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Payout Policy, Signalling, and Firm Value

Tai-Yuan CHEN

Doctor of Philosophy

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October 2006

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Payout Policy, Signalling, and Firm Value

By

Tai-Yuan CHEN

A thesis submitted in fulfilment of
the requirements for the Degree of
Doctor of Philosophy

At

The Department of Economics and Finance
The School of Economics, Finance, and Business
Durham University

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Declaration

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Abstract

One major issue in studying payout policy concerns the information implicit in payout announcements. It is becoming increasingly difficult to ignore why the firms make substantial cash distributions by dividends or share repurchases under the scenario of information asymmetry. Of particular interest, this thesis aims to clarify 1) whether the wealth effect of dividend announcements exists while earnings and dividends are announced simultaneously, 2) whether current or future earnings are the information conveyed by dividend announcements, and 3) whether share repurchase announcements signal, and if they do, whether they signal the same information as dividend announcements.

The evidence of this thesis suggests that dividend effect exists even when dividend and earnings are announced simultaneously. Dividend changes appear to play a confirmative role for the earnings increase announcements which alone are not reliable enough to earn investors' trust. By comparison, earnings decline announcements *per se* are informative for investors and possess prominent effect on the market reactions. Moreover, the evidence, after controlling mean reversion and autocorrelation in earnings process, shows that current but not future earnings changes are the information which dividend changes convey. When making dividend decisions, managers are also found to take account of current rather than future earnings performance. With respect to share repurchase announcements, the evidence indicates that share repurchase announcements signal good news to the market and are likely made after a long-term drop in share prices. More specifically, comparing the managerial motives for different payout decisions reveals that share repurchase announcements mainly signal for the undervaluation of the firm value while dividends are announced to signal for the firms' superior operating performance.

To the Memory of

My Grandfather

CHEN, Ko-Hung (1921 – 2000)

&

My Mom

CHAO, Shu-Hua (1950 – 1989)

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No pain, no palm; no thorns, no throne; no gall, no glory; no cross, no crown.

(William Penn, 1644-1718)

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Chapter 1

Introduction

1.1. First view of payout policy

Payout policy, one of the most controversial issues in corporate finance, is becoming increasingly crucial in that the policy *per se* is involved with substantial cash distribution and, furthermore, the policy closely pertains to firms' financing and investment decisions. To date a variety of options, including regular dividends, extraordinary dividends, special dividends, and share repurchases, have been available for managers' preference on payout methods¹. However, the issue as to why firms pay out is as yet an enigma. This thesis, specifically, focuses on 1) regular dividends (hereafter, dividends or cash dividends) which are traditionally a primary payout mechanism, and 2) share repurchases which surge as a popular payout device in recent years. Recently, a great amount of researchers have provided insights, theoretically as well as empirically, into the payout policy puzzle. With regard to dividends and share repurchases, in general, agency problem², clientele effect³ and information signalling⁴ have been most frequently mentioned by previous studies as the three major managerial motivations. For share repurchases alone, some other studies additionally suggest that share repurchases are utilised with a view to

¹ Managers may account stock dividends as another payout option, but stock dividends do not directly affect the firms' cash flow. Instead, firms distribute new shares to their shareholders. Such distributions were popularly imposed by British companies during the eighteenth and nineteenth centuries but are not prevalent recently (Lakonishok and Lev, 1987).

² See Easterbrook (1984) and Jensen (1986).

³ See Elton and Gruber (1970) and Pettit (1977).

⁴ See Bhattacharya (1979) and Miller and Rock (1985).

substituting dividends (Bagwell and Shoven, 1989; Grullon and Michaely, 2002), signalling undervaluation (Ikenberry, Lakonishok, and Vermaelen, 2000; Oswald and Young, 2004), or preventing dilution of earnings (Bens, Nagar, Skinner, and Wong, 2003).

Among the various predictions regarding the managerial motivations, the signalling theory can be accounted one of the most prominent theories in that its prediction directly links dividends and share repurchases with the important source of funds in payout policies, that is, firms' earnings. In light of the signalling theory, a number of empirical evidence to emerge from previous studies shows that shareholders experience increases in profits around the announcements of dividend increases and share repurchases, but suffer losses or earnings declines around dividend cuts (see Aharony and Swary, 1980; Asquith and Mullins, 1983; Comment and Jarrell, 1991 *etc*). Moreover, a number of literature about the evidence on signalling of dividends or share repurchases for firms' current or future earnings performance has been documented (Benartzi, Michaely, and Thaler, 1997; Nissim and Ziv, 2001; Lie, 2005).

In addition to the signalling theory, the undervaluation hypothesis of share repurchases has also drawn increasing attention in that not only signalling for firms' performance but also signalling for firms' undervaluation may be the motivation for announcing share repurchases. The underlying reason for this speculation is that share repurchases are implemented by share transactions (while dividends are not) and repurchasing firms very likely take advantage of their private information to buy back own shares with bargain prices. The existing studies have reported that share repurchase announcements signal for the firm's undervaluation (see Ikenberry, Lakonishok, and Vermaelen, 1995; Oswald and Young, 2004).

Theories and prior evidence discussed above demonstrate different explanations for the determinants of firms' payout policy. The aim of this thesis, of particular interest, is exploring the following questions: 1) whether dividends possess signalling power when they are simultaneously announced with earnings, 2) whether current or future earnings changes are the information signalled by dividend changes, and 3) whether share repurchases signal, and if they do, whether share repurchases announcements signal identical information with dividends. This thesis, on one hand, aims to help managers make use of signalling devices more efficiently. On the other hand, investors could better understand the information implicit in dividend announcements and share repurchase announcements.

1.2. Market reactions to simultaneous dividend and earnings announcements

The signalling model of Miller and Rock (1985) suggests that dividends convey the missing piece of information about current earnings to investors who then accordingly update their expectations of future earnings. As a result, the shareholders' wealth effect should be induced by the information about firms' earnings performance implicit in dividend announcements rather than the announcements *per se*. Among the enormous previous studies focusing on the market reactions to dividend announcements, the evidence that markets react positively to dividend increases and negatively to dividend cuts⁵ has been well documented. Nonetheless, far too little attention has been paid to control the earnings information which has been held by investors on the time of dividend announcements. Lack of considering the earnings

⁵ See the empirical evidence provided by Aharony and Swary (1980), Asquith and Mullins (1983) and many others or the discussion in Allen and Michaely (2003).

information already held by investors may result in spurious findings of dividend effect. This underlying reason motivates this thesis to jointly examine the market reactions to the information of dividend and earnings announcements.

According to the suggestion of the dividend signalling model, dividend effect should diminish or disappear after the earnings information is adequately controlled. Relatively, once the earnings effect has been controlled, any shareholders' wealth effect detected around dividend announcements can be attributed to "real" dividend effect. Conroy, Eades, and Harris (2000) suggest that simultaneous dividend and earnings announcements provide a good opportunity for empirical studies to test the relative effects of dividends and earnings on share prices based on the same information set. In the UK, dividends and earnings are announced simultaneously, of which can be taken advantage by this thesis to adequately control for earnings effect and detect "real" dividend effect (if any).

Moreover, the information about large firms is more focused by analysts who in turn bring more information about the large firms to the market. Previous studies indicate that the level of information asymmetry between managers and investors is greater in small firms than that in large firms, leading to the bigger market reactions to the announcements made by small firms than by large firms. Freeman (1987) and Ball and Kothari (1991) provide the evidence for the association between the market reactions and the differential information for earnings announcements while Bajaj and Vijh (1990; 1995) and Bali (2003) find the similar evidence for dividend announcements. However, the tests on the differential information to date have not been carried out for simultaneous dividend and earnings announcements whose dividends and earnings are released on the same information set. As a consequence,

another motivation of this thesis is to understand whether the market reactions to the simultaneous announcements are dependent on the level of information asymmetry.

The market reactions to the simultaneous announcements are firstly examined to understand whether the market reactions are dependent on the information in dividend announcements or earnings announcements. More explicitly, the market reactions are further tested by the regression analysis for the purpose of finding out whether it is the dividend, earnings, or interaction effect the main factor affecting shareholders' wealth. The signalling theory of dividends predicts that, if dividend effect exists, the market reaction around the announcement day should be dependent on the news signalled by dividend announcements. If earnings announcements have captured most information about earnings performance, the market is expected to depend on the information in earnings announcements and no dividend effect is expected. In addition, if the market jointly evaluates the information implicit in the simultaneous announcements, the positive relation between the market reaction and the interaction effect is expected.

On the other hand, to examine whether the market reactions are dependent on the level of information asymmetry, firm size is used as the proxy for the level of information asymmetry between managers and investors. The market reactions to the simultaneous announcements are tested by the differential information hypothesis stating that the information released by small firms elicits greater market reactions than that by large firms.

The evidence of comparing the market reactions to the simultaneous announcements of dividends and earnings confirms the existence of both dividend effect and earnings effect. Nevertheless, dividend effect seems to be more prominent than earnings effect.

When dividend and earnings signal for contradictory information, the market reactions are found to be more dependent on the information in dividend announcements.

More explicit implication to emerge from the evidence shows that, dividends play a confirmative role for earnings increases, but not for earnings declines. This, however, may stem from that managers are reluctant to cut dividends when the firms' earnings are in depression (Lintner, 1956), making the information signalled by dividends become unreliable and that by the earnings declines relatively creditable. Furthermore, the market reactions are likewise detected to pertain to the subsequent earnings changes, indicating that the market may correctly anticipate the future earnings based on the information content of the simultaneous announcements.

Moreover, the simultaneous announcements made by small firms are found to elicit greater market reactions than those made by large firms. This phenomenon is found to be particularly prominent for the firms which announce simultaneous increases in dividends and earnings. Consistent with the differential information hypothesis, the level of information asymmetry are greater in small firms than that in large firms, leading to the findings that the simultaneous announcements made by small firms are more informative to investors.

1.3. Dividend signalling and earnings information

Based on the signalling model of Miller and Rock (1985), beyond the information of current earnings, dividends may indirectly convey the information about future earnings. Debates have been raised about whether dividends only represent current

earnings or further signal for future earnings. The findings, combined with the evidence on the significant relation between dividends and current earnings, indicate that dividend changes are associated with current rather than future earnings changes (e.g. Benartzi, Michaely, and Thaler, 1997; Grullon, Michaely, Benartzi, and Thaler, 2005). However, Nissim and Ziv (2001), by contrast, report that dividends are capable of signalling for future earnings for up to two subsequent years. Interestingly, Healy and Palepu (1988) and some others demonstrate that the earnings changes reverse in the subsequent years of dividend changes. This, however, is contradictory to the notion that dividends signal for future earnings. Taken together, the findings on the relations between dividend signalling and earnings performance are still controversial, motivating this thesis to find out the real information signalled by dividends and provide incremental evidence on this issue. Given the miscellany of prior evidence, understanding the potential reasons leading to these results is important before carrying out examinations.

Among the previous studies, a major controversy among the previous studies is whether the methods applied are appropriate for controlling the mean reversion and (or) autocorrelation in earnings process as the results obtained could possibly differ in light of various methods. To this end, this thesis engages in various models and methods to control the nonlinear patterns in earnings process and meanwhile critically examine the association of dividend changes with current and future earnings changes. The first method, the categorical analysis, compares the current and future earnings performance of the firms with different dividend decisions. Considering the dividend signalling hypothesis, it is predicted that the firms with dividend increases (cuts) should have better (worse) current and future earnings performance than the firms with dividend continuations. Further taking account of the mean reversion and

autocorrelation in earnings process, the second method, the multivariate regression models, critically examines the relation between dividend changes and the changes in current or future earnings. Since large earnings changes are indicated to reverse faster than small earnings changes (Fama and French, 2000), taking the mean reversion and the autocorrelation in earnings process into consideration is of vital importance when forecasting earnings changes. Based on the signalling theory of dividends, this thesis hypothesises that the relations between dividend changes and current earnings changes and between dividend changes and future earnings changes should be positive. The third method applies the logit model in an attempt to investigate the influence of current and future earnings changes on managers' propensity for dividend increases and cuts. If the dividend signalling hypothesis is supported, current and (or) future earnings increases (declines) should raise the likeliness of dividend increases (cuts).

In this thesis, directly testing the relation between dividend and earnings changes proposes that dividend changes mainly represent current earnings performance. While the signalling models predict that dividend changes also signal for the information about firms' future performance, this thesis does not find explicit evidence supporting this notion. Furthermore, managers' decisions on dividends are found to be influenced by current earnings changes but not future earnings changes. The findings on the information of dividend signalling in this thesis are consistent with the findings of Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, Benartzi, and Thaler (2005) but inconsistent with the findings of Nissim and Ziv (2001).

1.4. Managerial motives and shareholders' wealth effect of share repurchase announcements

Considering that share repurchases appear to be an alternative method of cash distribution emerging last decade, researchers have shown an increasing interest in understanding whether share repurchase announcements signal for new information and whether the announcements signal for the same information as dividend announcements do. To date, previous studies extensively focus on the US share repurchases while the UK share repurchases have drawn little attention. Due to the potential effect of different regulations and taxation⁶, the share repurchases in the UK merits more comprehensive investigations.

Recently, the studies of Rau and Vermaelen (2002), and Oswald and Young (2004) are the two recent studies which focus on investigating the UK share repurchases. Nonetheless, the database (SDC) used by Rau and Vermaelen (2002) has been criticised for excluding comprehensive observations of the UK share repurchases. Moreover, the main focus of Rau and Vermaelen (2002) is on the effect of the changes in tax regimes on shareholders' wealth around share repurchase announcements. Oswald and Young (2004), on the other hand, only concentrate on testing open market share repurchases. With an increasing attention paid on this alternative payout mechanism, relative insufficiency in prior evidence for the UK share repurchases inspires this thesis to test and to understand the information implicit in the UK share

⁶ Prior to 7th October 1996 in the UK, off-market repurchases (tender offer and privately-negotiated share repurchases) are likely the favourite payout method of taxpayers while dividends should be the favourite method of tax-exempt investors. From 8th October 1996, a tax reform no longer allows tax-exempt investors reclaiming the tax credits for off-market repurchases. This reform makes tax-exempt investors become indifferent between off-market repurchases and open market repurchases. The tax credit for dividends is further eliminated for tax-exempt institutional investors on 2nd July 1997 and for all other tax-exempt investors on 1st April 1999, making dividends less attractive to tax-exempt investors. More details about the tax reforms in the UK can be found in Section 5.2.1. of this thesis, Rau and Vermaelen (2002) and Renneboog and Trojanowski (2005).

repurchase announcements. Furthermore, neither of Rau and Vermaelen (2002) nor Oswald and Young (2004) examine the shareholders' wealth effect of the UK tender offer repurchases. Since the US findings suggest that share repurchases with different methods⁷ are different in their shareholders' wealth effect, this thesis is prompted to investigate whether the similar phenomenon exists in the UK share repurchases.

On the other hand, due to the nature of share repurchases⁸, managers may announce share repurchases for not only signalling firms' performance but also signalling the undervaluation of firm value. Ikenberry, Lakonishok, and Vermaelen (1995; 2000) respectively suggest that the US and Canadian share repurchases are made for signalling undervaluation while Oswald and Young (2004) confirms that the undervaluation is also the determinant for firm to buy back own shares in the UK. Nonetheless, most of prior studies focus on only one of the potential motivations for announcing share repurchases, which neglects a possibility that managers may, by utilising share repurchase announcements, communicate two or more sorts of information to markets simultaneously. With taking this possibility into account, this thesis jointly examines whether share repurchases are announced for signalling undervaluation, signalling firms' performance and substituting dividends.

Another reason makes this chapter important is that this study compares the managerial motivations for announcing share repurchases with those for announcing dividends. For the UK market, this comparison has not been carried out in prior

⁷ The evidence from the US repurchase shows that market reacts more positively to the announcements of tender offer repurchase than the announcements of open market repurchase (Comment and Jarrell, 1991). In addition, prior evidence shows that the market responds positively to the privately negotiated repurchases announcements with repurchase premiums but negatively to those for greenmail (Peyer and Vermaelen, 2005; Bradley and Wakeman, 1983).

⁸ Share repurchases are implemented by share transactions but dividends are not.

studies⁹. Nonetheless, the comparison of the managerial motivations is crucial in that the evidence could help to figure out the role share repurchases play in payout policy and the reasons why managers choose between dividends or share repurchases as the payout mechanism.

This thesis, therefore, examines the shareholders' wealth effect in term of various repurchasing methods as well as compares the managerial motives for different payout decisions. The examinations on the UK share repurchases are mainly threefold. First and foremost, in order to figure out whether share repurchases with different buyback methods are indifferent to the market, the short-term abnormal returns are tested for the period around the announcements. This thesis hypothesises that 1) the market reactions to share repurchases announcements should be positive and 2) the market reactions to tender offer repurchase announcements should be greater due to the repurchase premiums offered by tender offer repurchases. Secondly, to test the undervaluation hypothesis, the long-term abnormal returns are examined for a four-year period centred on the announcements. If the undervaluation of the share prices is a reason for announcing share repurchases, the announcements are hypothesised to follow a downtrend of long-term return performance and precede an upward return performance. The third examination applies the multinomial logit model to compare the managerial motives for different payout decisions on share repurchases and dividends. The comparison of the managerial motives helps to understand whether dividend and share repurchase announcements signal for the same information and whether share repurchases can be used as a means of distributing cash to substitute for cash dividends.

⁹ See Rees (1996), Lasfer (2002), Rau and Vermaelen (2002) and Oswald and Young (2004).

The evidence to emerge from the short-term shareholders' wealth effect corroborates that the announcements of share repurchases are generally good news for the shareholders. Particularly, consistent with the US findings of Comment and Jarrell (1991), the tender offer repurchase announcements induce larger positive market reactions than the open market repurchase and the privately-negotiated repurchase announcements. On the other hand, the evidence on the long-term return performance is in favour of the undervaluation hypothesis by showing that the firms announcing share repurchases have experienced a long-term drop in share prices before the announcements. Furthermore, the shareholders seem to have received the information about the undervaluation and the share price reverses around the month of the announcements. Taken together, the evidence on the long-term returns performance is consistent with the findings of Oswald and Young (2004) and Ikenberry, Lakonishok, and Vermaelen (1995; 2000). Finally, comparing the managerial motives for share repurchases and for dividends generates the evidence suggesting that dividends and share repurchases are announced with different motivations. In this respect, it is indicated that the primary motive for announcing share repurchases should be signalling for the undervaluation while signalling for firms' operating performance is the main motive for announcing dividends. Furthermore, since these two payout mechanisms are used for different purposes, they are unlikely the substitute for each other.

1.5. Plan of the study

The remainder thesis is organised as follows. Chapter 2 reviews extensive literature on dividends and share repurchases. Both theoretical and empirical studies are thoroughly discussed in this chapter. Furthermore, it identifies the gaps of prior

literature and provides insightful understanding on the main issues about payout policy.

When dividends are believed to signal for the information about earnings, markets should have positive reaction to good news and negative reaction to bad news. The UK firms which announce dividends and earnings simultaneously provide an ideal circumstance for testing “real” dividend effect by controlling earnings effect. The tests are presented in Chapter 3.

Directly examining the association of dividend changes with current and future earnings changes, this thesis is particularly interested in finding out whether dividends signal reliable information for future earnings beyond the information about current earnings. The empirical examinations are presented in Chapter 4.

With the emergence of share repurchases in recent years, this thesis examines the wealth effect of share repurchase announcements. Moreover, the potential factors (motivations) which induce managers to make different payout decisions are examined by the multinomial logit model. The examinations are carried out in Chapter 5.

Finally, Chapter 6 concludes and summarises the findings of this thesis. This chapter also discusses the implications of this thesis for managers and investors.

Chapter 2

Research Issues in Dividends and Share Repurchases

2.1. Introduction

Regular cash dividends, among numerous strategies of cash distribution, have long been a major form of payout for managerial decisions. The dividends are paid quarterly in the US and semi-annually in the UK. Relative to the regular cash dividends, firms may distribute special dividends (or specially designated dividends) to indicate these dividends are not recurrent. Normally, firms, possessing temporary excess funds, distribute special dividends instead of committing to pay them regularly. Alternatively, share repurchases may be used by firms for the purpose of distributing cash and buying back their own shares. Similar to special dividends, share repurchases are not a recurrent policy. However, comparing to dividends, it is suggested that different characteristics are inherent in share repurchases. For example, managers are allowed to receive dividends whereas they are not allowed to participate in share repurchases. Previous study into share repurchases shows that the strict regulations have been set on in many countries to prevent managers' deliberate manipulation on share prices (Sabri, 2003). Another type of dividends which does not directly affect the firms' cash flow is stock dividends. Instead of distributing cash, stock dividends distribute a proportionate of new shares to shareholders in the light of their share holdings. It is analogous to that shareholders first receiving cash dividends from firms reinvest in the firms' stocks afterwards. Normally, the growth firms with more investment opportunities and eagerness for more cash flow tend to distribute

stock dividends.

It is important to note that dividend irrelevance proposition, introduced by Miller and Modigliani (1961), has provided a revolutionary influence on the traditional view about dividend policy to date. Before the proposition is presented, the corporate officials and investors broadly believe that higher dividend leads to higher firm value. For example, given a constant on investors' required rate of return, the dividend discount model indicates that the present firm value is determined by current and future dividends. By contrast, the dividend irrelevance proposition proposes that the real increase in firm value should result from increase in firm's investments rather than sole increase in dividends.

The proposition starts from presuming that the sources and the uses of firm's funds have to be balanced over any given period. Suppose that a firm has two sources of funds which are retained earnings and the funds financed externally. During the same period, the firm expends its funds on either investments or dividends. The balance can be expressed as Eq. (2.1):

$$E(t) + \Delta S(t) = D(t) + I(t), \quad (2.1)$$

where $E(t)$ denotes retained earnings at the start of period t , $\Delta S(t)$ denotes external funds financed during period t with ex-dividend price¹⁰, $D(t)$ and $I(t)$ respectively denote dividend and investments during time t .

On the other hand, given the rate of return on each share of the firm equals $r(t)$, the

¹⁰ Note that negative $\Delta S(t)$ indicates share repurchases.

share price of the period t (denoted as $p(t)$) in perfect capital markets can be expressed as Eq. (2.2):

$$p(t) = \frac{1}{1+r(t)}(d(t) + p(t+1)), \quad (2.2)$$

where $d(t)$ denotes dividend per share during time t and $p(t+1)$ denotes the ex-dividend share price. If the firm does not raise external funds during the period t , the total value of the firm at the start of period t (denoted as $V(t)$) can be expressed as Eq. (2.3):

$$V(t) = \frac{1}{1+r(t)}(D(t) + V(t+1)). \quad (2.3)$$

Nevertheless, if the firms raise external funds ($\Delta S(t)$), Eq. (2.3) has to be amended as Eq. (2.4):

$$V(t) = \frac{1}{1+r(t)}(D(t) + V(t+1) - \Delta S(t)). \quad (2.4)$$

Recalling Eq. (2.1), the divergence between total dividends and the raised funds equals the residuals of retained earnings after investments. The equilibrium can be express as Eq. (2.5):

$$E(t) - I(t) = D(t) - \Delta S(t). \quad (2.5)$$

Thus, Eq. (2.4) can be rearranged as Eq. (2.6):

$$V(t) = \frac{1}{1+r(t)}(E(t) + V(t+1) - I(t)). \quad (2.6)$$

Eq. (2.6) clearly indicates that, given the firm's retained earnings, the decision of investments is the only element which determines the firm value of the period t . Since the firm value of the period $t+1$ is also predicted by the subsequent retained earnings and investments, it becomes that the firm value is determined by the sequential investment policy. With respect to the dividend decision during each period, after the decision of investments is made, the divergence between total dividends and the externally raised funds should be equal to the residual of retained earnings. Consequently, for each level of dividend decided, the firm could correspondingly finance externally to make balance between the uses and the sources of the funds. It follows that dividend policy does not possess any influence on firm value in perfect capital markets.

In the real world, however, it is hard to find perfect capital markets. The major imperfect elements discussed in previous studies are 1) information asymmetry, 2) agency problems and 3) the tax differentials between dividend and capital gains. While information asymmetry exists between insiders (managers) and outsiders (investors), the information about stocks is no longer freely available for all traders. The underlying idea is that insiders know the real value of their firms in that they possess more information about investments and expected profits (Jaffe, 1974). By contrast, outsiders can only get information from financial reports or speculate about real firm value via firm's announcement, such as dividend or repurchases announcements. This, thus, leads to the possibility that these announcements may be imposed by managers in order to change the outsiders' evaluation on their firms. According to the signalling theory of payout policies, managers use dividend or

repurchases to signal for their expected earnings and profits. Relatively, investors respond positively to dividend increases or share repurchases and negatively to dividend cuts.

The second imperfect element is the agency problem existing between managers and shareholders. Without complete contracts, managers may operate the firms in the light of their own interests. An implication of this is the possibility that expenses are lavished on unproductive projects or are consumed as perquisites by managers. However, dividend or share repurchases could serve as a tool to reduce free cash flow available for managers and therefore abbreviate the agency problem. Moreover, it follows that increases in payouts may likewise force the firms to enter the capital markets more frequently and thus get monitored.

The tax differentials are the third imperfection which makes the investors no longer neutral between dividends and capital gains. A dollar of dividend becomes less valuable than a dollar of capital gains when the tax on dividend is higher, and *vice versa*. Similarly, with the same value of cash payout, the investors may also prefer share repurchases to dividend when capital gains are taxed on a lower rate. It follows that investors may bias evaluate the firm value due to their discrimination between dividend and capital gains. The dividend clientele hypothesis predicts that investors would invest in the stocks whose payout policy is consistent with their best interests. Relatively, managers would make the payout policy accordingly in an attempt to reduce the potential transaction costs for their clienteles.

The remainder of this chapter is structured as follows: Section 2.2 discusses the theoretical and empirical studies with respect to dividend and asymmetric information,

followed by Section 2.3 which reviews the studies on the agency theory and the clientele hypothesis of dividends. Section 2.4 reviews the studies on share repurchases and the conclusion is presented in Section 2.5.

2.2. Dividends and asymmetric information

2.2.1. Signalling models

What is proposed by Miller and Modigliani (1961) on dividend irrelevant theory is founded on the assumption of perfect capital markets. An underlying implication of the theory is that dividend policy may affect firm value if this assumption is not held. Asymmetric information between investors and managers is a kind of market imperfection. Managers possess more insiders' information about firms' policies whereas investors can only revise the expected firm performance by evaluating the firms' signals. Given firms' investment policy set, dividend policy is a residual of the investment policy, and dividend changes should be driven by the changes in earnings. Consequently, dividend is thought to convey information about earnings even if managers have no intention to signal.

Although dividend effect has been detected earlier in the 1970s¹¹, it is until 1979 that the first signalling model is originated. One very initiative paper in this topic is that by Bhattacharya (1979) who develops the signalling model in which consists of two periods. In the first period, managers decide the investment policy which they are going to carry out and thereby make a commitment of dividends to their shareholders. In the second period, managers distribute dividends which they committed in the previous period by using the proceeds of the investment projects.

A crucial assumption implicit in Bhattacharya's (1979) model is that access to capital markets for external financing is costly. In light of this assumption, it is supposed that if firms are incapable of meeting the dividend commitments, the firms will be forced

¹¹ See Pettit (1972) and Brown, Finn, and Hancock (1977).

to finance externally and therefore incur transaction costs. The increasing frequencies of external financing are likewise considered to raise the transaction costs, and in turn increase the costs of signalling. As a consequence, if the committed dividend is high enough, a firm with inferior investment projects is unable to mimic the dividend decisions of a firm investing in productive projects. Otherwise, the transaction costs incurred by the inferior firms may exceed the signalling benefits generated by mimicking the better firms' dividend decisions.

Nevertheless, Bhattacharya's (1979) model fails to shed light on why dividend are made to signal when they are costly (Allen and Michaely, 2003). Since the real value of the firms will be disclosed when the firms realise the proceeds of the previous period's investment projects in the second period, it is questionable whether it is worth to pay a lot of cash merely to signal for the next period. Furthermore, Bhattacharya (1979) assumes that the incentive of signalling dividend is the rise in liquidation value. But then a question mentioned by Allen and Michaely (2003) is that why the rise in liquidation value becomes the main concerns of managers in the first period and prompts them to distribute cash.

Unlike Bhattacharya's (1979) model, Miller and Rock (1985) develop a signalling model from the aspect of dividend, investment and financing policies. They assume that there are two groups of shareholders who behave differently after dividends are announced. A group of shareholders sell their shares after dividend announcements but before dividend realisations while the other hold the shares. The objective of the firms is to make a compatible dividend policy and maximum their wealth for these two groups. Additionally, as indicated by Miller and Rock (1985), the earnings are

only used for investments and dividends¹². Based on these two assumptions, they derive the optimal dividend given a specific level of earnings.

Nonetheless, with the information asymmetry between managers and investors, managers pay higher than the optimal dividend to eliminate the information asymmetry and the signalling costs are the foregone use of the funds in productive investments. Bearing the signalling costs may be worth for good-news firms since they could “*avoid giving the market the false impression that earnings were not good enough to justify a dividend*” (Miller and Rock, 1985; p. 1045). Yet, the signalling costs may lower the future earnings at the same time since the firms give up a part of productive investment.

The model, developed by Miller and Rock (1985), clearly explains that dividend is made to signal for earnings and to eliminate the information asymmetry. Unlike the signalling costs in Bhattacharya’s (1979) model (i.e. the transaction costs of external financing), the signalling costs in Miller and Rock’s (1985) model are the cuts in funds for productive investment. The model could also be applied to share repurchases in that the “dividend” discussed in Miller and Rock (1985) is net dividend. However, the assumption that earnings are only used for investment and dividend are rarely the case in reality. When the retained earnings are allowed in the model, the managers would have more flexible financial policies and signalling by dividend may not necessarily force managers to give up investment opportunities.

In their model, John and Williams (1985) shed light on dividend signalling from the aspect of taxes and liquidity needs. With liquidity needs, both shareholders and firms

¹² The “dividend” here indicates net dividend which is dividend less any additional funds raised.

have to sell a partial of owning shares in order to meet their needs. It is assumed in the model that managers will act in the best interest of firms and current shareholders. For an undervalued firm, when the cash demanded by current shareholders and firms exceeds the overall internal cash which firms are able to supply, managers who know the true firm value then announce dividend to signal for the value. As a result, dividend announcements will raise share price, following that the shares could be sold at the true value. At the same time, the shareholders will be levied taxes on dividend but they can get compensation form the rise of share price. As for an overvalued firm, their managers may mimic the dividend policy of the undervalued firm, but their shareholders will be levied more taxes on the higher dividends. Since the shares held by these shareholders are not worthy enough, higher tax costs will offset their benefits from the rise of share price.

What is different from that in Bhattacharya (1979) is the role of tax costs in John and Williams (1985). While Bhattacharya's (1979) model suggests tax costs make the liquidation value respond higher to dividend, tax costs in John and Williams' (1985) model is the signalling costs which distinguish firms' true value. Nonetheless, Allen and Michaely (2003) criticise that the model based on the assumption that liquidity needs could only be achieved by selling shares is questionable. There are still a number of methods which could meet shareholders' liquidity needs, such as borrowing from banks or using credit cards, and the interest costs might be lower than tax costs on dividends.

In contrast to the aforementioned models developed on the basis of dividend's signalling for the proceeds of investments, Ambarish, John, and Williams (1987) develop a model in which both dividend and investment are employed to signal for

firm's value. Their model proposes that a valuable firm may signal solely by dividend, but signalling by both investment and dividend are more efficient and are capable of maximising shareholders' wealth. In their model, managers are assumed to maximise their shareholders' wealth and avoid their rivals' mimicry on signalling. Under these assumptions, Ambarish, John, and Williams (1987) compare less valuable firms with more valuable firms. For less valuable firms, their managers do not worry about mimicry and the firms do not entail signalling costs as under systematic information. The optimal decision to maximise their shareholders' wealth is to pay no dividend and to invest in non-negative NPV projects. By contrast, managers in more valuable firms need to signal for their value, preclude rivals' mimicry and maximise shareholders' wealth. Their dividend policy relies on the information which is mainly asymmetric between the firms and the investors.

With asymmetric information, the present value of investment, including assets in place and investment opportunities, is only known by insiders (directors and managers), but is unobserved by outsiders (investors). In this scenario, more value firms could decide to signal for their true value either solely by dividend or by both dividend and investment. When signalling solely by dividend, the dividend has to be high enough to preclude mimicry given an optimal investment level. However, such signalling is feasible but inefficient. When the asymmetric information between firms and investors is mainly on assets in place, the model suggests that the more valuable firms reduce their investment level and pay fewer dividends, which is also capable of precluding mimicry and maximising shareholders' wealth. Alternatively, when the asymmetric information is mainly on investment opportunities, the firms could make the signalling efficient by increasing investment level and paying fewer dividends. In each of the two above scenarios, the higher marginal costs of adjusting investments

for less valuable firms prevent the firms from mimicking dividend policy and help more valuable firms to minimise signalling costs.

It is really an innovation of signalling model when Ambarish, John, and Williams (1987) propose that signalling costs could be minimised by signalling with both investment and dividend. However, in this model, the assumption that more valuable firms have to forego positive NPV investment projects or adopt negative NPV projects just for minimising signalling costs and precluding mimicry is not reasonable enough. It seems possible that the agency problem would arise while adopting negative NPV projects to minimise the signalling costs.

Extending the model of Ambarish, John, and Williams (1987), Williams (1988) presents a multi-period signalling model with the same elements. In his model, firms observe their cash and possess private information about the returns on investment projects. Some feasible value of the returns, not necessarily the true value, is then reported to outsiders by the firms who possess private information. In order to make the report creditable, managers further signal by means of announcing dividends, investments and fractional new shares. If the signals are believed by investors, investors would buy the firm's stock accordingly and managers must optimise the policies on the three signals to meet the returns on investments they reported. In light of this model, it is assumed that the optimal investment is firstly financed by internal funds and secondly by issuing new shares. In equilibrium, firms exhaust all cash and sell sufficient shares to finance for their investment projects which maximise the firm value. Dividends are thereby distributed to signal for the firm value and to support the stock sale which in turn increases the external funds for investments.

The earlier models presented by Bhattacharya (1979), Miller and Rock (1985) and John and Williams (1985) emphasize more on signalling costs for precluding mimicry. By contrast, the later models developed by Ambarish, John, and Williams (1987) and Williams (1988) additionally consider the interaction between investment and dividend policies for the purpose of making signalling efficient and maximising firm value. Another observable difference among these models is the signalling costs, such as transaction costs in Bhattacharya (1979), forgone funds for investment in Miller and Rock (1985) and taxes in John and Williams (1985). Despite the variety of the signalling costs, they are all dissipated for precluding mimicry, which helps to distinguish a “good” firm from a “bad” firm. Moreover, the information signalled by dividends is a little different if comparing these models. Bhattacharya’s (1979) model explicitly indicates that managers use dividends to signal for future earnings. Relatively, Miller and Rock’s (1985) model likely indicates that dividend signals for current earnings while John and Williams (1985) suggests that dividends signal for the undervaluation of the current firm value.

Despite the existence of some divergences among these models, there are common implications. Firstly, under information asymmetry, dividends are used as a communication mechanism between managers and shareholders. The signals from dividends are thought to be more creditable than press releases in that dividends are costly. Secondly, only valuable firms have a demand for signalling their true value. The underlying reason is that private information is only known by insiders but not observed by outsiders, signalling would make their shares valued correctly. By contrast, less valuable firms would prefer to disguise their true value and, if feasibly, they would try to mimic the payout policy of more valuable firms. This leads to the third implication that the cash payout for dividends has to be high enough to eliminate

information asymmetry and to preclude mimicry. Otherwise, signalling would fail and dividend is only waste of cash for both firms and their shareholders.

2.2.2. Prior evidence on dividend signalling

Wealth effect of dividend announcements

One of the implications from the dividend signalling theory predicts that markets respond positively to the good news conveyed by dividend increase and negatively to the bad news conveyed by dividend cuts. The market reactions to dividend announcements are usually measured by the abnormal returns around the announcements. The underlying hypothesis is that if positive (negative) abnormal returns are found around dividend increases (cuts), the theory is therefore confirmed.

Another prediction to emerge from the signalling theory is that dividend signals the information about expected earnings or profits. In what follows is that a part of studies, focusing on testing the association of dividend changes with current and future earnings changes, expect to detect positive correlations between them.

Pettit (1972) tests the abnormal returns around the dividend announcements for 14 dividends and earnings intersectional portfolios sorted by dividend changes and earnings changes. As expected, market has the largest positive reaction to both dividend initiations and dividend increases that are larger than 25 percent. The evidence demonstrates that the largest negative market reaction is found for dividend cuts and dividend omissions.

