4324	4324	4324	4324	4324	4324	4324	4324	4324	4324	4324	4324	4324	4324

$$\Delta D_{it} = \alpha + \beta_{1} DEF_{it} + \beta_{2} DEF_{it}^{2} + \sum \beta_k \Delta FS_{k,it} + \beta_{k+1} country-specific\ factors + \varepsilon_{it}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2, Table 5.3 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

The results from Table 5.15 show that firms in countries with high levels of ***legal enforcement*** tend to have higher financing deficits or higher need for external finance.[132] Tables 5.16 to 5.18 show that the stronger the legal enforcement, the higher use of equity or the lower use of debt. ***Legal protection*** also plays a significant role in determining the source of finance. Table 5.15 shows that when CRR is low, financing deficit is high. This is still puzzling because financing deficit should be high when creditors are most protected. However, the negative relationship found between CRR and financing deficit is consistent with other measures for firms in developed countries and in countries with strong legal enforcement. As expected, the coefficient of SHR is insignificant. The results from Tables 5.16 to 5.18 show a positive relationship between CRR and net debt issues and a negative but insignificant relationship between SHR and net debt issues. The results show that the higher creditor rights, the greater use of debt issues compared with equity issues.

As expected, ***ownership structure*** is found to be negatively related to financing deficits as shown in Table 5.15 suggesting that firms with highly concentrated ownership prefer to use internal finance to avoid control dilution. When there is a choice between debt and equity, firms with high ownership concentration issue more debt to avoid control dilution from issuing equity leading to a positive relationship between OWN and net debt issues as shown in Tables 5.16 to 5.18. The results also show that ***accounting and asymmetric information*** is also a significant factor. Levels of asymmetric information and adverse selection costs are lower for firms with high involvement of auditors leading these firms to prefer internal to external finance as shown in Table 5.15. The results from Tables 5.16 to 5.18 show that AUD is negatively related to net debt issues as expected. Tables 5.15 to 5.18 also show that the fewer important items included in the annual report (ACC), the higher the asymmetric

[132] This is in exception for EFF whose estimated coefficient is not significant which may be due to the fact that the indicators for EFF are quite close among Singapore, Malaysia and Australia; therefore, the distinct pattern cannot be detected.

information and adverse selection costs leading firms in countries with low rating score to rely more on internal finance and if firms have to choose among external finance, debt should be preferred to equity. However, the coefficient is not significant for external finance regression. Finally, as firms in countries that have higher average numbers of analysts (ANA) have higher information asymmetries and adverse selection costs because of higher dispersion of opinion, they prefer external to internal finance as supported by the results from Table 5.15. The results from Tables 5.16 to 5.18 also show that for firms in countries that have high average numbers of analysts, debt is in more use than equity.

In summary, the results show that country-specific factors do play an important role in influencing the pattern of firms' financing behaviour in moving away from or toward the predictions of the pecking order theory. By focusing on the context that takes into account only firm-specific variables, the important key issues of why firms in different countries with different institutions do not behave in the same way and why there are such variations among sample countries are left out. By adding country-specific factors to the model, it is found that firms in this region do adhere to the pecking order theory to some extent and their deviation from the pecking order theory is partly due to the circumstances and settings they are operating in. The results show that firms in countries with high legal enforcement, low creditors' legal protection, developed economy, high auditors' involvement, and low average number of analysts appear to have higher need for external finance and they tend to deviate from the pecking order theory by preferring equity to debt when considering the choice of external finance. This emphasizes the importance of country-specific factors that have not been explored much in the literature in the context of the test of the pecking order theory.

5.6.2 Predictive Logistic Regressions

There are three main purposes of the use of logistic regression. First, examining only equation (5.4) does not give the whole picture of the relationship between firms' financing behaviour and the predictions of the pecking order theory because it is possible for net debt issues and net equity issues to be in opposite directions which can mislead the results. By using logistic regression, this problem is avoided. Second, the logistic regressions can be used as an indirect test of the order of financing decisions. Previous studies have overlooked the significance of financing hierarchies by focusing on the choice between debt and equity issues only. By studying mild and strong deviations, the focus of the analysis lies equally between the first tier of pecking order (internal versus external finance) and the second tier of pecking order (debt versus equity). Finally, logistic regressions can be used as robustness tests to confirm the conclusion from the main regression (equation (5.4)) as to whether firms in the Asia Pacific region do behave in the manner predicted by the multi-period pecking order theory. In particular, when asymmetric information or adverse selection costs are low, firms would prefer to deviate from the pecking order theory because they expect adverse selection costs to be higher in the future. The logistic results reveal what type of factors lead firms to need external finance (mild deviation, DEF > 0) and to go to the extent by issuing equity (strong deviation, $\Delta E > 0$).

Tables 5.19 and 5.20 present the results of logistic regressions for the mild and strong deviations, respectively.[133] The results from Tables 5.19 and 5.20 show that linear analysis results (as in Table 5.6) might be misleading and that logistic regression shows a better picture. Linear analysis (from Table 5.6) shows that ***asset tangibility***

[133] Autore and Kovacs (2005) lag all their independent variables due to the predictive nature of estimation. Therefore, the use of lagged independent variables has also been explored. However, there are no major and significant changes of the conventional coefficients between the regressions with lagged or with level terms and the additional factors are in some cases more significant with level terms than with lagged terms. Therefore, only the results using level terms instead of the lagged terms are reported in order to increase the degrees of freedom.

(TANG) has no influence on the choice of internal versus external finance. However, the results from Tables 5.19 and 5.20 reveal that TANG is one of the main driving forces that lead Thai, Malaysian and Singaporean firms to deviate slightly from the pecking order theory. On the other hand, TANG is not important enough for these firms to strongly deviate from the pecking order by issuing equity. Consistent with Autore and Kovacs (2005), firms with more collateral have more debt capacity and are less likely to deviate from the pecking order theory in a strong form.

Consistent with the test of internal versus external finance from Table 5.6 and with the predictions of the pecking order theory, logistic results show that Thai and Singaporean firms are more likely to deviate from the pecking order when their ***growth opportunity*** is high. A mild deviation is found for Thai firms while strong deviation is found for both Thai and Singaporean firms. When considering sub-samples, the coefficient is higher for the post-crisis period. The results from Tables 5.19 and 5.20 confirm the results in Table 5.6 and Table 5.11 that growth opportunity does not have any material effect on firms in other countries. The results from logistic regression reveal that ***firm size*** is one of the main factors that drive firms to deviate from both the mild and strong pecking order theories for firms in this region (a significant relationship is not detected for Thailand and Malaysia with linear analysis as shown in Table 5.6). Consistent with Autore and Kovacs (2005), large firms have higher debt capacities so they tend to deviate more than small firms from the mild pecking order theory. However, the results from Tables 5.19 and 5.20 also show that large firms in this region go to further lengths by deviating from the pecking order theory in a strong form because large firms also have higher access to equity markets.

Table 5.19 : Predictive logistic regression analysis of mild deviation from the pecking order theory

Equation	Thailand			Malaysia			Singapore			Australia		
	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)	Full Sample (1993 - 2001)	Pre-Crisis (1993 - 1996)	Post-Crisis (1998 - 2001)
Constant	-2.9615 ***	-2.3962	-5.5610 ***	-3.5488 ***	-5.0579 ***	-3.6254 ***	-1.2300	-4.1272 **	-1.0989	2.0059 ***	5.3783 ***	1.3660 **
t-statistics	(-2.7800)	(-1.1700)	(-3.1900)	(-6.4700)	(-3.9300)	(-5.2900)	(-1.5300)	(-1.9800)	(-1.1100)	(4.1000)	(2.9600)	(2.4400)
TANG	0.9186 ***	0.8015	1.4015 ***	0.1648	0.1262	0.5243 **	0.6956 **	0.7330	0.7294 *	-0.2255	-1.3230 *	-0.1446
t-statistics	(2.6500)	(1.3000)	(2.7400)	(0.7960)	(0.3000)	(1.9600)	(2.1400)	(0.9500)	(1.8300)	(-0.7740)	(-1.6700)	(-0.4220)
Wald Test			<7.5025> ***			<3.8306> *			<3.3672> *			<11.8143> ***
GROW	0.1971 *	0.1478	0.4018 *	-0.0642 *	-0.0262	-0.0812	-0.0234	-0.1307	0.1099	0.0273	-0.1622	0.0320
t-statistics	(1.8400)	(0.9510)	(1.8700)	(-1.8800)	(-0.6280)	(-0.9930)	(-0.2560)	(-0.7760)	(0.8100)	(1.0100)	(-0.9500)	(1.1200)
Wald Test			<3.4840> *			<0.9855>			<0.6563>			<1.2625>
SIZE	0.2225 ***	0.2333 *	0.1863 *	0.3936 ***	0.5171 ***	0.3243 ***	0.2077 ***	0.4457 ***	0.1409 *	-0.0634 *	-0.1316	-0.0529
t-statistics	(3.2500)	(1.8300)	(1.8600)	(10.1000)	(5.7600)	(6.7100)	(3.3400)	(2.7600)	(1.9200)	(-1.9100)	(-1.3300)	(-1.3400)
Wald Test			<0.2211>			<15.9109> ***			<17.2387> ***			<1.7971>
PROF	-2.5600 ***	-3.2102	-3.1070 **	-0.8617 **	-8.6587 ***	0.0572	-0.2096	-2.3849	-0.4305	-0.2705	1.1920	-0.2779
t-statistics	(-2.6600)	(-1.3400)	(-2.5700)	(-1.9600)	(-5.0600)	(0.1020)	(-0.2610)	(-0.9510)	(-0.4810)	(-0.9580)	(0.9530)	(-0.8930)
Wald Test			<6.5963> **			<242.6720> ***			<0.2318>			<0.7981>
AGE	-0.2683 *	-0.2760	0.3636	-0.3824 ***	-0.5264 ***	-0.3753 ***	-0.3376 ***	-0.3523	-0.3506 ***	-0.1107	-0.0344	-0.0849
t-statistics	(-1.7500)	(-1.2000)	(1.2000)	(-5.5700)	(-3.2500)	(-4.4000)	(-4.0500)	(-1.4800)	(-3.6400)	(-1.6000)	(-0.2160)	(-1.0200)
Wald Test			<1.4443>			<3.1430> *			<13.2617> ***			<1.0335>
BIG4	0.1497	0.1865	0.2914	-0.2300 **	0.0731	-0.2194 *	0.2121	0.4714	0.1852	-0.1788	-1.2274	-0.1141
t-statistics	(0.9120)	(0.6940)	(1.1600)	(-2.2500)	(0.3120)	(-1.7500)	(1.1900)	(1.2700)	(0.8360)	(-0.9230)	(-1.3700)	(-0.5380)
Wald Test			<1.3512>			<3.0775> *			<0.6992>			<0.2893>
PMCMT	-0.9880 **	-1.8890 **	0.0792	-0.1495	-0.4038	-0.3116	0.3234	1.0707	0.0000	-1.2781 **	-2.2267	-0.8968
t-statistics	(-2.0400)	(-2.1400)	(0.1140)	(-0.3440)	(-0.4010)	(-0.5840)	(0.5370)	(0.7140)	(0.0000)	(-2.3100)	(-1.5700)	(-1.3800)
Wald Test			<7.9555> ***			<0.3410>			<0.0000>			<1.9076>
SIGMA	-2.6194	-28.9960	1.9278	2.4897	18.1780	0.0643	-8.6573 *	-13.1621	-6.6861	-0.8263	-30.1520 **	2.2505
t-statistics	(-0.5590)	(-1.4600)	(0.3750)	(0.6460)	(1.3200)	(0.0141)	(-1.7200)	(-0.5640)	(-1.2100)	(-0.2570)	(-2.0200)	(0.6000)
Wald Test			<0.1405>			<0.0002>			<1.4649>			<74.5809> ***
TURN	2.0125	7.3803	-0.2513	17.8836 ***	6.4109	26.8518 **	35.3506 ***	28.3168 *	40.1646 ***	33.9538	-33.0227	44.2272
t-statistics	(0.5440)	(0.8640)	(-0.0546)	(3.1300)	(1.0200)	(2.3800)	(3.3300)	(1.6600)	(2.9700)	(1.4600)	(-0.6710)	(1.5200)
Wald Test			<0.0030>			<5.6622> **			<0.7689>			<2.3216>
No. of obs.	885	315	461	2313	577	1476	1045	244	693	1361	288	940