Aharony and Swary (1980) estimates the market reaction to dividend announcements by distinguishing the observations whose earnings are released preceding dividends

from those whose earnings are released following dividends. They report that market reacts positively to dividend increases and negatively to dividend cuts regardless of dividend announced preceding or following earnings. Additionally, their findings also demonstrate that market reacts severer to dividend cuts than to dividend increases.

Confirming the findings of Aharony and Swary (1980), a test on dividend initiation is undertaken by Asquith and Mullins (1983). Their result shows that, with earnings announcements made within ten days from dividend announcements, the market reaction to dividend initiation becomes substantially smaller. An implication of this finding is that the information provided by dividend and earnings announcements are partially substituted.

In 1984, Kane, Lee, and Marcus (1984) further study the market reaction to dividends and earnings announcements whose announced period is within ten days between each other. As the announcement days of dividends and earnings are close, Kane, Lee, and Marcus (1984) additionally investigate the interaction effect in an attempt to understand how the market reacts to the close announcements. Their evidence shows that, without considering the interaction effect, both dividends and earnings appear to positively pertain to cumulative abnormal returns. While the interaction effect is added to the regression model, the coefficients on dividends and earnings variables become insignificant. On the contrary, four out of five coefficients on the interaction variables appear to be significant. This finding implies that the market jointly evaluates dividends and earnings announcements. Easton (1991) studies Australian market in which dividend and earnings are announced simultaneously. His findings, similar to the findings of Kane, Lee, and Marcus (1984), confirm the existence of interaction effect between dividends and earnings announcements and also show that abnormal returns are positively related to dividend changes.

Another similar study is implemented by Lonie, Abeyratna, Power, and Sinclair (1996) for the UK market. It is found that the earnings effect remains significant despite the model's inclusion of or exclusion from the interaction effect variables. This implies that, for the UK market, when earnings are announced simultaneously, dividend does not carry information about current earnings. Nonetheless, the interaction effect still appears to be significant, indicating that market evaluates the announcements jointly.

Consistent with the UK findings of Lonie, Abeyratna, Power, and Sinclair (1996), Conroy, Eades, and Harris (2000) point out that, in Japan, earnings effect also dominates dividend effect on explaining market response. Recalling the study of Dewenter and Warther (1998), Japanese firms, particularly keiretsu-member firms, revise their dividend policy immediately in order to reflect their current earnings. When 1) dividends are mostly made to reflect earnings and 2) dividend announcements are announced with earnings announcements, as Conroy, Eades, and Harris (2000) conclude, earnings announcements are capable of providing sufficient information, and dividends are likely redundant for signalling in Japan.

In China, firms announce earnings, cash dividends and stock dividends simultaneously. Chen, Firth, and Gao (2002) suggest that, consistent with the aforementioned UK and Japanese findings, investors mainly react to unexpected earnings. The market reaction to cash dividends is unobvious and only two out of twelve coefficients on cash dividends are significant.

In German, earnings are usually announced preceding dividend announcements. Amihud and Murgia (1997) employ regression analysis to test whether the price movements are induced by unexpected dividends and earnings. Their evidence shows

that both unexpected dividends and earnings are positively related to two-day cumulative abnormal returns. However, as earnings are announced before dividends, dividends are expected to contain no information. The findings of abnormal returns associated with dividend announcements implicitly indicate that dividends may contain other information additional to concurrent earnings.

Dividend signalling and earnings performance

Another approach widely employed to test dividend signalling is estimating the associations of dividends with current and future earnings. In a classic study, Lintner (1956) selects 28 out from 600 listed firms. From an interview with their top managements, it is found that, on one hand, the current dividend rate is viewed as an important benchmark for making dividend policy. On the other hand, through the consistency of the dividend policy, the firms believe that outsiders would perceive what the firms expect them to understand. That is, the information about current earnings.

Based on the results of the interviews, Lintner (1956) establishes a model as Eq. (2.7) explaining dividend policy:

$$D_{it} = \alpha_{it} + bP_{it} + dD_{i(t-1)} + \mu_{it}, \quad (2.7)$$

where D_{it} denotes dividend payment of firm i at time t , and P denotes earnings. What is observed from this model is that current dividend decision is based on the previous dividend and the concurrent earnings. Lintner's (1956) assertion that this model could explain 85 percent of dividend decisions over the post-war period is later confirmed by Fama and Babiak (1968) who examine a larger sample (392 firms) for a 19-year

period. A further suggestion by Fama and Babiak (1968) is that additionally including the lagged profits variables could possibly improve the predictive power of the model.

Examinations on the earnings changes, based on both the year and the subsequent year respectively of paying special dividends and increasing regular dividends, is undertaken by Brickley (1983). The result shows that earnings increases are detected in both the year of special dividend paid and the year of regular dividend increases. What is more, the earnings increases in the subsequent year are also found for regular dividend increases. Consistent with the signalling theory, Brickley's (1983) finding suggests that regular dividend increases signal for current and future earnings.

A further study with investigating the dividend policy of the firms which experience at least one annual earnings loss or declines during 1980 to 1985 is implemented by DeAngelo, DeAngelo, and Skinner (1992). By employing binary logit model, they specifically report that dividend cuts are influenced by the earnings of the previous year, the current year and the subsequent year. The higher level of earnings the firms possess, the lower propensity they would cut dividends. Another important finding is that firms, with suffering initial loss but not cutting dividends, perform better in subsequent earnings than those cutting dividends and with initial earnings loss. Taken together, the result to emerge from their evidence on firms suffering initial earnings declines and loss supports the prediction of the dividend signalling theory.

The framework in Aharony and Dotan (1994) examines the changes in earnings yield of the subsequent quarters following dividend changes. As indicated by their results from the regression, it is suggested that both dividend increases and dividend cuts have positive and significant relations with the changes in earnings yield for the

subsequent two quarters. Specifically, the coefficient for dividend cuts variables are more significant, signifying that dividend cuts are more creditable on explaining the changes in earnings. Additionally, as further demonstrated by Aharony and Dotan (1994), the earnings changes for the quarter of dividend payment are larger positive (negative) for dividend initiations (omissions) than for dividend increases (cuts). Overall, these findings support the dividend signalling theory.

In contrast to earlier findings, however, Benartzi, Michaely, and Thaler (1997), suggest that dividend does not signal for future earnings. As demonstrated by their test on the signalling power of dividend increases and dividend cuts for unexpected earnings of the years surrounding dividend changes, their evidence, by using both categorical analysis and regression analysis, indicates that the information signalled by dividends tends to be current earnings changes. Remarkably, the relations between dividend cuts and future changes in earnings appear to be negative. This, however, is contradictory to the expectation of the dividend signalling theory.

The models, developed by Nissim and Ziv (2001), investigate the US firms for the period of 1963 to 1998 with further consideration to the mean reversion of earnings process. Moreover, in the context of testing whether dividend signals for future earnings, an innovative model is formed with controlling the information about future profits available for investors prior to dividend announcements. It is important to note that the control over the available information helps to detect the signals that are really conveyed by dividend. In this view, the evidence generated from this examination supports the dividend signalling theory, implying that dividend increases signal for the future earnings up to two subsequent years and dividend cuts up to one year.

In 1988, the study of Healy and Palepu (1988) examines the earnings performance around dividend initiations and omissions. Consistent with the prediction of signalling theory, their finding suggests that positive earnings changes follow dividend initiations for two subsequent years. By contrast, contradictory to the signalling theory, that earnings improvement following dividend omissions is detected. A possible explanation for this unexpected finding, according to Healy and Palepu (1988), might be that the potential survival bias of the dividend-omission sample.

A similar study, implemented by Ho and Wu (2001), additionally takes the survival bias of the sample into account. That future earnings reversal following both dividend initiations and omissions is observed from their evidence with an indication that the post-announcement earnings performance of the dividend-initiation firms is inferior to the control group. Relatively, the omission firms outperform the control group in post-announcement earnings changes. By studying the UK sample, Balachandran, Cadle, and Theobald (1996) detect negative relations between future earnings changes and dividend cuts. Likewise, Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, and Swaminathan (2002) provide the similar findings about the U-shape earnings process surrounding dividend changes. Healy and Palepu (1988) name this U-shape earnings process a “dividend puzzle” whereas Balachandran, Cadle, and Theobald (1996) suggest that this phenomenon may stem from earnings’ mean reversion.

The potential effect of the mean reversion on testing dividend signalling has been well controlled in Grullon, Michaely, Benartzi, and Thaler (2005). Thanks to the partial-adjustment model for profitability developed by Fama and French (2000), Grullon, Michaely, Benartzi, and Thaler (2005), applying the model on testing the

relations between dividend changes and the changes in future profitability, find that the relations between dividend changes and future profitability changes only appear in the linear model but not in non-linear models. The contribution of their finding implies that 1) the dividend puzzle is very likely induced by mean reversion and autocorrelation factors and 2) dividend changes do not signal for the changes in future profitability.

An examination on Germany sample is carried out by Georgen, Renneboog, and Da Silva (2005). Their evidence suggests that Germany firms, except widely held firms, reduce dividend in order to reflect the concurrent earnings. In particular, Germany firms revise their dividend policy as soon as they experience earnings improvement. These findings are consistent with the Japanese findings of Dewenter and Warther (1998) for “keiretsu“ firms. Nonetheless, different findings are provided by DeAngelo, DeAngelo, and Skinner (1996), who examine the US firms experiencing initial earnings declines after a long-term earnings growth. Their evidence shows that, among the 145 firms, only two of them cut dividends with their initial earnings declines while 44 of the firms do not change the dividends. Obviously, a majority of these firms are unwilling to cut dividends. As indicated by DeAngelo, DeAngelo, and Skinner (1996), it is suggested that managers’ reluctance to cut dividend erodes the authenticity of signals conveyed by dividend increases.

Examining firms’ propensity for paying dividends during the period of 1978 to 2000, DeAngelo, DeAngelo, and Skinner (2004) find that the increases in real earnings¹³ of a small number of large firms explain most of the aggregate dividend increases during

¹³ Since the examination of DeAngelo, DeAngelo, and Skinner (2004) is carried out for a long-term period, for comparison purpose, the nominal earnings are converted to 1978 dollars based on the consumer price index.

the period of 1978 to 2000. The reduction in the number of dividend payers, mentioned in Fama and French (2001), can be mainly attributed to the firms which paid very small dividends and were subsequently delisted. This evidence indirectly supports the prediction of dividend signalling theory, indicating that earnings performance is an important factor influencing firms' dividend policy.

Overall, two methods for examining the dividend signalling theory are used in previous studies. The first is to examine the market reactions to dividend announcements to understand whether the signalled information is perceived by the market. Normally, these studies expect to detect positive market reactions to dividend increases and negative reactions to dividend cuts to support the signalling theory. Alternatively, previous studies directly examine the correlations between dividends and earnings process. The findings of these examinations help to distinguish whether dividend changes reflect current of signal for future earnings performance. Generally, the studies which support the signalling theory find that dividends are positively associated with current or future earnings. Recently, a main problem raised by employing the first method is that little attention has been paid to finding an adequate method to control the existing earnings information held by analysts and investors while dividends are announced. Chapter 3 attempts to fill this gap by thoroughly examining the simultaneous dividend and earnings announcements in the UK. Another debate which is raised by employing the second method is placed on whether dividend changes represent current earnings changes or signal for future earnings changes. Chapter 4 will further discuss this debate and try to provide incremental evidence on this issue.

2.3. Dividends and other related models

2.3.1. Dividends and agency models

The aforementioned signalling models are developed based on the assumption that managers act to maximise shareholders' value. Differently, there are some other studies which suggest that dividends play a role as agency costs to ensure managers' interests are aligning with those of shareholders. Basically following Jensen and Meckling (1976), these studies assume that managers of a widely-held firm will lavish expenses and consume perquisites in their interests. The existence of agency problems rules out the assumption of perfect capital markets imposed in Miller and Modigliani (1961). It can therefore be suggested that dividend policy may be no longer irrelevant and may affect current firm value.

By observing that firms often pay dividends and raise new capital simultaneously, Easterbrook (1984) explains dividend policy by agency costs. In the light of Easterbrook (1984) theory, it is suggested that, under the scenario of imperfect contracts (i.e. agency problem), shareholders have to bear the costs of monitoring managers. This, in turn, shows that dividends could be made to mitigate the agency problem. There are several possible explanations for this result. Firstly, dividends may force firms to finance externally. As entering capital markets, the firm's financial condition will be reviewed by investment banks, lawyers or accountants. While the firm with worse financial condition will incur higher cost of capital, managers in need of frequently raising money will more likely act in shareholders' interests. Secondly, dividends, if made by internal cash, may reduce free cash flow available to managers (agents), leading to mitigation of the agency problem. Despite the scenario that

shareholders are incapable of directly monitoring the behaviour of managers, lower free cash flow would reduce the possibility that managers lavish money beyond optimal investments. Thirdly, dividends, to some extent, could prevent shareholders' wealth from being taken advantage of by bondholders. Suppose a rate of interest has been set before a firm prospers and raises earnings, the interests become relatively high, given the lower risk the bondholders bear after the firm's prosperity. Consequently, by paying dividends and issuing new debts, managers restore the initial debt-to-equity ratio.

Based on the agency theory, Easterbrook (1984) provides a number of implications for empirical studies. Firstly, dividends *per se* are worthless for a firm with little agency problem. As a result, if firms externally finance for other purposes (rather than finance for dividends), it is expected that these firms pay lower dividends. This example can be found from "growth" firms in more demand for external funds than others. Secondly, the agency theory predicts that dividend policy has to be stable so as to keep firms in the capital markets. Hence, dividends are not expected to have a strong relation to short-term profits. Thirdly, contrary to the prediction of signalling theories, the agency theory assumes that dividends are related to past earnings and unrelated to future earnings. This is due that the interest conflicts between shareholders and bondholders would compel managers to pay out the unexpected earnings for the purpose of avoiding windfalls taken advantage of by the bondholders.

Shortly after Easterbrook (1984) develops an agency theory to explain dividends, Jensen (1986) advocates explaining dividends from the aspect of agency costs¹⁴. His theory suggests that dividends (or repurchases) are paid by managers with possessing

¹⁴ However, Jensen (1986) focuses more on the relation between takeover and free cash flow.

substantial free cash flow. Without paying out cash by dividends, managers may lavish the cash on perquisites or invest in low-return projects. Furthermore, managers may further commit permanent increase in dividends to control the use of future cash flow and imply that they act in shareholders' interests. Shareholders would punish the firms by sharp drop in firm prices when managers are incapable of meeting their commitment.

Although the agency theory proposes how dividends mitigate agency problems, it does not show managers' strong incentive to pay dividends. The only apparent incentive to stem from is that managers would like to show what they behave is consistent with shareholders' interests. However, given the conflict interests between shareholders and bondholders¹⁵, the latter would prefer managers to pay limited dividends, particularly when the firms are in financial distress. Moreover, since the firms' financial conditions are reviewed by investment banks when they issue new debts, simultaneous dividend payments appear to be redundant. For the agency theory, the reason why some firms simultaneously pay dividends and issue new debts remains ambiguous.

Another drawback criticised by Allen and Michaely (2003) is that the theory provides a reasonable explanation for dividend increases, but much less clear for dividend cuts. The main question addressed is that: do dividend cuts relatively indicate that firms are short of cash flow and hence free cash flow if dividend increases indicate that managers distribute free cash flow? If investment opportunities remain unchanged, dividend cuts induced by the short of free cash flow are not good news for shareholders. It is, therefore, logically to see share price drops responding to dividend

¹⁵ See Jensen and Meckling (1976) and Myers (1977).

cuts. Nevertheless, what the theory does not predict is that if the short of free cash flow results from increases in investment opportunities, it should be rather good news for shareholders and it deserves a positive response in markets.

In sum, dividends, in the agency models, play a role in mitigating agency problems. The models are based on the assumption of imperfect contracts which lead to interest conflicts between managers, shareholders and bondholders. Under the interest conflicts, dividends help to reduce free cash flow available for managers and compel them to act in shareholders' interests. The contention of the agency models is different from that of dividend signalling models in which suggest that dividends are made to signal for firms' performance. However, similar to signalling models, there are also a number of empirical studies advocating of agency models. The empirical studies are discussed in the following section.

2.3.2. Prior evidence on agency models of dividends

Empirical evidence for the relation between dividends and agency problems are carried out much later than that for the dividend signalling theory. It may be partly due that dividends are directly linked to investments or (and) earnings in the pioneering studies of Lintner (1956) and Miller and Modigliani (1961), making the contention of the dividend signalling theory more intuitive and straight forward. Nonetheless, there are still a number of empirical studies supporting the agency theory of dividend policy.

Effect of over-investments on dividend decisions

Lang and Litzenberger (1989) is the one which first applies Tobin's Q to examine the

agency theory for dividends. Firms with Tobin's Q greater than unity are designated to be at the value-maximising level of investment while firms with a Q ratio less than unity are labelled as over-investing firms. Accordingly, they separate the sample into two groups and compare the abnormal returns on dividend announcement days for value-maximising and over-investing firms. They test on "free cash flow hypothesis" which states that excess free cash flow would prompt managers' overinvestment and dividends could help to reduce free cash flow available for managers. As a result, dividend increases for firms with Q ratio less than unity signify lower probability of overinvestment. By only examining dividend changes greater than 10 percent, their findings show that the over-investing firms induce larger market responses on the dividend announcement day regardless of the signs of dividend changes. This evidence implying that dividend changes for over-investing firms convey more information about reducing free cash flow is consistent with the notion of the agency theory.

Similarly, Akhigbe and Madura (1996) test the relation between long-term post-announcement abnormal returns and Q ratio. For dividend initiations, they find negative relation between the wealth effect and Q ratio, implying that the wealth effect following dividend initiations is more favourable for over-investing firms.

Extending the investigation of Lang and Litzenberger (1989), Yoon and Starks (1995), by additionally using the variables of capital expenditures, examine on the free cash flow hypothesis. Their evidence suggests that dividend increases for the over-investing firms have larger positive impact on share price than those for the value-maximising firms. Nonetheless, no significant difference in market responses to dividend cuts between over-investing and value-maximising firms is found, which is

different from the evidence of Lang and Litzenberger (1989). The framework in Yoon and Starks (1995) also shows that, the Q ratio loses its explanatory power on dividend effect after dividend changes, dividend yield and firm size are imposed to explain cumulative abnormal returns. Furthermore, tests on the relations between dividend changes and subsequent capital expenditures are undertaken. Their result suggests that, regardless of the Q ratio, dividend increases are followed by increases in capital expenditure while dividend cuts are followed by cuts in capital expenditures. This evidence, similar to the findings of Denis, Denis, and Sarin (1994), is contradictory to the prediction of the free cash flow hypothesis. The only evidence in their studies supporting the free cash flow hypothesis is that the over-investing firms have higher dividend yields and larger dividend changes than value-maximising firms.

Another study following Lang and Litzenberger's (1989) method is Ryan, Besley, and Lee (2000). They examine NASDAQ firms with fewer major press releases and thus evoking more obvious market reactions to dividend announcements. Consistent with the signalling hypothesis, their findings documents that the market reacts positively to dividend initiations and negatively to dividend omissions. Nonetheless, with further examinations in light of the Q ratio, they report that the free cash flow hypothesis predicts the information content of dividend initiation announcements well but no supportive evidence on dividend omission announcements is detected.

Christie and Nanda (1994) take advantage of a special event, an unexpectedly introduced legislation of undistributed profits tax (UPT) by President Roosevelt, to examine the agency theory for dividend policies. The UPT potentially encourage firms to distribute the excess funds to avoid tax levied on retained earnings. The tests are implemented by examining market response to the tax announcement day (The

March 3, 1936) and real dividend changes during 1936. It is predicted that as the firms with lower payout ratios likely have more excess funds than others, they are expected to pay out more dividends after the UPT is in action. By examining the market responses for different levels of payout ratios, the agency theory for dividend policies suggests that the tax reform should have more impact on the firms with low payout ratios. The findings of Christie and Nanda (1994) support this notion, showing that tax announcement generally induces 1.23 percent of abnormal returns for the firms with payout ratios equal to 40 percent or less, and 0.19 percent for payout ratios greater than 80 percent. In addition, their regression analysis indicates that the market expects that the tax act would force low-Q firms (over-investing firms) to disgorge more cash than high-Q firms.

Relatively, by examining real dividend growth during 1936, Christie and Nanda (1994) test whether the tax announcement has real effect on managers. Their result shows that, consistent with the expectation of the market, firms with lower payout ratios during 1935 generally have higher dividend growth than firms with higher payout ratios. Nevertheless, the evidence that firms with lower Q ratio respond to the tax act sluggishly and appear to have less dividend growth than firms with higher Q ratio is contradictory to the market's initial expectation. Christie and Nanda (1994), however, suggest that even the relatively small reduction in free cash flow available to managers who only behave in their interests is sufficient to increase firm value.

Effects of other factors on dividend decisions

Rozeff (1982) estimates a regression model of dividend payout ratios on previous and forecasted future growth rate of revenues which are respectively the proxy for past and future investment opportunities. Consistent with the agency theory, Rozeff (1982)

concludes that greater past and expected investment opportunities reduce dividend payouts. In an attempt to test whether the agency theory is valid on explaining the dividend policy in different periods, Dempsey and Laber (1992) apply Rozeff's (1982) model on a period which is characterised by lower inflation, stronger economic growth and lower taxes. Their evidence is consistent with Rozeff's (1982), concluding that Rozeff's (1982) model is stable enough to predict dividend payouts.

In 1989, Crutchley and Hansen (1989) test the relation between capital expenditures and dividends. Their test, different from Yoon and Stark (1995), focuses on the concurrent capital expenditures of the event year rather than on the changes in capital expenditures around dividend payment. The capital expenditures, in Crutchley and Hansen (1989), are measured by the expenses on advertising, research and development. Their finding of a negative relation between capital expenditures and dividends is consistent with the prediction that firms with higher growth opportunities would pay smaller dividends. Furthermore, Crutchley and Hansen (1989) also show a negative relation between the capital expenditures and the firm's leverage ratio. Their evidence for debts and dividends jointly implies that firms with less capital expenditures (and hence more free cash flow) tend to issue more debts or pay more dividends. These findings, consistent with the suggestion of Jensen (1986), proposes that the promise of paying out future cash flow for debts or dividends makes the managers with possessing more free cash flow operate the firms more efficiently.

By using regression analysis, Smith and Watts (1992) test the relation between firms' finance policy, dividend policy and investment opportunities. The equity-to-value ratio is imposed as the proxy for finance policy in that higher debts would lead to lower equity-to-value ratio. Additionally, they use the ratio of book value of assets to

firm value in an attempt to measure firms' investment opportunities. As the higher ratio of assets in place to firm value indicates the lower ratio of the value of investment opportunities to firm value, the ratio of book value of assets to firm value is an inverse indicator for investment opportunities. Their evidence suggests that the ratio of equity to firm value is negatively related to the ratio of book value of assets to firm value. Jensen (1986) states that firms with higher free cash flow could issue more debts to force managers to make use of the free cash flow efficiently, which, in turn, leads to low ratio of equity to firm value. On the other hand, higher free cash flow also indicates lower opportunities and higher assets in place. Consequently, the negative relation between the ratio of equity to firm value and the ratio of book value of assets to firm value is consistent with Jensen's prediction. Furthermore, according to Easterbrook (1984), higher opportunities would demand more cash flow and result in lower dividends. Smith and Watts (1992) support this prediction and show that dividend yields are positively related to the ratio of book value of assets to firm value.

Similarly, the findings in Gaver and Gaver (1993) also examine the relations between debts and investment opportunities and between dividends and investment opportunities. A major difference on this study is that Gaver and Gaver (1993) impose six variables to form an index to measure investment opportunities. Nonetheless, their findings are consistent with the findings of Smith and Watts (1992). Their evidence, in agreement with the contention of the agency theory for dividend policies, indicates that more investment opportunities are related to lower dividend yields and lower debt-to-equity ratio.

Some other studies, by testing the market responses to debts or dividend announcements, examine the agency theory for dividend policy. Examining bond

prices around dividend announcement days, Handjinicolaou and Kalay (1984) test two *vis-à-vis* hypotheses which predict the bond price behaviour oppositely. The “information content hypothesis”, based on signalling theory, predicts that both share prices and bond prices rise with dividend increases and drop with dividend cuts. By contrast, the “wealth redistribution hypothesis”, based on agency theory, predicts the same on share price behaviour but oppositely on bond price behaviour. The different prediction on bond price by the wealth redistribution hypothesis is due that unexpected dividend increases may transfer bondholders’ wealth to shareholders no matter “debt-financed” or “investment-financed” dividends. Their results, overall, suggest that dividend increases do not have apparent effect but dividend cuts possess negative effect on the bond prices. It can therefore be suggested that their evidence is more consistent with the information content hypothesis but is contradictory to the wealth redistribution hypothesis.

By examining a larger sample, the findings of Dhillon and Johnson (1994) who carry out a similar test for share and bond prices support the “wealth redistribution hypothesis”. For two-day abnormal returns around dividend announcements, their finding that bond prices are negatively associated with dividend changes indicates that unanticipated increases (cuts) in dividend are unfavourable (welcome) for bondholders. Dhillon and Johnson (1994) attribute the different findings from those of Handjinicolaou and Kalay (1984) to a larger sample they examine and their focus on larger dividend changes.

Johnson (1995), by involving with debts, also tests the agency models for dividend policies. Nonetheless, different from the above studies, he examines the share price response to announcements of debt issues. In light of Jensen's (1986) suggestion,

debts could reduce the free cash flow problems as dividends do in that the necessity of meeting debts would force managers to avoid unprofitable projects. Based on this proposition, Johnson (1995) argues that debt issues should benefit more for firms with low dividend payout since debts and dividends are substitute devices for reducing the free cash flow problems. This argument is supported by his findings which show that market responds positively to debt issue announcements made by low-dividend firms and the price effect for low-dividend firms are significantly larger than that for high-dividend firms. What is more, among the low-dividend firms, bond issue announcements appear to have more impact on low-growth firms than high-growth firms. This is consistent with the notion that low-growth firms have severer free cash flow problems and are expected to benefit more on debt issues. In addition to test the market response to debt issues, Johnson (1995), in an attempt to compare the cash demands of the firms, directly examines the firms' frequencies of entering the capital markets. It is found that, among the low-growth firms, the firms with high dividends enter the capital market more frequently than those with low dividend. This evidence supports the agency model of Easterbrook (1984), indicating that higher dividends force firms to go through the monitoring of capital markets more frequently.

By investigating different legal protection of minority shareholders across 33 countries, La Porta, Lopez-De-Silanes, Shleifer, and Vishny (2000) compare dividend policies of companies whose minority shareholders bear difference degree of agency problems. They develop and test two agency models of dividends. The "outcome model" proposes that, under the effective legal protection, minority shareholders impose legal power in order to force managers to pay out dividends, precluding managers to lavish expenses and consume perquisites in their own interests. Shareholders, with perception of highly protected, are more willing to allow chances

for firms with more investment opportunities and thus ask for smaller dividends due to the understanding of the possibility for getting higher dividends from productive investment projects. In contrast, with poor legal protection, the model predicts that the shareholders may try to grasp whatever benefits they can although the cash may not be much. Additionally, the “outcome model” suggests, *ceteris paribus*, the better the legal protection of minority shareholders, the higher cash dividend managers are forced to pay. Another model is the “substitute model”, suggesting dividends are a substitute for legal protection. With the necessity of financing externally occasionally, firms need to establish their reputation in advance so as to reduce the cost of capital. One of the approaches to establish reputation is to pay out dividends which mitigate agency problems. Since, in this model, dividends are regarded as a substitute of legal protection, paying dividends is less needed for managers in high-protection countries. Consequently, this model predicts that, other things equal, dividends should be higher in low-protection countries than in high-protection countries. Additionally, since growth firms are thought to have more investment opportunities and thus have greater needs for external funds, they are expected to pay more dividends than mature firms.

The findings of La Porta, Lopez-De-Silanes, Shleifer, and Vishny (2000) are in more agreement with the predictions of the “outcome model”. Comparing the dividend policies in low-protection and high-protection countries, their evidence shows that firms in high-protection countries pay higher dividends than those in low-protection countries. In addition, the results also suggest that, in high-protection countries, the growth firms generally pay lower dividends than mature firms. This evidence supports the notion that, with good shareholder protection, shareholders are more willing to allow chances for the growth firms to invest in productive projects. For dividends in low-protection countries, the growth firms appear to have higher dividend payouts

than the mature firms. Nonetheless, the statistical difference between the dividend payouts of these two groups is insignificant.

To conclude, the empirical studies which support the agency theory of dividend policy mainly provide the following implications. Firstly, firms with more investment opportunities (i.e. growth firms) generally have less free cash flow and pay smaller dividends. Furthermore, since dividend is capable of reducing free cash flow, dividend made by over-investing firms are thought to be more important and thus induce higher price effect than dividend made by value-maximising firms. Thirdly, consistent with Jensen's (1986) suggestion, dividends and debts are substitute for reducing free cash flow available to managers. However, the evidence for the interest conflict between shareholders and bondholders are still divergent.

2.3.3. Dividends and clientele effect

In addition to the agency and signalling theories, clientele effect provides a different explanation for dividend policy. The assumption of perfect capital markets for the dividend irrelevant theory in Miller and Modigliani (1961) is characterised by no tax and transaction costs, symmetric information, and complete contracts. While the agency and signalling theories respectively interpret the effect of incomplete contracts and asymmetric information on dividend policy, the clientele effect explains dividend policy by taking account of tax and transaction costs.

The clientele effect hypothesis suggests that investors are attracted to different dividend policies in light of their individual interests. When a firm changes its dividend policy, the investors who take an aversion to the change would sell their

shares. At the same time, the investors who favour this change would buy the shares. Accordingly, the hypothesis predicts that the firms with low dividend-yield (or payout ratio) attract investors who view dividend increases negatively and those with high dividend-yield (or payout ratio) attract investors who are in favour of dividends. The factors which drive the divergent preference for dividends between investors are kaleidoscopic. A number of studies mention that the tax discrimination between dividends and capital gains plays an important role in dividend clientele effect (e.g. Elton and Gruber, 1970). On the other hand, the investors' individual characteristics, such as age or personal incomes, are also considered to induce the dividend clientele effect (e.g. Pettit, 1977).

Tax-induced clientele effect

To measure the share price behaviour on ex-dividend days, Elton and Gruber (1970) develop a price-drop-to-dividend ratio. The tax discrimination between ordinary incomes and capital gains leads to investors' different appetites for dividends. Investors, selling their shares before the shares go ex-dividend, lose the right to claim upcoming dividends but get more capital gains. Making transactions before ex-dividend days, these investors are more likely in higher tax brackets and averse to dividends. As dividends are levied by ordinary income tax, investors may prefer to sell the shares at a higher price and pay the capital gains tax at a lower rate. By contrast, investors in lower tax brackets or exempted from ordinary income taxes may prefer to receive dividends and keep their shares as long as the gains from after-tax dividends are not smaller than the price drop on the ex-dividend day. Taken together, it can therefore be suggested that the basic condition for investors to keep their shares is to maintain their wealth on the ex-dividend day.

The price-drop-to-dividend ratio is derived from the wealth equilibrium on the ex-dividend day and on the day before the stock goes ex-dividend. The equation can be expressed as Eq. (2.8):

$$P_B - t_C(P_B - P_C) = P_A - t_C(P_A - P_C) + (1 - t_O)D, \quad (2.8)$$

where P_A and P_B respectively denote the share price on the ex-dividend day and the day before the stock goes ex-dividend. P_C denotes the original price at which the share was purchased. D denotes the amount of the dividend while the tax rates on capital gains and ordinary incomes are respectively denoted by t_C and t_O . Rearranging the above equation generates the price-drop-to-dividend ratio as Eq. (2.9):

$$\frac{P_B - P_A}{D} = \frac{1 - t_O}{1 - t_C}. \quad (2.9)$$

The price-drop-to-dividend ratio presents that the price equilibrium on the ex-dividend day depends on the tax brackets of prospective buyers and sellers. The investors would change the timing of their purchases or sales accordingly until the ex-dividend share prices are in equilibrium. Moreover, given a price-drop-to-dividend ratio, one could infer the tax brackets of investors.

Since firms with different dividend yields or payout ratios attract investors with different dividend appetites, the price-drop-to-dividend ratio is expected to shift with different dividend yields or payout ratios. Based on this rationale, Elton and Gruber (1970) examine the relation 1) between price-drop-to-dividend ratio and dividend yields and 2) between price-drop-to-dividend ratio and payout ratios. They point out that the price-drop-to-dividend ratio almost monotonously increases with dividend

yield and payout ratio. Moreover, the implied tax bracket decreases as the dividend yield or payout ratio increases. Evidence based on Elton and Gruber (1970) implies that investors in higher tax brackets are more favourable to capital gains while those in lower tax brackets prefer higher dividends.

Nevertheless, the estimates of the price-drop-to-dividend ratio is criticised for its inherency in a downward bias since Elton and Gruber (1970) estimate the ratio by closing prices. Kalay (1982) points out that the bias is equal to the expected daily rate of the stock return times the reciprocal of its dividend yield. The downward bias is severer for the stocks with low dividend yields than the stocks with high dividend yield due to the larger reciprocal of its dividend yield. After adjusting the price-drop-to dividend ratio, Kalay's (1982) findings that the correlation between the ratio and the dividend yield is still positive are in agreement with the findings of Elton and Gruber (1970).

In an empirical test for Canadian market, to estimate the price drop on the ex-dividend day, Booth and Johnston (1984) suggest using the closing price of the last cum-dividend day (P_B in Eq. (2.9)) and the opening price of the ex-dividend day (P_A in Eq. (2.9)). The closing price on ex-dividend day (P_A in Eq. (2.9)) is used by Elton and Gruber (1970) in that the opening price in the US market reflects the specialists' adjusted closing price. Nonetheless, this factor does not bias the opening price in Canadian market. Without the bias on the ex-dividend day opening price, the estimating method of Booth and Johnston (1984) removes intervening price uncertainty between the prices of the last cum-dividend day and the ex-dividend day, making the price drop only reflect the receipt of the dividends. Similar to the aforementioned studies, Booth and Johnston (1984) examine the correlation between

dividend yield and the price-drop-to-dividend ratio along with test for individual sample years. Their result, for five out of eleven sample years, shows that the simple rank correlation coefficients appear to be negative. This, however, is not completely consistent with the findings of the previous studies. Nevertheless, the time-serial mean ratio is positively correlated with the dividend yield, providing little evidence for the tax-induced clientele effect.

For the UK market, Lasfer (1996) carries out a similar examination by dividing the sample into five groups in light of dividend yield. Contradictory to the findings of Elton and Gruber (1970) and Kalay (1982), Lasfer (1996) finds that the price-drop-to-dividend ratio monotonously declines as the dividend yield increases. His evidence shows that the mean ratio for the lowest-yield group is 0.934 which is closed to one while the ratio for the highest-yield group is only 0.365. For the whole sample, the ex-day share prices approximately drop by 64 percent of gross dividends. Overall, for the UK market, the test on the price-drop-to-dividend ratio fails to support the tax-induced clientele effect.

More recent challenge against the price-drop-to-dividend ratio and the tax-induced clientele effect has been raised by Bali and Hite (1998). They argue that, while share prices on exchanges are constrained to be multiples of a tick, dividends are not. Consequently, the price drop on ex-dividend days cannot always be the exact amount of the dividends. What is more, for two different amounts of dividends which are equidistant from the nearest tick, the price-drop-to-dividend ratio for the larger dividend is more closed to unity than the ratio of the smaller dividend. Thus, Bali and Hite (1998) argue that the plausible correlation between dividend yields and the price-drop-to-dividend ratio may result from the discreteness of share prices in that

dividends and dividend yields are highly correlated. Based on their findings, their argument is clearly supported, showing that the ratios approach unity with dividends and tick multiples increase but the ratios decline within each tick multiple (see Table 4, p. 139-140). In addition, when Bali and Hite (1998) estimate regressions of price drops on the tick below dividends, and the gap between dividends and the tick below dividends, the coefficient on the tick below dividends is insignificantly different from one and the coefficient for the gap is about one-half, indicating that the price drop is only slightly larger than the tick below dividends. Bali and Hite (1998), therefore, conclude that, without tax-induced dividend clienteles, the discreteness of trading prices are still capable of accounting for the price-drop-to-dividend ratio increasing with dividends.