$$LOG(DEF_{i,t} > 0) = \alpha + \sum_{k=1} \beta_k FS_{k,i,t} + e_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.20 : Predictive logistic regression analysis of strong deviation from the pecking order theory

Equation	Thailand Full Sample (1993 - 2001)	Thailand Pre-Crisis (1993 - 1996)	Thailand Post-Crisis (1998 - 2001)	Malaysia Full Sample (1993 - 2001)	Malaysia Pre-Crisis (1993 - 1996)	Malaysia Post-Crisis (1998 - 2001)	Singapore Full Sample (1993 - 2001)	Singapore Pre-Crisis (1993 - 1996)	Singapore Post-Crisis (1998 - 2001)	Australia Full Sample (1993 - 2001)	Australia Pre-Crisis (1993 - 1996)	Australia Post-Crisis (1998 - 2001)
Constant	-5.9116 ***	-4.2418 *	-6.7629 ***	-4.3199 ***	-6.2569 ***	-4.2712 ***	-3.0799 ***	-4.7734 **	-3.2991 ***	0.6488	2.7030	0.9279 *
t-statistics	(-4.3200)	(-1.7700)	(-2.8200)	(-7.3500)	(-4.6600)	(-5.7200)	(-3.7600)	(-2.4300)	(-3.1100)	(1.3500)	(1.5900)	(1.7000)
TANG	0.5418	0.3526	0.2289	-0.1248	-0.0268	0.2365	-0.2982	0.5609	-0.2920	-0.9607 ***	-1.7263 **	-0.7092 **
t-statistics	(1.2700)	(0.5240)	(0.3390)	(-0.5730)	(-0.0639)	(0.8150)	(-0.9220)	(0.7820)	(-0.7130)	(-3.2800)	(-2.1500)	(-2.0900)
Wald Test			<0.1150>			<0.6644>			<0.5090>			<8.9579> ***
GROW	0.2552 **	0.4145 **	0.7038 **	-0.1336 ***	-0.0616	-0.1688	0.2131 **	0.2561	0.5036 ***	0.0353	-0.1713	0.0330
t-statistics	(2.0100)	(2.5500)	(2.2400)	(-2.5800)	(-1.1500)	(-1.4600)	(2.0800)	(1.4000)	(3.0400)	(1.3100)	(-1.0300)	(1.1800)
Wald Test			<0.8476>			<2.1181>			<9.2528> ***			<1.3822>
SIZE	0.3247 ***	0.1574	0.3221 **	0.4099 ***	0.5685 ***	0.3464 ***	0.2021 ***	0.2907 **	0.1974 **	-0.0047	-0.0873	-0.0177
t-statistics	(3.7800)	(1.0800)	(2.3900)	(9.8700)	(6.0500)	(6.6200)	(3.2500)	(1.9600)	(2.5500)	(-0.1420)	(-0.8900)	(-0.4520)
Wald Test			<5.7333> **			<17.9991> ***			<1.4481>			<0.2045>
PROF	-2.5821 **	-5.4930 **	-1.3667	0.6090	-3.4731 **	2.2901 ***	-0.1637	0.3091	-0.8064	-0.7428 **	-0.5501	-0.6211 *
t-statistics	(-2.1500)	(-1.9900)	(-0.8580)	(1.0200)	(-2.0800)	(2.6600)	(-0.2010)	(0.1260)	(-0.8680)	(-2.4600)	(-0.4940)	(-1.9500)
Wald Test			<6.7060> ***			<44.9097> ***			<0.7539>			<3.7872> *
BIG4	0.4820 **	0.1981	1.1388 ***	-0.2386 **	0.1567	-0.3531 ***	0.4607 **	0.2762	0.4882 **	0.1777	-0.1362	0.1234
t-statistics	(2.3000)	(0.6420)	(3.1400)	(-2.2000)	(0.6710)	(-2.5900)	(2.5100)	(0.7370)	(2.0600)	(0.9410)	(-0.1850)	(0.5980)
Wald Test			<9.8292> ***			<6.7015> ***			<4.2238> **			<0.3577>
AGE	-0.2191	-0.2719	-0.1457	-0.1859 ***	-0.4249 ***	-0.0124	-0.0491	0.0031	-0.0782	0.0976	0.2737 *	0.0524
t-statistics	(-1.1500)	(-1.0500)	(-0.3630)	(-2.6100)	(-2.7400)	(-0.1350)	(-0.5980)	(0.0145)	(-0.7920)	(1.4100)	(1.7300)	(0.6290)
Wald Test			<0.1318>			<20.1567> ***			<0.6275>			<7.0574> ***
PMGMT	-2.1325 ***	-0.8446	-4.7011 ***	1.2035 ***	0.4774	1.0861 *	0.1475	0.6472	-0.3109	-1.9081 ***	-3.2414 **	-1.5942 **
t-statistics	(-3.0000)	(-0.8310)	(-3.5600)	(2.6800)	(0.4890)	(1.9400)	(0.2430)	(0.4760)	(-0.4090)	(-3.2100)	(-2.0300)	(-2.3700)
Wald Test			<12.6660> ***			<3.7640> *			<0.1674>			<5.9963> **
SIGMA	2.0310	27.3462	-2.6362	-13.8585 ***	-1.5186	-21.0598 ***	-11.6941 **	8.3223	-12.2168 **	-7.0294 **	-33.5363 **	-5.6539
t-statistics	(0.3350)	(1.2500)	(-0.3530)	(-3.1100)	(-0.1120)	(-3.8500)	(-2.1600)	(0.3650)	(-1.9900)	(-2.1700)	(-2.2200)	(-1.5900)
Wald Test			<0.1246>			<14.8489> ***			<3.9450> **			<61.1417> ***
TURN	10.1838 **	-6.3331	13.9129 ***	17.1382 ***	5.3807	63.7301 ***	37.2001 ***	16.3096	42.7897 ***	88.6450 ***	83.1409	107.0660 ***
t-statistics	(2.5000)	(-0.6580)	(2.6000)	(3.5400)	(1.0300)	(4.8200)	(3.7200)	(1.2100)	(3.2200)	(3.2300)	(1.4300)	(3.0800)
Wald Test			<6.7408> ***			<23.2409> ***			<10.3808> ***			<9.4913> ***
No. of obs.	885	315	461	2313	577	1476	1045	244	693	1361	288	940

$$LOG(\Delta E_{i,t} > 0) = \alpha + \sum_{i=1} \beta_i FS_{i,j,t} + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2 and Section 5.3 for the definition of the variables. Wald test (chi-square distributed with 1 degree of freedom) is used to find whether the differences of the coefficients between pre- and post-crisis periods are statistically significant or not.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Consistent with Autore and Kovacs (2005), logistic results show that firms with more ***profitability*** are less likely to access external finance because they have enough financial slack. In particular, more profitable Australian firms tend to deviate from the pecking order theory in a strong form, especially for the post-crisis period, suggesting that Australian firms' behaviour is moving away from the pecking order. Profitability does not seem to have much influence on the probability of Singaporean firms. ***Firm age*** is also found to influence the deviation from the theory. Young Malaysian firms deviate the most from the pecking order theory in both mild and strong forms while young Thai and Singaporean firms deviate mildly from the pecking order. The results show that young firms are more likely to have high need of external finance because they have accumulated less retained earnings.