Litzenberger and Ramaswamy (1979) develop an after-tax version of the Capital Asset Pricing Model (CAPM) which is expressed as Eq. (2.10):

$$E\left(\tilde{R}_i\right) - r_f = a + b\beta_i + c(d_i - r_f), \quad (2.10)$$

where d_i denotes the dividend yield of stock i and c is a positive coefficient which accounts for the taxation of dividends and interest. The other denotations remain the same with the original CAPM. Since the clientele hypothesis predicts that the investors in low (high) tax brackets invest in high (low) yield stocks, Litzenberger and Ramaswamy (1979) hypothesise the coefficient c to be a linear decreasing function of the i^{th} stock's dividend yield. Hence, the above model is rearranged as Eq. (2.11):

$$E\left(\tilde{R}_i\right) - r_f = a + b\beta_i + (k - hd_i)(d_i - r_f), \quad (2.11)$$

where the coefficient c is replaced by $(k - hd_i)$ and both k and h are positive. The econometric model can be expressed as Eq. (2.12):

$$\tilde{R}_i - r_{ft} = \gamma_0 + \gamma_1 \beta_i + \gamma_2 (d_i - r_{ft}) + \gamma_4 d_i (d_i - r_{ft}) + \tilde{\varepsilon}_i, \quad (2.12)$$

where γ_2 is the estimate of k and γ_4 is the estimate of $-h$. Actually, this model is not far different from the after-tax version of CAPM except the variable with γ_4 . By using maximum likelihood estimation, the estimate of γ_2 equals to 0.336 which is significant and the estimate of γ_4 equals to -6.92 which is also significant. The suggestion to emerge from this result is that, for every percentage rise in dividend yields, the implied tax rate for ex-dividend months would decline 6.92 percent. The evidence presents the tax-induced clientele effect and thus supports the clientele hypothesis.

A recent study by Lee, Liu, Roll, and Subrahmanyam (2006) presents the evidence of tax-induced clientele effect for Taiwanese market. Since the capital gains tax is zero in Taiwan, the ordinary income tax becomes the only tax which may affect investors' dividend appetites. Lee, Liu, Roll, and Subrahmanyam (2006) first compare the trading behaviour before and after dividend announcements. They find that the wealthy individuals in higher tax brackets decrease their net buying after the announcements of dividend increases and increase their net buying after dividend cuts. The trading behaviour of the less wealthy investors just appears to be opposite. In addition, examining the relation between dividend changes and ownership structure changes generates the result indicating that firms with increasing dividends decreases the shares proportion held by wealth individuals but increases the proportion held by middle- and lower-wealth individuals. Regarding to the shares proportion held by institutions, only foreign institutions increase their share holdings in response to

dividend increases. Nonetheless, no significant changes in the proportion of share holdings are found for tax-exempt and government-operated institutions. Overall, the tax-induced dividend clientele effect is evident in Taiwanese market.

Clientele effect induced by other factors

In addition to tax-induced dividend clientele effect, some other studies mention that the clientele effect relates to other factors besides tax discrimination. Pettit (1977) estimates the regression model of dividend yields on a set of variables, including investor's age, income, and the differential tax rate between ordinary incomes and capital gains. His results show that, for the whole sample, investor's age has a significantly positive relation to dividend yield. One-year increase in age would averagely increase 0.03 percentage points of dividend yields. This evidence is consistent with the expectation that as an investor gets older, he (she) tends to invest in high-dividend stocks to secure his (her) regular incomes for consumption. Furthermore, for those whose tax rate on ordinary incomes is higher than on capital gains, Pettit (1977) claims that investors with higher differential tax rate tend to invest in lower yield stocks, which is consistent with the prediction of the tax-induced clientele hypothesis.

By testing more variables of investors' personal attributes, Lewellen, Stanley, Lease, and Schlarbaum (1978) implement a similar research on dividend clientele effect. They first estimate the mean of the variables for ten yield deciles. The F statistics indicates that investor's age, employment status, tax bracket, education level, sex and family size appear to be significantly different at the 0.01 level across the yield deciles. The clearest change pattern appears on investor's age which declines with dividend yield declines, and investor's employment status which indicates the investors with a

job tend to invest in low-yield stocks. More explicitly, they test the regression model of dividend yields on the variables of investors' personal attributes. With overall R square is only 1.5 percent, the variable of investor's age provides about two-thirds of explanatory power on dividend yields. Relatively, the taxation variable also appears to be significant at 0.01 percent. However, its coefficient shows that ten percentage points increase in the tax brackets for investors is only associated with 0.1 percent decline in the dividend yields of the held stocks. The tax-induced clientele does not seem to have economically meaningful effect on dividend yields. By judging the overall evidence, Lewellen, Stanley, Lease, and Schlarbaum (1978) suggest that the "life cycle" rationale could explain the dividend clientele better than investor's tax brackets. The older investors are normally unemployed, with smaller family size (since dependent children may depart), and exempted from taxes (since most of them live on pensions). As a result, the tax-induced clientele effect may not actually exist and could be a by-product of the effect arisen by the other factors.

A similar but more recent research of Scholz (1992), however, supports the notion of tax-induced dividend clientele effect. In his regression model, the dividend yields are explained by the variables, part of which are similar to those used by Pettit (1977). Differently, Scholz (1992) uses dummies for the variables of investor's age, and three proxies for investor's risk appetites. Consistent with the findings of Pettit (1977), he finds positive association between dividend yields and age. Moreover, for investors whose marginal tax rate on ordinary incomes exceeds the tax rate on capital gains, he detects negative association between differential tax rate and dividend yields. However, partly inconsistent with the findings of Lewellen, Stanley, Lease, and Schlarbaum (1978), Scholz (1992) finds the relationship between family size and dividend yield is convex. Yields decline as family size increases up to about

four-person family, but yields increase when family size is beyond four persons. His findings, overall, confirm the dividend clientele effect.

With 192 firms announcing their first cash dividend, Richardson, Sefcik, and Thompson (1986) investigate the effects of dividend signalling and dividend clientele on trading volume around the announcement day. Hypothesising that dividend clientele and signalled information are the only two components which induce abnormal volume, they constitute a model in which signalling effect and clientele effect are respectively captured by the variables of the abnormal returns in the week of announcement and the intercept. They find that the coefficients on the abnormal returns variable are significantly positive on explaining the abnormal volume in the interval from announcement day to ex-day while the intercepts are insignificant. Remarkably, their evidence implies that the abnormal volume is mainly induced by dividend signalling while the effect of dividend clientele is weaker.

Similarly, Bajaj and Vijh (1990) also examine the dividend clientele and the information content of dividend changes. They hypothesise that investors with preference for dividends tend to invest in high-yield stocks, and abnormal returns around dividend change announcements should be higher for high-yield stocks than for low-yield stocks. Consistent with this hypothesis, their initial evidence shows that, for dividend increases (cuts), the abnormal returns for the high-yield stocks are the largest positive (negative), and the magnitude of the abnormal returns declines with dividend yields. Furthermore, Bajaj and Vijh (1990) consider whether dividend changes for high-yield stocks are more informative, and are accompanied by a larger change in systematic risk, or with a greater reduction in free cash flow. If dividend yield is found to link one of these elements, the initial evidence cannot be fully

attributed to clientele effect. To test whether dividend changes are more informative for high-yield stocks, Bajaj and Vijh (1990) use share price as the proxy for the information effect. The evidence presents that firms with lower share price indeed have higher abnormal returns than firms with higher share price. Nevertheless, the signalling effect does not rule out the existence of clientele effect. For each group of share price, dividend changes for high-yield stocks still have larger impact than the changes for low-yield stocks. As for the systematic risk and free cash flow, Bajaj and Vijh (1990) do not find obvious relation between such elements and dividend yields.

Another study which similarly supports cash flow signalling and dividend clientele hypotheses is presented by Denis, Denis and Sarin (1994). Their evidence from regression analysis confirms that, for dividend increases, both dividend changes and dividend yields are positively related to the stock price reaction to dividend changes. But for dividend cuts, only the coefficient on dividend changes is significant.

To conclude, the dividend clientele hypothesis predicts dividend policy from a perspective of the dividend appetites of various investors who constitute their own portfolios in their best interests. The elements of affecting investors' appetites for dividends are varied, such as differential taxation between dividends and capital gains, personal incomes or investor's age etc. A majority of prior studies confirm the existence of dividend clientele effect. Nonetheless, the evidence regarding whether the dividend clientele is solely induced by investors' tax discrimination is still a debatable point. While the tax brackets are thought to relate with some of the investors' personal attributes (e.g. age or employment status etc.), the debatable point cannot generate a clear answer unless future studies successfully control the relation between the variables of dividend yields and investor's attributes.

2.4. Share repurchases

Share repurchases are an alternative payout policy to cash dividends. Due to the limitation of regulations on share repurchases, share repurchases have not grown as a popular payout method until 1980s for the US market and 1990s for the European countries¹⁶. In perfect capital markets, share repurchase decisions, the same with dividend decisions, do not have influence on firm value. According to this explanation, without increases in investments, managers cannot increase the firm value merely by paying out more cash and buying back their own share from their shareholders.

By indicating the notion that share repurchases, in perfect capital markets, can be regarded as adverse new shares issuance, the dividend irrelevance proposition (Miller and Modigliani, 1961) can be easily applied on share repurchases. Recall Eq. (2.1), the balance exists between the uses and the sources of firm's funds¹⁷. It follows that the residuals of retained earnings after investments should be equal to dividend payouts minus the funds financed externally, which is shown in Eq. (2.5). With an adverse direction of external finance, such as share repurchases, the firms still have to make the uses and the sources of their funds in equilibrium. Still, firm value, determined only by current retained earnings and investments, is irrelevant to dividends and share repurchases.

Releasing the assumption of perfect capital markets, empirical studies provide several possible explanations for why managers distribute cash through share repurchases. The signalling hypothesis, as it predicts for dividends, assumes that share repurchases are made to signal the firms' superiority in earnings performance. The undervaluation

¹⁶ See Badrinath, Varaiya, and Ferling (2001), Fama and French (2001), and Stonham (2002).

¹⁷ See the section of introduction in this chapter.

hypothesis assumes that managers engage in share repurchases since they believe their firms are undervalued. Taken together, both of these hypotheses predict the repurchases from the perspective of information asymmetry between insiders and outsiders. Nonetheless, share repurchases could also mitigate the agency problem as dividends if it effectively reduces the free cash flow available for managers. The evidence could be found in Lie (2000), for example. There are some other empirical studies comparing share repurchases with dividends. The substitution hypothesis, for instance, predicts that share repurchases are viewed as interchangeable payout methods for dividends. This, implicitly, indicates that managers and investors are indifferent to the tradeoffs between dividends and share repurchases. Nevertheless, from the perspective of taxation, some studies assert that repurchases are made to benefit investors who are in higher tax brackets. This is due that repurchases are levied by capital gains tax while dividends are levied by ordinary income tax. The empirical findings for the relative hypotheses are discussed as follows.

2.4.1. Undervaluation hypothesis

One of the implications to emerge from undervaluation hypothesis is that the share repurchase announcements are preceded by undervalued share prices. By examining the long-term return performance preceding and following the UK repurchase announcements, Rau and Vermaelen (2002), for open market share repurchases, they find -2.47 percent of cumulative abnormal returns (CARs) during the one-year period preceding the announcements. This finding is consistent with the undervaluation hypothesis but the estimate is statistically insignificant. Extending Rau and Vermaelen's (2002) study, Oswald and Young (2004) focus on examining open market repurchases with a more complete sample. Their evidence shows that the one-year

pre-announcement CARs are -10.08 percent and -5.46 percent for the two sub-samples¹⁸. This is consistent with the finding of Vermaelen (1981), showing that the cumulative abnormal returns during the period of 60 to two days preceding to open market repurchase announcements are -7.08 percent. In order to make the evidence robust, Oswald and Young (2004) estimate the regression model of the percentage of share repurchased on the abnormal returns over the twelve-month preceding and following the share repurchases completion. The evidence shows that the preceding abnormal returns are negatively related to the percentage of share repurchases. In other words, the lower the preceding share prices are, the more the shares managers buy back.

Another implication from the undervaluation hypothesis is that firms with buying back own shares should have lower market-to-book ratio (or high book-to-market ratio), indicating market's undervaluation relative to book value. Ikenberry, Lakonishok, and Vermaelen (1995) estimate the long-term abnormal returns for the four-year period subsequent to repurchases announcements. They detect that the portfolio with the highest book-to-market ratio has 135.91 percent of four-year compounded abnormal returns, which is 45 percent above those for the reference portfolio with similar size and book-to-market ratio. Another finding shows that the divergence of the compounded abnormal returns between the repurchase and the reference portfolios shrinks with the book-to-market ratio decreases. This evidence indicates that the market revises their valuation for the firms with high book-to-market ratio after the share repurchase announcements, while such revision is not obvious for those firms with low book-to-market ratio. Since book-to-market ratio is a proxy for undervaluation, the evidence, therefore, supports the undervaluation

¹⁸ They divide the sample into two sub-samples based on the data sources to compare their findings with Rau and Vermaelen's (2002).

hypothesis.

Ikenberry, Lakonishok, and Vermaelen (2000) further extend their test to the repurchases in Canada. A large part of this study devotes to test the managers' trading strategy and the price movement. Consistent with the UK finding of Oswald and Young (2004), their evidence signifies that the preceding abnormal returns are negatively related to the portion of the share repurchased while the variable of book-to-market ratio is positively related. Another striking finding is that the firms which do not actually buy back after the repurchases announced averagely experience higher abnormal returns than those which actually buy back shares. Based on the evidence, it suggests that managers are sensitive to stock prices and undervaluation is a factor inducing repurchases. In contrast, Dittmar (2000) does not find significant relation between the previous stock returns and the portion of shares repurchased but she finds the evidence for undervaluation hypothesis from the variable of market-to-book ratio. Her evidence shows that, for most of the sample years, the market-to-book ratio negatively relates to the proportion of the shares repurchased.

Hatakeda and Isagawa (2004) study the relation between abnormal returns around share repurchase announcements and the previous twenty-day price performance. In line with the expectation of the undervaluation hypothesis, they claim that the market reacts to repurchase announcements more severely as the previous price drop is larger. The evidence is significant for the sub-sample of repurchases completions. More explicitly, by using logit and probit model, they examine whether the undervaluation induces managers to buy back shares. The evidence reveals that the more the previous share prices drop, the higher the probability managers execute share repurchases. This finding is consistent with the Canadian findings of Li and McNally (2003) who also

apply a probit model to examine the effect of undervaluation on announcing open market share repurchases.

Jagannathan and Stephens (2003) examine the firm's characteristics with different frequencies of share repurchases. They find lower market-to-book ratio associated with firms which infrequently make share repurchases, suggesting that, the share price undervaluation is the motive of infrequently-repurchasing firms for announcing share repurchases. Another study which indirectly supports the undervaluation hypothesis is carried out by Lee, Mikkelson, and Partch (1992). They test the managers' trading around fixed price and Dutch auction tender offer repurchases. For Dutch auction repurchases, they do not detect unusual frequencies of managers' trading. Nonetheless, for fixed price repurchases, managers averagely increase their frequency of buying and decreasing their frequency of selling prior to fixed price repurchase announcements. After the announcements, no unusual frequency of managers' trading is detected. According to this finding, it can thus be suggested that managers take advantage of their private information to buy back their firm's stocks when they are potentially undervalued.

Based on the evidence of Lee, Mikkelson, and Partch (1992), D'Mello and Shroff (2000) also examine whether managers' increasing buying stems from managers in possession of private information about share undervaluation. By using realised earnings and book value of five years subsequent to tender offer announcements, they estimate firm's economic value and compare this value with the market value to define whether the firm is undervalued. It is shown on the evidence that 74 percent of repurchasing firms are undervalued, compared to only 51 percent of the control sample (non-repurchasing firms). Additionally, the tender premium is positively

related to but is smaller than the magnitude of undervaluation, indicating that the undervaluation is a factor inducing share repurchases but managers are conservative in setting tender premiums. Finally, consistent with Lee, Mikkelsen, and Partch (1992), they find that, in the previous year of tender offer announcements, the insiders of the undervalued firms have significantly larger net buying than the insiders of the overvalued firms.

2.4.2. Signalling hypothesis

Similar to the prediction for dividend policy, the signalling hypothesis predicts that share repurchases signal the information about current or future earnings. A number of studies examine this hypothesis by testing the changes of operating incomes around repurchase announcements. Dann, Masulis, and Mayers (1991) study the earnings information contained in tender offer repurchases. The earnings forecast errors appear to be positive for each of five years after the announcements of tender offer repurchases. However, the significance of the forecast errors is found in year 0 (the event year) and year 3 for both EPS and EBIT variables and in year 5 for only EPS variable. Moreover, stock price reactions to tender offer repurchase announcements are positively related to subsequent unexpected earnings. These findings support the prediction of the signalling hypothesis, presenting that tender offer repurchase announcements signal the information about future earnings.

Hertzel and Jain (1991) estimate the revision of analysts' earnings forecasts around tender offer repurchase announcements. For both short-term and long-term earnings forecasts, they find positive and significant revision around repurchase announcements. Nonetheless, the results of regression analysis show that the

announcement-period market reactions are only positively related to the revision of short-term earnings forecasts. This evidence indicates that the information signalled by share repurchases is about transitory rather than permanent earnings changes.

The earnings signalled in fixed-price and Dutch auction tender offer repurchases is examined by Lie and McConnell (1998). The evidence, consistent with the signalling hypothesis, suggests that the operating performance of the repurchase firms is better than their industry peers, and the outperformance continues for up to five subsequent years. However, the operating performances are not different between the two repurchase methods.

Different from the aforementioned studies, Lie (2005) examines the changes in operating performance around open market repurchase announcements. He finds that, over eight quarters following the announcements, the repurchasing firms have significant improvement in operating performance. Furthermore, since the firms announcing open market repurchases do not necessarily buy back shares later, he tests whether the divergent behaviours contain different information about future earnings. The evidence shows that the firms which actually buy back shares experience improvement in the subsequent operating performance whereas the firms which merely make announcements do not. Lie's (2005) evidence not only supports the signalling hypothesis, but also implies that, when the firms do not perform well as what managers expected, the flexibility of share repurchases provides managers an opportunity to change their mind on payout decisions.

A signalling model for open market stock repurchase is developed by McNally (1999). His model suggests that 1) the repurchase proportion is a positive signal for earnings,

and 2) given the repurchases level, firms with higher insider ownership are related to higher earnings. The first suggestion is the basic implication of the signalling hypothesis. The rationale for the second implication is as follows. Since firms with higher insider holdings make their insiders exposed to greater undiversified risk, for a given level of earnings, firms with higher insider ownership would like to repurchase less. Relatively, given the repurchase level constant, the market will infer the greater earnings the higher insider holdings. Taken together, McNally (1999) finds empirical supports for his model.

2.4.3. Substitution hypothesis

The substitution hypothesis indicates that managers make share repurchases as a substitutive payout method for dividends. Bagwell and Shoven (1989) argue that managers learn to use share repurchases for replacing dividends by virtue of tax advantage inherent in the former payout mechanism. A survey-based study, implemented by Wansley, Lane, and Sarkar (1989), however, reveals manager's view on share repurchases by indicating that about a half of respondents disagree with the statement, that is, repurchases substitute for cash dividends. Among the repurchasing firms, the percentage of disagreement is even higher, which is about 60 percent.

A more recent survey-based study by Brav, Graham, Harvey, and Michaely (2005) presents that, for managers, dividend decisions are priority to investment decisions which are in turn priority to share repurchase decisions. Consistent with the argument of Miller and Rock (1985), managers may forgo potential investment opportunities for dividends. Nonetheless, managers do not tend to forego investments for share repurchases. This result implicitly objects to the substitution hypothesis.

Grullon and Michaely (2002) present that firms paying only dividends have similar firm characteristics to firms paying dividends and repurchase shares. Relatively, firms which only make share repurchases have similar characteristics to firms which do not pay out any cash. While Grullon and Michaely (2002) test the association between dividend forecast errors and repurchase yields, the dividend forecast errors turn to be negative as the repurchases yield¹⁹ increases. The evidence by regression analysis also shows a negative relation between repurchases expenses and dividend forecast errors. On the other hand, they study whether the market perceives dividends and repurchases as substitutes. The evidence implies that, when firms cut dividends, those which do not make share repurchases experience -1.93 percent of three-day cumulative abnormal returns while those which make repurchases only experience -0.45 percent. The evidence supporting the substitution hypothesis is explicit.

2.4.4. Other Related Hypotheses

There are still some other hypothesis providing different explanations for share repurchases. Howe, He, and Kao (1992) test the free cash flow hypothesis for tender offer repurchases. If this hypothesis predicts repurchases correctly, it is expected to find that the market reacts to repurchases more positively for over-investing firms than for value-maximising firms. Howe, He, and Kao (1992) employ the similar method used by Lang and Litzenberger (1989), but differently, they do not detect significant difference between the two-day abnormal returns for high-Q firms (value-maximising firms) and low-Q firms (over-investing firms).

Fenn and Liang (2001) employ 1) EBITDA less capital expenditures and 2)

¹⁹ The repurchases yield is the capital expenditure on share repurchases scaled by the market value of equity.

market-to-book ratio respectively as the proxy for firm's free cash flow and investment opportunities. The firms with higher EBITDA less capital expenditures (lower market-to-book ratio) normally have higher free cash flow (less investment opportunities) and pay higher dividends or repurchase more shares. In addition, their model includes the variable of debts. In the light of the agency theory for payout policy (Jensen 1986), firms which rely more on debts to disgorge free cash flow will rely less on dividends and repurchases. Their evidence suggests that the free cash flow hypothesis and the agency theory predict both dividends and share repurchases correctly.

Another explanation for share repurchases is that managers use them to prevent dilution of earnings. Bens, Nagar, Skinner, and Wong (2003) examine the relation between share repurchases, targeted earnings per share and employee stock options. Their finding suggests that the share repurchases by firms whose earnings growth falls below the target are higher than the other firms' repurchases by 1.3 percent of shares outstanding. Furthermore, when examining the relation between the numbers of share repurchased and exercise proceeds, they find that the coefficient on the variable of exercise proceeds is significant and close to one. This finding suggests that the repurchasing firms use exercise proceeds to buy back own shares. Similarly, using a logit model, Jolls (1998) documents a positive relation between repurchase decisions and the granted executive options. However, she does not find evidence about the influence of the overall employee options on repurchase decisions. Weisbenner (2000), examining the level of share repurchases in 1995, also find positive relation between share repurchases and total outstanding options. Moreover, in his study, large firms are found to buy back own shares gradually to offset the dilution effect of stock option grants on earnings per share.

The clientele effect hypothesis predicts that investors invest the stocks whose payout policy is consistent with their interests. Chhachhi and Davidson (1997) compare tender offer repurchases and special dividends, confirming the existence of clientele effect. According to the clientele hypothesis, their arguments are presented as follows. Firstly, if shareholders, with preference to higher dividends, tend to invest in the high-yield firms, firms that pay special dividends are expected to have higher dividend yield than repurchasing firms. Secondly, since insiders do not take part in the tender offer but they receive special dividend when it is paid, firms that pay special dividends are expected to have greater insider ownership. Consistent with these expectations, firms that pay special dividends averagely have 5.79 percent of dividend yield and 34.53 percent of insider ownership, both of which are greater than those of repurchasing firms.

Nonetheless, for open market share repurchases, Isagawa (2000) suggests that firms which possess higher insider ownership, greater cash and less investment opportunities have a stronger motivation to make share repurchases in that insiders could benefit from the resulting share price increases. This statement is empirically confirmed by the findings of Li and McNally (2003), showing that greater insider ownership and free cash flow would lead to higher possibility of open-market repurchases.

To conclude, the undervaluation and signalling are the two which most empirical studies suggest to be the motives for share repurchases. Nonetheless, there are still other studies which provide evidence supporting other predictions. Since share repurchases have more flexibility than dividends, managers may use them for

different purposes, resulting in divergent findings from previous studies. Additionally, different regulations for share repurchases may also make managers use them in different ways (Kim, Varaiya, and Schremper, 2004). For example, in the UK, share repurchases are only allowed to pay out by distributable profits. This regulation apparently limits the uses of repurchases to reallocate the capital structure. Moreover, the methods of share repurchases are kaleidoscopic and each of the method may convey different information (Comment and Jarrell, 1991). This is probably another factor which results in divergent empirical findings.

2.5. Conclusion

While Miller and Modigliani (1961) propose the potential imperfection elements which may induce dividend effect on firm value, a large number of studies on payout policy try to find out the correlations between the payouts and the imperfection elements. For dividends, the three major imperfection elements which are believed to induce dividend effects are 1) information asymmetry, 2) agency problems and 3) the tax differentials.

When information asymmetry exists, managers, compared to investors, possess more information about firm's investment opportunities and expected profits. Consequently, investors cannot accurately evaluate the real firm value and can only estimate the firm's expected profits or earnings by dividend payouts. In comparison to audited financial reports, dividends need to be backed up by sustainable earnings, making the information signalled by dividend creditable. The dividend signalling models primarily provide two implications for dividend policies. Firstly, since dividend payouts require firms' sustainable earnings, the models predict that unexpected dividends provide information about current and future earnings. Secondly, based on the first implication, positive (negative) unexpected dividends convey good (bad) news about current and future earnings, to which markets should react positively (negatively).

The agency theory for dividend policy predicts that dividend payouts would reduce free cash flow and mitigate agency problems. Firms with greater investment opportunities are expected to have less free cash flow and therefore lower dividends. By contrast, mature firms which tend to have less opportunities should have more free

cash flow and pay higher dividends.

The dividend clientele effect hypothesis interprets dividends based on the perspective that investors would maximise their wealth by investing the stocks whose dividend policy is consistent with their best interests. The investors' preference may result from tax differentials, personal incomes or risk appetites.

Some studies believe that the above models or hypotheses can still provide explanatory power for share repurchases. Nonetheless, there are still some other studies which provide different findings for share repurchases. For example, some studies compare share repurchases to dividends and suggest that share repurchases are the substitute for dividends (e.g. Grullon and Michaely, 2002). Moreover, some studies suggest that share repurchases are funded for management or employee stock options since the exercise of stock options would dilute firm's earnings per share (e.g. Fenn and Liang, 2001; Bens, Nagar, Skinner, and Wong, 2003). The controversy findings for share repurchases may stem from the different methods and the flexibility of repurchases. Consequently, the hypothesis which predicts open market share repurchases well may fail to predict tender offer share repurchases. The findings for repurchase announcements may not be the same as the findings for repurchase completion (e.g. the UK findings from Rees, 1996 and Rau and Vermaelen, 2002). Even for tender offer repurchases, empirical studies also generate different findings for Dutch auction repurchases and fixed price repurchases (e.g. Comment and Jarrell, 1991; Lee, Mikkelson, and Partch, 1992).

Among these potential hypotheses, this thesis mainly focuses on examining the signalling theory and the undervaluation hypothesis of share repurchases. Chapter 3

tests the shareholders' wealth effect of the simultaneous dividend and earnings announcements. The examinations attempt to find out whether the dividend announcements remain informative while the simultaneous earnings announcements capture most of the information about earnings performance. Chapter 4 directly examines the association of dividend changes with current and future earnings changes. Previous studies have long argued about whether dividends are announced to represent current earnings or to signal for managers' prospect of future earnings. Chapter 4 expects to provide incremental evidence to clarify this issue. Share repurchase announcements are examined in Chapter 5. The main interest of Chapter 5 is estimating the wealth effect of the announcements, and comparing the managerial motives for share repurchase announcements and for other payout decisions. The evidence of Chapter 5 will help to understand the role and the function of share repurchases in firms' payout policy.

Chapter 3

Market Reactions to Simultaneous Dividend and Earnings Announcements

3.1. Introduction

Information asymmetry is known to exist between managers and investors. Under the circumstances of information asymmetry, dividends are thought as one of the mechanisms which managers employ to communicate with markets. Empirical evidence for this is provided by a number of studies, showing that abnormal returns are positively associated with dividend changes²⁰. Since dividend policy *per se* does not change overall shareholders' wealth in perfect capital markets, the existence of dividend effect implies that the market, to some extent, must receive certain information from dividend announcements to mitigate the information asymmetry. For this, this chapter intends to provide an insight into the market's perceptions of the information implicit in dividends, and thereby helps managers to make use of dividends as the signalling device more efficiently. Of particular interest are the objectives of this chapter including 1) to examine the shareholders' wealth effect of the simultaneous announcements of dividends and earnings, 2) to examine whether the market reaction to the simultaneous announcements is dependent on the level of information asymmetry, and 3) to examine the relative effects of dividends and earnings on the market reactions.

Interpreting dividend effect by dividend signalling model, Miller and Rock (1985)

²⁰ See Charest (1978); Aharony and Swary (1980); Asquith and Mullins (1983); Bajaj and Vijh (1995) and many others.

argue that dividends are merely a mechanism for firms to signal the missing piece of information about current earnings. It follows that the market applies this information to revise their expectations of future earnings. By this indirect route, dividends appear to possess predictive power for future earnings. When dividends are thought to convey the information about earnings, it is important to note that, empirical studies which examine the dividend announcement effect have to control for the conveyed information. Otherwise, abnormal returns observed around the dividend announcements could be a compound of dividends and earnings effects.

This notion motivates this chapter to examine simultaneous dividend and earnings announcements whose implicit information are released at the same time and based on the same information set. Many attempts have been made to control the earnings effects in previous studies but the information implicit in dividend announcements and earnings announcements is not examined on the same information set, which increases the difficulty in controlling the effect of earnings information of dividend announcements. For example, Aharony and Swary (1980) control the earnings effect by comparing the wealth effect of dividend announcements which are made before earnings announcements with those made after earnings announcements. Their evidence indicates that dividend announcements made before earnings announcements are not more informative than those made after earnings announcements. Similarly, Penman (1983) examines the dividend announcements which are announced before and which are announced after the announcements of management's forecast for future earnings. Nonetheless, he finds that dividend announcements made after the forecast announcements are less informative. In addition, Mozes and Rapaccioli (1995) control the earnings effect by using a dummy variable. Their evidence suggests that dividends which are announced before earnings

announcements mitigate the information asymmetry for small firms. Although mix in prior evidence could be attributed to the difference of the examined sample, it could be also possibly induced by the research designs which do not adequately control the earnings information.

Furthermore, this chapter attempts to fill this gap and examines whether the market reaction to the simultaneous announcements is dependent on the level of information asymmetry. Previous studies suggest that different levels of information asymmetry exist between large and small firms, leading to the greater market reactions to the information released by small firms than large firms (Freeman, 1987; Ball and Kothari, 1991; Bajaj and Vijh, 1995; Bali, 2003). However, while prior studies respectively examine this issue for either earnings or dividend announcements, none has examined this issue for simultaneous announcements of dividends and earnings. A question merits considering is that whether investors have different demands for dividend signals released by small firms and by large firms when earnings information is simultaneously released.

This chapter, examining the simultaneous announcements of dividends and earnings in the UK market, starts from forming six intersectional portfolios according to the directions of dividends and earnings changes. With this grouping, the relative effects of dividend changes and earnings changes can be clearly observed and compared. The tests on dividend and earnings effects are mainly twofold. Event study is applied firstly to examine the market reactions around the announcements for each intersectional portfolio. More tests are then implemented by using regression analysis to explicitly examine the relative effects of earnings and dividends on the market reactions.

The use of event study generates abnormal returns for each intersectional portfolio to be the proxy of market reactions. To detect whether “pure” dividends effect exists, one can compare the market reaction to the portfolios which possess the same direction of earnings changes but different directions of dividend changes. In light of the dividend signalling hypothesis, if dividend effect exists, the market is predicted to react positively to dividend increases, and negatively to dividends cuts. If the earnings announcements have captured most information about earnings performance, the market reactions are not expected to depend on the announcements of dividend changes. The evidence of this chapter, confirming the existence of both dividend and earnings effects, is found to be more prominent in dividend effect.

Furthermore, the level of information asymmetry between managers and investors is bigger in smaller firms than in larger firms due to differential information. Therefore, the firms’ market capitalisations are used as the proxy for the level of information asymmetry in this chapter. The market reactions to the simultaneous announcements are compared for each intersectional dividend and earnings portfolios with the ranks of firm size. The differential information hypothesis predicts that, around the days of the simultaneous announcements, the market reaction to the announcements should be larger for small firms than for large firms. Consistent with the findings of Ball and Kothari (1991) for earnings announcements and Bali (2003) for dividend announcements, the shareholders of small firms which announce dividend increases are found to react more greatly to the announcements than those of large firms, indicating that the market reactions are dependent on the level of information asymmetry.

Explicitly examining the relative effects of dividends and earnings, regression

analysis is imposed to test the associations of the abnormal returns with dividend and earnings changes. Dividends are thought to serve as a mechanism to signal for earnings, and hence the coefficient on the dividend variable is expected to be insignificant when the model simultaneously includes the earnings variables. In addition, owing to the nature of simultaneous announcements of dividends and earnings, the market may jointly rather than separately evaluate the information signalled by the simultaneous announcements. This, thus, leads to an interaction effect on stock price (Kane, Lee, and Marcus, 1984). By using restricted least square (RLS) approach, the model additionally tests the significance in the effects of dividends, earnings and interaction. A partial of the evidence of this chapter, however, disagrees with the Australian findings of Easton (1991), the US findings of Kane, Lee, and Marcus (1984) and the UK findings of Lonie, Abeyratna, Power, and Sinclair (1996). The evidence of this chapter signifies that the market responds to more convinced signals from dividends rather from earnings. In addition to dividend effect, the evidence alike supports the existence of the interaction effect, indicating that market evaluates the compound information of the announcements.

More broadly, this chapter constitutes another model and further considers the possibilities which result in insignificance on the effect of current earnings in the first model. According to the dividend signalling theory, it is proposed that dividends are a mechanism to signal managers' future prospects. The underlying idea is that markets may have accurately anticipated the current earnings but they still need dividend's signals to revise their expectations for future earnings. Therefore, the second regression model examines the explanatory power of the changes in future earnings on the event-day abnormal returns. Furthermore, as indicated by DeAngelo, DeAngelo, and Skinner (1996), managers, with firms' financial status getting worse,

are reluctant to cut dividends, making dividend increases unreliable. In this case, dividend announcements may not convey reliable information about earnings declines, making the announcements of earnings declines relatively valuable. Hence, the second regression model examines the earnings increases and earnings declines separately to study whether the wealth effect of the announcements of earnings declines is larger than that of the announcements of earnings increases.

The results of this examination, partially consistent with findings of Conroy, Eades, and Harris (2000) for Japanese market, point out that the changes in future earnings have a significant and positive relation with the event-day abnormal returns. Furthermore, with jointly considering the future earnings, the dividends and the earnings declines still contribute strong explanatory power to the market reactions. This evidence suggests that both dividend announcements and the announcements of earnings declines are important to investors, and moreover, investors seem to revise their expectations of future earnings in light of the information implicit in the simultaneous announcements.

This chapter is organised as follows: Section 3.2 reviews the previous studies. Section 3.3 provides a description of the data resource and descriptive statistics of the main variables, followed by a discussion of the methodology and the research design in Section 3.4. The empirical results are presented and discussed in Section 3.5 and Section 3.6 contains the implications and conclusions.

3.2. Prior evidence on dividend effect

The dividend irrelevant theory, as proposed by Miller and Modigliani (1961), indicates that, given a firm's investment policy, its dividend policy is irrelevant to its current market valuation in a perfect market. Nonetheless, when dividend effect is detected under the scenario of information asymmetry, empirical studies²¹ presume that the effect is induced by the information, conveyed by dividends, about future earnings prospects. In the study of Miller and Rock (1985), it is suggested that dividends are a mechanism to convey missing information about earnings to the market. Therefore, the dividend effect is actually market's response to unexpected earnings rather than to dividends *per se*. Moreover, the earnings information in dividends is also an implicit factor that makes dividend possess predictive power on future earnings (Miller and Rock, 1985). The implications to emerge from the argument of Miller and Rock (1985) include 1) what the market reacts to is good or bad news about earnings but not dividend changes, and more importantly 2) dividend announcements would become less informative when investors could get the information about earnings from elsewhere. Consequently, this chapter argues that an important task of examining the dividend effect on share price is to control the earnings information which has been known by investors when dividends are announced.

Forming the portfolios in light of the degrees of dividend changes and the directions of earnings changes, Pettit (1972) tests the abnormal returns around the dividend announcements for 14 dividend and earnings intersectional portfolios. He points out that the market mainly reacts to dividends particularly when dividends are cut or

²¹ See Pettit (1972), Aharony and Swary (1980), and Asquith and Mullins (1983) and many others.

substantially increased. However, he fails to find the earnings effect around dividend announcements, which may stem from the inadequate control of earnings information.

By investigating Australian sample for the period of 1963 to 1972, Brown, Finn, and Hancock (1977) apply event studies to examine the abnormal returns around dividend announcements. Substantially, they do not encounter the problem as Pettit (1972) does in that 98 percent of dividends and earnings are announced simultaneously in Australia. As a result, they could compare the dividend and earnings effect on the same information set. Additionally, regression analysis is applied by Brown, Finn, and Hancock (1977) to examine the relation between dividends, earnings and the abnormal returns. Despite the evidence suggesting that both changes in dividends and in earnings have positive relation with the abnormal returns, only dividend effect appears to be significant. Regarding the interaction effect, Brown, Finn and Hancock (1977) observe the effect from the results of event studies but do not explicitly test it by regression analysis, leaving a doubt about whether including the interaction effect would reduce the explanatory power of dividends or not.

Aharony and Swary (1980) examine the sample whose earnings and dividends are announced on different days. In order to isolate dividend effects from those of earnings, they distinguish the observations whose earnings are released preceding dividends from those whose earnings are released following dividends. It is found that market reacts positively to dividend increases and negatively to dividend cuts. Besides, the market has larger response to dividend cuts than to increases. Their evidence, however, does not indicate that market reacts differently to the groups whether earnings announcements precede or follow dividend announcements. Aharony and Swary (1980) furthermore test whether market reacts differently to earnings

announcements released before and after dividend announcements. Remarkably, they still fail to find different market response to these two groups. Concluding their evidence, Aharony and Swary (1980) suggest that dividends provide additional information beyond that conveyed by earnings announcements. Unlike the study of Pettit (1972), Aharony and Swary (1980), in their test, consider the timing of earnings announcements, which helps to control the information set that the market has about earnings when dividends are announced. However, in most of their test, Aharony and Swary (1980) neglect the directions of earnings changes. This would make their evidence biased when dividends and earnings are not independent. For example, dividend increases following the announcement of earnings increases might be thought as confirmative information. Conversely, dividend increases following the announcement of earnings declines might be interpreted as either manager's reluctance to cut dividends (Lintner, 1956) or as positive signal for future performance.

Confirming the findings of Aharony and Swary (1980), Asquith and Mullins (1983) carry out a test on dividend initiations. They detect that the market reaction to dividend initiations appears to be smaller when there is an earnings announcement happening within ten days from dividend announcements. Another finding is that the information provided by dividend and earnings announcements are partial substituted. Similar to Aharony and Swary (1980), they do not consider the direction of unexpected earnings, and this might be a factor resulting in the declines of the abnormal returns when there are earnings announced closely.

Kane, Lee, and Marcus (1984) examine the market reaction to dividend and earnings announcements which are announced within ten days of each others. They empirically

test the interaction effect of dividend and earnings announcements, which are not done in the analogues study of Brown, Finn, and Hancock (1977). Moreover, taking account of the direction and the timing of earnings announcements, their study more adequately capture the earnings effect. On one hand, when the variables of interaction effect are exclusive in the regression model, their result signifies that both changes in dividends and earnings have significantly positive relation to the cumulative abnormal returns around the announcements. On the other hand, when taking account of interaction effect, the explanatory power of dividends and earnings variables reduces. Kane, Lee, and Marcus (1984) conclude that the market jointly evaluates dividend and earnings announcements, and the interaction effect exists between these two announcements.

Kane, Lee, and Marcus (1984) are followed by a number of studies applying their approach in examining the abnormal returns around the simultaneous announcements and the interaction effect between dividends and earnings. Among others, Easton (1991) studies Australia sample for the period of 1975 to 1981. Different from the sample examined in Kane, Lee, and Marcus (1984), the Australian sample comprises the observations whose dividends and earnings are announced simultaneously. 'Examining simultaneous announcements explicitly tests the relative contribution of the earnings and dividend announcements to market reactions without concern for whether the announcements are based on the same information set' (Conroy, Eades, and Harris, 2000; p. 1201). Easton's (1991) findings confirm the existence of interaction effect between dividends and earnings. His evidence is crucial in that it implies that the interaction effect does not only exist in the US market but also in other markets. Moreover, it also shows that the interaction effect is not sensitive to discretion in the relative timing of the dividend and earnings announcements.

The study of simultaneous announcements can also be found on the event study of Lonie, Abeyratna, Power, and Sinclair (1996) for the UK market. Their evidence suggests that firms announcing increases in both earnings and dividends earn the largest positive abnormal returns while those announcing declines in both earnings and dividends earn the largest negative abnormal returns. Explicitly examining the dividend, earnings and interaction effects by regression analysis, their evidence is only partially consistent with Kane, Lee, and Marcus (1984) and Easton (1991). The evidence of Lonie, Abeyratna, Power, and Sinclair (1996) confirms the existence of interaction effect. Additionally, they present that earnings effect dominates over dividend effect and remains significant after introducing interaction effect. This finding is not found in the US and Australian studies.

Another study on simultaneous announcements is carried out by Conroy, Eades, and Harris (2000). They similarly find that earnings effect dominates dividend effect on explaining market response, which is consistent with the findings of Lonie, Abeyratna, Power, and Sinclair (1996) for the UK market. They conclude that, at least in Japan, earnings announcements are capable of providing sufficient information to the market, making dividends appear to be a redundant signalling mechanism. Furthermore, management forecasts of next year's dividends are also relevant to abnormal returns although the coefficient is not as significant as that of next year's earnings forecasts. The evidence presents that future dividend forecasts provide additional information beyond that contained in current earnings announcements or future earnings forecasts.

Chen, Firth, and Gao (2002) study the simultaneous announcements in China. The announcements comprise the information about earnings, cash dividend and stock dividend. Consistent with Japanese and the UK findings, their result suggests that the

share price movement is more related to unexpected earnings. Cash dividend in China only plays a limited role in signalling while stock dividend is made to corroborate or to modify the previous earnings signals.

Different from the above studies mainly focusing on testing the wealth effect of simultaneous announcements, Eddy and Seifert (1992) compare the market reaction to contemporaneous and non-contemporaneous dividend and earnings announcements. It is found that market's response to contemporaneous announcements is almost twice than that to non-contemporaneous announcements (i.e. single dividend or earnings announcement). Their evidence implicitly supports the argument by Chang and Chen (1991), stating that the total effect of the two signals from the joint announcements are additive, but not multiplicative or synergistic. Chang and Chen (1991) investigate the sensitivity of the interaction effects given the different intervals between dividend and earnings announcements. When they employ the regression model as that used by Kane, Lee, and Marcus (1984), they find that dividend and earnings effects are almost significant regardless of announcement intervals but interaction effect is only significant for the portfolios with wider announcement intervals. Conversely, they control for the announcement interval as constant and test whether "interaction" F statistics vary with different cumulative windows. Their results show that the interaction effect dummies (indicated by interaction F statistics) are only jointly significant when the abnormal returns are cumulated over a long window. Additionally, similar to Eddy and Seifert's (1992) findings, they fail to find evidence supporting that market has larger reactions to joint announcements than to separate announcements. Chang and Chen (1991), thus, conclude that the information signalled by dividend and earnings announcements does not differ with the types of announcements. They also conclude that the interaction effect suggested by Kane, Lee,

and Marcus (1984) is likely caused by various corporate noise factors during the announcements. The information of two signals is additive rather than multiplicative.

Although simultaneous announcements provide a unique opportunity for testing the dividend and earnings effects based on the same information set, they are not always feasible in financial markets. For example, in German, earnings announcements usually precede dividend announcements. By using regression analysis, Amihud and Murgia (1997) study dividend and earnings effects in Germany market to test whether the price movements are related to unexpected dividends and earnings. Their finding is consistent with Kane, Lee, and Marcus (1984), showing that both unexpected dividends and earnings possess explanatory power on share price movement. Considering that the earnings in German are announced preceding dividend announcements, Amihud and Murgia's (1997) evidence implies that dividend announcements signal for the information about current earnings beyond that signalled by the earlier earnings announcements.

Similarly, Koch and Sun (2004) also provide evidence that the market reactions to dividend announcements are significantly related to the preceding and the following earnings changes when dividend and earnings have the same direction of changes. Their evidence confirms that dividends are made to signal for unexpected current and future earnings. However, when dividend change and preceding earnings change are different in signs, market reactions to dividend announcements are negatively related to the preceding earnings changes but positively related to the following earnings changes. This evidence is partially consistent with Chinese findings of Chen, Firth, and Gao (2002), implying that dividend changes play a role in modifying the signals of the previous earnings announcements.

To conclude, the market reaction to dividend announcements has been well documented by previous empirical studies. The majority agree that market responds positively to good news (dividend increases) and negatively to bad news (dividend cuts). However, evidence on the relation between dividend and earnings effects still lacks for conclusiveness. The main difficulty encountered in examining dividend effect is to adequately control the earnings effect. The approach used by Kane, Lee, and Marcus (1984) could be an applicable sample when studying the UK market in that the approach examines both dividend and earnings effects as well as interaction effect. Most importantly, the approach examines the effects based on the same information set. In addition, the findings of Conroy, Eades, and Harris (2000) and Koch and Sun (2004) suggest that market's response to dividends is also correlated with future unexpected earnings. This chapter, therefore, carries out a similar test for the UK market to understand what the market views the information implicit in the dividend announcements when they are announced simultaneously with earnings.

3.3. Data and descriptive statistics

This section consists of two sub-sections. The first sub-section discusses the source of the examined data and the criteria of data selection. The second sub-section presents the descriptive statistics, including the frequencies of the announcements by year, the means and the percentiles for the main variables.

3.3.1. Data

This chapter starts from daily price observations for all the UK firms listed on the London Stock Exchange (LSE) during the period from January 1992 to March 2004. The dates of the dividend announcements and the size of the dividends are acquired from “Extel Card” of Thomson Research. Datastream is the database providing the data of earnings, daily adjusted share prices, FTSE All Share Index and the market value. The dividends and earnings are announced semi-annually in the UK. Thus, the time unit of the data is on the semi-annual basis.

To fit the needs of the test, the following selection criteria are imposed to filter the data:

1. Sixty-five observations whose raw earnings changes equal to 0 are dropped. These observations also report zero earnings, indicating that finance problems are likely inherent in these observations. In addition, there are only six of these observations with dividend cuts. The numbers are not sufficient to form a portfolio for testing the abnormal returns.

2. The observations with negative earnings per share are also forsaken in that they are inappropriate for computing earnings changes.
3. Since dividend initiations and omissions are the extreme cases of dividend changes and are thought to signal difference information, these observations are not included in the sample.
4. Market value and daily adjusted price should be feasible for computing the daily returns of individual stocks and the value-weighted average returns of portfolios. Consequently, the observations which miss the price data are crossed out.

The selection criteria finally yield a total of 4,978 observations.

3.3.2. Descriptive statistics

Panel A of Table 3.1 presents the frequencies of the announcements by year. Six intersectional portfolios are formed in light of the raw dividend changes (RDC in Eq. (3.1)) and raw earnings changes (REC in Eq. (3.2)):

$$RDC_{i,t} = Div_{i,t} - Div_{i,t-2}, \quad (3.1)$$

$$REC_{i,t} = EPS_{i,t} - EPS_{i,t-2}, \quad (3.2)$$

where $Div_{i,t}$ and $EPS_{i,t}$ denotes the dividends and earnings per share announced by firm i in the semi-annual period t .

Panel A shows that the announcements are well spread in each year, except 1992 and 2004. The number of dividend increases is 3,607, which is much larger than 357 for dividend cuts, and 1,014 for dividend continuations. In each individual year, the numbers of dividend increases are still much larger than those of dividend cuts and continuations. On the other hand, the number of earnings increases is 3,252 (i.e. the sum of 104, 382 and 2,766), overwhelming the number of earnings declines (1,726). Dividend cuts and continuations are more announced with earnings declines (i.e. totally 885 out of 1,371 observations) while only about 50 percent (841 out of 1,726) of earnings declines are released with dividend cuts and continuations. In contrast, a large portion of earnings increases (2,766 out of 3,252) are reported with dividend increases. This situation does not differ much for the individual years.

Panel B of Table 3.1 presents the mean and the percentiles of the main variables. The percentage change of dividends and earnings per share are respectively defined as the raw dividend changes (RDC_i) divided by $Div_{i,t-2}$ and the raw earnings changes (REC_i) divided by $EPS_{i,t-2}$. Daily security returns are computed as Eq. (3.3):

$$R_{i,d} = \ln \left(\frac{P_{i,d}}{P_{i,d-1}} \right), \quad (3.3)$$

where $R_{i,d}$ is the return on security i on day d , and $P_{i,d}$ denotes the daily adjusted price of security i on day d .

The mean percentage change in dividends is 0.1300 for the whole sample and the median is 0.0877. Most of the percentiles and the means of the dividend changes signify that the portfolios with earnings declines announce more dividend cuts and

less dividend increases than the portfolios with earnings increases. The mean (median) dividend change for the portfolio of earnings declines and dividend cuts is -0.4306 (-0.5994) while the mean (median) for the portfolios of earnings declines but dividend increases is -0.3282 (-0.5000). Regarding the portfolios with dividend increases, the one with earnings increases averagely has larger dividend increases than that with earnings declines (0.2275 versus 0.1913). The median dividend change of the former portfolio is 0.1226, which is also larger than 0.0951 of the latter portfolio.

The mean and median percentage changes in earnings for the whole sample are 0.3008 and 0.0926 respectively. For the portfolios with earnings increases, the one with dividend increases has the largest mean earnings increases (0.6455), but the largest median earnings increases appear on the portfolio with dividend cuts (0.2931). The standard deviation of the earnings changes is notably large on the portfolio of dividend and earnings increases (4.2004), indicating that the observations in the portfolio with dividend increases are more divergent in earnings performance than those in the others. Among the portfolios with earnings declines, their standard deviations of earnings changes range from 0.22 to 0.31, which are not far different. Both means and medians suggest that the portfolio with dividend cuts has inferior earnings performance than the other two portfolios. The mean and the median for the portfolio of dividend cuts and earnings declines are respectively -0.4846 and -0.4349, while those for dividend continuations are -0.3725 and -0.2778 and those for dividend increases are -0.2110 and -0.1330 respectively.

The mean returns on the event day are 0.0067 and the median is 0.0031 for the whole sample. Among six intersectional portfolios, the portfolios with dividend increases appear to have positive mean returns on the event day which are 0.0065 for the one

with dividend increases but earnings declines and 0.0135 for the one with dividend and earnings increases. For the other four portfolios, the one of dividend cuts and earnings declines possesses the lowest mean and median returns, which are respectively -0.0188 and -0.0131. The mean returns for both of the portfolios with dividend continuations are -0.0063 and -0.0005 respectively while the median for these portfolios appear to be zero.

The mean market value of the samples is about 1,005 million pounds, and the median is only about 122 million pounds. The median is far smaller than the mean of market value, implying that a vast majority of the sample is dominated by the small firms. The standard deviation of the market value, which is 4323.464, presenting that the large divergence of the firm sizes is inherent in the sample.

To sum it up, this chapter tests the market reaction to simultaneous dividend and earnings announcements by forming six intersectional portfolios. Each portfolio has different directions of dividend and (or) earnings changes. By testing these portfolios, it is expected to figure out whether the information in dividends or earnings announcements is what the market mainly responds to.

3.4. Methodology and hypotheses development

The aim of this chapter is to test the existence of information effect and to identify which factors (i.e. dividends, earnings or both) that explain changes in firm value on the event day. Since the dividends and earnings in the UK are announced simultaneously, dividends and earnings are examined on the same information set and, furthermore, the changes in information induced by the announcements can be fully captured. Accordingly, six portfolios are formed on the basis of dividend and earnings changes. In what follows, the investigation is carried out by observing and comparing the market reactions to the portfolios. In addition, dividing the sample by the rank of firm size, event study methodology is imposed to test whether the market reaction is dependent on the level of information asymmetry. Following the event study methodology, regression analysis is adopted to test the associations of abnormal returns with dividends and earnings changes. This procedure is important in that it helps to clarify if it is dividends, earnings or both inducing the abnormal returns (if any) on the announcement day.

3.4.1. Market reactions to dividend information - Event-time approach

The examinations start by using the standard event study to detect the abnormal returns during the event period. The tests assume that, following the semi-strong form market efficiency, the market would only react to new information implicit in the simultaneous announcements of dividends and earnings. To examine the existence of the market reactions, the abnormal returns are estimated to measure the reactions, and the event study is carried out as the following processes:

1. using the stock returns prior to the event period (i.e. the estimation period) to form a model for estimating the expected stock returns,
2. estimating the divergence between the real stock returns and the expected stock returns during the event period to generate the abnormal returns, and
3. testing whether the abnormal returns are different from zero.

The details of the methodology are presented as follows.

Firstly, the event period and the estimation period have to be defined. Due that the dividends and earnings are announced semi-annually in the UK, it does not allow this test to employ a long estimation period, such as one-year pre-event period. Thus, the estimation period is defined as an eighty-day period (about 4 trading months) which starts from 95 days to 16 days prior to the announcements. The event period is designed to be a 31-day period, which is from 15 days before the announcements to 15 days after the announcements.

For each observation, the market model is imposed to be the benchmark model for estimating the expected returns. The market model is shown as Eq. (3.4):

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \quad \text{where } \varepsilon_{i,t} \sim NID(0, \sigma_\varepsilon^2). \quad (3.4)$$

The FTSE All Share Index is used as the proxy to compute the market returns $R_{m,t}$. The daily return of the firm i on day t ($R_{i,t}$) is computed as the natural logarithm of the security price on day t minus the natural logarithm of the price on day $t-1$. The returns

during the eighty-day estimation period are employed to estimate the β and the intercept α . The β and α are then used to generate the expected returns for each day of the event period.

Secondly, given the estimated expected returns, the abnormal returns could be computed as Eq. (3.5):

$$AR_{i,t} = R_{i,t} - E(R_{i,t}), \quad (3.5)$$

where $AR_{i,t}$ denotes the abnormal returns of the firm i on day t . In addition, the buy-and-hold abnormal returns, which do not make an implicit assumption of portfolio rebalancing on each event day, are imposed to represent the shareholders' wealth over an event period. The buy-and-hold abnormal returns for the period from $t1$ to $t2$ (e.g. 6 to 10 days relative to the event day) are computed as Eq. (3.6):

$$BHAR_{i,T} = \sum_{T=t1}^{t2} AR_{i,T}. \quad (3.6)$$

Thirdly, the event study statistically tests whether the cross-sectional average abnormal returns or buy-and-hold abnormal returns are different from zero. The (buy-and-hold) abnormal returns which are significantly different from zero indicate the prominent market reaction to the information conveyed by the simultaneous announcements of dividends and earnings. The significant tests on the cross-sectional average abnormal returns and buy-and-hold abnormal returns are carried out by using student's t test. The standard deviations for the t test, which take account of cross-correlation, are estimated from the time series of the cross-sectional average abnormal returns over the eighty-day estimation period. Failure to consider

cross-correlation when it exists would result in underestimating the variance of the abnormal returns and over-rejecting the null hypotheses (Brown and Warner, 1985). As for the tests on the buy-and-hold abnormal returns, the standard deviation is computed by using the above standard deviation times the square root of the days compounded.

The signalling hypothesis states that, if dividend effect exists, the announcements of dividend increases should induce positive wealth effect while the announcements of dividend cuts should induce negative wealth effect. If the information about earnings has been captured by the announcements of earnings changes, the market reactions are not expected to depend on the announcements of dividend changes.

3.4.2. Market reactions to dividend information - Calendar-time approach

An alternative approach used to measure the abnormal returns during the event period is the calendar-time method, which is firstly introduced by Jaffe (1974) and Mandelker (1974) and advocated by Fama (1998). This method examines time-serial portfolios whose composition is renewed over time in light of the calendar date on which each firm's event period (e.g. day -15 to day -6, or a specific event day, day 5) is investigated.

The advantage of this approach is that the variances of the time-serial returns portfolios automatically account for the cross-correlations in stock returns at each point in calendar time. Furthermore, the calendar-time approach could overcome a potential problem which the event-time approach suffers. The problem raised on

event-time approach is that the short interval between two subsequent announcements (i.e. normally six months) is not appropriate for an estimation period longer than the short interval. The typical length of the estimation period is suggested at least 100 trading days (Peterson, 1989). When the estimation period is limited to a shorter interval, it may reduce the accuracy for the market model on estimating expected returns. The calendar-time approach, however, would not encounter the similar problem since this approach does not require an estimation period.

Accordingly, the time-serial portfolios are formed for each calendar day from January 1992 to March 2004. For the purpose of simplifying the illustration, the following takes the event day (day 0) for example. For a given calendar day, the portfolio includes all observations whose dividends and earnings are announced on the day. A time-serial portfolio may consist of two or more observations when two or more firms made the announcements on the same calendar day. The observations' returns on the given day are then used to compute the value-weighted average returns for the portfolio. The employment of the value-weighted average returns corresponds to the value-weighted explanatory variables of the benchmark models, CAPM and the three-factor model (discussed later). Moreover, Fama (1998) suggests that adopting the equally-weighted returns incurs severer bad-model problem in inferences in that systematic problems in explaining the average returns on the categories of small stocks are inherent in all the asset pricing models. For computing the value-weighted returns, considering that the share price would fluctuate during the event period, the firms' market values 16 trading days prior to the simultaneous announcements (i.e. the last trading day prior to the event period) are used. The above procedure is repeated for each calendar day until the end of March 2004.

The similar procedure is likewise applied to estimate the average abnormal returns during a specific event period. Take the event period of day 6 to day 10 for example; the time-serial portfolio for a given day consists of all observations whose announcements are made within previous six to ten days. The portfolio renews daily to drop all observations that reach the end of their five-day event period (i.e. day 6 to day 10), and add all observations that just start their five-day event period. The computation of the portfolio returns for the event period is exactly the same as that for the individual event day.

After the returns of the time-serial portfolios are computed, the test makes use of two models to estimate the abnormal returns for each dividends and earnings intersectional portfolio. The first model in use is the capital asset pricing model (CAPM) introduced by Sharpe (1964) and Lintner (1965). Jensen (1968) applies the CAPM on estimating abnormal returns and argues that, given the empirical validity of the CAPM, the risk premium on the individual portfolio can be expressed as a liner function of the risk factor β , the market premium and the residual, whose expected value equals zero. The model is given as Eq. (3.7):

$$R_{p,t} - R_{f,t} = \beta(R_{m,t} - R_{f,t}) + \varepsilon_{p,t}, \quad (3.7)$$

where $R_{p,t}$, $R_{f,t}$ and $R_{m,t}$ respectively denote the returns on capital asset, the returns on risk-free asset, and the returns of the market on calendar day t . The returns on capital asset are the value-weighted returns of the time-serial portfolios. The annual discount rate of the UK Treasury Bill (T-bill) is converted into daily interest rate to be the proxy of the return on the risk-free asset. The FTSE All Share Index is used to compute the returns of the market.

The CAPM would predict the returns well when β is stable and thus the expected value of the residual equals zero. However, if the dividend and earnings announcements have information effect on the share prices, it may induce the prices to fluctuate, resulting in that 1) $R_{p,d}$ becomes divergent to what the model predicts and 2) expected residual no longer equals zero. Jensen (1968) allows a constant adding to the right hand side of the model to capture the divergence caused by the event and to leave white noise to the residual. The model therefore becomes as Eq. (3.8):

$$R_{p,t} - R_{f,t} = \alpha_{p,t} + \beta(R_{m,t} - R_{f,t}) + \delta_{p,t}, \quad (3.8)$$

where $\delta_{p,t}$ is the new residual after the intercept $\alpha_{p,t}$ is added to estimate the information effect of the dividend and earnings announcements. The intercept is the main interest of the test. Positive (negative) intercepts indicate positive (negative) market reactions to the announcements. The null hypothesis states that the intercept equals to zero for all portfolios. Rejecting the null hypothesis suggests the prominence of the market reactions.

Additionally, Fama and French (1993) assert that the three-factor model could be a common model explaining stock returns. While the CAPM only makes use of systematic risk to predict the returns, the three-factor model additionally includes the size factor, “SMB” (small minus big) and the book-to-market factor “HML” (high minus low), to respectively capture the size effect and the book-to-market effect. Fama and French (1996) empirically compare the prediction ability of the CAPM and the three-factor model, showing that the CAPM mis-prices some portfolios, such as high and low book-to-market portfolios. They argue that many anomalies are caused

from the CAPM's failure to take account of size and book-to-market factors. In order to mitigate the "bad model problem" interfering with the estimation, the three-factor model is employed to provide the supplemental evidence for the test. The three-factor model is given as Eq. (3.9):

$$R_{p,t} - R_{f,t} = \alpha_{p,t} + \beta_1(R_{m,t} - R_{f,t}) + \beta_2SMB_t + \beta_3HML_t + \delta_{p,t}, \quad (3.9)$$

where β_1 , β_2 , and β_3 are the coefficients in the time-series regression. The coefficient of market premium, β_1 , is analogous to the beta of the CAPM but not equal to it since the additional factors provide some of the explanation for risk premium ($R_{p,t} - R_{f,t}$). The size factor, SMB (small minus big), is the difference between the return on a portfolio of small stocks and the return on a portfolio of large stocks. On the other hand, the book-to-market factor, HML (high minus low), is the difference between the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks²². All the other factors are the variables remaining the same with the CAPM.

Similar to the test on the CAPM model, the foremost interest is placed on the intercept of the three-factor model. The model is tested upon the assumption that the expected value of the residual equals to zero. In other words, the three factors are assumed to capture all the variation in the returns of the time-serial portfolios, and the intercept could capture the anomalies induced by the announcements, leaving only white noise to the residual. If the simultaneous dividend and earnings announcements convey new and positive information, the market, which is characterized by semi-strong form efficiency, would have immediate and positive response to the information. Relatively,

²² Sincere appreciation is placed for the data provision of SMB and HML from Professor Krishna Paudyal, Durham Business School, Durham University, UK. All remaining errors are mine.

the market should respond negatively to disfavoured news conveyed by the announcements. Therefore, according to the dividend signalling hypothesis, if dividend announcement effect exists, the intercepts, for measuring average abnormal returns, are predicted to be positive for the portfolios with dividend increases and negative for the portfolios with dividend cuts. If earnings announcements convey most information about earnings performance, the market is only expected to respond to the earnings announcements.

3.4.3. Testing the existence of differential information

After examining the market reactions to the simultaneous announcements of dividends and earnings, this chapter further examines whether the market reactions to the simultaneous announcements of dividends and earnings are dependent on the level of information asymmetry. Previous findings suggest that the magnitude of the abnormal returns around earnings announcements are greater for small firms than large firms (Freeman, 1987; Ball and Kothari, 1991). Since analysts tend to focus more on large firms and bring more related information to the market, the share price may already incorporate the information before it is announced or signalled. By contrast, the information about small firms is relatively rare, making the market rely more on official announcements and the small firms rely more on dividend signalling.

Based on the notion that the level of information asymmetry is inversely related to the firm size, this chapter imposes firms' market capitalisations as the proxy for the level of information asymmetry²³. The differential information hypothesis predicts that,

²³ The use of firm size as the proxy for the level of information asymmetry can also be found in the studies of Bajaj and Vijh (1990), Bajaj and Vijh (1995), Mougoue and Rao (2003), Bali (2003) and many others.



around the days of the simultaneous announcements, the market's reactions to the announcements should be larger for small firms than for large firms. To test this hypothesis, the observations are sorted and split into five quintiles by the market capitalizations 16 days prior to the announcements. The first quintile consists of the observations with the smallest 20 percent in firm size while the fifth quintile consists of those with the largest 20 percent in firm size. The observations for each quintile are further grouped in light of the directions of dividends and earnings changes. The average abnormal returns are estimated by Fama and French's (1993) three-factor model for each dividend-earnings-size portfolio.

3.4.4. Estimations of relative dividends and earnings effects

One intention of this chapter, in addition to examine the information effect of the simultaneous announcements, also aims to understand whether it is dividends, earnings or both inducing the market response. As stated by Miller and Rock (1985), the dividend effect stems from that dividends convey the missing piece of information about current earnings. The market then revises the expectation of future earnings in light of the dividend changes. However, when dividends and earnings are announced simultaneously, earnings announcements should signal most information about earnings, edging out the signalling power of dividend announcements. In this case, the abnormal returns may only pertain to earnings changes unless dividends still possess information additional to current earnings. A regression model is formed to examine the explanatory power of dividend changes and earnings changes on the event-day abnormal returns. The dividend signalling hypothesis for this examination states that the coefficients on the dividends and earnings variables should be positive but the coefficient on the earnings variable should be larger than that on the dividends

variable.

Another possibility is that the market compounds the information conveyed by the simultaneous announcements and judges the information jointly. To investigate this possibility, the model additionally imposes five dummy variables for the six intersectional portfolios as the proxies for the interaction effect between dividends and earnings announcements. When the interaction effect is taken into account, it is simple to anticipate market response to the portfolios with simultaneous increases or declines in dividends and earnings. Nevertheless, it is difficult to predict how the market responds to the announcements whose dividends and earnings signal contradictory information. For example, if earnings declines are expected and the dividend increases are unexpected, market would respond positively to the announcement. Conversely, market would respond negatively to the unexpected earnings. However, when both factors are unexpected, the market's response is expected to be ambiguous and no abnormal returns would be detected. In this case, the abnormal returns are not expected to relate to the interaction effect. Equation (3.10) expresses the model discussed above:

$$AR0_{i,t} = \alpha + \beta_1 \times \Delta Div_{i,t} + \beta_2 \times \Delta EPS_{i,t} + \gamma \times Dummy(\Delta Div_{i,t}, \Delta EPS_{i,t}) + \varepsilon_{i,t}, \quad (3.10)$$

where $\Delta Div_{i,t}$ and $\Delta EPS_{i,t}$ respectively denote the percentage changes of dividends and earnings. The coefficient γ is a vector of coefficients on a vector of five dummy variables which are imposed as the proxies for the interaction effect. Kane, Lee, and Marcus (1984) apply restricted least square (RLS) to test the joint significance of dividends and earnings as well as the joint significance of the dummies for the interaction effects. The former is tested by "first order" F statistic whose restricted

model includes only a constant and the interaction dummies. The latter is tested by “interaction” F statistic whose restricted model includes a constant, dividend changes and earnings changes. The unrestricted model for the both F statistics includes a constant, dividend changes, earnings changes, and the interaction dummies. When dividends or earnings possess information effect, the “first order” F statistic will be significant and reject the null hypothesis which states that both of the coefficients equal to zero. Similarly, when the interaction effect exists, the “interaction” F statistic will be significant, indicating that not all the coefficients of the dummies equal to zero.

In the second part of regression analysis, the tests are conducted for the respective effect of earnings increases and earnings declines. When a firm experiences increases in earnings, simultaneous increases in dividends would more or less confirm the signals of earnings. Nonetheless, when a firm experiences declines in earnings, the signals from dividends might be redundant if dividends only signal for current earnings. Particularly, Lintner (1956) suggests that managers are reluctant to cut dividends. The reluctance of cutting dividends when the firms experience declines in earnings makes dividends increases less creditable (DeAngelo, DeAngelo, and Skinner, 1996). Hence, when the market evaluates the information from a firm incurring earnings recession, it would rely more on the earnings signals than dividends signals. Consequently, examining the explanatory power of dividends, earnings increases, and earnings declines on the event-day market reactions, the tested hypothesis states that the coefficients on the explanatory variables should be positive, while the coefficient on the earnings declines variable should be larger than that on the earnings increases variable.

Prior findings furthermore suggest that that managers or investors believe that dividend changes signal for the future earnings (Baker and Powell, 1999; Conroy, Eades, and Harris, 2000; and Koch and Sun, 2004). Thus, it is possible that the apparent market responses to dividend changes are actually to future earnings. In this chapter, the hypothesis for examining the future earnings variables states that future earnings should have positive relation to the abnormal returns and reduce the explanatory power of dividend changes. Otherwise, dividend changes will remain as significant as they do in the model without future earnings. Assuming that the earnings process follows a random walk in this chapter, the variables of the future earnings are the raw earnings changes of the first and the second following semi-years. The future earnings changes are computed as Eq. (3.11) and Eq. (3.12):

$$\Delta EPS_{i,t+1} = \frac{EPS_{i,t+1} - EPS_{i,t-1}}{EPS_{i,t-1}} \quad (3.11)$$

$$\Delta EPS_{i,t+2} = \frac{EPS_{i,t+2} - EPS_{i,t}}{EPS_{i,t}} \quad (3.12)$$

The model for testing the effects of earnings increases, earnings declines and future earnings can be expressed as Eq. (3.13):

$$ARO_{i,t} = \alpha + \beta_1 \Delta Div_{i,t} + \beta_2 \Delta EPS_{i,t} + \beta_{2D} (D_{ED} \times \Delta EPS_{i,t}) + \beta_3 \Delta EPS_{i,t+1} + \beta_4 \Delta EPS_{i,t+2} + \varepsilon_{i,t}, \quad (3.11)$$

where D_{ED} denotes the dummy variable which equal one for earnings declines and zero otherwise. The variables, $\Delta EPS_{i,t+1}$ and $\Delta EPS_{i,t+2}$, are respectively the percentage changes of future earnings of the first and the second subsequent semi-years.

The dependent variable, for all the models in this section, is the abnormal returns on

event day (day 0) estimated by the standard event study. The test only employs the abnormal returns on day 0 rather than three-day or two-day buy-and-hold abnormal returns around day 0 for two reasons. Firstly, in the market with semi-strong form efficient, market should respond to news immediately. Thus, the abnormal returns on the event day are the best indicator for information effect. Secondly, the evidence from the event study (discussed in the next section) indicates that the information effect on the event day is more prominent than that on either day 1 or day -1. Consequently, employing the abnormal returns on day 0 as the dependent variable should be more appropriate (at least not worse) than employing the two- or three-day buy-and-hold abnormal returns around the event day.

To conclude, the examinations of this chapter start from testing the market reaction to the simultaneous announcements of dividends and earnings. The market is expected to react positively to good news and negatively to bad news if the announcements convey new information. Additionally, this chapter investigates whether the market reactions to the announcements are dependent on the level of information asymmetry. Using the firm's market capitalisations as the proxy for the level of information asymmetry, the differential information hypothesis predicts that the announcements made by small firms would induce larger market responses than those made by larger firms. More explicitly, this chapter examines the relative effects of dividends and earnings changes on the market reactions. The explanatory variables of the changes in dividends, current earnings and future earnings are all expected to have positive relation to the event-day abnormal returns. However, earnings changes should capture most unexpected information about current earnings, and leave little information in dividends. In this case, the relation between dividend changes and the abnormal returns should become trivial. Furthermore, if the information conveyed by dividends

is also about future earnings, including the future earnings variables in the model should reduce the explanatory power of dividends. Otherwise, the significance of dividends will not be affected when dividend announcement effect actually exists.

3.5. Empirical results

Generally, the results of event studies suggest that market has significant responses to the simultaneous announcements around the event day. The evidence appears to be consistent regardless which approach of event study is employed to estimate the abnormal returns. As the earlier expectation, market responds positively to good news and negatively to bad news, indicating the existence of both dividend and earnings effects. In addition, for the announcements with dividend increases, the market appears to respond more prominently to the information released by small firms than large firms. Nonetheless, this phenomenon is not found on the announcements with dividend continuations or dividend cuts. When directly testing the dividend and earnings effects by regression analysis, dividend effect appear to dominate earnings effect on accounting for abnormal returns. Furthermore, the abnormal returns are likewise positively related to current earnings declines and future earnings changes of the first subsequent half-year. Current earnings increases only play a limited role in signalling.

3.5.1. Event-time abnormal returns around simultaneous dividends and earnings announcements

Estimates of the abnormal returns during the event period for each intersectional portfolio are presented in Table 3.2. Consistent with the evidence well documented in previous studies²⁴, the market is found to respond positively to dividend and (or) earnings increases and negatively to dividend and (or) earnings decreases. Panel A of Table 3.2 presents that, on day 0 (the event day), the portfolio of dividend and

²⁴ See Aharony and Swary (1980); Penman (1983); Lonie, Abeyratna, Power, and Sinclair (1996) and many others.

earnings increases earns the largest positive abnormal returns, which is 1.30 percent. By contrast, the portfolio of dividend and earnings decreases earns the largest negative abnormal returns (-1.84 percent). For the portfolios whose dividends and earnings signal contradictorily, the market reactions seem to be driven by the announcements of dividend changes. The portfolio of dividend increases but earnings declines earns 0.64 percent of abnormal return on day 0 while the portfolio of dividend cuts but earnings increases earns -0.64 percent of abnormal returns. When dividends are announced to remain unchanged, market reacts negatively to the portfolio with earnings declines (-0.55 percent) and insignificantly to that with earnings increases.