Tables 5.19 and 5.20 show that there is variation on how ***the level of asymmetric information*** influences deviation from the pecking order. Thai and Singaporean firms who are involved with good quality auditors tend to issue more equity; therefore, they deviate more in a strong form. This is in line with the prediction of the multi-period pecking order that equity would be optimal when adverse selection cost is low because when level of asymmetric information is low, the adverse selection cost tends to be low. However, the opposite pattern is found for Malaysian firms. Malaysian firms without good quality auditors tend to deviate in both mild and strong forms. On the other hand, BIG4 has no influence on deviation from the pecking order for Australian firms.

When firms have a high proportion of management vested in the same family (***management team involvement***), they tend to follow more strictly the expectations of pecking order theory in order to avoid dilution of control. This is supported by the evidence from Tables 5.19 and 5.20 for Thailand and Australia where a negative relationship is found for both mild and strong deviations. In addition, consistent with the multi-period pecking order theory, the results show that firms are more likely to deviate from pecking order when ***adverse selection costs*** are low. Adverse selection cost is found to play a greater role in strong than in mild deviation. When adverse selection cost is low, firms are likely to go for high-risk sources of finance such as equity. ***Trading activity*** is another main factor that leads firms to deviate from the pecking order in both mild and strong forms. The results show that when trading activity is high, firms have more access to external finance leading them to have higher probabilities of deviating from the pecking order. The coefficients are also more significant for the post-crisis period.

As in Section 5.5.4, all observations from each country over the sample period are combined and the logistic regressions (equation (5.13) and equation (5.14)) are estimated again by adding country dummies which are replaced with other country-specific factors one at a time. The results are summarized in Tables 5.21 and 5.22 for mild and strong deviations, respectively. All country dummies are found to be significant for both mild and strong deviations confirming that country-specific factors play an important role in steering firms' behaviour away from the predictions of the pecking order theory. The results show that country-specific factors are the main driving forces that lead firms in each country to deviate from the pecking order theory. In particular, these country-specific factors play a greater role for strong deviation than for mild deviation as shown by the higher significance levels and larger coefficients for the strong deviation regressions. The results show that ***economic development*** is a key factor that influences deviation from the theory. Firms in developed countries are likely to deviate from the pecking order theory in both mild and strong forms because they have better access to external finance, especially to equity markets. Also firms in developed economies have better growth opportunities leading them to have higher need for external sources of finance.

Table 5.21 : Predictive logistic regression analysis of mild deviation from the pecking order theory with country-specific factors

	Country Dummies	Economic Development	Legal Enforcement						Legal Protection		Ownership Structure	Accounting and Asymmetric Information		
Equation	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6	Model-7	Model-8	Model-9	Model-10	Model-11	Model-12	Model-13	Model-14
Constant	0.1379	0.7624 ***	-0.6125 **	-1.8791 ***	-1.7956 ***	-3.7303 ***	0.8655 ***	-4.2279 ***	1.4561 ***	-1.7770 ***	1.9082 ***	-1.4174 ***	-4.9241 ***	1.3190 ***
t-statistics	(0.4980)	(3.0200)	(-1.9700)	(-5.1400)	(-5.0700)	(-8.1500)	(3.4300)	(-8.0800)	(5.6100)	(-4.5100)	(6.9100)	(-4.0900)	(-6.6000)	(4.4200)
TANG	0.1600	0.0275	0.0150	0.0622	0.1039	0.1284	0.1531	0.0717	-0.0191	0.0093	0.0110	0.0111	-0.0300	-0.1038
t-statistics	(1.2600)	(0.2210)	(0.1200)	(0.4960)	(0.8270)	(1.0200)	(1.2100)	(0.5720)	(-0.1540)	(0.0749)	(0.0880)	(0.0891)	(-0.2420)	(-0.8430)
GROW	0.0006	0.0082	0.0042	0.0050	0.0013	0.0034	-0.0047	0.0080	-0.0008	0.0048	-0.0008	0.0116	0.0087	0.0051
t-statistics	(0.0394)	(0.5240)	(0.2700)	(0.3230)	(0.0825)	(0.2180)	(-0.2970)	(0.5100)	(-0.0503)	(0.3070)	(-0.0517)	(0.7370)	(0.5590)	(0.3310)
SIZE	0.1304 ***	0.0628 ***	0.0384 **	0.1274 ***	0.0765 ***	0.1384 ***	0.0950 ***	0.0916 ***	0.0178	0.1054 ***	0.0260	0.0771 ***	0.0967 ***	0.0104
t-statistics	(6.5800)	(3.6300)	(2.2800)	(6.4800)	(4.3400)	(7.0600)	(5.2400)	(5.0800)	(1.0700)	(5.4500)	(1.5600)	(4.3500)	(5.0400)	(0.6150)
PROF	-0.7345 ***	-0.6632 ***	-0.6265 ***	-0.8131 ***	-0.6438 ***	-0.7794 ***	-0.6632 ***	-0.6942 ***	-0.6267 ***	-0.8106 ***	-0.6156 ***	-0.7065 ***	-0.8158 ***	-0.6810 ***
t-statistics	(-3.4300)	(-3.1700)	(-2.9900)	(-3.8300)	(-3.0500)	(-3.6600)	(-3.1100)	(-3.3000)	(-2.9900)	(-3.8400)	(-2.9400)	(-3.3800)	(-3.8800)	(-3.2700)
AGE	-0.2926 ***	-0.2636 ***	-0.2616 ***	-0.2872 ***	-0.2759 ***	-0.2919 ***	-0.2890 ***	-0.2722 ***	-0.2628 ***	-0.2814 ***	-0.2648 ***	-0.2640 ***	-0.2744 ***	-0.2537 ***
t-statistics	(-7.9100)	(-7.2200)	(-7.1900)	(-7.8400)	(-7.5200)	(-7.9200)	(-7.8500)	(-7.4200)	(-7.2500)	(-7.7200)	(-7.2900)	(-7.2300)	(-7.5400)	(-7.0400)
BIG4	-0.0476	0.0495	0.0938	-0.0202	0.0283	-0.0529	0.0097	0.0023	0.1464 **	0.0255	0.1256 *	0.0295	0.0369	0.1691 ***
t-statistics	(-0.6970)	(0.7430)	(1.4200)	(-0.2960)	(0.4230)	(-0.7730)	(0.1450)	(0.0346)	(2.2400)	(0.3780)	(1.9100)	(0.4400)	(0.5480)	(2.5900)
PMGMT	-0.5460 **	-0.9241 ***	-1.0169 ***	-0.4985 **	-0.8372 ***	-0.4880 **	-0.7026 ***	-0.7853 ***	-1.0476 ***	-0.5768 **	-1.0286 ***	-0.8555 ***	-0.6415 ***	-1.0793 ***
t-statistics	(-2.3100)	(-4.0200)	(-4.4300)	(-2.1100)	(-3.6400)	(-2.0700)	(-3.0300)	(-3.4000)	(-4.5700)	(-2.4400)	(-4.4900)	(-3.7100)	(-2.7200)	(-4.6700)
SIGMA	-0.0062	-3.3643 *	-4.3541 **	-0.5342	-2.4237	0.1746	-1.4046	-2.0174	-5.2728 ***	-1.6341	-4.8130 ***	-2.8900	-2.2083	-6.0229 ***
t-statistics	(-0.0033)	(-1.8700)	(-2.4300)	(-0.2880)	(-1.3400)	(0.0942)	(-0.7690)	(-1.1100)	(-2.9500)	(-0.8850)	(-2.6900)	(-1.6000)	(-1.2000)	(-3.3500)
TURN	8.4175 ***	5.8181 **	5.3936 **	7.7869 ***	6.7852 ***	8.4027 ***	7.7265 ***	6.6955 ***	4.9860 **	6.9848 ***	5.3181 **	5.9165 **	6.3605 **	4.1136 *
t-statistics	(3.2800)	(2.3800)	(2.2200)	(3.0500)	(2.7400)	(3.2700)	(3.0600)	(2.7000)	(2.0600)	(2.7600)	(2.1900)	(2.4100)	(2.5400)	(1.7100)
THDUM	-1.4684 ***													
t-statistics	(-12.1000)													
MLDUM	-0.6991 ***													
t-statistics	(-8.8600)													
SPDUM	-0.3137 ***													
t-statistics	(-3.3800)													
EDEV		-0.6376 ***												
t-statistics		(-10.1000)												
LAW			0.2845 ***											
t-statistics			(8.8900)											
EFF				0.1771 ***										
t-statistics				(10.9000)										
RULE					0.2580 ***									
t-statistics					(11.3000)									
CORR1						0.4289 ***								
t-statistics						(12.4000)								
CORR2							-0.2115 ***							
t-statistics							(-11.8000)							
EXP								0.5055 ***						
t-statistics								(11.4000)						
CRR									-0.1520 ***					
t-statistics									(-6.2900)					
SHR										0.4604 ***				
t-statistics										(9.1600)				
OWN											-2.2741 ***			
t-statistics											(-7.7000)			
AUD												2.1532 ***		
t-statistics												(10.2000)		
ACC													0.0668 ***	
t-statistics													(8.4500)	
AUD														-0.0115 *
t-statistics														(-1.8100)
No. of obs.	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604

$$LOG(DEF_{it} > 0) = \alpha + \sum_{i=1} \beta_i FS_{i,t} + \beta_{i+1} country - specific\ factors + \varepsilon_{i,t}$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found. See Table 5.2, Table 5.3 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

Table 5.22 : Predictive logistic regression analysis of strong deviation from the pecking order theory with country-specific factors