In addition to the event day, price behaviour shown in Panel A of Table 3.2 for each portfolio is also different during the rest of the event period. During the periods of day -6 to day -10 and day -6 to day -15, only the portfolio of dividend and earnings increases earns significantly positive abnormal returns. None of the other portfolios earn significant abnormal returns during these periods. Share price has more apparent movements during the week prior to the event day. Positive abnormal returns for the portfolio of dividend and earnings increases remain significant throughout this week. The magnitude of the market reaction becomes larger as the announcement day is getting close. Even though, the pre-announcement market reactions are still much smaller than that on the event day. Similar pattern of the price behaviour is found on the portfolio of dividend increases but earnings declines. The significantly positive abnormal returns emerge from three days prior to the announcement and reach the maximum on the event day. Another portfolio earns three days of significant abnormal returns is that of dividend cuts but earnings increases. Surprisingly, the market reacts to this portfolio positively prior to the announcement day but negatively when

dividends and earnings are announced. For the other portfolios, the price movement prior to the announcement appears to be positive but rarely significant.

During the post-announcement period, Panel A of Table 3.2 shows that the direction of price movement appears to reverse for some portfolios but appears to continue for some others. Price movement for the two portfolios with dividend increases continues to be significantly positive posterior to the announcement. The market reaction to the portfolio of dividend and earnings increases remains significant until five days after the announcements. For the portfolio of dividend increases but earnings declines, significantly positive abnormal returns are found up to three weeks (15 trading days) of the post-announcement period. The reversal of the price movement during the post-announcement period is the most obvious for the portfolio of dividend continuations but earnings declines. During the week following the announcements, abnormal returns for this portfolio appear to be significantly positive on four out of five trading days. Similar pattern of price movement happens to the portfolio of dividend and earnings decreases though the price movement is less significant. Note that the trend of the reversal seems to continue even after six days following the announcement. During the period from day 6 to day 15, the buy-and-hold abnormal returns are 2.18 percent for the portfolio of dividend and earnings decreases, and are 1.05 percent for the portfolio of dividend continuations but earnings declines. These buy-and-hold abnormal returns are much larger in size than those during the corresponding period for other portfolios.

Panel B of Table 3.2 presents the wealth earned by shareholders during the event period centred on the simultaneous announcement day. During the three-day period centred on the announcement day, shareholders whose stocks announcing increases in

both dividend and earnings earn 1.92 percent of abnormal returns which is statistically significant. By contrast, shareholders whose stocks announcing declines in both dividends and earnings suffer 1.61 percent loss of abnormal returns. While dividends remain unchanged, it seems that the market only reacts to the information conveyed by earnings changes. The three-day buy-and-hold abnormal returns are -0.57 percent for the portfolio of dividend continuations but earnings declines while those for dividend continuations but earnings increases are 0.28 percent. Given constant on dividend changes, the market reacts to bad news about earnings more prominently than to good news about earnings. As for the portfolios with contradictory information, shareholders with dividend increases but earnings declines earn significant and positive abnormal returns (1.07 percent) during the three-day period centred on the announcement day. By comparison, shareholders with dividend declines but earnings increases experience 0.4363 percent loss of abnormal returns. However, the loss is insignificant. For the event periods with longer intervals, shareholders with dividend continuations and dividend increases experience positive abnormal returns around these periods. The announcements with dividend increases are found to induce larger positive wealth effect than the announcements with dividend continuations. Nonetheless, during the 31-day event period, the abnormal returns earned by shareholders with dividend increases or dividend continuations range between 1.98 to 3.10 percent, which are not far different. Surprisingly, the announcements of declines in both dividends and earnings, which induce the largest negative abnormal returns on the announcement day, also evoke 2.23 percent of abnormal returns during the 31-day period. The results seem to imply that the announcements do not have much effect for longer event periods.

Figure 3.1 provides a clear overview of the share price behaviours over the 31-day

event period. Before dividends and earnings are announced, the price performances do not seem to have much difference among the intersectional portfolios although the portfolio of dividend and earnings increases outperforms the others a little. The largest divergence of the share price performance happens on day 0, showing that three of the portfolios induce obviously negative market reactions and two of them evoke positive market reactions. During the post-announcement period, all except the portfolio of dividend cuts but earnings increases have an uptrend of share price performances. During the six-week event period centred on the announcement days, the portfolio of dividend cuts but earnings increases end up with about 0.5 percent of buy-and-hold abnormal returns while the other portfolios at least earn about two percent of buy-and-hold abnormal returns. The portfolio of simultaneous increases in dividends and earnings is the one whose event-period buy-and-hold abnormal returns exceed 3 percent.

Consistent with the prediction of the dividend signalling hypothesis, the evidence suggests the existence of both dividend and earnings effects. The wealth effect is the most prominent for the announcements of simultaneous increases (declines) in dividends and earnings. However, when dividends remain unchanged, the market reactions are found to depend on news about earnings performance. As for the announcements with contradictory information, the market reactions are likely more dependent on the information of the dividend announcements.

3.5.2. Calendar-time abnormal returns around simultaneous dividends and earnings announcements

Abnormal returns estimated by CAPM

The evidence of the calendar-time abnormal returns is mostly consistent with that of event-time abnormal returns. Table 3.3 presents the estimates of the abnormal returns by CAPM. Panel A of Table 3.3 shows that, the largest positive market response on the announcement day (day 0) is created to the portfolio of increases in both dividends and earnings. Consistent with the signalling hypothesis, the daily abnormal returns illustrated in Panel A for the portfolio of simultaneous increases in both dividends and earnings appear to be positive and significant. Moreover, the significance of the average abnormal returns during the period of day 6 to day 10 or to day 15 is notable in that this finding is different from that provided by event-time approach. The average 0.07 percent of daily abnormal returns is analogous to 0.7 percent of buy-and-hold abnormal returns during the period of day 6 to day 15. The estimate by CAPM is almost ten times larger than the estimate by even-time approach. The reason for this divergence might stem from that the calendar-time approach estimates value-weighted average returns which take account of the firm capitalisations. Panel B of Table 3.3 clearly indicates that the increases in shareholders' wealth induced by the announcements of increases in dividends and earnings are prominent. Throughout the 31-day event period, shareholders with the announcements of simultaneous increases in dividends and earnings averagely earn 0.10 percent of abnormal returns per day. The average abnormal returns during the three-day period around the announcements are even as large as 0.54 percent which is analogous to 1.6 percent of three-day buy-and-hold abnormal returns.

As the evidence shown in Panel A of Table 3.3, the market also reacts positively to the

portfolio of dividend increases but earnings declines from day -3 to day 2. The largest market reaction, which is measured as 0.55 percent of abnormal returns, is found on day 0. The signals from this portfolio comprise the mix of good and bad news, which is not as favourable as those from the portfolio of dividend and earnings increases. Therefore, during the event period, the abnormal returns for the portfolio of dividend increases but earnings declines are generally smaller in size and less significant, comparing to those for the portfolio of simultaneous increases in dividends and earnings. Estimates in Panel B provide the similar implication, although, over the various periods, the shareholders' wealth induced by the announcements of dividend increases but earnings declines all appears to be positive.

Market reaction to another portfolio which signals contradictory information (i.e. dividend cuts but earnings increases) also appears to be positive for the pre-announcement period but negative on the announcement day. Panel A of Table 3.3 shows that the abnormal returns on day -5 to day -1 are positive while some of the abnormal returns are even significant at ten percent level. From day 0 to day 2, the abnormal returns are found to be negative but insignificant, which are respectively -0.54, -0.29 and -0.12 percent. On day 3, the portfolio earns 0.43 percent of abnormal returns and thereafter the abnormal returns diminish. In Panel B of Table 3.3, the market reacts negatively but insignificantly to the announcements of dividend cuts but earnings increases during the period from day -1 to day 1. However, during the two-week event period (day -5 to day 5), such announcements induce 0.21 percent of abnormal returns which appear to be significant. For the other event periods, the average abnormal returns are found to be insignificant. Taken together, the evidence presented here, therefore, suggests that the returns on this portfolio are volatile, which may stem from investors' indecision on responding to the contradictory information.

The pattern of the abnormal returns for the portfolio of decreases in both dividends and earnings is partially different from that estimated by event-time approach. The abnormal returns estimated by event-time approach all appear to be positive during the pre-announcement period while most of those estimated by CAPM appear to be negative. Even though, the estimates from both approaches are not statistically significant during the pre-announcement period. On the announcement day, the abnormal returns estimated by CAPM are found to be -1.82 percent which is closed to the finding of the event-time approach. The post-announcement abnormal returns turn into positive but only significant on day 2. The findings in Panel B of Table 3.3 indicate that the negative market reactions, which are -0.80 percent of average abnormal returns, appear to be significant during the three-day period around the announcement day. For the other event periods, the abnormal returns are negative but insignificant.

When dividend continuations are thought as a neutral signal, the signalling hypothesis predicts that the market reaction should depend on the information signalled by earnings announcements. Consistent with this anticipation, Panel A of Table 3.3 shows that the market reacts to the announcements of dividend continuations but earnings declines negatively on day -1 and day 0. The abnormal returns on these days are respectively -0.31 and -0.64 percent, both of which are significant. The estimates in Panel B also present -0.26 percent of the average abnormal returns during the three-day period around the announcements. By comparison, during the same period, the market is not found to have prominent reaction to the portfolio of dividend continuations but earnings increases. The significant abnormal returns for this portfolio are found during the period of day -5 to day 5, and the period of day -10 to day 10. Consistent with the dividend signalling hypothesis, the average abnormal

returns for the two periods are respectively 0.13 percent and 0.06 percent per trading day.

To conclude, the evidence supports the dividend signalling hypothesis which predicts that the existence of dividend announcement effect. The evidence is particularly sound on the announcement day (day 0) and the three-day event period centred on day 0. The largest positive market reactions are found to the announcements of increases in both dividends and earnings while the largest negative market reactions are found to the announcements of simultaneous declines in dividends and earnings. As for the announcements with dividend continuations, the market reactions mainly rely on the information signalled by earnings changes, suggesting the existence of earnings announcement effect. When the announcements signal contradictory information, the market reactions on the event day are found to follow the information signalled by dividend announcements. The overall evidence suggests the existence of both dividend and earnings effects, but dividend effect is more prominent.

Abnormal returns estimated by the three-factor model

Table 3.4 demonstrates the abnormal returns estimated by using the three-factor model. Although Fama and French (1993) assert that this model could capture size and book-to-market effects, the evidence provided by this model is virtually the same as that provided by CAPM. The results in Panel A again show that, supporting the signalling hypothesis, the simultaneous announcements of both increases in dividends and earnings have the largest positive effect on share price. The abnormal returns emerge from average 0.08 percent during two and three weeks prior to the announcement, reach 1.20 percent of maximum on day 0, and gradually diminish after the announcement. The wealth effect induced by simultaneous increases in dividends

and earnings lasts for almost six weeks. Confirming this evidence, Panel B shows that the average abnormal returns are significant and about 0.1 percent during the 31-day event period. Regardless of the length of the event period examined, the significance of the positive average abnormal returns induced by simultaneous increases in dividends and earnings is explicit and the abnormal returns for the period from day -1 to day 1 are the most prominent.

The contradictory signals of dividend increases but earnings declines also induce positive effect for several days around the announcements. Panel A of Table 3.4 presents that the significant and positive abnormal returns emerge from five days prior to the announcements (0.15 percent) and grow into the most prominent on the day of announcements (0.59 percent). For the various event periods centred on day 0, the evidence in Panel B shows that the average abnormal returns induced by dividend increases but earnings declines all appear to be significantly positive. However, due to the negative changes in earnings performance, the abnormal returns are smaller in size, comparing to the abnormal returns induced by simultaneous increases in dividends and earnings.

Besides, the results in Panel A of Table 3.4 indicates that the simultaneous decreases in dividends and earnings induce the largest negative impact on shareholders' wealth on day 0 (-1.50 percent of abnormal returns). Surprisingly, the market reactions turn to be positive following the announcement. The evidence in Panel B suggests that, the abnormal returns during the period of day -1 to day 1, consistent with the signalling hypothesis, are found to be significant and about -0.68 percent per trading day. The average abnormal returns for the other longer event periods appear to be negative but insignificant.

The announcements of dividend continuations and earnings declines also induce negative wealth effect around the day of announcements. Panel A of Table 3.4 shows that the abnormal returns on day -1 and day 0 are respectively -0.31 and -0.53 percent which are very similar to the findings provided by CAPM. For the three-day period from day -1 to day 1, the average abnormal returns presented in Panel B are about -0.22 percent and are significant at ten percent level. When dividend continuations are though as neutral news, the evidence shows that the market mainly reacts to the information implicit in earnings changes, which suggest the existence of earnings announcement effect.

With respect to the announcements of dividend continuations but earnings increases, the evidence in Panel A of Table 3.4 shows that, except the abnormal returns on day 4 which appear to be significantly positive, those on each event day from day -5 to day 5 are insignificant. Nonetheless, for the period of day 6 to day 10, the market appears to react significantly and positively to the information of dividend continuations but earnings increases announcements. Positive average abnormal returns, which are 0.13 percent and 0.06 percent, are also respectively found in Panel B for the event periods of day -5 to day 5 and day -10 to day 10. The late market reactions are not predicted by the signalling hypothesis but the direction of the market reactions is consistent with the prediction.

As for the portfolio of dividend cuts but earnings increases, Panel A of Table 3.4 illustrates that the announcements induce negative wealth effect during the period from day 0 to day 2 but positive wealth effect are found on the event days preceding and following this period. Panel B shows that the abnormal returns for the three-day period centred on the announcement day are averagely -0.02 percent, but those for the

11-day period are approximately 0.2 percent. The findings on this portfolios show that the market's view on the announcements of dividend cuts but earnings increases are divergent, making the shareholders' wealth volatile during the event period.

To conclude, consistent with the expectation of the dividend signalling hypothesis, the announcements of dividend increases (cuts) induce positive (negative) abnormal returns, indicating the existence of dividend effect. The evidence also suggests the existence of earnings announcement effect. When dividend continuations are viewed as neutral news, the market is found to react positively to earnings increases and negatively to earnings declines. When contradictory information is signalled, the dividend announcement effect is found to be more prominent than earnings announcement effect.

3.5.3. Differential information and market reactions to the simultaneous announcements of dividends and earnings

The hypothesis of differential information maintains that, the market reacts more prominently to the information released by small firms than large firms. The underlying reason is that analysts have stronger motivations to follow large firms and bring more information about large firms to the market, indirectly reducing the level of information asymmetry in large firms. By using the firm size as the proxy for the level of information asymmetry between managers and investors, the market reactions to the simultaneous announcements of dividends and earnings in light of the size rank are presented in Table 3.5. Panel A to Panel D respectively demonstrate the average abnormal returns for the three-day, 11-day, 21-day and 31-day event periods centred on the announcement day. Some of the results obtained in Table 3.5 confirm the

prediction of the differential information hypothesis²⁵.

The most striking evidence supporting the hypothesis comes from the market reaction to the announcements of simultaneous increases in dividends and earnings. The magnitude and the significance of the market reactions almost monotonously magnifies as the firm size shrinks. The findings in Panel A of Table 3.5 illustrate that, comparing with 0.3359 percent of the average three-day abnormal returns of the largest-firm quintile, the abnormal returns of the smallest-firm quintile are about five times larger and are averagely 1.5653 percent. The average abnormal returns of the second to the fourth quintiles decline progressively, which are respectively 0.8317, 0.5503 and 0.4554 percent. Remarkably, the three-day abnormal returns of the five quintiles all appear to be significant at one percent level but the abnormal returns of the smallest-firm quintile are the most prominent. A similar pattern of return performance is likewise demonstrated from the results in Panels B, C and D. Comparing these panels, it is apparently found that the market reactions to the announcements made by the smallest firms all appear to be greater than the reactions to the largest firms. From the diagram in Figure 3.2 illustrating the abnormal returns accumulated from 15 trading days prior to the announcements²⁶, the returns performances of the five quintiles are shown to diverge 11 days prior to the announcements (day -11). This, however, may stem from the leakage of good news to the market before the announcements are formally made. On the other hand, after day -11, the buy-and-hold abnormal returns (BHARs) of the smallest firms are found to outperform those of the other quintiles and finish at about 8.5 percent on day 15. Accordingly, the magnitude of the abnormal returns around the announcement days is

²⁵ The following discussion mainly focuses on the results of the three-day event period, but also refers to the results of the longer-event periods as appropriate.

²⁶ The results of the daily abnormal returns for each size quintile are available upon request.

also inversely related to firm size. These findings are consistent with the findings of Bali (2003) on dividend announcements and the findings of Ball and Kothari (1991) on earnings announcements. In addition, the BHARs of the fourth and the largest-firm quintiles do not show far divergent but, on day 0, the abnormal returns of the fourth quintile are slightly larger than those of the largest-firm quintile. Overall, the evidence obtained unequivocally supports the differential information hypothesis, indicating that the announcements of simultaneous increases in dividends and earnings made by the small firms are more informative than those made by the large firms.

The evidence to emerge from the portfolio of dividend increases but earnings declines is also supportive for the differential information hypothesis. Throughout the four panels of Table 3.5, except the second size quintile, it is apparent that the market reactions swell as the firm size declines. For the three-day period centred on the announcement day, the smallest firms averagely earn 0.8325 percent of abnormal returns which are significant at one percent level and are about thirty times larger than the three-day abnormal returns of the largest firms. The abnormal returns of the third and the fourth quintiles are respectively 0.5284 and 0.3837 percent, which are smaller than the abnormal returns of the smallest firms and larger than those of the largest firms. Presenting similar returns pattern, the evidence in Panels B, C and D is also, in support of the prediction that the market reacts more prominently to the announcements made by small firms. Figure 3.3 demonstrates that the smallest firms appear to experience the largest BHARs during the event period, indicating that the announcements made by the smallest firms are the most informative. The BHAR performance of the second, third and fourth quintiles are not far divergent, whilst the BHARs of the largest-firm quintile appear to be the smallest compared to the others. The diagram presented in Fig. 3.3 remarkably supports the differential information

hypothesis, stating that the market reactions are inversely related to the level of information asymmetry.

For the portfolio with the worst news (simultaneous declines in dividends and earnings), during the three-day period around the announcement day, the largest abnormal returns in Panel A of Table 3.5 appears on the third size quintile which is about -1.2458 percent and significant at 10 percent level. By contrast, the quintile of the smallest firms and the second quintile respectively incur -0.6923 and -0.6353 percent of the three-day abnormal returns. Taken together, these results are contrary to the prediction that the announcements made by the smaller firms induce larger market reactions. Nonetheless, the abnormal returns of these three quintiles are all greater than the abnormal returns of the largest firms in magnitude. On this portfolio, this is the only evidence supporting the differential information hypothesis. The results of the longer event periods does not show much supportive evidence and, surprisingly, only the abnormal returns of the third quintile appear to be significantly negative. One can clearly get the pattern of the BHAR performance of each quintile from Fig. 3.4. During the 31-day event period, the second quintile has the largest positive BHAR performance but the third quintile incurs the largest decline in abnormal returns. The smallest-firm and the largest-firm quintiles also earn positive abnormal returns and, furthermore, the BHAR trends of these two quintiles are similar during the event period. While the differential information hypothesis predicts that the announcements made by small firms would induce larger market reactions, the evidence of this portfolio does not support this prediction and the level of the information asymmetry is unlikely related to the market reactions to the announcements of simultaneous declines in dividends and earnings.

The results for the portfolio of dividend continuations and earnings declines are ambiguous and weak. The three-day average abnormal returns presented in Panel A of Table 3.5 show that the firms in the second quintile experience the largest negative abnormal returns (-0.4393 percent) and the magnitude of the market reaction shrinks from the second quintile to the fourth quintile. The market reaction to the quintile of the smallest firms is a little larger than that to the fourth quintile but much smaller than that to the second quintile. For the abnormal returns during the longer event period, the abnormal returns of the smallest firms appear to be positive and the largest in magnitude. If dividend continuations are regarded as neutral news and the earnings declines are regarded as bad news, this evidence is contrary to the signalling hypothesis which predicts that the market reacts negatively to bad news. Figure 3.5 reports that, although all the quintiles experience abnormal declines in share prices around the announcement day, the market does not suffer obvious loss of share returns over the 31-day event period. The smallest-firm and the second quintiles respectively earn the largest and the second largest positive BHARs while the third and the largest-firm quintiles experience the BHARs which are close to zero. The evidence, therefore, does not show obvious relation between the level of information asymmetry and the market reactions to the announcements of dividend continuations and earnings declines.

The evidence for the portfolios of dividend continuations and earnings increases is also weak. The three-day abnormal returns of the smallest-firm quintile shown in Panel A of Table 3.5 are 0.3091 percent which is insignificant but larger than the abnormal returns of the fourth and the largest-firm quintiles. However, while testing the abnormal returns for the longer periods, the divergences of the average abnormal returns among these three quintiles become smaller (see Panels B and C). On the other

hand, the results of the three-day window present that the market reacts negatively to the announcements made by the second and, particularly, the third quintiles. The negative abnormal returns of the third quintile are found in all the four panels and are significant in Panel A and Panel B. Figure 3.6 indicates that the third quintile experience the worst BHAR performance during the event period while the BHARs of the second quintile slightly fluctuate around zero. The smallest-firm quintile, consistent with the differential information hypothesis, earns larger BHARs than the largest-firm quintile around the announcements and over the 31-day event period. Overall, consistent with the differential information hypothesis, the announcements of dividend continuations and earnings increases made by the smallest firms induce the largest market reactions. However, the results on the second and the third quintiles are out of the prediction of the differential information hypothesis. The hypothesis is only partially supported.

With respect to the market reactions to the announcements of dividend declines and earnings increases, the results are mixed. Throughout the four panels of Table 3.5, the market seems to react similarly to the announcements made by the smallest firms and the largest firms. Surprisingly, during the three-day period around the announcements, the largest market reactions in Panel A are not found on either the smallest-firm or the largest-firm quintile but on the third quintile. The abnormal returns of the third quintile even appear to be significantly negative in Panels A, B and C while none of the average abnormal returns of the smallest-firm quintile appears to be significant. The diagram in Figure 3.7 also shows that the third quintile suffers dramatic loss of share returns over the 31-day event period. The BHARs of the smallest-firm and the largest-firm quintiles appear to have similar trends but the BHARs of the smallest-firms are larger. This is the only evidence on the announcements of dividend

declines and earnings increases, supporting the differential information hypothesis.

To conclude, the differential information hypothesis is strongly supported by the evidence on the portfolios with dividend increases. The most prominent evidence is found on the portfolio of simultaneous dividend and earnings increases, showing that the magnitude of the market reactions monotonously declines as the firm size magnifies. For the portfolio of dividend increases but earnings declines, except the second quintile, the evidence also coincides with the differential information hypothesis. The findings of this section are consistent with the previous findings of Bajaj and Vijh (1990; 1995), Bali (2003) and Amihud and Li (2006) on dividend announcements and the findings of Ball and Kothari (1991) on earnings announcements, suggesting that the market reactions to the simultaneous announcements of dividend increases are dependent on the level of information asymmetry.

3.5.4. The relative effects of dividends and earnings on the market reactions to the simultaneous announcements

Dividends, earnings and interaction effects

The initial findings of the regression analysis suggest the existence of dividends and interaction effects. The Column 1 estimates in Table 3.6 indicate that the UK sample generates different results from those of previous studies. A notable difference is that earnings changes almost do not associate with the abnormal returns on the event day. The coefficient of earnings changes is close to zero (-0.0001) and is insignificant. Relatively, the coefficient of dividend changes is 0.0348 which highly exceeds one percent of significance level. The results suggest that when dividends and earnings are

announced simultaneously, dividend effect dominates earnings' effect on inducing market reactions. One unit increases or decreases in dividends would result in 0.0348 units of rise or fall in the market reaction. The F statistic, which is 63.34, rejects the null hypothesis which states that the coefficients are jointly equal to zero.

The Column 2 estimates are analogous to comparing the abnormal returns of each intersectional portfolio to the portfolio with simultaneous decreases in dividends and earnings. The intercept represents the abnormal returns for the portfolio of the worst news (simultaneous declines in dividends and earnings), and the coefficient of each dummy represents the incremental abnormal returns resulting from different directions of the signals. All the coefficients are positive and significant, implying that simultaneous decreases in dividends and earnings are the most unwelcome signals to the market. By contrast, the dummy for simultaneous increases in dividends and earnings has the largest positive coefficient, suggesting that the simultaneous increases are the most favourable signals. The dummy for dividend increases but earnings declines have a larger coefficient than the dummy for dividend cuts but earnings increases. It implicitly indicates that, when holding constant the alternative effect, dividends generally have larger impact on abnormal returns than earnings.

The Column 3 estimates present the model comprising the dividend changes, earnings changes and the dummies which capture the interaction effect. In comparison with the Column 1 estimates, including the dummies of interaction effect reduces the size and the significance of the coefficient on the dividend variable. Even though, the coefficient of dividend changes becomes 0.0260, which is still highly significant. The coefficient on the earnings variable is unlikely affected, which equals -0.0006 and still remains insignificant. However, including dividends and earnings variables also

absorbs a partial of interaction effect. Comparing with the Column 2 estimates, only two coefficients of the dummies remain significant in Column 3. The “first order” and the “interaction” F statistics are respectively 23.16 and 6.43, both of which are significant at one percent level. These results suggest the existence of dividends effect and interaction effect. Surprisingly, earnings changes only have little impact on abnormal returns.

The evidence of the interaction effect confirms the findings in other studies (Kane, Lee, and Marcus, 1984; Easton 1991; and Lonie, Abeyratna, Power, and Sinclair, 1996). However, none of these studies detect dividends effect while this chapter finds that dividends effect dominates even when jointly considering earnings and interaction effects. Earnings changes, not in agreement with the prediction of the dividend signalling hypothesis, only possess little power on explaining the event-day market reactions. The evidence here implies that the simultaneous existence of earnings announcements does not mitigate the signalling power of dividend announcements. Conversely, the information signalled by dividends rather than earnings is what the market reactions rely on.

Effects of earnings increases, earnings declines and future earnings

The findings that lack of earnings effect and existence of dividends effect on the event day contradict the anticipation of dividend signalling theory (Miller and Rock, 1985). Table 3.7 presents the estimates of the model which separately examines the effects of earnings increases and earnings declines and additionally considers the prospect of future earnings changes. The Column 2 estimates show that, without dividend changes as the explanatory variable in the model, current earnings changes have significantly positive relation to abnormal returns. However, the size and the significance of the

coefficient are much smaller than that of the dividend variable presented in Column 1. When the model additionally includes the earnings changes of the first subsequent semi-year, the Column 6 estimates show that both current and future earnings changes possess explanatory power on abnormal returns. The coefficient on the future earnings variable is larger and more significant than that on the current earnings variable. It suggests that a part of market reaction stems from market's expectation for future performance. The Column 4 estimates confirm the implication from the Column 6 estimates. Nevertheless, the Column 5 estimates imply that the market's expectation is only for the future performance in the first subsequent semi-year. The earnings changes of the second subsequent semi-year do not appear to associate with the abnormal returns on the event day.

The model in Column 3 separately examines the effects of earnings increases and declines. The estimates show that, with the variable of earnings declines, the coefficient of earnings changes becomes insignificant. Consistent with the earlier anticipation, earnings declines are an important signal for the market to understand the firms which are in difficult time but reluctant to cut dividends to signal for bad news.

The estimates in Columns 7, 8 and 9 jointly examine the effects of dividends, earnings increases, earnings declines and future earnings. The coefficients of dividend changes, earnings declines and the earnings changes of the first subsequent semi-year appear to be significantly positive. The variables of earnings increases and the earnings changes of the second subsequent semi-year almost lose their explanatory power on the event-day abnormal returns. The finding of the future earnings effect is consistent with the findings of Conroy, Eades, and Harris (2000) for Japan.

In this section, this chapter argues that the existence of the earnings effects should edge out the signalling power of dividends. Inconsistent with this prediction, the evidence implies that, for earnings increases, dividend effect exists and dividends play a confirmatory role in signalling. However, when experiencing earnings declines, the market tends to respond to the information of earnings declines since dividends in this scenario do not always signal creditably. In addition, consistent with the argument of Miller and Rock (1985), the market updates their expectations for the future earnings performance based on the information signalled by the simultaneous announcements. Overall, it seems that the event-day abnormal returns could be attributed to four effects which are respectively dividends, earnings declines, expectations for future earnings and interaction effects.

3.6. Conclusion

Since dividends and earnings are announced simultaneously in the UK, the signals of the earnings should capture the change of the information set beyond which investors already have about earnings on the time of announcements. In this context, the dividend announcements should convey little information about earnings and the market is expected to react mainly to the earnings changes. In other words, when dividend effect is found around the announcement after controlling the signals from earnings changes, the dividend effect should be “pure” dividend effect.

Event studies and regression analysis are employed to examine dividends, earnings as well as interaction effects. Event studies are carried out by event-time and calendar-time methods, testing 1) the abnormal returns for the portfolios formed by the directions of dividend and earnings changes and 2) whether the market reactions to the announcements are dependent on information asymmetry. Regression analysis first examines the model suggested by Kane, Lee, and Marcus (1984). The model investigates the dividend, earnings and interaction effects. Since the chapter is unable to find significant earnings effect from the first regression model, the test is further implemented by examining the potential effects of earnings declines and market's prospect of future earnings. The second part of the regression analysis indicates that, additional to dividend changes, the market reactions also depend on the announcements of earnings declines and the market's prospect of future earnings.

Generally, as the prior evidence which has been well documented²⁷, this chapter presents that the market responds positively to good news and negatively to bad news

²⁷ See Abeyratna, Lonie, Power, and Sinclair (1996), Gunasekarage and Power (2002), Brown, Finn, and Hancock (1977) and some others.

in simultaneous announcements of dividends and earnings. More specifically, by examining the market reactions to the six intersectional portfolios, this chapter finds the existence of dividend effect and earnings effect. When dividend and earnings simultaneously signal for good news or bad news, the announcements induce the largest wealth effect on the event day. When dividends signal for neutral news, the market reactions are dependent on the information of earnings announcements. However, when dividend and earnings signal for contradictory news, the market reactions seem to depend more on the information of dividend announcements. The evidence from examining the wealth effect of the simultaneous announcements suggests that both dividend announcements and earnings announcements are informative for investors but the effect of dividend announcements are greater.

The evidence from examining differential information confirms the notion that the market reactions are dependent on the level of information asymmetry. Consistent with the differential information hypothesis, the findings suggest that the simultaneous increases in dividends and earnings announced by small firms induce larger market reactions during the event period than those announced by large firms. Similar evidence is also found on the portfolio of dividend increases but earnings declines. The implication of these findings suggests that the market reactions are dependent on the level of information asymmetry. Therefore, signalling is more needed for small firms.

Regression analysis, which explicitly examines various effects, provokes some striking evidence. Firstly, the evidence confirms previous findings of interaction effect existing between simultaneous dividend and earnings announcements. However, this evidence contradicts to Change and Chen's (1991) argument which states that

interaction effect is caused by noisy information during the interval between dividend and earnings announcements. Secondly, this chapter finds that dividend effect dominates earnings effects on explaining the event-day abnormal returns. Not only is this evidence inconsistent with the findings of previous studies, but also is opposing to the prediction of the dividend signalling theory. However, after examining the effects of earnings declines and future earnings (discussed in the following), the implication from this evidence becomes reasonable. The dividends actually play a role in confirming the signals implicit in the earnings announcements, particularly the signals of earnings increases. Since dividend payment is costly, it makes dividends creditable when it is announced with earnings increases. Thirdly, in addition to dividend effect, there are also the effects of earnings declines and future earnings. Since managers are reluctant to cut dividends, it results in lack of creditable signals available for earnings declines. The evidence suggests that, unlike earnings increases, earnings declines *per se* are important signals to the market under the circumstances which lacks of other signals for these bad news. On the other hand, the link between abnormal returns and future earnings changes implies that the market revises their expectations of future earnings performance based on the signals of the simultaneous announcements. This finding is consistent with the findings of Conroy, Eades, and Harris (2000) for the Japanese market and the findings of Koch and Sun (2004) for the US market.

To conclude, this chapter reveals clear evidence supporting the dividend signalling theory and the differential information hypothesis. Besides, this chapter also provides a number of implications for managers. Firstly, as the information of small firms is more needed, it is suggested that managers of small firms incorporate more information in the simultaneous announcements to reduce the level of information asymmetry. Moreover, that the announcements of earnings increases alone are not

credible enough indicates that managers announce the signals of earnings increases with dividend increases in order to earn investors' trust. Nonetheless, unlike earnings increases announcements, the announcements of earnings declines *per se* are informative for investors. Last but not least, the evidence specifically signifies that future earnings are associated with the event-day abnormal returns. It is implied that the market uses the signals of the simultaneous announcements to update their expectations for the future earnings performance. Accordingly, managers could make use of dividend announcements to signal for their prospects of future performance.

Table 3.1: Descriptive statistics

This table presents the frequencies of the portfolios scattered in each sample year and the distribution of the main variables. The frequencies are presented in panel A. The portfolios are formed on the basis of the changes in dividends and earnings, which are respectively denoted by ΔDiv and ΔEPS .

Panel B presents the distributions of the variables, which are the percentage changes in dividends, the percentage changes in earnings, security returns on even day and firms' market value 16 days prior to the event day. The statistics, which include mean, median, standard deviation (SD), the 1st percentile (P1), 10th percentile (P10), 1st quartile (Q1), 3rd quartile (Q3), 90th percentile and 99th percentile (P99), are presented for the whole sample as well as for each intersectional dividends and earnings portfolio.

Panel A: The frequencies of dividend announcements by year

Year	Portfolio	$\Delta\text{Div}<0$		$\Delta\text{Div}=0$		$\Delta\text{Div}>0$		Total
		$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	
1992		1	1	5	5	6	18	36
1993		20	4	44	23	50	119	260
1994		14	10	51	41	55	247	418
1995		17	9	42	55	72	380	575
1996		18	7	90	48	102	347	612
1997		19	10	79	53	102	357	620
1998		40	18	64	46	75	364	607
1999		41	15	75	27	123	275	556
2000		23	9	45	29	98	254	458
2001		26	9	49	17	73	179	353
2002		21	10	49	20	49	126	275
2003		13	2	38	17	33	92	195
2004		0	0	1	1	3	8	13
EPS Portfolio's Total		253	104	632	382	841	2766	4978
Div Portfolio's Total		357		1014		3607		

Table 3.1 - *Continued*

Panel B: The distributions of the main variables									
Variables	Mean	SD	P1	P10	Q1	Med	Q3	P90	P99
Δ Div	0.1300	0.4807	-0.7088	0.0000	0.0000	0.0877	0.1538	0.2997	1.5000
Portfolio (Δ Div<0, Δ EPS<0)	-0.4306	0.2462	-0.9741	-0.7714	-0.5994	-0.4149	-0.2502	-0.0693	-0.0055
Portfolio (Δ Div<0, Δ EPS>0)	-0.3282	0.2160	-0.8801	-0.6148	-0.5000	-0.3200	-0.1506	-0.0525	-0.0129
Portfolio (Δ Div>0, Δ EPS<0)	0.1913	0.5894	0.0105	0.0348	0.0515	0.0951	0.1497	0.2531	1.9215
Portfolio (Δ Div>0, Δ EPS>0)	0.2275	0.4996	0.0226	0.0511	0.0834	0.1226	0.2079	0.4118	1.8874
Δ EPS	0.3008	3.1850	-1.0000	-0.4103	-0.1030	0.0926	0.2815	0.6369	3.6737
Portfolio (Δ Div<0, Δ EPS<0)	-0.4846	0.3121	-1.0000	-1.0000	-0.7139	-0.4349	-0.2253	-0.0884	-0.0053
Portfolio (Δ Div<0, Δ EPS>0)	0.5555	0.7624	0.0015	0.0325	0.0841	0.2931	0.7190	1.7704	4.8250
Portfolio (Δ Div=0, Δ EPS<0)	-0.3725	0.2991	-1.0000	-1.0000	-0.5497	-0.2778	-0.1375	-0.0625	-0.0080
Portfolio (Δ Div=0, Δ EPS>0)	0.6046	1.4718	0.0038	0.0326	0.0763	0.2006	0.4807	1.3841	7.6333
Portfolio (Δ Div>0, Δ EPS<0)	-0.2110	0.2242	-1.0000	-0.4962	-0.2836	-0.1330	-0.0597	-0.0184	-0.0019
Portfolio (Δ Div>0, Δ EPS>0)	0.6455	4.2004	0.0070	0.0472	0.1072	0.2103	0.4085	0.8419	5.6933
Returns on Event Day	0.0067	0.0600	-0.1753	-0.0527	-0.0146	0.0031	0.0308	0.0659	0.1805
Portfolio (Δ Div<0, Δ EPS<0)	-0.0188	0.1110	-0.3151	-0.1294	-0.0675	-0.0131	0.0247	0.0686	0.2480
Portfolio (Δ Div<0, Δ EPS>0)	-0.0060	0.0662	-0.2774	-0.0742	-0.0323	0.0003	0.0234	0.0570	0.1884
Portfolio (Δ Div=0, Δ EPS<0)	-0.0063	0.0610	-0.1836	-0.0811	-0.0336	0.0000	0.0206	0.0613	0.1510
Portfolio (Δ Div=0, Δ EPS>0)	-0.0005	0.0595	-0.1825	-0.0585	-0.0261	0.0000	0.0271	0.0626	0.2111
Portfolio (Δ Div>0, Δ EPS<0)	0.0065	0.0589	-0.1668	-0.0491	-0.0155	0.0000	0.0273	0.0611	0.2366
Portfolio (Δ Div>0, Δ EPS>0)	0.0135	0.0514	-0.1164	-0.0348	-0.0078	0.0071	0.0343	0.0707	0.1596
MV (million GBP)	1005.5891	4323.4644	3.1158	11.9690	31.5050	122.1500	421.8450	1987.4990	15051.4194

Table 3.2: Market reactions to the simultaneous announcements estimated by the event-time methods and the market model

This table presents the average abnormal returns around the announcements by intersectional dividends and earnings portfolios. The estimation period, which is employed as a benchmark of expected returns, starts from 95 to 16 days prior to the event day (day 0), and the event period is designed as a 31-day period centred on the event day. The expected returns are estimated by using the market model. The t statistic testing the abnormal returns (AR) on each event day is computed as the AR divided by the standard deviation of the abnormal returns over the estimation period. As for the t statistic testing the buy-and-hold abnormal returns (BHAR), the statistic equals to the BHAR divided by the standard deviation of the estimation period times the square root of the numbers of the days accumulated. The statistics are presents in the parentheses, and statistical significance at 0.1, 0.05 and 0.01 levels are marked with *, **, and *** respectively.

Market model: $R_i = \alpha + \beta R_m + \varepsilon_i$ (3.4)							
Panel A: AR and BHAR for individual event days and various event periods							
Day	Portfolio	$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
		$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
	N	253	104	632	382	841	2766
(-15,-6)	BHAR	0.0711%	-0.5160%	0.3921%	-0.0307%	-0.0717%	0.3677%***
		(0.1241)	(-0.6805)	(1.3048)	(-0.1050)	(-0.3711)	(3.9809)
(-10,-6)	BHAR	0.2161%	-0.5222%	0.1649%	-0.1215%	-0.1338%	0.1211%*
		(0.5331)	(-0.9740)	(0.7760)	(-0.5883)	(-0.9798)	(1.8535)
-5	AR	0.0576%	0.3311%	0.0881%	0.0277%	0.0832%	0.0633%**
		(0.3176)	(1.3808)	(0.9271)	(0.3002)	(1.3619)	(2.1660)
-4	AR	0.2625%	0.3993%*	0.0463%	0.0020%	0.0341%	0.0680%**
		(1.4481)	(1.6655)	(0.4869)	(0.0218)	(0.5579)	(2.3264)
-3	AR	0.0103%	0.6354%***	0.1794%*	0.1426%	0.1320%**	0.1450%***
		(0.0571)	(2.6499)	(1.8876)	(1.5439)	(2.1620)	(4.9651)
-2	AR	0.0479%	0.0474%	0.0732%	0.1583%*	0.2043%***	0.1220%***
		(0.2644)	(0.1975)	(0.7699)	(1.7138)	(3.3456)	(4.1756)
-1	AR	-0.0614%	0.5857%**	-0.2060%**	0.1616%*	0.2510%***	0.3455%***
		(-0.3388)	(2.4428)	(-2.1679)	(1.7500)	(4.1103)	(11.8270)
0	AR	-1.8411%***	-0.6496%***	-0.5587%***	-0.0195%	0.6479%***	1.3030%***
		(-10.1545)	(-2.7093)	(-5.8792)	(-0.2111)	(10.6079)	(44.6078)
1	AR	0.2908%	-0.3724%	0.1870%**	0.1432%	0.1797%***	0.2755%***
		(1.6041)	(-1.5532)	(1.9680)	(1.5509)	(2.9424)	(9.4310)

Table 3.2 – Continued

2	AR	0.3391%* (1.8701)	-0.2302% (-0.9600)	0.3295%*** (3.4672)	0.1379% (1.4933)	0.1834%*** (3.0025)	0.1187%*** (4.0652)
3	AR	0.2006% (1.1064)	0.4423%* (1.8445)	0.2940%*** (3.0935)	0.1078% (1.1674)	0.1398%** (2.2882)	0.1076%*** (3.6843)
4	AR	0.4023%** (2.2190)	0.3517% (1.4669)	0.1004% (1.0568)	0.1606%* (1.7391)	0.1211%** (1.9831)	0.0635%** (2.1730)
5	AR	0.2703% (1.4908)	-0.0379% (-0.1581)	0.2681%*** (2.8211)	0.1193% (1.2920)	0.0646% (1.0575)	0.0507%* (1.7363)
(6,10)	BHAR	0.8916%** (2.1993)	-0.9832%* (-1.8337)	0.8183%*** (3.8508)	0.7365%*** (3.5668)	0.5451%*** (3.9916)	0.1044% (1.5982)
(6,15)	BHAR	2.1857%*** (3.8122)	-0.5887% (-0.7764)	1.0557%*** (3.5131)	0.8762%*** (3.0004)	0.4453%** (2.3053)	0.0739% (0.7998)

Panel B: BHAR for various event periods centred on the announcement day

Period	$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
(-1,1)	-1.6117%*** (-5.1322)	-0.4363% (-1.0506)	-0.5777%*** (-3.5098)	0.2853%* (1.7839)	1.0786%*** (10.1964)	1.9239%*** (38.0276)
(-5,5)	-0.0210% (-0.0349)	1.5027%* (1.8896)	0.8012%** (2.5421)	1.1415%*** (3.7271)	2.0411%*** (10.0763)	2.6626%*** (27.4851)
(-10,10)	1.0868% (1.3080)	-0.0027% (-0.0024)	1.7844%*** (4.0975)	1.7566%*** (4.1509)	2.4524%*** (8.7623)	2.8881%*** (21.5765)
(-15,15)	2.2359%** (2.2149)	0.3980% (0.2982)	2.2491%*** (4.2507)	1.9871%*** (3.8647)	2.4147%*** (7.1009)	3.1042%*** (19.0876)

Figure 3.1: Shareholders' wealth around the simultaneous announcements of dividends and earnings

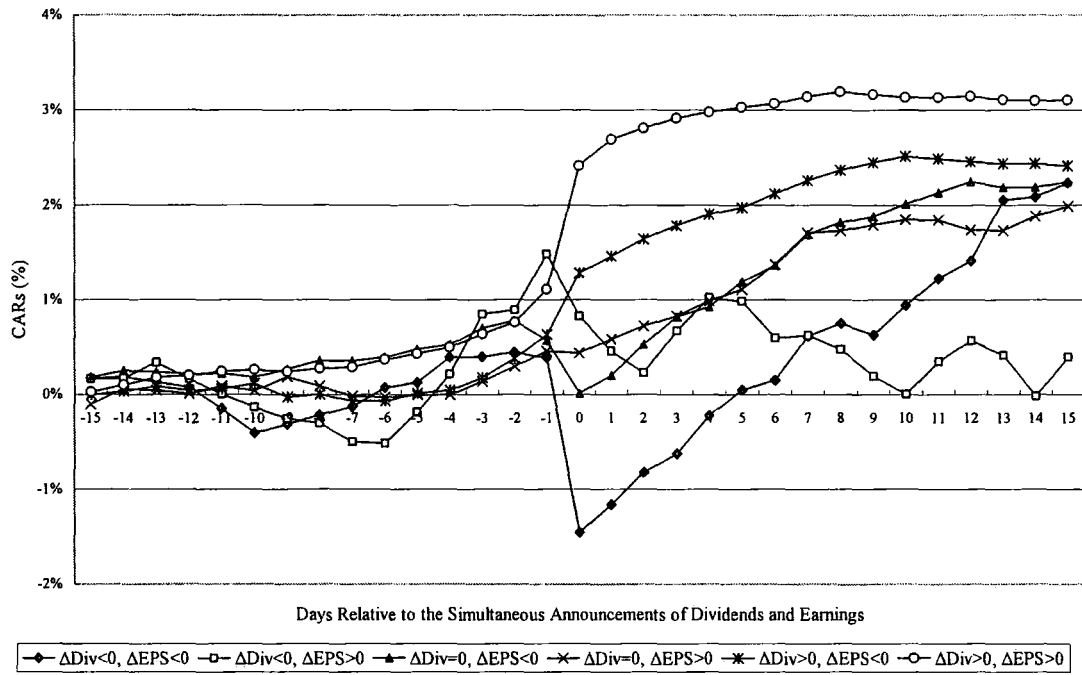


Table 3.3: Market reactions to the simultaneous announcements estimated by CAPM

This table presents the average abnormal returns around the announcements by intersectional dividends and earnings portfolios. The dividend changes are denoted by ΔDiv and the changes in earnings per share (EPS) are denoted by ΔEPS . For each trading day, the average daily security return ($\bar{R}_{i,t}$) is the value-weighted mean of the daily returns of the securities whose event periods examined comprise the trading day. The FTSE All Share Index is employed to compute the proxy of the market returns ($R_{m,t}$), and the interest rate of one-month treasury bill (T-Bill) is converted into daily rate as the proxy of the daily returns of risk-free assets ($R_{f,t}$). The average abnormal returns (AR) of the event periods are then estimated by the intercepts (α) of the CAPM models. N denotes the numbers of the announcements for each intersectional dividends and earnings portfolio. The t statistics which test whether the ARs are significantly different from 0 are presented in the parentheses beneath the ARs. Statistical significance at 0.1, 0.05 and 0.01 levels are marked with *, **, and *** respectively.

$$\text{CAPM: } \bar{R}_{i,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + \varepsilon_t \quad (3.8)$$

Panel A: Average abnormal returns for individual event days and various event periods							
Day	Portfolio	$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
		$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
	N	253	104	632	382	841	2766
(-15,-6)	AR	-0.0396%	-0.0011%	-0.0185%	-0.0593%	0.0024%	0.0659%**
		(-0.7294)	(-0.0177)	(-0.5366)	(-1.6117)	(0.0803)	(2.5527)
(-10,-6)	AR	-0.0439%	-0.0482%	-0.0373%	-0.0491%	-0.0043%	0.0685%**
		(-0.5862)	(-0.6457)	(-0.8424)	(-1.1280)	(-0.1213)	(2.3613)
-5	AR	-0.0563%	0.2639%	0.0445%	0.0082%	0.1110%*	0.0672%*
		(-0.3443)	(1.1569)	(0.4840)	(0.0788)	(1.6738)	(1.7943)
-4	AR	0.0895%	0.4343%*	0.0507%	-0.0029%	0.0059%	0.1002%**
		(0.6080)	(1.6959)	(0.4187)	(-0.0309)	(0.0957)	(2.4249)
-3	AR	-0.0836%	0.6708%*	0.1181%	0.1251%	0.1835%***	0.1575%***
		(-0.4956)	(1.8600)	(1.5364)	(1.1804)	(2.8083)	(3.2545)
-2	AR	-0.0387%	0.0606%	0.0574%	0.1426%	0.1996%**	0.1119%**
		(-0.2497)	(0.2739)	(0.7011)	(1.3616)	(2.3832)	(2.5754)
-1	AR	-0.0926%	0.5577%*	-0.3101%**	0.0764%	0.2417%**	0.2960%***
		(-0.3184)	(1.8046)	(-2.4573)	(0.5577)	(2.0609)	(4.8395)
0	AR	-1.8203%**	-0.5643%	-0.6419%**	-0.0600%	0.5531%**	1.1696%***
		(-2.5312)	(-0.8788)	(-2.4947)	(-0.1877)	(2.4826)	(9.6009)
1	AR	0.1447%	-0.2911%	0.1840%	0.1360%	0.2152%*	0.3618%***
		(0.5836)	(-0.9532)	(1.2016)	(0.9020)	(1.8396)	(5.5955)

Table 3.3 – *Continued*

2	AR	0.3288%** (2.1316)	-0.1262% (-0.4078)	0.2666%** (2.0147)	0.0526% (0.5088)	0.1612%** (1.9796)	0.1592%*** (3.3286)
3	AR	0.0390% (0.2001)	0.4307%* (1.6945)	0.2621%** (2.4991)	0.0679% (0.6306)	0.0999% (1.0832)	0.1358%*** (3.1551)
4	AR	0.3290%* (1.6808)	0.2932% (0.9702)	0.0329% (0.3895)	0.1610% (1.3890)	0.0816% (1.1077)	0.0797%* (1.7866)
5	AR	0.1621% (0.9796)	0.0110% (0.0661)	0.2473%*** (2.6569)	0.1001% (0.9466)	0.0378% (0.5661)	0.0938%** (2.1920)
(6,10)	AR	0.0490% (0.6093)	-0.2091%** (-2.1157)	0.1235%*** (2.6373)	0.1139%** (2.3138)	0.0720%** (2.0891)	0.0763%*** (2.7578)
(6,15)	AR	0.1186%** (1.9850)	-0.0429% (-0.6511)	0.0641%* (1.7836)	0.0081% (0.2296)	0.0486%* (1.7870)	0.0704%*** (2.8851)

Panel B: Average abnormal returns for various event periods centred on the announcement day

Period	$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
(-1,1)	-0.8058%*** (-3.3616)	-0.0544% (-0.2074)	-0.2680%** (-2.1647)	0.0010% (0.0073)	0.3089%*** (3.0831)	0.5432%*** (8.8633)
(-5,5)	-0.1231% (-1.3141)	0.2108%** (1.9806)	0.0271% (0.4826)	0.1380%** (2.3678)	0.1549%*** (3.9341)	0.2404%*** (7.7908)
(-10,10)	-0.0886% (-1.4050)	0.0608% (0.9258)	-0.0081% (-0.2148)	0.0681%* (1.7877)	0.0767%** (2.5739)	0.1390%*** (5.7133)
(-15,15)	-0.0335% (-0.6373)	0.0602% (1.1400)	-0.0173% (-0.5537)	0.0144% (0.4293)	0.0589%** (2.4901)	0.1065%*** (5.2564)

Table 3.4: Market reactions to the simultaneous announcements estimated by three-factor model

This table presents the average abnormal returns around the announcements by intersectional dividends and earnings portfolios. The dividend changes are denoted by ΔDiv and the changes in earnings per share (EPS) are denoted by ΔEPS . For each trading day, the average daily security return ($\bar{R}_{i,t}$) is the value-weighted mean of the daily returns of the securities whose examined event periods comprise the trading day. The FTSE All Share Index is employed to compute the proxy of the market returns ($R_{m,t}$), and the interest rate of one-month treasury bill (T-Bill) is converted into daily rate as the proxy of the daily returns of risk-free assets ($R_{f,t}$). SMB_t and HML_t are respectively size and book-to-market factors suggested by Fama and French (1993) to capture the size and book-to-market effects on returns. The average abnormal returns (AR) of the event periods are estimated by the intercepts (α) of the three-factor models. N denotes the numbers of the announcements for each intersectional dividends and earnings portfolio. The t statistics, which test whether the ARs are different from 0, are presented in the parentheses beneath the ARs. Statistical significance at 0.1, 0.05 and 0.01 levels are marked with *, **, and *** respectively.

$$\text{Three-factor model: } \bar{R}_{i,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + \gamma\text{SMB}_t + \lambda\text{HML}_t + \varepsilon_t \quad (3.9)$$

Panel A: Average abnormal returns for individual event days and various event periods							
Day	Portfolio	$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
		$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
	N	253	104	632	382	841	2766
(-15,-6)	AR	-0.0446%	-0.0004%	-0.0027%	-0.0565%	0.0107%	0.0826%***
		(-0.8210)	(-0.0062)	(-0.0785)	(-1.5355)	(0.3596)	(3.2090)
(-10,-6)	AR	-0.0494%	-0.0588%	-0.0209%	-0.0457%	-0.0040%	0.0830%***
		(-0.6551)	(-0.7727)	(-0.4704)	(-1.0493)	(-0.1138)	(2.8728)
-5	AR	-0.0448%	0.3145%	0.0538%	0.0110%	0.1548%**	0.0822%**
		(-0.2729)	(1.3938)	(0.5769)	(0.1033)	(2.3475)	(2.1848)
-4	AR	0.1054%	0.4759%*	0.0902%	0.0237%	-0.0021%	0.1092%***
		(0.7134)	(1.8259)	(0.7433)	(0.2489)	(-0.0344)	(2.6201)
-3	AR	-0.0893%	0.5938%	0.1079%	0.1372%	0.1986%***	0.1741%***
		(-0.5377)	(1.6054)	(1.3904)	(1.2829)	(3.0367)	(3.5842)
-2	AR	-0.0220%	0.0238%	0.0610%	0.1387%	0.1990%**	0.1284%***
		(-0.1408)	(0.1043)	(0.7429)	(1.3168)	(2.3181)	(2.9435)
-1	AR	-0.0334%	0.5526%*	-0.3123%**	0.0763%	0.3017%**	0.3135%***
		(-0.1120)	(1.7660)	(-2.4149)	(0.5624)	(2.5792)	(5.0704)
0	AR	-1.5012%**	-0.4390%	-0.5306%**	-0.1120%	0.5929%***	1.2015%***
		(-2.0704)	(-0.6718)	(-2.0163)	(-0.3486)	(2.6257)	(9.7252)

Table 3.4 – *Continued*

1	AR	0.1459% (0.5847)	-0.3578% (-1.1492)	0.2168% (1.3672)	0.1656% (1.0766)	0.2551%** (2.1498)	0.3908%*** (5.9958)
2	AR	0.3736%** (2.4364)	-0.1905% (-0.5920)	0.2838%** (2.1551)	0.0275% (0.2626)	0.1513%* (1.8307)	0.1802%*** (3.7999)
3	AR	0.0404% (0.2106)	0.4666%* (1.7855)	0.2576%** (2.4348)	0.0990% (0.9077)	0.1487% (1.6070)	0.1389%*** (3.1947)
4	AR	0.3528%* (1.7852)	0.2151% (0.6822)	0.0267% (0.3135)	0.1940%* (1.6691)	0.1187% (1.5865)	0.1159%*** (2.6047)
5	AR	0.2549% (1.5470)	-0.0111% (-0.0654)	0.2673%*** (2.8021)	0.0862% (0.7991)	0.0861% (1.2995)	0.1247%*** (2.9056)
(6,10)	AR	0.0850% (1.0540)	-0.1602% (-1.6231)	0.1392%*** (2.9479)	0.1291%*** (2.6082)	0.0932%*** (2.7078)	0.0928%*** (3.3494)
(6,15)	AR	0.1327%** (2.2055)	-0.0272% (-0.4066)	0.0789%** (2.1827)	0.0150% (0.4251)	0.0568%** (2.0767)	0.0779%*** (3.1864)

Panel B: Average abnormal returns for various event periods centred on the announcement day

Period	$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
(-1,1)	-0.6886%*** (-2.8532)	-0.0263% (-0.0992)	-0.2280%* (-1.8024)	-0.0084% (-0.0608)	0.3285%*** (3.2519)	0.5543%*** (8.9571)
(-5,5)	-0.0944% (-1.0022)	0.2130%* (1.9609)	0.0398% (0.7030)	0.1351%** (2.2860)	0.1591%*** (3.9954)	0.2337%*** (7.4906)
(-10,10)	-0.0658% (-1.0356)	0.0773% (1.1571)	0.0041% (0.1080)	0.0689%* (1.7939)	0.0814%*** (2.7039)	0.1404%*** (5.7200)
(-15,15)	-0.0139% (-0.2633)	0.0726% (1.3589)	-0.0061% (-0.1931)	0.0158% (0.4685)	0.0585%** (2.4460)	0.1025%*** (5.0138)

Table 3.5: The information asymmetry and the market reactions to the simultaneous announcements of dividends and earnings

This table presents the average abnormal returns around the announcements for the portfolios grouped by dividends, earnings and firm size. The sample consists of the simultaneous announcements of dividends and earnings made by the UK firms during the period from January 1992 to March 2004. The observations are sorted by firm size and divided into five quintiles. The first quintile consists of the observations with the smallest 20 percent in firm size and the fifth quintile consists of those with the largest 20 percent. For each size quintile, the observations are further split by dividend and earnings changes. The dividend changes are denoted by ΔDiv and the changes in earnings per share (EPS) are denoted by ΔEPS . The calendar-time event study approach is imposed for estimating the ARs, and the three-factor model suggested by Fama and French (1993) is applied as the benchmark model. The FTSE All Share Index is employed to compute the proxy of the market returns ($R_{m,t}$), and the interest rate of one-month treasury bill (T-Bill) is converted into daily rate as the proxy of the daily returns of risk-free assets ($R_{f,t}$). SMB_t and HML_t are respectively size and book-to-market factors. N denotes the numbers of the announcements for each intersectional dividend-earnings-size portfolio. The t statistics, which test whether the ARs are different from 0, are presented in the parentheses beneath the estimates of ARs. Statistical significance at 0.1, 0.05 and 0.01 levels are marked with *, **, and *** respectively.

$$\text{Three-factor model: } \bar{R}_{i,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + \gamma SMB_t + \lambda HML_t + \varepsilon_t \quad (3.9)$$

Panel A: Average abnormal returns for the period from day -1 to day 1 by firm size							
Size Rank		$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
		$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
1 (Smallest)	N	114	25	194	113	134	416
	AR	-0.6923%*	0.3463%	-0.0840%	0.3091%	0.8325%***	1.5653%***
	t-statistic	(-1.7659)	(0.5417)	(-0.3719)	(1.2883)	(3.0403)	(9.5522)
2	N	46	15	181	105	151	498
	AR	-0.6353%	-0.8846%	-0.4393%**	-0.1053%	0.3130%	0.8317%***
	t-statistic	(-1.2882)	(-0.8496)	(-2.2308)	(-0.4391)	(1.5491)	(7.5850)
3	N	32	16	94	50	188	616
	AR	-1.2458%*	-1.3498%**	-0.1886%	-0.7077%**	0.5284%***	0.5503%***
	t-statistic	(-1.8943)	(-2.0469)	(-0.6835)	(-2.1483)	(2.9159)	(5.8378)
4	N	27	13	81	54	181	639
	AR	0.1917%	0.6903%	-0.0564%	0.2639%	0.3837%**	0.4554%***
	t-statistic	(0.2629)	(1.0796)	(-0.2038)	(0.7565)	(2.1015)	(6.1242)
5 (Largest)	N	34	35	82	60	187	597
	AR	-0.5423%	0.3924%	0.1130%	0.1057%	0.0279%	0.3359%***
	t-statistic	(-1.1598)	(1.1691)	(0.5439)	(0.3932)	(0.1785)	(3.8821)

Table 3.5 - *Continued*

Panel B: Average abnormal returns for the period from day -5 to day 5 by firm size							
Size Rank		$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
		$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
1 (Smallest)	N	114	25	194	113	134	416
	AR	-0.0095%	0.4264%	0.0681%	0.1745%**	0.3336%***	0.5745%***
	t-statistic	(-0.0677)	(1.6261)	(0.8572)	(2.0168)	(3.6605)	(8.9558)
2	N	46	15	181	105	151	498
	AR	-0.0372%	0.0014%	0.0053%	0.0377%	0.1976%***	0.3520%***
	t-statistic	(-0.2301)	(0.0040)	(0.0692)	(0.3963)	(2.7252)	(8.3850)
3	N	32	16	94	50	188	616
	AR	-0.5217%**	-0.4123%*	0.0287%	-0.1933%*	0.2533%***	0.2756%***
	t-statistic	(-2.5031)	(-1.7446)	(0.2556)	(-1.7421)	(3.9471)	(7.5378)
4	N	27	13	81	54	181	639
	AR	-0.1686%	-0.0059%	-0.0054%	0.1773%	0.2113%***	0.1666%***
	t-statistic	(-0.7022)	(-0.0289)	(-0.0528)	(1.4871)	(3.3779)	(5.0449)
5 (Largest)	N	34	35	82	60	187	597
	AR	0.0030%	0.4491%***	0.0089%	0.1853%**	0.0788%	0.2041%***
	t-statistic	(0.0167)	(3.3756)	(0.1043)	(2.0253)	(1.2833)	(5.1601)

Panel C: Average abnormal returns for the period from day -10 to day 10 by firm size							
Size Rank		$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
		$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
1 (Smallest)	N	114	25	194	113	134	416
	AR	0.0150%	0.1694%	0.0649%	0.1454%**	0.2164%***	0.3955%***
	t-statistic	(0.1829)	(1.1892)	(1.1486)	(2.2865)	(3.9865)	(9.3637)
2	N	46	15	181	105	151	498
	AR	0.0518%	0.0778%	0.0267%	0.0491%	0.1309%***	0.2255%***
	t-statistic	(0.4912)	(0.4304)	(0.5349)	(0.7877)	(2.6050)	(7.3614)
3	N	32	16	94	50	188	616
	AR	-0.2668%*	-0.3768%***	-0.0364%	-0.0802%	0.1710%	0.1549%***
	t-statistic	(-1.8742)	(-3.0489)	(-0.5065)	(-1.1740)	(4.2298)	(6.8210)
4	N	27	13	81	54	181	639
	AR	-0.1903%	-0.0424%	0.0359%	0.1283%*	0.1012%***	0.1219%***
	t-statistic	(-1.2836)	(-0.2796)	(0.5064)	(1.7786)	(2.6257)	(5.6445)
5 (Largest)	N	34	35	82	60	187	597
	AR	0.0261%	0.1937%**	-0.0087%	0.1039%	0.0705%*	0.1399%***
	t-statistic	(0.2306)	(2.2862)	(-0.1468)	(1.6270)	(1.6797)	(4.6830)

Table 3.5 - *Continued*

Panel D: Average abnormal returns for the period from day -15 to day 15 by firm size							
Size Rank		$\Delta\text{Div}<0$	$\Delta\text{Div}<0$	$\Delta\text{Div}=0$	$\Delta\text{Div}=0$	$\Delta\text{Div}>0$	$\Delta\text{Div}>0$
		$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$	$\Delta\text{EPS}<0$	$\Delta\text{EPS}>0$
1 (Smallest)	N	114	25	194	113	134	416
	AR	0.0244%	0.1360%	0.0513%	0.0599%	0.1821% ^{***}	0.2673% ^{***}
	t-statistic	(0.3720)	(1.2436)	(1.1619)	(1.1818)	(4.3538)	(8.8039)
2	N	46	15	181	105	151	498
	AR	0.0635%	0.0682%	0.0244%	0.0112%	0.0586%	0.1592% ^{***}
	t-statistic	(0.8000)	(0.5266)	(0.6333)	(0.2213)	(1.4453)	(6.0562)
3	N	32	16	94	50	188	616
	AR	-0.1651% [*]	-0.1743%	-0.0046%	-0.0624%	0.1209% ^{***}	0.1280% ^{***}
	t-statistic	(-1.6656)	(-1.6366)	(-0.0841)	(-1.1658)	(4.2138)	(7.1725)
4	N	27	13	81	54	181	639
	AR	-0.0218%	0.0509%	0.0275%	0.1104% ^{**}	0.0797% ^{***}	0.1220% ^{***}
	t-statistic	(-0.1881)	(0.5015)	(0.4946)	(2.0249)	(2.5842)	(7.2111)
5 (Largest)	N	34	35	82	60	187	597
	AR	0.0517%	0.1027%	-0.0300%	0.0741%	0.0278%	0.0992% ^{***}
	t-statistic	(0.5860)	(1.5467)	(-0.6602)	(1.4031)	(0.8370)	(4.0579)

Figure 3.2: Shareholders' wealth around the announcements of simultaneous increases in dividends and earnings

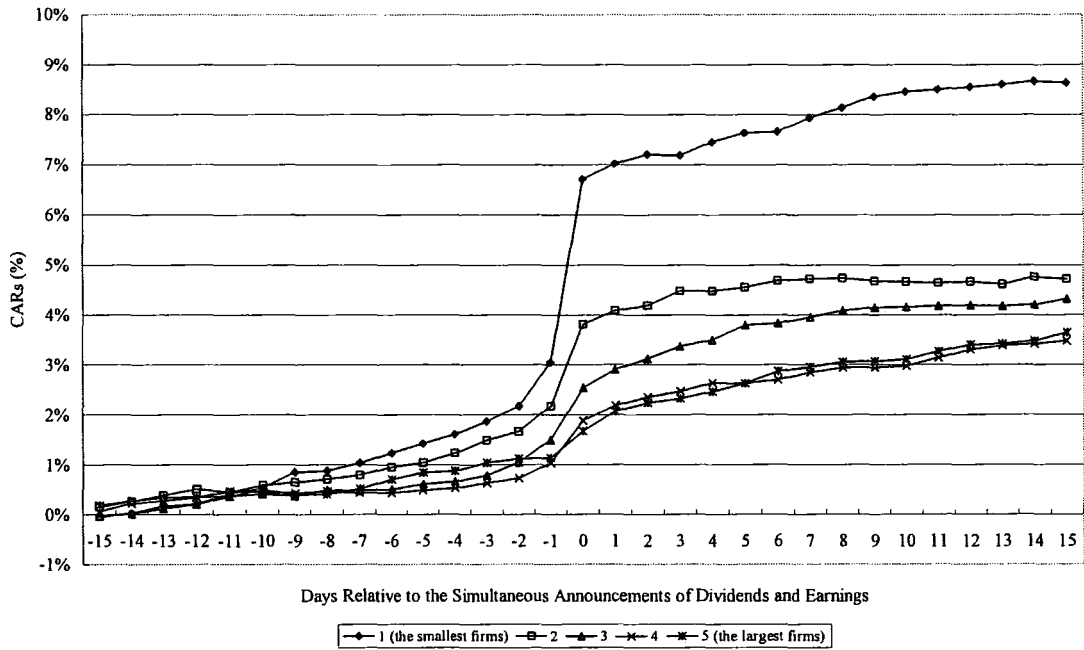


Figure 3.3: Shareholders' wealth around the announcements of dividends increases and earnings declines

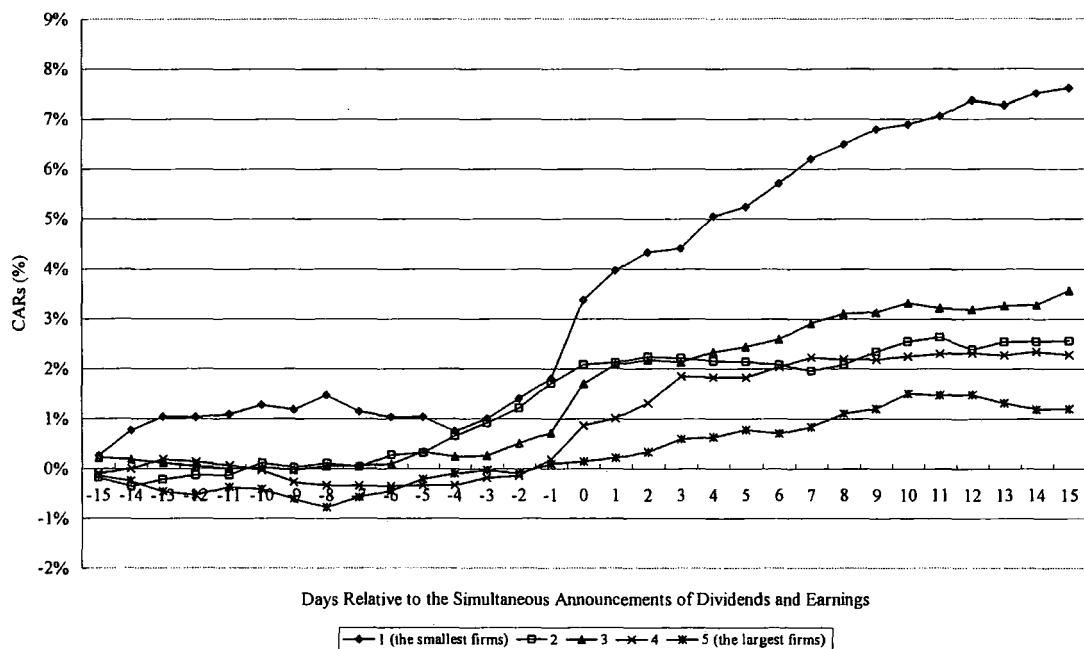


Figure 3.4: Shareholders' wealth around the announcements of simultaneous declines in dividends and earnings

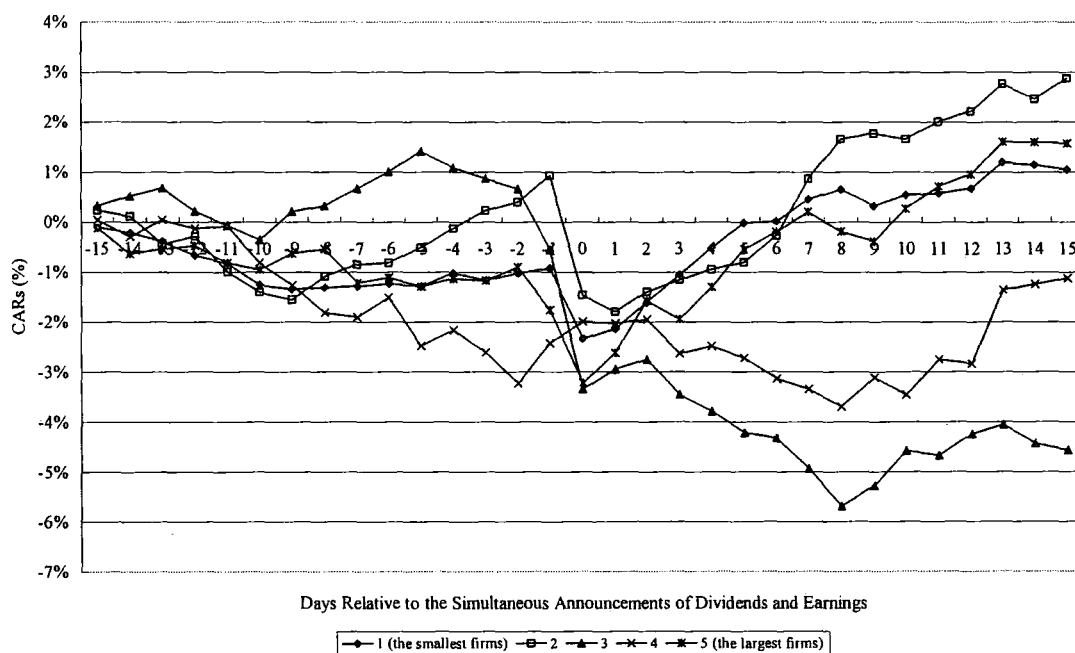


Figure 3.5: Shareholders' wealth around the announcements of dividends continuations and earnings declines

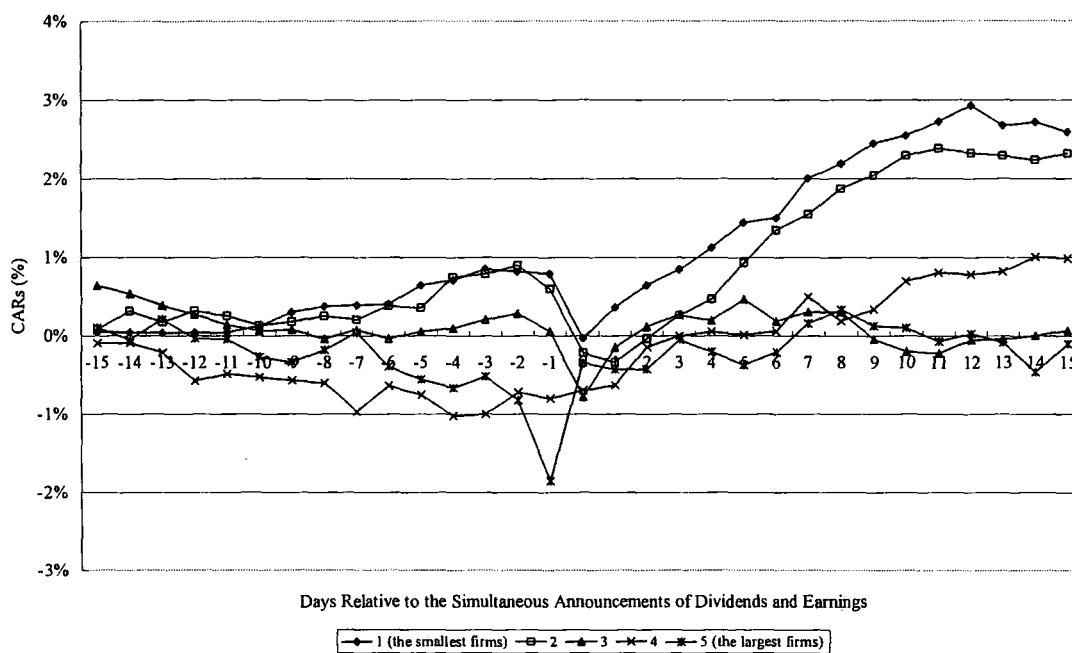


Figure 3.6: Shareholders' wealth around the announcements of dividends continuations and earnings increases