	Country Dummies	Economic Development	Legal Enforcement						Legal Protection		Ownership Structure	Accounting and Asymmetric Information		
Equation	**Model-1**	**Model-2**	**Model-3**	**Model-4**	**Model-5**	**Model-6**	**Model-7**	**Model-8**	**Model-9**	**Model-10**	**Model-11**	**Model-12**	**Model-13**	**Model-14**
Constant	-0.8727 ***	-0.0835	-2.2783 ***	-4.1486 ***	-4.0200 ***	-7.0738 ***	0.1036	-7.3011 ***	1.0925 ***	-3.9235 ***	1.7971 ***	-3.0611 ***	-8.1573 ***	1.1176 ***
t-statistics	(-3.0100)	(-0.3170)	(-6.9900)	(-10.5000)	(-10.8000)	(-14.3000)	(0.3900)	(-13.5000)	(4.0900)	(-9.2800)	(6.3600)	(-8.5000)	(-10.1000)	(3.6800)
TANG	-0.4969 ***	-0.7051 ***	-0.6993 ***	-0.6727 ***	-0.5807 ***	-0.5732 ***	-0.5009 ***	-0.6558 ***	-0.7197 ***	-0.7441 ***	-0.6832 ***	-0.7447 ***	-0.8055 ***	-0.8536 ***
t-statistics	(-3.7300)	(-5.4300)	(-5.4000)	(-5.1400)	(-4.4200)	(-4.3400)	(-3.7800)	(-5.0200)	(-5.5900)	(-5.7400)	(-5.2800)	(-5.7500)	(-6.2500)	(-6.7100)
GROW	0.0160	0.0317 *	0.0256	0.0256	0.0213	0.0238	0.0114	0.0315 *	0.0158	0.0247	0.0166	0.0360 **	0.0306 *	0.0249
t-statistics	(0.9740)	(1.9300)	(1.5500)	(1.6100)	(1.2900)	(1.4700)	(0.6930)	(1.9200)	(0.9730)	(1.5700)	(1.0200)	(2.2000)	(1.9400)	(1.5500)
SIZE	0.1716 ***	0.0757 ***	0.0432 **	0.1654 ***	0.0989 ***	0.1829 ***	0.1260 ***	0.1144 ***	0.0099	0.1311 ***	0.0241	0.0903 ***	0.1112 ***	-0.0098
t-statistics	(8.3000)	(4.2200)	(2.4800)	(8.1100)	(5.3800)	(8.9300)	(6.6300)	(6.0900)	(0.5780)	(6.5900)	(1.4000)	(4.9200)	(5.6400)	(-0.5690)
PROF	-0.7473 ***	-0.6865 ***	-0.6230 ***	-0.8982 ***	-0.6348 ***	-0.8298 ***	-0.6513 ***	-0.7224 ***	-0.6079 ***	-0.9098 ***	-0.5912 ***	-0.7549 ***	-0.9174 ***	-0.7095 ***
t-statistics	(-3.5000)	(-3.3000)	(-2.9900)	(-4.2400)	(-3.0200)	(-3.9100)	(-3.0700)	(-3.4500)	(-2.9100)	(-4.3000)	(-2.8300)	(-3.6200)	(-4.3500)	(-3.4100)
AGE	-0.1158 ***	-0.0688 *	-0.0673 *	-0.1065 ***	-0.0869 **	-0.1110 ***	-0.1076 ***	-0.0798 **	-0.0727 **	-0.0994 ***	-0.0742 **	-0.0690 *	-0.0874 **	-0.0589
t-statistics	(-3.0900)	(-1.8700)	(-1.8300)	(-2.8900)	(-2.3400)	(-2.9900)	(-2.8800)	(-2.1600)	(-1.9800)	(-2.7100)	(-2.0200)	(-1.8800)	(-2.4000)	(-1.6300)
BIG4	0.1103	0.2447 ***	0.3009 ***	0.1499 **	0.2070 ***	0.0980	0.1792 **	0.1817 **	0.3774 ***	0.2203 ***	0.3450 ***	0.2276 ***	0.2467 ***	0.4226 ***
t-statistics	(1.5100)	(3.4600)	(4.2900)	(2.0700)	(2.9000)	(1.3500)	(2.5000)	(2.5400)	(5.4300)	(3.0900)	(4.9400)	(3.2000)	(3.4700)	(6.1200)
PMGMT	-0.7207 ***	-1.2894 ***	-1.4138 ***	-0.6760 ***	-1.1465 ***	-0.6594 **	-0.9457 ***	-1.1015 ***	-1.4680 ***	-0.8006 ***	-1.4317 ***	-1.2173 ***	-0.9450 ***	-1.5705 ***
t-statistics	(-2.7900)	(-5.1400)	(-5.6500)	(-2.6100)	(-4.5600)	(-2.5600)	(-3.7300)	(-4.3600)	(-5.8600)	(-3.0900)	(-5.7200)	(-4.8300)	(-3.6700)	(-6.2300)
SIGMA	-6.3842 ***	-11.3688 ***	-12.6658 ***	-7.5202 ***	-9.7322 ***	-6.2651 ***	-8.2933 ***	-9.5011 ***	-14.2472 ***	-9.3975 ***	-13.4018 ***	-11.0510 ***	-10.6641 ***	-16.0648 ***
t-statistics	(-3.1200)	(-5.6500)	(-6.3200)	(-3.6300)	(-4.8500)	(-3.0600)	(-4.1100)	(-4.7100)	(-7.0900)	(-4.5200)	(-6.6900)	(-5.4500)	(-5.1200)	(-7.9000)
TURN	13.7656 ***	8.8960 ***	8.3999 ***	12.6949 ***	10.5761 ***	13.6353 ***	12.3002 ***	10.2163 ***	8.0014 ***	11.1797 ***	8.4669 ***	8.9132 ***	9.7609 ***	6.3922 ***
t-statistics	(5.2000)	(3.6400)	(3.4600)	(4.7700)	(4.2400)	(5.1200)	(4.8000)	(4.0900)	(3.2900)	(4.2800)	(3.4800)	(3.6300)	(3.8300)	(2.6700)
THDUM	-2.3718 ***													
t-statistics	(-17.5000)													
MLDUM	-1.1238 ***													
t-statistics	(-14.0000)													
SPDUM	-0.6781 ***													
t-statistics	(-7.3100)													
EDEV		-0.9339 ***												
t-statistics		(-14.5000)												
LAW			0.4461 ***											
t-statistics			1(3.6000)											
EFF				0.2878 ***										
t-statistics				(15.1000)										
RULE					0.3951 ***									
t-statistics					(16.9000)									
CORR1						0.6846 ***								
t-statistics						(17.7000)								
CORR2							-0.3322 ***							
t-statistics							(-18.0000)							
EXP								0.7341 ***						
t-statistics								(16.3000)						
CRR									-0.2731 ***					
t-statistics									(-11.2000)					
SHR										0.7338 ***				
t-statistics										(12.7000)				
OWN											-3.8440 ***			
t-statistics											(-12.9000)			
AUD												2.9917 ***		
t-statistics												(14.0000)		
ACC													0.0970 ***	
t-statistics													1(1.1000)	
AUD														-0.0298 ***
t-statistics														(-4.6200)
No. of obs.	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604	5604

$$LOG(\Delta E > 0) = \alpha + \sum \beta FS + \beta \, country - specific\ factors + \varepsilon$$

The t-statistics are adjusted for heteroscedasticity consistent standard errors. Industry and time dummies were included in the model in order to control for industry and time effects but no statistically significant effect was found.
See Table 5.2, Table 5.3 and Section 5.3 for the definition of the variables.
*, **, *** Significant at 10%, 5% and 1% level, respectively.

The results also show that firms in countries with better ***legal enforcement*** have higher probabilities of deviation in both mild and strong forms. All measures of legal enforcement are highly significant showing that firms in these countries have better access to external finance especially to equity markets as well as higher growth opportunities; therefore, they have higher need for extra funding than for internally generated funds and tend to deviate more from the predictions of the pecking order theory. In addition, consistent with Table 5.15, ***legal protection*** is an important factor. The results show that firms in countries with low creditor rights are more likely to use more external finance. In particular, when there is choice between debt and equity, firms in countries with low creditor rights prefer to issue more equity leading to strong deviation from the pecking order theory. The results also show that when shareholder rights are high, firms are likely to use more external finance and in particular to use more equity leading to the deviation from the pecking order in both mild and strong forms. Firms are less concerned about dilution of control; therefore, they can go for riskier sources of finance such as equity.

Firms with widely-held ***ownership structures*** tend to deviate from the expectations of pecking order theory because they are less concerned with control dilution. The results show evidence to support this argument and also show that the deviation is more in a strong form than a mild form. ***Accounting and asymmetric information*** are also found to play a significant role in firms' deviations from the pecking order theory. High involvement of good quality auditors (AUD) or more items disclosed in firms' financial statement (ACC) lead to lower asymmetric information. Therefore, firms with high AUD and ACC indices tend to deviate more from the pecking order theory. The results show support to multi-period pecking order in that when the asymmetric information level is low, firms prefer to go for riskier sources of finance such as equity because they expect asymmetric information levels to be higher in the future. On the other hand, firms with high numbers of analysts per firm (ANA) have higher levels of asymmetric information; therefore, they would prefer to go for the safest source of finance and follow the pecking order theory. The results show that deviation in both forms is found for firms with low ANA where asymmetric information levels are lower.

In summary, the logistic results show that firms with high tangibility, high growth opportunity, larger size, lower profitability, younger age, lower levels of management team in the same family and high trading activity have higher need for external finance; therefore, they are more likely to deviate in a mild form (DEF>0). On the other hand, firms with high growth opportunities, larger size, lower profitability, lower levels of management team in the same family, higher level of BIG4, and high trading activity are more likely to deviate in a strong form by issuing more equity ($\Delta E>0$). The evidence also shows support for the multi-period pecking order theory in that if information asymmetry varies over time, then there might be instances when adverse selection costs are low. Therefore, deviating from the financing hierarchy is not as costly. When asymmetric information is low, it is not costly for firms to deviate from the pecking order theory especially not by issuing equity. Also the results suggest that country-specific factors do play an important role in shaping firms' financing behaviour. Firms in countries with high economic development, strong legal enforcement, low creditor protection, high shareholder protection, low levels of ownership concentration, high accounting standards and low levels of asymmetric information tend to deviate from the pecking order theory. The logistic regressions also help to improve understanding derived from the main regression as several of the effects from some variables, such as EXP and SHR, cannot be detected from the main regression due to low variation among the sample countries. However, the use of logistic regression can help to pick up the effect of such variables.