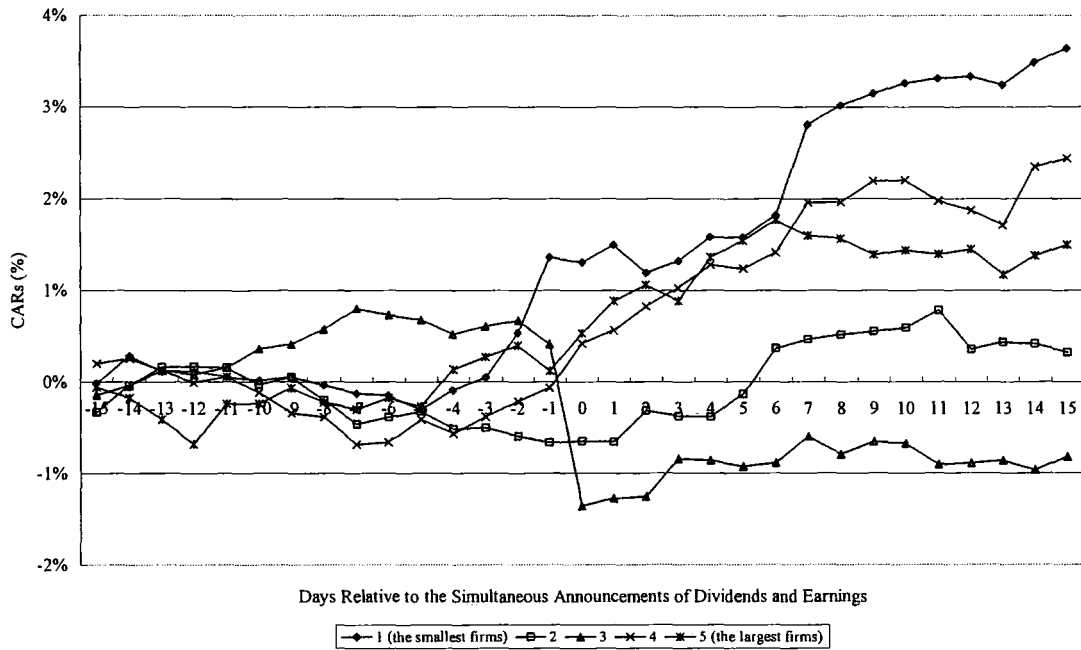


Figure 3.7: Shareholders' wealth around the announcements of dividends cuts and earnings increases

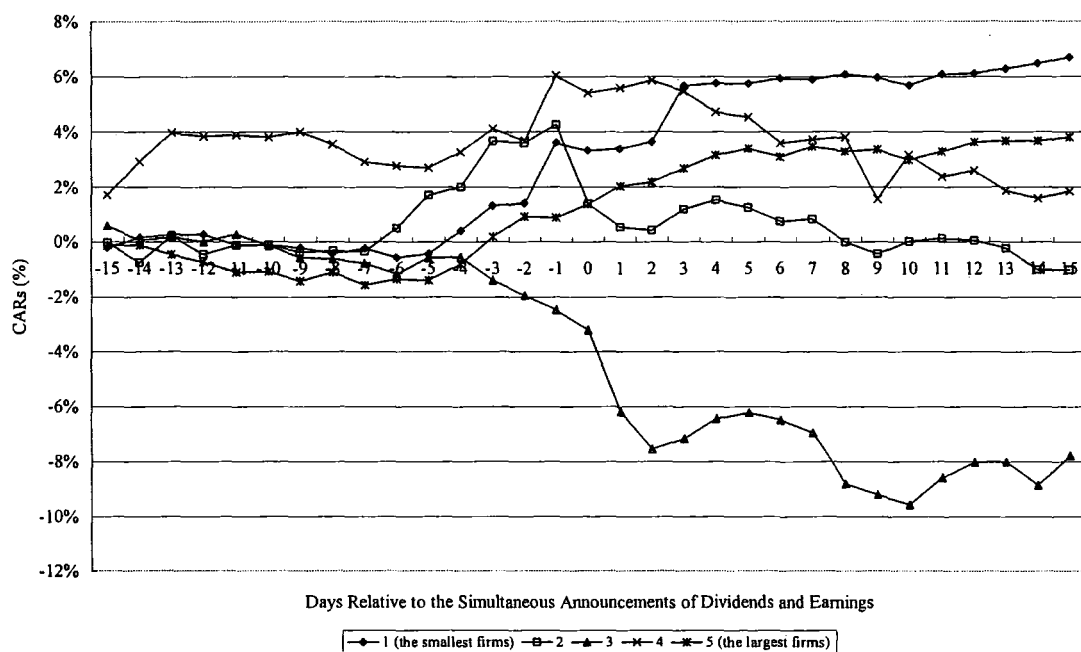


Table 3.6: The dividend, earnings and interaction effects on the event-day abnormal returns

The table presents the estimations on dividend, earnings and interaction effects. The dependent variable is the abnormal returns of the event day (day 0). The estimation of the models is carried out by using the ordinary least square (OLS). The percentage changes in dividends are denoted by ΔDiv and the percentage changes in earnings per share (EPS) are denoted by ΔEPS . The five dummies are respectively equal to one for the intersectional dividend and earnings portfolio indicated in the parentheses and zero otherwise. The F statistic suggests the significance of the regression and the R square. The “first order” F statistic tests the joint significance of the dividend and earnings variables while the “interaction” F statistic tests the interaction dummy variables. The t statistics testing the significance of the coefficients are presented in the parentheses. Statistical significance at 0.1, 0.05 and 0.01 levels are marked with *, **, and *** respectively.

$$ARO_{i,t} = \alpha + \beta_1 \times \Delta Div_{i,t} + \beta_2 \times \Delta EPS_{i,t} + \gamma \times Dummy(\Delta Div_{i,t}, \Delta EPS_{i,t}) + \varepsilon_{i,t} \quad (3.10)$$

Model	Column	1	2	3
Intercept		0.0026*** (2.9020)	-0.0184*** (-4.9788)	-0.0075* (-1.8650)
ΔDiv		0.0348*** (11.1250)		0.0260*** (6.8032)
ΔEPS		-0.0001 (-0.2523)		-0.0006 (-1.0251)
Dummy ($\Delta Div < 0, \Delta EPS > 0$)			0.0122* (1.7454)	0.0098 (1.4058)
Dummy ($\Delta Div = 0, \Delta EPS < 0$)			0.0128*** (2.9306)	0.0017 (0.3668)
Dummy ($\Delta Div = 0, \Delta EPS > 0$)			0.0170*** (3.4912)	0.0064 (1.2514)
Dummy ($\Delta Div > 0, \Delta EPS < 0$)			0.0253*** (5.9854)	0.0104** (2.1975)
Dummy ($\Delta Div > 0, \Delta EPS > 0$)			0.0311*** (8.0311)	0.0154*** (3.3907)
N		4835	4835	4835
F Statistic		63.3465***	22.4509***	22.8008***
“First Order” F Statistic				23.1605***
“Interaction” F Statistic				6.4399***
Adjusted R ²		0.0251	0.0217	0.0306

Table 3.7: The dividends, earnings increases, earnings declines and future earnings effects on the event-day abnormal returns

This table presents the estimates of the regression model explained by dividend changes and different periods of earnings changes. The dependant variable is the abnormal returns of the event day (day 0). The percentage changes in dividends are denoted as ΔDiv , and the percentage changes in earnings at time t are denoted as ΔEPS . The suffix of the explanatory variables denotes the period of the changes (e.g. 0 represents current changes, and 1 represents the period following the period 0). D_{ED} denotes the dummy of earnings declines, which equals to 1 if the current earnings changes less than 0 and equals to 0 otherwise. The F statistic indicates the significance of the regression and the R square. The t statistics testing the significance of the coefficients are presented in the parentheses. Statistical significance at 0.1, 0.05 and 0.01 levels are marked with *, **, and *** respectively.

$$ARO_{i,t} = \alpha + \beta_1 \Delta Div_{i,t} + \beta_{21} \Delta EPS_{i,t} + \beta_{2D} (D_{ED} \times \Delta EPS_{i,t}) + \beta_3 \Delta EPS_{i,t+1} + \beta_4 \Delta EPS_{i,t+2} + \varepsilon_{i,t} \quad (3.13)$$

Explanatory Variables	Column	1	2	3	4	5	6	7	8	9
Intercept		0.0026*** (2.8916)	0.0060*** (6.9924)	0.0088*** (9.0063)	0.0057*** (6.2242)	0.0066*** (6.9331)	0.0054*** (5.8891)	0.0045*** (4.2408)	0.0041*** (3.6166)	0.0045*** (3.6623)
ΔDiv_0		0.0347*** (11.2541)						0.0321*** (9.9542)	0.0294*** (8.1781)	0.0258*** (6.5066)
ΔEPS_0			0.0009* (1.6894)	0.0001 (0.1466)			0.0014** (2.0824)	-0.0005 (-0.9693)	-0.0001 (-0.1317)	-0.0005 (-0.6751)
$D_{ED} \times \Delta EPS_0$				0.0233*** (5.9761)				0.0135*** (3.3895)	0.0167*** (3.5869)	0.0208*** (3.9173)
ΔEPS_1					0.0045*** (5.6821)		0.0042*** (5.1792)		0.0037*** (4.6682)	0.0034*** (4.0477)
ΔEPS_2						0.0009 (1.3471)				0.0010 (1.1246)
N		4835	4835	4835	3967	3722	3967	4835	3967	3391
F Statistic		126.6538***	2.8541*	19.2939***	32.2864***	1.8148	18.3249***	46.1522***	34.3207***	20.4591***
Adjusted R ²		0.0253	0.0004	0.0075	0.0078	0.0002	0.0087	0.0273	0.0325	0.0279

Chapter 4

Dividend Signalling and Information about Earnings

4.1. Introduction

Previous empirical studies which find the existence of dividend effect attribute that to dividend's signalling for future earnings²⁸. Miller and Rock (1985) provide an explanation for these findings under the circumstance of information asymmetry between managers and investors. They state that the dividend effect induced by unexpected dividend changes reflects the gap between firm's real earnings and markets' expectation for earnings. Moreover, dividends themselves, determined by earnings and investments, are employed by managers to provide missed information about current earnings under information asymmetry. It follows that investors use the earnings information conveyed by dividends to update their expectations for future earnings (Miller and Rock, 1985). Consequently, it seems that dividends are related with both current and future earnings.

The links between dividends and earnings have long been one of the major issues in discussions on dividend policy. Recently, several findings regarding dividend signalling have been presented, but the findings are mixed. Some findings support that dividends contain the information about current earnings (e.g. Benartzi, Michaely, and Thaler, 1997; and Grullon, Michaely, Benartzi, and Thaler, 2005) while some others suggest that future earnings are the information signalled by dividends (Aharony and

²⁸ See Pettit (1972), Aharony and Swary (1980) and Asquith and Mullins (1983).

Dotan, 1994; and Nissim and Ziv, 2001). The miscellany of the prior evidence on dividend signalling motivates this chapter to investigate this issue by imposing various methods and models. By carrying out these comprehensive examinations, this chapter aims to help investors understand better the information signalled by dividend announcements and thereby more correctly evaluate their shares.

Furthermore, many of previous studies provide evidence by testing special cases of dividend changes (e.g. dividend omissions or initiations) or financial conditions (e.g. firms with their initial loss after long-term earnings increases)²⁹. These findings only interpret the firms' signalling behaviour in special scenarios, but do not necessarily apply to general cases. This chapter, however, studies the sample of dividend increases, cuts and continuations in the UK market and generates the empirical evidence which could explain general dividend policy in the UK.

To this end, the major objective of this chapter is, by examining dividend changes (except initiations and omissions) in the UK market, to find out which period of earnings changes the dividend changes reflect or signal. Based on the dividend signalling theory, this chapter hypothesises that, in addition to the information about current earnings, the changes in dividends also have predictive power for future earnings changes to mitigate the information asymmetry between managers and investors. As a consequence, if the hypothesis is in favour of, it is expected to detect the positive association of dividends changes with both current and future earnings.

The examinations start from comparing the earnings performance of the firms whose decisions on dividend payout are varied. According to the dividend signalling

²⁹ See DeAngelo, DeAngelo and Skinner (1992; 1996) and Healy and Palepu (1988) and some others.

hypothesis, it is suggested that firms with superior performance pay higher dividends to signal their outstanding performance. If dividend payment is not high enough, inferior firms may easily mimic the dividend policy of superior firms, resulting in dividend losing its signalling function. Consequently, the firms with larger earnings increases (declines) are predicted to make larger dividend increases (cuts). To test the dividend signalling hypothesis, the categorical analysis is imposed to compare the unexpected earnings on the event year and the two subsequent years across the groups with different levels of dividend changes. The findings of this chapter, consistent with the signalling hypothesis for current earnings and the findings of Benartzi, Michaely and Thaler's (1997) for the US market, remarkably indicate that dividend changes are positively associated with concurrent unexpected earnings. However, the findings do not support the prediction of the dividend signalling hypothesis on future earnings. Particularly, after controlling the unexpected earnings for the event year, this chapter does not observe significant difference in future earnings changes among the groups.

Furthermore, by imposing multivariate regression analysis, this chapter explicitly tests the relations between the dividend changes and the earnings changes of the different years. Previous studies, as implied by Elgers and Lo (1994) and Fama and French (2000), demonstrate that earnings changes are characterised by mean reversion. Without considering this factor may result in paradoxical findings on the relation between dividends and earnings. For example, while positive earnings changes in year 0 (the event year) are likely followed by negative earnings changes in year 1 (the first year subsequent to the event year) due to the mean reversion in earnings process, lack of taking account of this factor may lead to a conclusion that positive (negative) dividend changes signal for negative (positive) future earnings. Surprisingly, the negative association between dividend changes and future earnings changes is indeed

found in Healy and Palepu (1988), DeAngelo, DeAngelo, and Skinner (1992), and Ho and Wu (2001). To avoid the nonlinear patterns in the behaviour of earnings potentially influencing the findings of this chapter, various models and variables are imposed by the regression analysis in this chapter. The hypothesis of these regression models states that the associations of dividend changes with both current and future earnings changes should be positive to support the dividend signalling theory. The evidence of the regression analysis is found to be consistent with that generated by the categorical analysis, suggesting that the information conveyed by dividend changes is only about current earnings changes. However, no significant relations between dividend changes and future earnings changes are found.

Additionally, the regression analysis is undertaken for a secondary objective. It is argued that managers are reluctant to cut dividends in that cutting dividends are thought to contain unfavourable information (Lintner, 1956). Consequently, given the same magnitude of dividend changes, the magnitude of earnings declines signalled by dividend cuts should be larger than the magnitude of earnings increases signalled by dividend increases. It can therefore be hypothesised in this chapter that the coefficient on the dividend cuts variable should be larger and more significant than the coefficient on the dividend increases variable. Supporting Lintner's (1956) argument, the evidence demonstrated in this chapter manifests that dividend cuts possess more explanatory power on current earnings changes than dividend increases.

Last but not least, this chapter, by applying the binary logit model, examines whether managers' decisions on dividend increases and dividend cuts are dependent on current and future earnings performance. The hypothesis predicts that current and future earnings increases (declines) should promote managers' propensity to increase (cut)

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dividends. The findings on the current earnings changes are consistent with the prediction of the hypothesis and indicate that the managers' dividend decisions are influenced by the current earnings changes. Nevertheless, the future earnings changes do not show much influence upon the dividend decisions.

The remainder of this chapter is organised as follows. Section 4.2 discusses literature reviews about dividend signalling. Data collection and the descriptive statistics are presented in Section 4.3, followed by the section of hypotheses and methodologies. Section 4.5 demonstrates the results and evidence. Section 4.6 concludes this chapter.

4.2. Prior evidence on dividend signalling

This section mainly focuses on reviewing previous studies on dividend representing current earnings or signalling for future earnings. The dividend signalling hypothesis is based on the idea that uninformed investors may not be convinced by the information released from managers of firms if this information is costless (such as press releases). Instead, firms, as compared to others, pay dividends to signal their outperformance. Since cash distribution is costly for dividend-paying firms, the firms have to earn enough profits for the dividend payouts. However, on the other hand, for managers who have no confidence in their firms' future performance, they would not mimic the dividend policy in that their firms are unable to afford dividend payouts.

To signal their superiority, two possible situations would make managers willing to pay higher dividends. One possibility is that the firms' current earnings or profits are high enough to afford the cash dividend payout. If the firms' earnings are not high enough, managers may try to maintain the level of dividends, and dividend cuts are the last choice of the dividend policy (Lintner, 1956). The second possibility is that managers have good prospects of their future earnings and profitability, which are generated by the future returns of current investments (Bhattacharya, 1979). Since information asymmetry exists between managers and investors, dividends are paid in order to reduce information asymmetry. However, it is possible that the cost of signalling would force the firms to forgo investing in productive projects, resulting in lower future earnings (Miller and Rock, 1985).

Various approaches are undertaken in previous studies investigating the signalling hypothesis. One of the approaches is empirical tests on historical data. The examples

could be found from DeAngelo, DeAngelo, and Skinner (1992), Benartzi, Michaely, and Thaler (1997), Nissim and Ziv (2001) and some others. There are some other studies surveying the managers or directors for learning directly the actual opinion of firms in setting dividend policy. Examples could be detected from Baker and Powell (1999), Dhanani (2005), and Brav, Graham, Harvey, and Michaely (2005). A main advantage of the former approach is that, by testing the historical data, one could estimate the relation between the dividends and earnings without being affected by the subjective opinion of the managers. Furthermore, the former approach could be carried out for the samples existing over the period of interest while the latter could only be implemented on the existing firms. Nevertheless, the advantage of the latter method is that the test could measure the manager's viewpoints if they respond to the questionnaires frankly. Besides, the survey-based studies are more capable of answering qualitative questions.

The findings of survey-based studies on dividend signalling

From managers' point of views, dividends convey information to outsiders but managers do not pay dividends to signal for the superiority of their firms to their competitors (Brav, Graham, Harvey, and Michaely, 2005). Moreover, only few managers (nine percent) agree that they would forgo investment to increase dividends for costly signal and only a third of managers agree that dividend decisions are made after investment decisions are set. This evidence is contrary to Miller and Rock's (1985) argument which proposes that managers would forgo productive investment projects to increase dividends for signalling purpose. However, the managers believe that the stability of future earnings and a sustainable change in earnings are important factors affecting dividend decisions. Specifically, this indirectly supports that dividends are related to current and future earnings.

Other survey-based studies also obtain similar findings. Baker and Powell (1999) similarly confirm that dividends are considered as a signal for future prospects. Dhanani (2005), by using survey approach, provides the evidence for the UK market. Her evidence supports the argument that a dividend increase (cut) indicates improvement (a decline) in future firm earnings. Her evidence additionally indicates that the large firms, the firms with high profitability or the firms with high growth opportunities demand less on signalling function of dividends. Unlike the above studies focusing on managers' views, Dong, Robinson, and Veld (2005) uniquely survey Dutch investors to learn their views about payout policy (mainly about cash dividends, but also including stock dividends and share repurchases). The respondents generally regard dividend changes as the indicators for future firm performance. While both managers' and investors' views confirm that dividends contain information about the future performance, the findings presented by the empirical studies appear to be mixed.

The findings of the relation between dividends signalling and future earnings

By applying logit model to test whether past, current or future earnings would influence managers on making dividend decisions, DeAngelo, DeAngelo, and Skinner (1992) study the firms which experience at least one annual earnings loss or declines during 1980 to 1985. The estimates of the model show that dividend cuts are influenced by the earnings of the previous, the current and the subsequent years. Besides, the firms with higher level of earnings or earnings expectations are less likely to cut dividends. Furthermore, they compare the level of annual earnings of the years surrounding the year of initial losses for firms cutting and not cutting dividends. Consistent with the signalling theory, their results reveal that the firms, experiencing earnings loss but not cutting dividends, earn positive earnings in the following two

years. By contrast, the firms which cut dividends experience improvement in earnings, but they still suffer earnings losses over two years following the initial loss. According to DeAngelo, DeAngelo, and Skinner (1992), it is proposed that what the dividends signal is the level of future earnings but not year-by-year earnings changes. Their findings of dividend signalling for future earnings appear evident even when they simultaneously include dividend changes and current earnings as the explanatory variables.

Another study about the firms experiencing earnings decline is carried out by DeAngelo, DeAngelo, and Skinner (1996) by examining 145 NYSE firms which experience earnings decline after nine or more consecutive years of earnings growth. They compare the average future earnings of the sample firms which increase dividends to those which do not increase dividends. However, no significant difference is detected among these firms. The finding of DeAngelo, DeAngelo, and Skinner (1996) presents that about 50 percent of the managers of the dividend-increasing firms show optimism about the future performance to investors while only 2.1 percent of the managers express their non-optimism. They, thus, suggest that managers' over-optimism makes managers overestimate future earnings, resulting in incredibility of the information signalled by dividend increases.

When DeAngelo, DeAngelo, and Skinner (1992) document that the firms with dividend cuts experience improvement in future earnings, their findings are consistent with the earlier study by Healy and Palepu (1988). Focusing on the sample of dividend initiations and omissions, they demonstrate that the earnings of the firms which initiate dividends appear to be permanent after the initiations. Nevertheless, the firms which omit dividends experience improvement in earnings in the subsequent

years. They call the U-shape relation between dividends and earnings changes a puzzle, and attribute the earnings reversal to the possible survival bias inherent in their sample. Ho and Wu (2001) carry out a similar study as Healy and Palepu (1988) but, additionally, they take the survival bias into account. Their evidence appears a little different from that of Healy and Palepu (1988). Ho and Wu (2001) find future earnings reversal following both dividend initiations and omissions while Healy and Palepu (1988) only find earnings reversal following dividend omissions but earnings persistence following dividend initiations. Similarly, Balachandran, Cadle, and Theobald (1996), studying the UK sample, find negative relation between future earnings changes and dividend cuts. They explain that the results are possibly caused by mean reversion of earnings process. Other studies, such as Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, and Swaminathan (2002), also provide the similar findings about the U-shape relation. Testing the relation between dividend changes and return on asset (ROA), the result indicates that, as implied by Grullon, Michaely, and Swaminathan (2002), the changes in ROA reverse following both dividend increases and dividend cuts. Moreover, the level of ROA rises following dividend cuts and drops following dividend increases. However, the level of post-announcement ROA for dividend cuts is substantially lower than that for dividend increases. This finding is similar to the findings of DeAngelo, DeAngelo, and Skinner (1992), suggesting that dividends may signal for the level of earnings but not for the yearly changes.

Different from the previous studies which focus on specific financial condition or dividend decisions, Nissim and Ziv (2001) examine for more general samples. They make some improvements in estimating earnings changes and regression models. Firstly, they use book value of equity instead of market value to scale earnings

changes. They argue that market value may contain investors' expectation about firms' future. Thus, using earnings changes scaled by market value would result in bias on examining the relation between earnings and dividends. Secondly, instead of using pooled regression models, they employ the regression procedure for the panel data suggested by Fama and MacBeth (1973). This approach not only preserves the explanatory power of cross-sectional model, but also provides inferences which take the residual cross-correlation into account. Thirdly, Nissim and Ziv (2001) consider the mean reversion in the earnings changes. Failure in considering the mean reversion may result in paradoxical evidence. Thus, they incorporate the concurrent earnings changes as an explanatory variable in their models. Fourthly, since future information may be mixed up with the information signalled by dividends, they suggest using concurrent or past information as explanatory variables.

Overall, Nissim and Ziv's (2001) evidence supports the dividend signalling theory, implying that dividend increases have explanatory power on the future earnings for the subsequent two years and dividend cuts for one year. When they examine the level of earnings instead of earnings changes, only dividend increases appear to correlate with future earnings for the subsequent years. However, no explicit evidence is found for dividend cuts. Nissim and Ziv (2001) attribute the lack of link between dividend cuts and the level of future earnings to concurrent earnings' capturing the information conveyed by dividends. When they exclude the concurrent earnings, the relation between dividend cuts and future earnings becomes significantly positive.

Grullon, Michaely, Benartzi, and Thaler (2005) further consider the autocorrelation and the mean reversion in earnings process on testing the relation between dividend changes and the earnings changes of different periods. They argue that it is

inappropriate for Nissim and Ziv (2001) to assume that the mean reversion in earnings process is linear since previous findings suggest that the mean reversion is highly non-linear³⁰ (Elgers and Lo, 1994; Fama and French, 2000). Grullon, Michaely, Benartzi, and Thaler (2005) test both the linear model suggested by Nissim and Ziv (2001) and the non-linear model modified from Fama and French (2000). They maintain that the relation between dividend changes and future earnings changes only appear in the linear model. The non-linear models do not generate significant relation between dividend changes and future earnings variables which include future earnings changes, the level of future earnings and future profitability (future ROA changes).

The findings of the relation between dividends signalling and current earnings

While the findings of dividend's signalling for future earnings are mixed, some other studies only detect conspicuous relation between dividends and current earnings. DeAngelo and DeAngelo (1990) study the troubled firms listed on NYSE for the signalling hypothesis. The troubled firms are defined as the firms which suffer at least three annual losses during 1980 to 1985. DeAngelo and DeAngelo's (1990) main focus is placed on the behaviour of dividend cuts and omissions. Their findings suggest that these firms gradually reduce their dividend level after suffering the initial loss. By the third year of distress, over half of the troubled firms omit dividends. The implication of their findings reveals that the current earnings have notable impact on dividend decisions for the firms with earnings losses. This evidence is confirmed by the later study of DeAngelo, DeAngelo, and Skinner (1992).

DeAngelo, DeAngelo, and Skinner (1996) further examine the firms which suffer earnings decline after nine or more consecutive years of earnings growth. In their

³⁰ Throughout this chapter, the term "linear" or "non-linear" indicates the relationships between the variables of earnings changes, but not the regression model itself.

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sample, 66.8 percent of the firms (99 firms) increases dividends, 30.3 percent maintains dividend level and only 1.4 percent cuts dividends. By implication, it implies that when firms suffer from the initial earnings declines after a long period of earnings growth, they are very reluctant to cut dividends. This indirectly undermines the reliability of the signals from dividend increases.

Unlike the US firms which are reluctant to cut dividends, Germany firms have more flexible dividend policy. As indicated by the findings of Georgen, Renneboog, and Da Silva (2005), Germany firms, except widely held firms, are more willing to reduce dividends to reflect the concurrent earnings. Moreover, Germany firms also revise their dividend policy as soon as they experience earnings improvement. For example, there are about 75 percent of the sample firms increasing dividends by two years after dividend cuts (Table 8; p. 393). This finding is consistent with the Japanese findings of Dewenter and Warther (1998). Japanese firms, particularly keiretsu-member firms³¹, are less reluctant to omit or cut dividends, and the dividends are paid to reflect the concurrent earnings changes.

Using the sample of dividend cuts, increases and continuations, the dividend signalling theory is thoroughly tested by Benartzi, Michaely, and Thaler (1997). Their findings, however, are not completely consistent with the prediction of the dividend signalling theory. Based on their evidence, both dividend increases and dividend cuts are detected to have obvious explanatory power on concurrent earnings changes. Particularly, after the model includes accounting variables to control for the prediction of earnings performance, the relation between dividends and current earnings remains evident. Nevertheless, they do not get much evidence supporting the prediction that

³¹ A keiretsu is an industrial group with interlocking business relationships and shareholdings. (Wikipedia, 2006)

dividends signal for future earnings performance.

To conclude, according to the theory of the dividend signalling, it is predicted that dividend is informative for current and future earnings. The positive relation between dividends and current earnings is well documented by previous studies. However, the findings on dividend signalling for future earnings have presented to be mixed so far. The survey-based studies confirm that managers and investors tend to believe that the information contents of dividend changes are about managers' future prospects. Supportive evidence is also presented by Nissim and Ziv (2001) from their empirical studies. Nonetheless, a number of findings provided by the empirical studies appear to be against this prediction. Healy and Palepu (1988) and many others suggest that dividend changes have a U-shaped relation with the process of earnings changes. Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, Benartzi, and Thaler (2005) fail to find a significant relation between dividend changes and future earnings. Overall, the aforementioned divergent findings advance the significance of this chapter in that this chapter controls various effects what previous studies suggest may bias the results. Moreover, the sample of this chapter consists of all observations with dividend increases, cuts and continuations. As a consequence, the results of this chapter are broadly valid for general cases, but not solely for a specific financial condition or a specific type of dividend changes. The data for the sample are discussed in the following section.

4.3. Data and descriptive statistics

4.3.1. Data

This chapter studies all the UK firms listed on London Stock Exchange during the period of 1989 to 1999. The data is sourced from Datastream provided by the Thomson Corporation. Datastream initially provides the data containing 1,119 firms, including listed and delisted firms. Dividends per share, which is the item coded 190, are utilised for measuring dividend changes. The item, net earnings per share (data code: 254), is employed for estimating the earnings variables (i.e. annual earnings changes, and returns on equity). Additionally, book value per share used is the item coded 1308 in Datastream.

The criteria of filtering data are set as follows:

1. All the observations included in the sample are required to have at least four consecutive annual data of dividend per share (DPS) and earnings per share (EPS) from the year prior to the event year to two years after the event year (i.e. year 0). The data of book value per share are required to be feasible from year -1 to year 1. This is essential for computing the annual dividend changes and the unexpected earnings which are assumed to follow a random walk process (discussed in the following).
2. The events of dividend omissions, initiations, or continuous non-dividend payments, are not included in the sample since the data is inappropriate for computing the rate of dividend changes.

3. The observations with negative EPS or negative book value per share are dropped as they are inappropriate to measure the earnings growth.
4. The sample crosses out the firm-year observations with the outliers of the dividend changes, the current earnings changes, and the future earnings changes which distribute under 0.25 percentile or over 99.75 percentile (approximate eight observations on each tail for each variable), as these observations would generate potential bias for empirical results.

Overall, 3,148 observations survive the above criteria for the tests which assume that the earnings follow a random walk process.

4.3.2. Descriptive statistics

Table 4.1 reports the descriptive statistics for the variables of dividends and earnings. The distributions of the earnings changes and dividend changes is presented in Panel A. Earnings changes are computed by the raw earnings changes scaled by book value per share, which is shown as Eq. (4.1):

$$CE_{i,t} = \frac{(E_{i,t} - E_{i,t-1})}{BV_{i,t-1}}, \quad (4.1)$$

where $CE_{i,t}$ denotes the changes in earnings of firms i in year t . $E_{i,t}$ denotes the earnings per share and $BV_{i,t-1}$ denotes book value per share of the previous year. As noted by Nissim and Ziv (2001), when testing dividend signalling, book value is more appropriate to scale the earnings changes. Since market value reflects investors'

expectation for future earnings, the ratio of current earnings to price is likely related negatively to the earnings changes of the following year. Whereas firms which increase (cut) dividends usually have high (low) ratio of current earnings to price, it may mislead the test to detect negative relation between dividend changes and changes in future earnings.

Dividend changes are the percentage changes of dividends, which are computed as Eq.

(4.2):

$$\Delta Div_{i,t} = \frac{Div_{i,t} - Div_{i,t-1}}{Div_{i,t-1}}, \quad (4.2)$$

where $Div_{i,t}$ denotes the dividend per share³² of firm i in year t . The $\Delta Div_{i,t}$ denotes the percentage change in dividends of firm i in year t .

For each variable, the statistics are presented by the categories of dividend changes. The statistics contain the mean, 1st percentile (P1), 10th percentile (P10), 1st quartile (Q1), median, 3rd quartile (Q3), 90th percentile (P90), and 99th percentile (P99) of each variable. According to the dividend changes, the categories are formed as follows:

1. dividend cuts which are larger than 25 percent (hereafter: large dividend cuts)
2. dividend cuts which are 25 percent or less (hereafter: small dividend cuts)
3. dividend continuations

³² Dividend per share is adjusted for subsequent rights and scrip issues.

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4. dividend increases which are 25 percent or less (hereafter: small dividend increases), and
5. dividend increases which are larger than 25 percent (hereafter: large dividend increases).

As demonstrated in Panel A of Table 4.1, the firm-year observations with earnings increases are apparently more than those with negative earnings declines. The median earnings change for the whole sample is 1.74 percent while the mean earnings change is 1.68 percent. While looking further at the dividend categories, the largest mean and median earnings declines (increases) appear in the category of large dividend cuts (increases). The category of dividend continuations is associated with more negative mean and median earnings changes than the category of small dividend cuts. While comparing the other percentiles or quartiles, the earnings changes for the category of small dividend cuts all appear to be less negative or more positive. Comparing these two categories in Panel C may provide explanation for this result. The numbers of the dividend continuations (456) are, strikingly, much larger than the small dividend cuts (56). Within the former category, there are 307 out of 456 firm-years (about 67 percent) experiencing earnings declines, while there are only 30 out of 56 (about 53 percent) for the latter category. As inferred from these statistics, it implicitly exhibits that managers are reluctant to cut dividends. Another implication worthy of note is that when firms are incapable of increasing dividends, a large number of them decide to maintain the dividend level.

On the other hand, Panel A reveals that the observations of dividend increases are much more than dividend cuts as the 10th percentile of the dividend changes variable

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appear to be zero. The mean dividend change is 0.231 and the median is 0.12. In terms of the dividend categories, the means and the medians appear to be consistent. The mean (median) dividend change for the category of small dividend cuts is -0.1534 (-0.1467), while the mean (median) for large dividend cuts is -0.5258 (-0.5). Comparing to the dividend cuts, the mean and the median dividend changes for small dividend increases are 0.1264 and 0.1202 respectively, and are 0.8953 and 0.4706 respectively for large dividend increases.

Panel B of Table 1 illustrates the frequency of the firm-year observations year by year. It is shown that the numbers of dividend increases (totally 2,494) overwhelm the number of dividend cuts (totally 198), revealing that the dividend cuts are not a favourable decision for managers. Noticeably, the numbers of the observation decline with years. The most significant decline is observed in the category of large dividend increases although similar patterns of declines are also found in other categories. The firms which largely increase dividends reduce from 134 in 1989 to only 32 in 1999. The declines properly stem from the tax reforms carried out in 1997 and 1999³³. Alternatively, it is also possibly due to firms' lower propensity to pay dividends (Fama and French, 2001; DeAngelo, DeAngelo, and Skinner, 2004).

Panel C is a two-way cross table, which presents the frequencies of the firm-years by dividends and earnings changes. Within the category of earnings declines, there are only about 13 percent of the firm-years cutting dividends, but over a half of the firm-years (56 percent) increasing dividends. Nevertheless, within the category of earnings increases, the proportion of dividend cuts appear even lower (2.7 percent)

³³ The tax reform eliminates the tax credit for dividends on 2nd July 1997 for tax-exempt institutional investors and on 1st April 1999 for all other tax-exempt investors. This reform makes dividends less attractive than they were.

and the proportion of dividend increases is as high as 90.5 percent. Interestingly, while there are 30.4 percent of the earnings-decline observations maintaining the dividend level, there are only 6.7 percent of the earnings-increase observations making the same decision.

Interpreting Panel C by columns also provides interesting information. The observations with earnings declines dominate the category of large dividend cuts (72.5 percent). Relatively, the two categories of dividend increases are dominated by the observations with earnings increases (73 percent for small dividend increases and 88.2 percent for large dividend increases). However, the proportions of earnings declines and increases are not far different in the category of small dividend cuts. Surprisingly, the category of dividend continuations has more observations with earnings declines (67.3 percent). If information contents of dividends are about earnings, it seems that those conveyed by the large dividend cuts and the dividend increases are more reliable.