5.6.3 Non-Linear Quantile Regressions

It has been suggested that non-linear quantile regressions or piecewise linear models will capture a relationship between financing deficit and net debt issues better than normal linear regressions as performed in the previous sections because it takes account of different deciles of financing deficit. To provide a comparison of the results, equation (5.4) is estimated again using OLS with the sample of positive financing deficit and the results are shown in the first column of Table 5.23 for each country. Then equation (5.15) is estimated using a piecewise linear model and the results are summarized in the second column for each country. For simplicity, only the coefficients of financing deficits from 0.0 to 0.2, which are highly significant, and the coefficient of financing deficit from 0.2 to 0.3, where the coefficients start to be insignificant as comparison, are reported. The coefficients of DEF from the simple linear model in the first column are very low for all sample countries. This evidence gives little support to the pecking order theory. However, the piecewise linear model in the second column shows a completely different picture. Adjusted R^2 increased substantially with the use of quantile regression. In addition, the results reveal that the relationship between net debt issues and financing deficit varies depending on the size of financing deficit. As found by Qiu and Smith (2005), the coefficients of $DEF_{i,t}$ (0.0 to 0.1), $DEF_{i,t}$ (0.1 to 0.2) and $DEF_{i,t}$ (0.2 to 0.3) decrease monotonically. The results suggest that firms are likely to use debt to finance their financing deficit when their financing deficit is low. The huge differences between the coefficients of financing deficits from the simple linear model (model-1) and the coefficients of financing deficits from the piecewise linear model (model-2) suggest that, without taking account for the non-linearity in the relationship, the effect of financing deficit on net debt issues when DEF is low is under-estimated and the effect when DEF is high is over-estimated.

Table 5.23 : Non-linear quantile analysis of financing deficit: Whole sample period

DEF >0 : Financial deficit

	Thailand			Malaysia			Singapore			Australia		
Equation	**Model-1**	**Model-2**	**Model-3**	**Model-1**	**Model-2**	**Model-3**	**Model-1**	**Model-2**	**Model-3**	**Model-1**	**Model-2**	**Model-3**
Constant	0.0259	-0.0043	-0.0240	0.0359	0.0035	0.0063	0.0400	0.0141	0.0007	0.0309	-0.0042	-0.0024
t-statistics	(3.3600)	(-0.6040)	(-1.5200)	(5.8400)	(0.6890)	(0.5620)	(5.3200)	(2.2500)	(0.0666)	(2.8500)	(-0.3770)	(-0.1470)
DEF	0.1605 ***			0.0739 ***			0.0470 **			-0.0164		
t-statistics	(4.7600)			(3.8500)			(2.0200)			(-1.0900)		
DEF (0.0-0.1)		0.7068 ***	0.6400 ***		0.7445 ***	0.7701 ***		0.6695 ***	0.6785 ***		0.4604 ***	0.4506 ***
t-statistics		(8.8500)	(4.8700)		(16.5000)	(14.7000)		(9.8800)	(9.9000)		(6.3800)	(4.9000)
DEF (0.1-0.2)		0.3738 **	0.2515		0.2445 **	0.4143 ***		0.3391 **	0.6571 ***		0.4481 ***	0.7018 ***
t-statistics		(2.0300)	(0.8000)		(1.9600)	(3.0200)		(2.2300)	(3.5400)		(2.9000)	(3.9600)
DEF (0.2-0.3)		0.0310	0.2973		0.0835	0.1278		-0.1456	-0.3319 *		0.0075	0.1719
t-statistics		(0.1810)	(1.3400)		(0.6200)	(0.7270)		(-1.0400)	(-1.6500)		(0.0657)	(1.0800)
ATANG			-0.0827			0.0727 **			0.0579			0.0344
t-statistics			(-1.5200)			(2.5000)			(1.2500)			(0.7890)
AGROW			-0.0037			-0.0006			-0.0040			0.0020
t-statistics			(-0.6460)			(-0.7270)			(-0.7680)			(0.9230)
ASIZE			0.0268 *			-0.0018			-0.0083			-0.0048
t-statistics			(1.7300)			(-0.3030)			(-0.8160)			(-0.8020)
APROF			-0.1276			0.0274			-0.0646			0.0207
t-statistics			(-1.3500)			(0.8060)			(-1.5900)			(0.6930)
AGE			0.0095			-0.0025			-0.0007			0.0006
t-statistics			(1.1700)			(-0.6470)			(-0.2110)			(0.1520)
PMGMT			0.0158			0.0035			0.0282			0.0082
t-statistics			(1.0800)			(0.1480)			(1.2100)			(0.3210)
BIG4			0.0027			0.0021			0.0016			-0.0026
t-statistics			(0.4290)			(0.4240)			(0.2550)			(-0.2020)
ASIGMA			0.3723 **			0.4427 ***			-0.0203			0.0098
t-statistics			(2.0400)			(2.7100)			(-0.1200)			(0.0301)
ATURN			0.0070			-0.1422			-0.0940			2.5706 *
t-statistics			(0.0305)			(-0.7360)			(-0.2450)			(1.8700)
Adj R^2	0.1135	0.2326	0.2958	0.0421	0.2456	0.3377	0.0323	0.1793	0.3803	0.0032	0.0714	0.2263
No. of obs.	955	955	447	1556	1556	1050	867	867	496	1190	1190	698

$$\Delta D_{i,t} = \alpha + \beta_{PO}^{D} DEF_{i,t} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \sum_{j=0} \beta_j DEF_{i,t} (j \ to \ j+0.1) + \beta_x DEF_{i,t} (over\ x) + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \sum_{j=0} \beta_j DEF_{i,t} (j \ to \ j+0.1) + \beta_x DEF_{i,t} (over\ x) + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \varepsilon_{i,t}$$

Financing deficit is divided into different quantiles depending on the maximum value of DEF in each country. X represents the highest bound for each country. The full specification of quantile regression for each country is shown in Table 5.1. See Table 5.2 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

The results suggest that when DEF is lower than 0.2, firms use debt to cover most of their financing deficits. However, when DEF is higher than 0.2, firms choose to issue equity instead. The use of equity might be due to the high financial distress that comes with large debt issues. Therefore, it can be concluded that firms in this region do not behave strictly according to the original pecking order theory but behave more in line with the predictions of the modified pecking order model.

In addition, to confirm these results, the first difference terms of firm-specific variables are added to test the effect of conventional and other additional firm-specific variables as predicted by the trade-off theory when nested in the pecking order model. In order for the predictions of the pecking order theory to be valid, the effect of firm-specific factors on net debt issues should be wiped out by the effect of financing deficits. The results in the third column of Table 5.23 (model-3) show that most coefficients of firm-specific variables become insignificant suggesting pecking order behaviour does exist for firms in this region.

Table 5.24 presents the results on the relationship between net debt issues and financial surplus with simple OLS linear regression (model-1) and piecewise regression (model-2). The results show that when financial surplus is low (financing deficit is between 0 to -0.2), most firms use their entire financial surplus to retire debt. However, when financial surplus is high (financing deficit is lower than -0.2), apart from repaying debt, firms start to repurchase a small proportion of equity. The results show that the non-linearity of the relationship between net debt issues and financial surplus is more limited than the relationship between net debt issues and financing deficit. In most cases, there is nearly a one-to-one relationship between financial surplus and net debt issues regardless of the size of financial surplus. As when firms have financing deficits, firm-specific variables do not add much significant effect to the relationship between financial surplus and net debt issues as shown in Table 5.24 (model-3).

Table 5.24 : Non-linear quantile analysis of financing surplus: Whole sample period

DEF <0 : Financial SURPLUS

	Thailand			Malaysia			Singapore			Australia		
Equation	**Model-1**	**Model-2**	**Model-3**	**Model-1**	**Model-2**	**Model-3**	**Model-1**	**Model-2**	**Model-3**	**Model-1**	**Model-2**	**Model-3**
Constant	0.0005	0.0009	-0.0024	-0.0024	-0.0022	-0.0018	0.0011	0.0022	0.0059	-0.0051	-0.0037	0.0102
t-statistics	(0.6840)	(0.9830)	(-0.5770)	(-1.8100)	(-1.7400)	(-1.4200)	(0.6410)	(0.9790)	(1.7400)	(-1.3300)	(-0.9350)	(1.6800)
DEF	1.0238 ***			1.0160 ***			1.0410 ***			1.0385 ***		
t-statistics	(90.7000)			(147.0000)			(48.1000)			(34.6000)		
DEF (0.0 to -0.1)		1.0458 ***	1.0541 ***		1.0252 ***	1.0373 ***		1.1218 ***	1.0888 ***		1.0305 ***	1.0196 ***
t-statistics		(48.2000)	(31.1000)		(84.6000)	(75.7000)		(15.7000)	(22.2000)		(31.5000)	(29.3000)
DEF (-0.1 to -0.2)		1.0201 ***	0.9527 ***		1.0394 ***	0.9572 ***		0.8941 ***	0.9735 ***		1.0444 ***	1.0097 ***
t-statistics		(21.2000)	(19.2000)		(24.3000)	(31.2000)		(8.3900)	(20.3000)		(11.6000)	(10.6000)
DEF (-0.2 to -0.3)		0.7458 ***	0.5854 ***		0.7294 ***	0.9199 ***		0.9985 ***	0.9455 ***		0.7640 ***	1.0647 ***
t-statistics		(4.6000)	(6.0700)		(5.8500)	(8.5300)		(20.3000)	(19.6000)		(3.1800)	(3.1000)
DEF (below -0.3)		0.4057	0.7724 ***		0.4814 **	0.2493					0.4940	-0.0095
t-statistics		(1.4700)	(4.1700)		(2.2300)	(1.3500)					(1.2900)	(-0.0171)
ATANG			0.0082			-0.0017			0.0038			-0.0259 **
t-statistics			(0.6630)			(-0.9360)			(0.4650)			(-2.0000)
AGROW			-0.0027			0.0001			-0.0006			-0.0003
t-statistics			(-0.6880)			(1.3100)			(-0.4060)			(-0.8270)
ASIZE			0.0098			-0.0003			-0.0030 *			0.0004
t-statistics			(1.1200)			(-0.7670)			(-1.6600)			(0.5090)
APROF			-0.0304 *			-0.0016			0.0201 *			-0.0023
t-statistics			(-1.7100)			(-1.6300)			(1.9400)			(-0.5990)
AGE			0.0017			-0.0005			-0.0022 *			-0.0009
t-statistics			(1.4100)			(-1.3300)			(-1.9500)			(-0.8510)
PMGMT			0.0059			0.0012			0.0017			-0.0080
t-statistics			(1.5400)			(1.5000)			(0.5690)			(-1.1200)
BIG4			-0.0028 *			0.0000			0.0008			-0.0082 **
t-statistics			(-1.6800)			(0.0824)			(0.3530)			(-2.1600)
ASIGMA			0.0310			-0.0051			-0.0035			-0.1131
t-statistics			(0.3930)			(-0.3100)			(-0.1660)			(-0.7770)
ATURN			0.0205			-0.0122			0.0373			0.0201
t-statistics			(0.5430)			(-0.8630)			(0.7530)			(0.0556)
Adj R^2	0.9050	0.9031	0.8605	0.9666	0.9663	0.9571	0.8768	0.8784	0.9427	0.9225	0.9251	0.9510
No. of obs.	946	946	470	1332	1332	956	539	539	367	558	558	385

$$\Delta D_{i,t} = \alpha + \beta_{i,t} DEF_{i,t} + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \sum_{j=1}^{n} \beta_j DEF_{i,t} (j \ to \ j-0.1) + \beta_j DEF_{i,t} (below \ x) + \varepsilon_{i,t}$$

$$\Delta D_{i,t} = \alpha + \sum_{j=1}^{n} \beta_j DEF_{i,t} (j \ to \ j-0.1) + \beta_j DEF_{i,t} (below \ x) + \sum_{k=1} \beta_k \Delta FS_{k,i,t} + \varepsilon_{i,t}$$

Financing surplus is divided into different quantiles depending on the minimum value of DEF in each country. *X* represents the lowest bound for each country. The full specification of quantile regression for each country is shown in Table 5.1. See Table 5.2 and Section 5.3 for the definition of the variables.

*, **, *** Significant at 10%, 5% and 1% level, respectively.

In conclusion, the results from quantile regressions show that once non-linearity is taken into account in the relationship between net debt issues and financing deficit, firms in this region behave in the manner predicted by the modified pecking order theory where financial distress plays an important role.

5.7 Summary

The pecking order theory has been tested on a broad cross-section of non-financial listed firms in four countries in the Asia pacific region for the period of 1993 to 2001. The results from linear models using OLS show little support to the traditional pecking order theory but strong support for the modified pecking order theory. Equity issues are quite common and also track financing deficits closer than debt issues which is the opposite of the predictions of the pecking order theory. The deviation is the greatest in Australia where net equity issues track nearly perfectly to financing deficit. The findings also suggest that time-varying adverse selection costs play a crucial role in financing decisions and can help to explain why previous studies have found material evidence that is in contrast to the original pecking order patterns. The results suggest the concavity function of firms choosing debt issues before equity issues. The addition of the second order term of financing deficit has improved the performance of all other related variables not only with regard to the significance level but also the magnitude of each individual factor. The inclusion of this term has shown us new evidence that in fact firms do behave in the manner predicted by the pecking order theory. The exclusion of this factor can lead to underestimation of the way each factor influences firms' behaviour. When nested in conventional regression, financing deficit somewhat challenges the role of the conventional factors. The inclusion of financing deficit improves the explanatory power of the regressions substantially. Most importantly, the effects of other firm-specific variables are wiped off nearly completely by the first- and second-order terms of financing deficit giving strong support for the pecking order theory.

As the relationship between net debt issues and financing deficit will not be as predicted by the pecking order theory when net debt issues and net equity issues have opposite signs, the main linear regression might give misleading results. Therefore, predictive logistic regressions are suggested to be a more appropriate test of the predictions of the pecking order theory and the results reveal several hidden factors that can lead firms to deviate from the pecking order theory where some factors might be found to be unrelated in the main linear regression. Finally, non-linear quantile regression was implemented and the results confirm that there exists a non-linearity function between the relationship of financing deficit and net debt issues. Firms also behave differently when they have a positive financing deficit from when they have a negative financing deficit (financial surplus). The results reveal that the relationship between net debt issues and positive financing deficit are significantly different across different sizes of financing deficit. Firms do behave in the manner predicted by the modified pecking order theory. Firms with low positive financing deficit fund their deficit mostly by net debt issues. However, when financing deficit gets higher, there is a higher probability of financial distress that comes with high debt level. Therefore, large financing deficits are funded by equity. On the other hand, the non-linearity function is more limited when firms have financial surplus as firms use surplus to repay debt regardless of the size of the surplus. The results are robust to the inclusion of firm-specific factors whose effects are totally wiped off by financing deficit.

Financial crisis does play an important role in firms' financing decisions due to higher risk and more concern for financial distress problems. Pecking order financing behaviour is encouraged by the particular form of financial constraints in Asia. The results show that financial constraints induce firms toward pecking order behaviour due to restricted access to capital markets. Also the crisis has a different impact on each country depending on the severity of its influence. The findings show that firms that face high financial constraints exhibit stronger pecking order behaviour. The results also show that firms' behaviour depends on the setting in the country they operate in. The degree of encouragement given to firms in each particular institutional setting is an important factor. Firms in countries with high economic development, high legal enforcement, low legal protection, high involvement of good quality auditors, and high dispersion of opinion prefer external finance to internal finance and among external finance they prefer equity to debt issues. Therefore, firms in countries with this setting, such as Australia, are found to deviate from the pecking order theory while firms in countries with the opposite setting are moving towards the pecking order theory. The results emphasize that the financing behaviours of firms in this region do not rely solely on their own characteristics but also on the environments in which they operate.

Chapter 6

Summary and Conclusion

6.1 Motivations and Contributions

Modigliani and Miller (1958) propose the irrelevancy of capital structure decisions in the world of a perfect capital market. However, the assumptions of perfect capital markets are unrealistic because there are a number of market imperfections such as tax, agency costs, bankruptcy costs and asymmetric information that can affect the valuation of a firm. Therefore, new theories have been developed taking these factors into consideration. A number of researchers have attempted to identify an optimal capital structure and to examine factors that explain the observed capital structure patterns which cannot fully be explained by any single financing theory because each theory provides different predictions based on different market imperfections. On the one hand, the trade-off theory predicts that firms trade off benefits of debt (tax deductibility) with costs of debt (bankruptcy and agency costs) and proposes that there exists an optimal capital structure. On the other hand, the pecking order theory proposes that, due to the presence of asymmetric information, firms follow a financing hierarchy of internal finance as their first resort followed by debt while equity would be their last choice.

Although many empirical studies find evidence in support of the trade-off theory, a drawback of the trade-off theory is the inverse relationship found between profitability and firm leverage which gives support to the pecking order theory. The pecking order theory also is not capable of fully explaining the observed patterns of firms' financing choices which does not mean that information costs are not important. This suggests that financing theories are not mutually exclusive and firms may act according to the predictions of more than one theory when they determine their financing decisions. However, there is still some doubt whether the commonly used models can fully reveal the pecking order behaviour of a firm or whether they are designed to favour the predictions of the trade-off theory. Therefore, recently a number of researchers have started to focus on the models that directly test the predictions of pecking order theory. As different theories have multiple, or offsetting, implications for each variable, it is difficult to find clear support for one particular theory in firms' financing behaviour. One way to test the predictions of the pecking order theory is to add financing deficit into the conventional model designed for the trade-off framework and see whether the effects of the conventional variables identified by the trade-off theory are wiped off by the effects of financing deficit.

In addition to capital structure decisions, the propositions of Modigliani and Miller (1958) also imply that debt maturity structure has no effect on the firm's value. Research relating to debt maturity structure started as a by-product of capital structure. A new line of financing theories was developed into a significant strand of corporate finance literature based on the benefits of short-term and long-term debt and shows that the choice of debt maturity can affect the firms' value. Short-term debt is expected to be used to mitigate agency problems and to signal high quality to the market while long-term debt is preferable for tax purposes. Studies have put forward a number of factors that influence the debt maturity structure decisions of a firm. The natural questions are therefore what proportion of long-term debt and short-term debt firms should use to maximize their market value and what factors affect this decision. However, similar to capital structure study, theoretical and empirical evidence for debt maturity structure is also inconclusive.

Despite the vast literature on corporate financing decisions, there is still a need for further empirical analysis because the existing evidence on the above issues has been mixed and mostly focuses on major developed countries. Financing decisions of firms in developing countries remain relatively unexplored. More importantly, there is a lack of evidence for firms in different institutional settings. The interesting issue is how far theories that have been formulated for firms in developed countries can be applied to those in other areas such as the Asia Pacific region. Little is known about how, and to what extent, the observed differences in corporate governance and institutional environment affect firms' financing decisions. Due to the tighter financial constraints that resulted from the financing crisis of 1997, financing behaviour of firms in this region has changed and this change is likely to depend on how severely the market is hit by the crisis and the developments of financial systems as well as legal enforcement in each country.

To this end, this thesis intends to fill these gaps in the current literature and to provide empirical evidence on corporate financing decisions of firms in Asia Pacific countries, namely Thailand, Malaysia, Singapore and Australia. More specifically, it re-addresses the determinants of capital structure and debt maturity structure and explicitly tests the predictions of the pecking order theory. The four sample countries were chosen in order to provide a broader set of samples with diversity in institutional settings and corporate governance and to provide natural experiments to study the effect of the 1997 financial crisis on firms' financing behaviour depending on how severely the markets were affected by the crisis. The 1997 financial crisis originated in Thailand and the effect quickly spread throughout the region. The crisis has generally led to higher risk and uncertainty in the market; however, the effects differed across sample countries. To investigate the effect of the crisis, the whole sample period was divided into two sub-periods of pre-crisis and post-crisis periods to examine whether there were any significant shifts of the capital structure and debt maturity structure and their determinants across two sub-periods. Thailand and Malaysia were severely hit by the 1997 financial crisis while Singapore and Australia avoided the effects. Because each market has been affected by the crisis by different degrees, sample countries are categorized into two groups (the first group composes of countries least affected by the crisis and countries most affected by the crisis are in the second group) to see whether there are any changes in financing behaviour of firms in Thailand and Malaysia where the effects of the crisis were more significant relative to the financing behaviour of firms in Singapore and Australia where the effects of the crisis were less severe. In this sense, the special feature of this thesis is that it examines the sample of firms in countries which have been subjected to limited attention. The vulnerability of economic conditions, differences in corporate governance and development stages in these countries offer an interesting setting to further study the impact of these factors on corporate financing choices.

Overall, this thesis has made several contributions to the literature.

(i) Unlike most previous studies, this thesis has examined a broader set of sample countries that provide diversity in economic conditions, corporate governance and institutional settings. There has been a lack of evidence for firms in different economic and financial settings. The focus on four sample countries provides new evidence of the variations across countries as well as how firms in different settings make their financing decisions.

(ii) This thesis studies the role of country-specific factors in influencing corporate financing decisions by using cross-country analysis. Country-specific factors are found to play a significant role in financing decisions.

(iii) This thesis has analysed the effects of the 1997 financial crisis on firms' financing decisions and their determinants by using both sub-periods and country grouping analysis.

6.2 Summary of the Results

The thesis starts with a review of economic conditions, corporate governance and institutional settings of four sample countries in Chapter 2. The review in this chapter reveals that in developed countries such as Singapore and Australia, publicly issued financial instruments are an important source of external finance. Developing countries such as Thailand and Malaysia on the other hand are characterized by much less developed financial markets and have a greater reliance on banks or on related financial intermediaries that provide most of their external funds. There are variations on several aspects of economic development and corporate governance among sample countries such as quality of legal enforcement, the level of legal protection, ownership structures, etc. As discussed earlier, the sample countries were divided into two groups, countries most affected and countries least affected by the crisis. This country grouping is also related to the development of financial markets in each country. There is also a unique difference in ownership structure in that East Asian firms tend to be family-based and have close relationships with banks while Australian firms' shareholders have arms-length relationships.

The empirical analysis of the thesis is presented in Chapters 3 through 5. Chapters 3 and 4 investigate the determinants of capital structure and debt maturity structure, respectively. They address several important questions. First, what criteria do firms rely on when they determine their capital structure and debt maturity structure or in other words to what extent are their capital structure and debt maturity structure driven by these factors? Second, whether the financial crisis has any significant impacts on the firms' financing behaviour across pre- and post-crisis periods and across country groupings? Third, how, and to what extent, do corporate governance and institutional settings influence firms' financing decisions? The results are largely consistent with the existing empirical evidence from other regions. It is found that firms' characteristics play important roles in determining the capital structure and debt maturity structure of firms in the Asia Pacific region. However, firms' capital and debt maturity structures and their determinants vary across the sample countries. Therefore, apart from the commonly used firm-specific factors, the analysis in these chapters also considers market-wide and legal and corporate governance factors. The results show that the differences in corporate financing decisions can be explained by differences in economic conditions, corporate governance and institutional environment. Overall, the results showed that, in addition to a firm's characteristics, the capital structure and debt maturity structure of a firm are also significantly affected by economic and financial environment in which the firm operates. An investigation of the financial crisis of 1997 on corporate financing decisions is then conducted. The results from sub-period and country grouping analysis show that the financial crisis has had a significant impact on both firm-specific and market-wide determinants of capital and debt maturity structures especially in Thailand where the crisis originated.

In particular, the results from Chapter 3 show that among firm-specific determinants, tangibility, firm size and earnings volatility are found to be positively related to debt while profitability, growth opportunity, non-debt tax shields, liquidity and share price performance are found to be inversely related to debt as predicted by the trade-off theory, the pecking order theory and the market timing theory. This suggests that firms' behaviour can be explained by a combination of capital structure theories not any particular single theory when they determine their financing decisions. In addition, firm-specific determinants of capital structure are significantly affected by changes in economic conditions such as the financial crisis. Firms' reliance on a number of variables changed after the crisis due to the increase in risk of bankruptcy and costs of financing. The results indicate that the crisis led firms to behave more closely to, or be more aware of, the predictions of capital structure theories.

The results also reveal that the role of market-wide determinants on firm leverage differs depending on country groupings in opposite directions. For example, firms in countries least affected by the crisis use higher levels of debt when bank development is high. However, high bank development does not guarantee higher borrowing capacity for firms in countries most affected by the crisis. Firms in most crisis affected countries are more concerned about tax deductibility than the cost of borrowing; therefore, they have higher levels of debt when interest rates are high while firms in countries least affected by the crisis focus more on the cost of borrowing. Similar to firm-specific determinants, the financial crisis also had significant effects on the relationship between market-wide factors and firm leverage. In many cases, the crisis changed the direction of the impact of market-wide factors. Firms started to consider market-wide factors when they determined their capital structure only in the post-crisis period. The country's legal and corporate governance factors also significantly affect the way firms finance. For example, firms in countries with efficient legal systems prefer to use higher equity issues to mitigate agency costs of debt. Also, when creditors are better protected by law firms have higher borrowing capacity. Firms with concentrated ownership structures tend to have lower levels of asymmetric information between lenders and borrowers and lower transaction costs. Therefore, they have better access to debt markets. When auditors' market share or the number of analysts' coverage is high, firms are likely to issue equity because level of asymmetric information is lower.

In particular the results from Chapter 4 lend some support to the liquidity risk hypothesis and to the adverse selection and signalling hypothesis. However, mixed support is found for the moral hazard and agency hypothesis. On the one hand, small firms use short-term debt to mitigate agency costs of debt and firms also match their maturity of assets and liability. On the other hand, the relationship between growth opportunity and maturity is mixed across countries. The results suggest that firms also rely on a combination of debt maturity structure theories when they decide their level of short-term and long-term debt. In addition, there is also a variation in the determinants of debt maturity structure across sample countries and some variations can be explained by the concentration of ownership structure and close relationship between firms and lenders of firms in this region. The financial crisis is found to significantly affect the relationship between debt maturity and some firm-specific determinants especially for firms in countries most affected by the crisis. Liquidity risk increased substantially for firms in these countries; therefore, they use higher long-term debt to delay the exposure to bankruptcy when leverage is high. Tax concern also increased due to the financial crisis; therefore, firms in these countries use higher long-term debt when they have high profitability.

The results also reveal an opposite pattern in the relationships between debt maturity and bank development, stock market development and the term structure of interest rates among two country groupings. On the one hand, banks in developed economies are able to take full advantage of their monitoring power; therefore, firms are encouraged to issue short-term debt when bank development is high. On the other hand, the legal systems are weaker in developing countries; therefore, a larger banking sector is associated with longer-maturity debts because creditor's rights are strengthened by the size of the banking sector. Due to higher stock market development in countries least affected by the crisis, firms in these countries hold shorter maturity because they can easily raise long-term finance from equity. Also firms in countries most affected by the crisis use more long-term debt when term structure of interest rates has an upward slope to take advantage of tax while firms in countries least affected by the crisis adopt an optimistic strategy by issuing short-term debt to wait for the decline of long-term rates in the future to reduce the overall cost of debt. The results also show that legal and corporate governance play important roles in debt maturity structure decisions. Firms in countries with a lower quality of legal enforcement use higher proportions of short-term debt financing to take advantage of the monitoring function of short-term debt. The ability of firms to use short-term debt is higher when creditors are better protected while firms in countries with higher shareholder protection use more long-term debt.

Chapter 5 explicitly tested the prediction of the pecking order theory. Specifically, it addresses the following questions: (i) whether firms in the Asia Pacific region follow a pecking order in making financing decisions; (ii) whether the financial crisis has any significant effect in the firms' financing behaviour between the two sub-sample periods; and (iii) whether corporate governance and institutional environment explain the observed financing behaviour. Various methodologies were adopted to address these issues. The results show that although equity issues tracked financing deficit closer than debt issues which is inconsistent with the predictions of the original pecking order theory, firms in the Asia Pacific region do behave according to the predictions of the modified pecking order theory and consider the adverse selection costs, bankruptcy and debt capacity when making financing decisions. The analysis starts by running basic linear regression models using Ordinary Least Square. Several firm-specific factors are found to affect the choice between internal and external finance. Small firms, highly profitable firms, young firms, firms with high proportion of management in the same family, high adverse selection costs, and low trading activity prefer internal to external finance as suggested by the pecking order hypothesis. For external financing decisions, financing deficit was found to be a significant factor in determining net debt issues as predicted by the pecking order theory. To investigate the concavity function of financing deficit, a second-order term of financing deficit was added into the basic linear regression models. The results show that the concavity function of financing deficit is very important in determining the order of sources of finance between debt and equity issues. The inclusion of the second-order term of financing deficit has improved the model substantially in terms of goodness-of-fit of the models. When nested in the trade-off model with conventional factors, the introduction of the first- and second-order terms of financing deficit has added a substantial amount of additional explanatory power to the trade-off framework. The effects of conventional factors are almost wiped off by the effects of first- and second-order terms of financing deficit.

Other testing methodologies were also implemented including predictive logistic regressions and non-linear quantile regressions. The use of a logistic model avoids the problem of net debt issues (ΔD) and net equity issues (ΔE) having opposite signs. The logistic results reveal what type of factors lead firms to deviate mildly from pecking order theory by using external finance (DEF > 0) and to go to the further extent of deviating from the pecking order theory in a strong form by issuing equity ($\Delta E > 0$). Firms with high tangibility, high growth opportunities, larger size, lower profitability, younger age, lower levels of management team in the same family and high trading activity are more likely to deviate in a mild form (DEF>0) while firms with high growth opportunities, larger size, lower profitability, lower levels of management team in the same family, higher levels of auditor involvement, and high trading activity need more funds; therefore, they are more likely to deviate in a strong form by issuing more equity ($\Delta E>$). The results also suggest that when asymmetric information is low, it is not costly for firms to deviate from the pecking order theory especially by issuing equity. Country-specific factors also play an important role in shaping firms' financing behaviour. The results emphasize that the financing behaviour of firms in this region do not rely solely on their own characteristics but also on the environment in which they operate. Firms in countries with high economic development, strong legal enforcement, low creditor protection, high shareholder protection, low levels of ownership concentration, high accounting standards and low levels of asymmetric information tend to deviate more from the predictions of the pecking order theory.

The results from non-linear quantile regressions show that the relationship between financing deficits and net debt issues is not linear as previously expected. Firms treat financing deficits and financing surplus differently and the size of financing deficit matters. Specifically when positive financing deficit is low, firms tend to go for net debt issues. When financing deficit is higher, equity issues are chosen because net debt issues come with bankruptcy and liquidity risks. However, at the high level of financing deficit, bankruptcy does not matter anymore; therefore, firms would finance their deficit with net debt issues. The results also indicate that financial constraints can lead firms to behave more in line with the predictions of the modified pecking order theory. Developed and least crisis affected countries with high quality of legal enforcement and lower levels of asymmetric information tend to deviate more from the pecking order theory. In sum, the results emphasize that the financing behaviour of firms in this region do not rely only on their own characteristics but also on the environment in which they operate.

6.3 Implications

The empirical evidence presented in this thesis has some implications on different groups of readers. The implications are related to the differences in economic condition, corporate governance and institutional settings across the sample countries. No corporate governance system in particular can be considered better than that in other countries because firms in each country are operating under different settings. Each system has its own advantages and disadvantages. While firms in weak legal environments might have a disadvantage in dealing with corruption and transparency problems leading to less efficient ways of acquiring external finance, they might have advantages in borrowing capacity due to concentrated ownership structures and close relationships with creditors. The results in this thesis suggest that different related parties should consider a mixture of firm-specific characteristics, economic conditions and corporate governance.

In particular, different types of users can benefit differently from the evidence provided by this thesis as follows.

Managers

As this thesis examined the financing behaviour of firms using historical data, it gives managers an idea of the type of factors they have considered in the past when they made their financing decisions. Managers need to consider their past choices and justify whether their choices maximize the firm's value. In order to make sensible and sound financing decisions, managers must understand the costs and benefits of different types of finance. Before making financing decisions, managers should begin by examining the firms' characteristics (such as, what are the maturity of the firms' assets? or how sensitive are their assets to inflation and economic condition?). After understanding their firms' characteristics, managers can try to match the maturity and interest rate to the firms' characteristics. Some factors are suggested by the financing theories to influence corporate financing decisions; however, they are not found to significantly affect financing choices. In addition, the results show that there is no universal factor and no universal financing theory that firms can rely on in determining their capital structure and debt maturity structure. Managers cannot make their financing decisions based on a particular financing theory because normally firms are subjected to a combination of market imperfections suggested by different theories. Managers can try to follow a particular financing theory if they are subject to a particular market imperfection suggested by that theory. For example, if firms are likely to have higher levels of asymmetric information probably because they are young, have highly concentrated ownership structure and lower involvement of financial intermediaries but they do not have higher risks of bankruptcy, they can try to follow the hierarchy of finance suggested by the pecking order theory.

In addition, managers should not only consider firm-specific factors when they make financing decisions but should also consider the environment and other market-wide factors and corporate governance that affect the firms' performance as a whole. For example, tangibility should provide firms with better borrowing capacity due to the collateral nature of tangibility. However, if firms already have close relationships with banks, or have lower level of asymmetric information due to the involvement of auditors, they should not rely too much on tangibility because higher tangibility limits growth opportunities. Also firms in weak legal environments can mitigate agency problems by employing more reputable auditors as auditors have a substitution role in monitoring firms. The results also suggest that managers need to change their financing strategies according to changes in economic conditions. For example, if firms suffer from the effect of a crisis and have no taxable income at the end of the year, they should not concentrate too much on having high non-debt tax shield or on tax deductibility because tax should be no longer their concern. On the other hand, they should focus more on liquidity risks and adapt their level of financing in order to reduce the risk of bankruptcy.

Shareholders

Existing shareholders should be aware that managers do not always act in the best interests of existing shareholders leading to agency costs of equity. Therefore, if they hold shares in firms that have high agency costs of equity, they should try to get involved more in the corporate governance or the running of the firm by participating more in the shareholder's meetings and try to influence the decisions of managers in order to reduce the expropriation of shareholders or they should try to diversify their shares by holding shares in different types of firms.

Creditors

In contrast to existing shareholders, creditors should be more aware of agency costs of debt and try to mitigate these by issuing more short-term debt to firms that have high levels of managerial ownership structure. Banks are the main financing source of firms. In particular, they have a monitoring advantage and have more inside information than outside investors. Banks could learn from this study that some asymmetric information exists. Therefore, they should try to resolve informational problems and allocate funds only where they can obtain adequate collateral.

Investors

Investors can also benefit from the evidence provided in this thesis. The evidence shows that share price performance is inversely related to firm leverage indicating support for the market timing theory. This means investors in this region do discount stock according to overvalued stocks. Investors should be aware of the firms' financing behaviour because it indirectly releases insider information to outsiders. Besides, before investing in any firms, investors should consider the firms' characteristics as well as the market-wide factors. Also, because the factors influencing firms' capital structure and debt maturity structure differ between country groupings, international investors need to consider all related characteristics relating to a particular country before making decisions.

Policy Makers

The results also provide some insights for policy makers. Because several country-specific factors are found to be significantly related to firms' financing decisions, the policy makers can shift the financing decisions to be favourable to the situation of each country as a whole. As financial market developments are important factors that influence how firms finance their investments, in order to encourage active and profitable investment policy makers should try to develop both debt and equity markets or provide easier access for firms so that firms do not forego profitable investments. Moreover, in order for small firms to go public and raise equity finance, an improvement in the ability of the market to gather and process information effectively is required. While weak corporate governance might not have triggered the financial crisis, weak corporate governance practices could have made the countries more vulnerable to the crisis and could have exacerbated it once it began. Thus, one way to prevent another financial crisis is to improve corporate governance systems. In addition, excessive use of short-term debt has been suggested to be one of the factors in triggering and aggravating the financial crisis. Therefore, in order to prevent such unexpected economic instability, policy makers should try to influence the proportion of long-term debt and short-term debt by adjusting the term structure of interest rates and tax rates. When the cost of long-term borrowing is not too high and the tax benefit from using long-term debt is more prominent, firms will shift from excessive use of short-term debt to long-term debt. In addition, for countries with weak legal enforcement, short-term debt is preferable in order to mitigate agency costs of debt. Policy makers in such countries should try to enforce stronger laws in order to reduce the firms' need in issuing too much short-term debt. Because market-wide factors influence capital structure and debt maturity structure of a firm differently between the two country groupings, the policies made in each country should also vary. For example, firms in countries least affected by the crisis are more aware of tax benefits while firms in countries most affected by the crisis are more concerned about the real cost of borrowing. Different levels of interest rate adjustment are required in different countries in order to reach optimal results.

6.4 Possible Future Research

Despite the contributions mentioned earlier, there are a number of issues that are not addressed in this thesis. Further research is still needed in order to fully understand firms' financing decisions. Suggestions for further research are:

(i) Due to the nature of the data and the unavailability of data for the sample countries, the proxy of country-specific factors were mostly obtained from previous studies. It is evident from the results from all three empirical chapters that country-specific factors play a crucial role in determining firms' financing decisions in this region. The role of financial systems and market mechanisms can be explored in more detail using more accurate proxies and data which will provide clearer and better evidence of the role of country-specific factors in corporate financing decisions. Future research could concentrate on the role of ownership structure, dispersion of investors' opinion, financial and information intermediaries and the strength of creditor and shareholder rights. As emerging markets are growing and become more integrated both within themselves and with the global economy, future research is needed to find out whether corporate governance systems in this region will be more matured or not.

(ii) Like most of the earlier studies, this thesis focuses only on listed firms. It is possible that listed firms are neither the majority nor good representations of firms in the sample countries. The investigation of private firms would provide another aspect of corporate financing decisions because private firms have different characteristics (such as ownership structure) and the agency costs of these firms should differ from listed firms.

(iii) This thesis provides an empirical, quantitative perspective of corporate financing decisions. Little is know about managers' opinions. The use of a survey of firms' financing behaviour would help to improve understanding of corporate financing decisions in practice to improve the theoretical models.

(iv) There is also a possible scope for further research in the area of forecasting. For example, it would be interesting to investigate the role of current firms' performance and characteristics, economic conditions and corporate governance in forecasting levels of debt and equity issues or short-term and long-term debt.

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