In sum, the descriptive statistics provide an overview on the examined sample which comprises all dividend increases, cuts and continuations from all the UK firms. By examining this sample, this chapter examines the validity of dividend signalling theory which states that dividends are used by managers to represent current and signal for future earnings. When the evidence supports the dividend signalling theory, it is expected to find the positive links between dividend changes and current or future unexpected earnings. The details of methodology and hypotheses are discussed in Section 4.4.

4.4. Methodology and hypotheses development

This section begins with the discussion of the methodology in testing the dividend signalling hypothesis. The tests are carried out by using three statistical approaches. Section 4.4.1 discusses the usage of the categorical analysis which compares the mean or median unexpected earnings among the dividend categories. Following the discussion on the categorical analysis, the constitutions of regression models, which examine the predictive power of dividends on earnings, are well presented. The final part of this section documents the employment of a binary logit model for testing the effect of the changes in earnings on the propensity to cut or increase dividends.

4.4.1. Comparisons of unexpected earnings by dividend changes

As argued by the dividend signalling hypothesis, dividends, to mitigate the information asymmetry between managers and investors, may not only represent the information about concurrent earnings, but also signal for future earnings. In order to examine this hypothesis, the tests start from comparing the means and medians of unexpected current and future earnings among different categories of dividend changes. The categorical analysis compares the difference of the earnings variables between two categories by using statistically parametric or non-parametric tests, which is an appropriate tool for the examinations in this section.

The five dividend categories to be examined in this test are respectively large dividend cuts (the cuts over 25 percent), small dividend cuts (the cuts equal 25 percent or less), dividend continuations, small dividend increases (the increases equal 25 percent or less), and large dividend increases (the increase over 25 percent). The

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underlying reasons for splitting the large and small dividend changes are twofold. Firstly, it helps to understand whether the information signalled by large dividend changes is more informative than that signalled by small dividend changes. Secondly, managers, as implied by the findings of DeAngelo, DeAngelo, and Skinner (1996), tend to make the modest cash commitment which does not always truly reflecting their firms' earnings performance and thus undermines the reliability of small dividend changes.

In the test, the unexpected earnings are compared for the event year (year 0) and the two subsequent years (year 1 and year 2). The estimations of the unexpected earnings are based on two different assumptions on the earnings process. The first model assumes that the earnings process follows a random walk. Thus, the expected earnings of year 0 are assumed to be the earnings of year -1. The unexpected earnings equal to the raw earnings changes as shown in Eq. (4.3):

$$UE_{i,t} = \frac{E_{i,t} - E_{i,t-1}}{BV_{i,t-1}}, \quad (4.3)$$

where $UE_{i,t}$ denotes the unexpected earnings of the firms i in year t . The earnings and book value are denoted by $E_{i,t}$ and $BV_{i,t}$ respectively.

Additionally, Albrecht, Lookabill, and McKeown (1977) suggest that the random walk model with drift also performs well on forecasting expected earnings. In light of this notion, the second model takes account of the earnings changes of the previous three years (year -3 to year -1) and employs the average past earnings changes as the proxy for the expected earnings changes of year 0. The adjusted unexpected earnings are

computed as the raw current earnings changes minus the average past earnings changes, which are expressed as Eq. (4.4):

$$UE_{i,t} = \frac{E_{i,t} - E_{i,t-1}}{BV_{i,t-1}} - \frac{1}{3} \sum_{y=t-3}^{t-1} \frac{E_{i,y} - E_{i,y-1}}{BV_{i,y-1}}, \quad (4.4)$$

Moreover, as the signalling hypothesis predicts that dividends contain information about future earnings beyond current earnings, comparing the observations which experience similar current earnings changes but make different dividend decisions should find observable relation between dividend changes and future unexpected earnings. To carry out this test, the test controls the earnings changes in year 0 and compares the unexpected earnings in years 1 and 2. The category of dividend continuations is designed as the basis category. The observations of the other categories are selected from those whose current earnings changes are within the range of three percentage points above or under the average current earnings changes of the basis category.

The tested hypothesis for the above categorical analysis is identical. Since dividend increases (cuts) are regarded as good (bad) news about unexpected earnings, the dividend signalling hypothesis predicts that the categories of dividend increases have better earnings performance and the categories of dividend cuts have inferior earnings performance than the category of dividend continuations. The statistical difference compares the mean and the median unexpected earnings of the four categories of dividend cuts or increases to the category of dividend continuations which is designed as the basis category. Student's t test and Mann-Whitney U test are respectively employed to test the statistical differences of the mean and median unexpected

earnings between two independent categories. The null hypothesis for the above two tests states that the current and future unexpected earnings of dividend cuts or dividend increases equal to those of dividend continuations. Rejecting the null hypothesis indicates that dividend increases (cuts) signal for good (bad) news.

4.4.2. Tests on dividends signalling, current and future earnings

Following the categorical analysis, regression analysis is applied to test the explanatory power of dividend changes on current and future earnings changes. The regression models employ dividend changes as the main explanatory variables to see whether it possesses predictive power on current and future earnings changes. Besides, for the purpose of controlling the noisy factors (such as mean reversion of earnings changes) which may mislead the results, this chapter constitutes four regression models as follows to corroborate the evidence:

1. an essential model which employs dividend increases and dividend cuts as the explanatory variables,
2. the second model, suggested by Nissim and Ziv (2001), further includes returns on shareholders' equity (ROE) and lagged earnings changes to control for the autocorrelation in earnings process and the omitted correlated variable problem (discussed later),
3. the third model employs the linear mean reversion and autocorrelation variables suggested by Fama and French (2000) to control for the trend in earnings process, and

4. based on the third model, the fourth model further employs non-linear variables suggested by Fama and French (2000).

The first model is expressed as Eq (4.5):

$$CE_t = \beta_0 + \beta_{1P}DPC_0 \times \Delta Div_0 + \beta_{1N}DNC_0 \times \Delta Div_0 + \varepsilon_t, \quad (4.5)$$

where DPC_0 (DNC_0) is the dummy variable which equals one for dividend increases (cuts), and zero otherwise. This model on which two hypotheses are tested essentially tests the relation between dividend changes and earnings changes. Firstly, the signalling hypothesis predicts that dividends changes may represent current earnings performance and signal for future earnings changes, and thus both of the coefficients on dividend increases and dividend cuts variables are expected to be positive. Secondly, since managers are reluctant to cut dividends, the secondary hypothesis predicts that the dividend cuts signal for larger earnings changes than dividend increases. As a consequence, the coefficient on dividend cuts are expected to be larger than that on dividend increases in size.

The second regression model suggested by Nissim and Ziv (2001) is as Eq. (4.6):

$$CE_t = \beta_0 + \beta_{1P}DPC_0 \times \Delta Div_0 + \beta_{1N}DNC_0 \times \Delta Div_0 + \beta_2 ROE_{t-1} + \beta_3 CE_0 + \varepsilon_t, \quad (4.6)$$

where ROE_{t-1} denotes the returns on shareholders' equity (ROE) in year t-1. Comparing to the first regression model, this model further includes lagged ROE and the earnings changes in year 0 to control the omitted correlated variable problem and the effect of autocorrelation. Nissim and Ziv (2001) state that high (low) ROE implies

expected decreases (increases) in earnings in that ROE is mean reverting. In addition, dividend changes are usually positively related to current ROE. It would lead to a plausible negative relation between dividend changes and expected changes in earnings. Thus, the inclusion of ROE as an additional explanatory variable could avoid the plausible results indicating that dividend changes are informative about future earnings. Furthermore, when the residual of the first model follows an AR (1), the inclusion of CE_0 would translate the residual into white noise. Due that the current earnings changes are employed as an explanatory variable, the estimations are only carried out for the earnings changes of year 1 and year 2. The tested hypotheses on this model are the same with those tested on Eq. (4.5).

The third model is modified from the linear model used by Fama and French (2000) and expressed as Eq. (4.7):

$$CE_t = \beta_0 + \beta_{1P} DPC_0 \times \Delta Div_0 + \beta_{1N} DNC_0 \times \Delta Div_0 + \gamma_1 DFE_{t-1} + \lambda_1 CE_{t-1} + \varepsilon_t, \quad (4.7)$$

where DFE_{t-1} represents the divergence of real ROE and expected ROE, and can be expressed as $ROE_{t-1} - E(ROE_{t-1})$. The variable, $E(ROE_{t-1})$, is predicted by the predictors used by Grullon, Michaely, Benartzi, and Thaler (2005). The predictors include the lagged ROE (i.e. ROE_{t-2}), the logarithm of lagged total assets and the logarithm of lagged market-to-book ratio. The variable, DFE_{t-1} , are developed by Fama and French (2000) to be a proxy for the effect of mean reversion in earnings process. The lagged earnings changes (CE_{t-1}) are imposed to capture the autocorrelation in earnings process. Originally, Fama and French (2000) constitute the model as Eq. (4.8):

$$CE_{t+1} = a + bDFE_t + cCE_t + e_{t+1}, \quad (4.8)$$

Fama and French (2000) propose that “*forecasts of earnings should exploit the mean reversion in profitability*” (p. 174). Assuming the DFE_t and CE_t in Eq. (4.8) are capable of explaining CE_{t+1} well, Equation (4.7) which includes the explanatory variables of Eq. (4.8) could well control the mean reversion and autocorrelation in earnings process and adequately estimate the explanatory power of the dividend changes on current or future earnings changes. The hypotheses tested on Eq. (4.7) are identical with those tested on Eq. (4.5) and Eq. (4.6).

Previous findings, moreover, suggest that the mean reversion in earnings process appears to be non-linear (Elgers and Lo, 1994; Fama and French, 2000). That is, large change in earnings has a more speedy reversion than small change. Thus, further considering non-linear earnings process could more adequately control the effect of the mean reversion and autocorrelation than Eq. (4.7). As a consequence, the fourth model is expressed as Eq. (4.9):

$$CE_t = \beta_0 + \beta_{1P}DPC_0 \times \Delta Di v_0 + \beta_{1N}DNC_0 \times \Delta Di v_0 + \gamma_1 DFE_{t-1} + \gamma_2 SDFE_{t-1} + \lambda_1 CE_{t-1} + \lambda_2 SCE_{t-1} + \varepsilon_t \quad (4.9)$$

where $SDFE_{t-1}$ equals to the square of DFE_{t-1} , and SCE_{t-1} denotes square CE_{t-1} . The tested hypotheses, which are identical with those on the aforementioned three models, predict that 1) both of the coefficients on dividend increases and dividend cuts should be positive and 2) the coefficient on dividend cuts should be larger than the coefficient on dividend increases.

These four models are all estimated by the regression procedure for panel data advanced by Fama and MacBeth (1973). Estimating the cross-sectional models year-by-year, the procedure uses the time-serial means of the cross-sectional coefficients as the coefficients of the original models. Consequently, this procedure takes account of the heteroscedasticity and autocorrelation of the residuals, and allows for the residual cross-correlation. The time-serial standard errors of the cross-sectional coefficients, which include the estimation errors induced by the cross-correlations of the residuals, are applied to test the significances of the coefficients.

To conclude, this chapter imposes four models to estimate the signalling power of dividend changes for current and future earnings changes. The models, by using various variables, further control the mean reversion and autocorrelation in earnings process. Notwithstanding the inclusion of different explanatory variables, the hypotheses tested on these models are identical. The signalling hypothesis predicts that the dividend changes are positively associated with current and future earnings changes and thus the coefficients on the dividend changes variables should be positive. The secondary hypothesis predicts that the managers are reluctant to cut dividends and thus dividend cuts should signal for a larger magnitude of earnings changes than dividend increases. Thus, the coefficient on dividend cuts are expected to be larger than the coefficient on dividend increases in size.

4.4.3. Testing influence of earnings changes on dividend decisions

This section examines whether the changes in current and future earnings possess any influence on managers' dividend decisions. Since the real factors which affect managers on their dividend decisions are only known by managers themselves, one

can only apply logit models to find out the effect of the potential factors on managers' dividend decisions. To this end, this chapter employs a binary logit model to study whether increase (decline) in current and future earnings would increase the chance of dividend increase (cut). The models are designed as follows:

The binary logit model assumes that the dividend decisions are made in managers' interest and managers will maximize the utility of their dividend decisions. The utility function is expressed as Eq. (4.10):

$$U_{ijt} = V_{ijt} + \varepsilon_{ijt}, \quad (4.10)$$

where U_{ijt} denotes the utility of the dividend-paying firm i which chooses the dividend decision j (increases or cuts) in year t . The V_{ijt} denotes the representative utility which is developed by this chapter via using future and (or) current earnings changes to predict the utility U_{ijt} that is only known by the managers.

The ε_{ijt} denotes the residual which is unobserved by this chapter (and outsiders) but known by the managers. The logit model assumes that the residuals are independently and identically distributed (*iid*) extreme value (i.e. Gumbel distribution) over parameters i, j and t .

Since the managers are assumed to maximize the utility of the dividend decision, they must make the decision with higher utility. Thus, the choice probability of the dividend decision can be expressed as Eq. (4.11):

$$P_{it}(U_j > U_k) \quad \forall k \neq j. \quad (4.11)$$

On the basis that the residuals are *iid* extreme value, the choice probability derived from McFadden (1974) is as Eq (4.12):

$$P_{it}(j) = \frac{e^{V_{ijt}}}{e^{V_{ijt}} + e^{V_{ikt}}} \quad \forall k \neq j. \quad (4.12)$$

For the alternatives j and k , the ratio of the probabilities (odd ratio) is:

$$\frac{P_{it}(j)}{P_{it}(k)} = \frac{\exp(V_{ijt})}{\exp(V_{ikt})} = \exp(V_{ijt} - V_{ikt}) = \exp((\beta'_j - \beta'_k)x_{it}) = \exp(\beta^* x_{it}) \quad \forall k \neq j. \quad (4.13)$$

And the logit L is the natural logarithm of Eq (4.13), expressed as Eq. (4.14):

$$L_{it} = \ln \left[\frac{P_{it}(j)}{P_{it}(k)} \right] = \beta^* x_{it} \quad \forall k \neq j, \quad (4.14)$$

where β^* is a vector of coefficients on a vector of earnings variables x_{it} , which includes current and (or) future earnings changes.

In order to examine the panel data, which consists of cross-sectional and time-serial units, the logit models are estimated by using random effect models. It is believed that random effect model is more appropriate than fixed effect model. Unlike fixed effect model, random effect model does not assume the homogeneity among the firms and (or) years³⁴. The residuals could be decomposed into three components, including cross-sectional specific error, time-serial specific error, and individual error. In other words, the random model assumes that there are differences among firms, over years,

³⁴ If homogeneity is assumed to be among firms and years, the model is so-called pooled regression model.

and certainly among individual observations.

In sum, the dependent variable is set to zero for dividend cuts and one for dividend increases. The signalling hypothesis predicts that the increases in current or future earnings would promote the firms' propensity to increase dividends and reduce the chance of dividend cuts. By contrast, the declines in current or future earnings are predicted to lessen the probability of dividend increases and raise the chance of dividend cuts. Hence, the coefficients on the variables of current and future earnings changes are expected to be positive to support the hypothesis.

4.5. Empirical results

This section presents the empirical results of the association of dividend signalling with current and future earnings. Generally, the findings indicate that dividends represent current earnings performance but do not signal for future earnings. The findings are consistent with the US findings of Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, Benartzi, and Thaler (2005). In addition, the signalling power of dividend cuts is greater than that of dividend increases, which supports the prediction of Lintner (1956).

4.5.1. Earnings performance with different dividend decisions

Table 4.2 presents the comparison of mean and median unexpected earnings of the categories with different dividend decisions. The test examines both the mean and median earnings for three years, starting from the year of dividend announcement (year 0). The dividend categories consist of two for dividend cuts (the cuts larger than 25 percent and those which are 25 percent or less), two for dividend increases (the increases larger than 25 percent and those which are 25 percent or less), and one for dividend continuations. The category of dividend continuations is designed to be the basis category.

Panel A of Table 4.2 reports the results of comparing the raw earnings changes which is used as the proxy for the unexpected earnings. The evidence reveals that dividends are likely changed with concurrent unexpected earnings. For the firms which cut dividends larger than 25 percent (large dividend cuts), they averagely experience 10.8 percent of the declines in unexpected current earnings. It is apparent from this

evidence that the mean and median unexpected earnings for large dividend cuts are much more negative than those for dividend continuations and for small dividend cuts (the cuts which are 25 percent or less). By contrast, the firms which increase dividends seem to experience increases in earnings in year 0. The firms with large dividend increases (the increases which are larger than 25 percent) generally possess more positive unexpected earnings than those with dividend continuations and with small dividend increases (the increases which are 25 percent or less). The only result which is contrary to the prediction of the signalling hypothesis on current earnings changes is that the unexpected earnings for small dividend cuts are less negative than those for dividend continuations. From the mean and median tests, it is shown that the differences of the current unexpected earnings between these two categories are significant at least at ten percent level. As what is discussed in Section 4.3.2, the category of dividend continuations has more observations than the category of small dividend cuts. Moreover, the former category has higher proportion of observations with earnings declines (67.32 percent). Thus, it is not surprising that the mean and median current unexpected earnings of the category of dividend continuations are more negative than those of the category of small dividend cuts. This evidence implicitly supports Lintner's (1956) argument that managers are reluctant to cut dividends though it does not support the prediction of the signalling hypothesis on current earnings.

Differently, the evidence in Panel A of Table 4.2 for year 1 is not as sound as that for year 0. Firms with dividend increases seem to have more positive median unexpected earnings than the firms with dividend continuations. The comparison of the median year-one unexpected earnings appears to be significant at five percent level for small dividend increases and at one percent level for large dividend increases, which is the

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only evidence supporting the prediction of the signalling hypothesis on future earnings. However, the evidence for large dividend cuts is surprising. After the firms experience severe negative unexpected earnings, they get positive unexpected earnings in the following year. The mean and median unexpected earnings are respectively 3.66 percent and 1.17 percent, both of which are significantly higher than those for the basis category. Besides, the category of dividend continuations appears to have better earnings performance in year 1 than the category of small dividend cuts.

As shown in Panel A of Table 4.2, the positive unexpected earnings for the firms which largely cut dividends continue in year 2 but the magnitude becomes smaller. Nonetheless, the evidence indicates that the firms of small dividend cuts also experience earnings rebound two years subsequent to the dividend cuts. Moreover, the category of small dividend cuts experiences larger positive unexpected earnings than the basis category and the categories with dividend increases in year 2. The results therefore suggest that unexpected earnings rebound by one or two years following dividend cuts. When the dividend signalling hypothesis proposes that dividends are made to signal for future earnings, most of the evidence so far is contrary to the prediction of the hypothesis.

The unexpected earnings adjusted by the average past earnings changes are presented in Panel B of Table 4.2 estimates. Apparently, the different estimations of the unexpected earnings do not provide much new evidence. The main difference between the results of Panel A and Panel B appears in the category of large dividend changes. In Panel B, the firms with large dividend increases are found to experience the rebound in the unexpected earnings in year 1 and the negative unexpected earnings continue in year 2. The rebounds in unexpected earnings for large dividend cuts still

exist in the two sequent years. The finding of the rebounds in earnings following dividend cuts is consistent with the findings of Healy and Palepu (1988), DeAngelo, DeAngelo, and Skinner (1992), Balachandran, Cadle, and Theobald (1996) and some others. Healy and Palepu (1988) further explain that these results may stem from survivorship bias while Balachandran, Cadle, and Theobald (1996) propose that it may be caused by mean reversion of earnings process. For the sample of this chapter, the results are more likely caused by the mean reversion of earnings in that the rebound of the unexpected earnings is not only found in the category of large dividend cuts but also in the category of large dividend increases. Furthermore, firms with small dividend cuts appear to have positive unexpected earnings in year 0. The unexpected earnings for the firms with small dividend cuts outperform those for the firms with dividend continuations or small dividend increases. This evidence contradicts the prediction of the dividend signalling hypothesis and merits further tests to see whether it is robust.

Panel C of Table 4.2 shows the results from examining the observations whose raw earnings changes are within the range of three percentage points under or above the mean earnings changes of the basis category (i.e. the category of dividend continuations). Therefore, the main focus in this panel is on the results of year 1 and year 2. In year 1 and year 2, the unexpected earnings do not seem to differ significantly among the dividend categories. When the signalling hypothesis proposes that dividend are made to signal for future earnings performance, different dividend decisions in year 0 should be positively associated with unexpected earnings in year 1 and year 2. However, the evidence is unable to find significant links between different dividend decisions in year 0 and future unexpected earnings. Furthermore, the estimates in Panel C also show the unexpected earnings rebound in either year 1 or

year 2.

To conclude, the evidence provided by the categorical analysis does not support the argument that managers pay dividends to signal for future earnings. In contrast, the evidence shows the rebounds in future unexpected earnings, which is opposite to the prediction of the signalling hypothesis although these findings are consistent with some previous studies. Regarding to current unexpected earnings, the test provides evidence supporting the dividend signalling hypothesis. The findings show that the firms increasing dividends generally experience better current earnings performance than the firms with dividend continuations. By contrast, the firms with large dividend cuts suffer worse current unexpected earnings than the dividend-continuation firms. On the other hand, the firms with small dividend cuts appear to outperform the firms with dividend continuations in current unexpected earnings. This finding may result from the managers' reluctance to cut dividends, even when their firms experience earnings declines. Consequently, when managers only maintain rather than increase dividends, it may not be good news about current earnings.

4.5.2. Associations of dividends with current and future earnings

Although the categorical analysis compares the earnings performance of the firms with different levels of dividend changes, it does not explicitly examine the relation between dividend changes and earnings changes. Table 4.3 to Table 4.6 present the estimates of the multivariate regression models, which are capable of showing the definite relation between the earnings changes and the dividend changes. The models are all estimated by the regression procedure suggested by Fama and MacBeth (1973), which accounts for the cross-correlation of the residuals in panel data. Panels A of

these tables report the time-serial means of the cross-sectional coefficients which indicates the dividend signalling power throughout the examined period. Panels B present the year-by-year cross-sectional coefficients and t-statistics for the dividend variables, showing the consistency of the dividend signalling power in each sample year.

According to the dividend signalling hypothesis, it is predicted that dividend changes represent current earnings changes and further signal for future earnings changes. Hence, the relation between dividend changes and earnings changes are expected to be positive. In addition, since managers are reluctant to cut dividends, the secondary hypothesis predicts that dividend cuts should pertain to larger magnitude of earnings changes than dividend increases. Panel A of Table 4.3 reveals that the dividend changes are more informative for current earnings changes than for future earnings changes. This finding is confirmed by the higher adjusted R square for the model of year 0 than for the models of year 1 and year 2. Moreover, consistent with the prediction of the secondary hypothesis, dividend cuts seem to have more explanatory power on earnings changes than dividend increases.

In the model of year 0, Panel A of Table 4.3 shows that both of the coefficients on dividend changes appear to be significantly positive. Nonetheless, the coefficient on dividend cuts is much larger than that on dividend increases. One percentage cut in dividends signals for 0.79 percentage of decline in current earnings while one percentage increase in dividends only indicates 0.05 percentage of increase in current earnings. The year-by-year results in Panel B of Table 4.3 corroborate the above evidence, revealing that the coefficients on dividend variables all appear to be positive throughout the sample years whereas those on dividend cuts are more significant than

those on dividend increases.

Unlike the model for year 0, those for year 1 and year 2 provide little evidence supporting the prediction of the dividend signalling hypothesis. The coefficient on dividend cuts appears to be negative in both year 1 and year 2 model. Particularly, the one in the model of year 1 is marginally significant at ten percent level. Both of the coefficients on dividend increases are insignificant. The estimates in Panel B show that there are six out of 11 coefficients on dividend cuts appearing to be significantly negative for the model of year 1, while only one of the coefficients on dividend increases in Panel B is significant for the models of year 1 and year 2. The evidence implies that the rebound in the behaviour of earnings is more apparent for the dividend cuts, which is consistent with the results generated by the categorical analysis. However, one cannot tell from this model whether the rebound in earnings process results from the mean reversion or autocorrelation in earnings process since this model does not take these factors into account. This, therefore, makes the following models important in that they include the mean reversion and (or) autocorrelation variables to control for this noisy effect.

Table 4.4 reports the estimates of the model introduced by Nissim and Ziv (2001). The model (see Eq. (4.6)) controls the autocorrelation of earnings changes and the omitted correlated variable problem³⁵. Nevertheless, the additional inclusion of the lagged returns on shareholders' equity (ROE) and the earnings changes in year 0 as the explanatory variables has only little impact on the results except the improvement in the adjusted R squares. The underlying indication is that the new variables possess

³⁵ Nissim and Ziv (2001) suggest that high returns on shareholders' equity (ROE) imply decreases in expected earnings. Besides, dividend changes are positive correlated with current ROE, resulting in the expected changes in earnings would negatively relate to dividend changes. Thus, including ROE as the explanatory variables could control for this plausible relation.

some explanatory power on future earnings changes, but none is significant enough.

For the model of year 1, the coefficient on dividend increases variable rises a little and that on dividend cuts turns to be positive. The rebound in the behaviour of earnings seems to be controlled in this model. The estimates in Panel B confirm this result. A number of coefficients on dividend cuts which appear significantly negative in Panel B of Table 4.3 become insignificant or even turn into positive. However, the coefficients on dividend increases still remain insignificant for each of the annual cross-sectional model. As for the model of year 2, both of the coefficients on dividend increases and cuts remain negative. Nevertheless, none of these coefficients are significant. From the estimates in Panel B, it is shown that most of the coefficients on dividend increases and dividend cuts are insignificant for the cross-sectional model of each sample year. These results suggest that dividend changes are not associated with the earnings changes in year 2. Overall, the estimation of the second model does not find the obvious links between dividend changes and future earnings changes as those found by Nissim and Ziv (2001).

Table 4.5 illustrates the estimates of the third multivariate model (see Eq. (4.7)) which includes the linear variables of the mean reversion and the autocorrelation developed by Fama and French (2000). Comparing the model for Table 4.3, the adjusted R squares in Table 4.5 are improved notably for all the three models. However, Panel A presents that, for the model of year 0, the coefficients on dividend increases and cuts drop a little and that on dividend increases becomes insignificant. This may result from that a partial of the explanatory power of dividend increases and cuts are absorbed by the new adding variables. The estimates in Panel B present that although eight out of 11 coefficients on dividend increases for year 0 appear to be positive,

only one is significant. By comparison, the coefficients on dividend cuts appear significantly positive for eight out of 11 yearly models. This is consistent with the secondary hypothesis which proposes that, since managers are reluctant to cut dividends, dividend cuts provide more information about earnings than dividend increases.

After controlling for the linear mean reversion and autocorrelation in earnings process, Panel A of Table 4.5 shows that the coefficient on dividend cuts for the model of year 1 appears significantly positive at ten percent significance level. The coefficient on dividend increases for the model of year 1 remains positive but insignificant. In Panel B, most of the coefficients on dividend increases and dividend cuts for year 1 are insignificant except the one on dividend cuts for year 1994. Similarly, in Panel A, the coefficients on the dividend variables for year 2 model are positive but insignificant. Most of the coefficients on the dividend variables for the model of year 2 in Panel B also appear to be insignificant. The lack of statistical significance on the coefficients for year 1 and year 2 indicates that both dividend increases and dividend cuts do not possess manifest explanatory power on future earnings changes. The evidence does not support the dividend signalling hypothesis which states that dividends are informative for future earnings performance.

Since Fama and French (2000) suggest that extreme changes in earnings reverse faster than normal changes, the third model which only considers the linear mean reversion and autocorrelation in earnings process may not be sufficient. The fourth model (see Eq. (4.9)) further considers the extreme changes in earnings process and additionally includes the square of the lagged DFE (the deviation of returns on equity from its expected value) and the square of the lagged CE (earnings changes) to control the

non-linearity of the mean reversion and autocorrelation in earnings process.

Table 4.6 shows that the inclusion of these variables only makes the evidence in a little different from, but not contrary to, that in Table 4.5. Consistent with the prediction on current earnings changes, Panel A shows that the coefficients on dividend increases and dividend cuts are both significantly positive in the model of year 0, indicating that both dividend increases and dividend cuts are informative for current earnings performance even after considering the mean reversion and autocorrelation in earnings process. In year 0, the higher significance level (t statistic equals 5.38) and the larger coefficient (0.3890) on the dividend cuts, comparing with the coefficient on the dividend increases, reveal that the signals from the dividend cuts is stronger than that from the dividend increases. The magnitude of earnings declines along with one percentage of dividend cuts is much larger than that of the earnings increases along with the same percentage of dividend increases. More specifically, one percent of dividend cuts approximately represent 0.38 percent of earnings declines. Nonetheless, one percent of dividend increases only represent 0.05 percent of earnings increases. This finding supports the hypothesis which predicts that dividend cuts are more informative for the earnings changes.

As for the models of year 1 and year 2, the test does not detect significant relation between dividend changes and future earnings changes. The estimates in Panel A of Tabel 4.6 indicate that none of the coefficients on the dividend variables are significant for the models of year 1 or year 2. The only significant variable in these models are the lagged earnings changes, indicating that the lagged earnings changes are more informative for future earnings changes than the dividend changes. This is implicitly consistent with Miller and Rock's argument (1985) for dividend

announcement effect, which proposes that dividends only provide missing information about current earnings, and the market uses this information to update their expectations about future earnings. This indirect route makes the dividends seem to be informative for future earnings.

To conclude, with the prudent controls over the mean reversion and the autocorrelation in earnings process, the findings present the evidence about the relations between dividend and earnings changes. The evidence, supporting the prediction of the dividend signalling hypothesis on current earnings, suggests that dividend changes are associated with the information about current earnings changes. Furthermore, consistent with the prediction of this chapter, dividend cuts are found to be more informative for earnings changes than dividend increases. This evidence may result from managers' reluctance to cut dividends (Lintner, 1956). The findings in this section are consistent with the findings of Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, Benartzi, and Thaler (2005) for the US market but inconsistent with the findings of Nissim and Ziv (2001).

4.5.3. Influence of earnings changes on firms' dividend decisions

Different from the above examinations which focus on the relation between dividend changes and earnings changes, the estimations of the logit model focus on whether the earnings performance have any influence on the firms' dividend decisions. Generally, the evidence indicates that the changes in current earnings are the determinative factor affecting the dividend decisions. However, the influence of the future earnings changes is not observed in this examination.

The estimates of the binary logit model are presented in Table 4.7. The dependent variable equals zero for dividend cuts and one for dividend increases. The signalling hypothesis predicts that earnings increases (cuts) should promote manager's propensity to increase (cut) dividends. Consequently, the coefficients on the earnings changes are expected to be positive. The Column 1 estimates shows that the coefficient of the current earnings changes is significantly positive, suggesting that the performance of the current earnings is considered when making dividend decisions. By contrast, in Column 2 and Column 3, when the variable of future earnings is alone in the model, both of the coefficients on the future earnings appear to be positive but insignificant. The Z statistics for these coefficients are only 0.04 and 0.05 respectively, which indicates that the variables of future earnings almost do not possess predictive power on dividend decisions. In addition, the log-likelihood in Column 2 and Column 3 are larger negative than in Column 1, indicating the current earnings are the better predictor on the dividend decisions.

In Column 4 and Column 5, the model jointly examines the explanatory power of the current and future earnings changes on the dividend decisions. The findings only support the prediction of the signalling hypothesis on current earnings changes. The estimates show that the coefficient of the current earnings changes remains significant and it remains positive and significant as it does in Column 1. The joint inclusion of the future earnings variables does not affect the predictive power of the current earnings changes on managers' dividend decisions. Moreover, the coefficients on future earnings are both negative but insignificant. The evidence again suggests that managers only think about the current earnings performance when they make dividend decisions. The future earnings performance is not taken into account when deciding dividend payments.

Overall, the evidence in Table 4.7 indicates that the current earnings changes are the important determinant of the managers' dividend decisions, which agrees with the evidence provided by the multivariate regression models. By contrast, the dividend decisions do not seem to be influenced by the future earnings changes. These findings coincide with the findings of Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, Benartzi, and Thaler (2005), suggesting that dividend changes do not signal for the future.

4.6. Conclusion

This chapter aims to find out the associations of dividend signalling with current and future earnings performance. The signalling hypothesis predicts that dividend changes signal for the information about future earnings beyond the information about current earnings. To test this hypothesis, the chapter applies 1) the categorical analysis to compare the earnings performance with different dividend decisions, 2) the regression analysis to examine the associations of dividend changes with current and future earnings changes and 3) the logit model to test the influence of earnings changes on dividend decisions.

The signalling hypothesis, however, is only partially supported by this chapter as the findings of this chapter indicate that the dividend changes only represent the current earnings performance. This evidence is robust regardless of the uses of the methods or the models. Even after controlling the mean reversion and autocorrelation in earnings process, the relation between dividends and current earnings are still explicit. On the other hand, the findings of this chapter reject the argument that dividends signal for future earnings. The only evidence found for this context is provided by the regression model which only consists of the linear mean-reversion and autocorrelation variables (i.e. Eq. (4.7)), but the evidence disappears after the non-linear variables are included³⁶. These findings are consistent with the findings of Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, Benartzi, and Thaler (2005).

Furthermore, as suggested by Lintner (1956) that managers are reluctant to cut dividends, the secondary hypothesis predicts that dividend cuts should be more

³⁶ See Eq. (4.9).

informative than dividend increases. The evidence of this chapter supports this hypothesis, showing that, given the same magnitude of dividend changes, dividend cuts signal for larger earnings changes than dividend increases. This finding likewise agrees with the findings of DeAngelo, DeAngelo, and Skinner (1996) and Brook, Charlton, and Hendershott (1998).

With respect to the negative relation between dividend changes and future earnings changes in the categorical analysis, the evidence of the regression analysis shows that the negative relation are mostly caused by the mean reversion and autocorrelation in earnings process. The underlying reason is that after controlling the mean reversion and autocorrelation in earnings process, the negative relation disappears or mitigates. Unequivocally, this chapter concludes that dividend changes only have prominent and positive relation with the changes in current earnings.

Table 4.1: Descriptive statistics

This table presents the distributions and the frequencies of dividend and earnings variables. Panel A presents the mean and median as well as the 1st percentile (P1), 10th percentile (P10), 1st quartile (Q1), 3rd quartile (Q3), 90th percentile and 99th percentile (P99) for earnings changes and dividend changes. Earnings changes are defined as the raw changes in annual earnings divided by the book value per share of the event year. Dividend changes represent the percentage changes of annual dividends. Panel B presents the frequencies of five categories of dividend changes for each sample year. Panel C is a two-way cross table, which presents the numbers of firm-year observations for the intersectional categories of dividend and earnings changes. Each cell in Panel C contains three numbers. The first number on the top represents the numbers of the observations for each intersectional category. The second number in the middle shows the proportion of the different dividend categories for an earnings category while the third number on the bottom presents the proportion of the different earnings categories for a dividend category.

Panel A: The distributions of earnings and dividend variables

Variables	Mean	P1	P10	Q1	Median	Q3	P90	P99
Earning Changes	0.0168	-0.3248	-0.0678	-0.0106	0.0174	0.0504	0.1014	0.3393
Dividend Cuts > 25%	-0.1088	-1.1985	-0.3066	-0.1705	-0.0698	0.0000	0.0378	0.2703
Dividend Cuts ≤ 25%	-0.0074	-0.2554	-0.1376	-0.0455	-0.0099	0.0274	0.0481	0.7552
Dividend Continuations	-0.0363	-0.4487	-0.1245	-0.0685	-0.0245	0.0054	0.0367	0.2744
Dividend Increases ≤ 25%	0.0182	-0.2398	-0.0384	-0.0025	0.0176	0.0420	0.0782	0.2601
Dividend Increases > 25%	0.0800	-0.1663	-0.0033	0.0287	0.0610	0.1075	0.1800	0.5394
Dividend Changes	0.2301	-0.6667	0.0000	0.0410	0.1200	0.2172	0.4865	2.6191
Dividend Cuts > 25%	-0.5258	-0.9783	-0.7961	-0.6456	-0.5000	-0.3856	-0.2968	-0.2508
Dividend Cuts ≤ 25%	-0.1534	-0.2500	-0.2428	-0.2210	-0.1467	-0.1020	-0.0467	-0.0037
Dividend Increases ≤ 25%	0.1264	0.0154	0.0476	0.0828	0.1201	0.1691	0.2068	0.2500
Dividend Increases > 25%	0.8953	0.2527	0.2811	0.3333	0.4706	0.7391	1.4832	10.4964

Table 4.1 - *Continued*

Panel B: The frequencies of dividend changes by years						
Years	DPS Cuts > 25%	DPS Cuts \leq 25%	DPS Continuations	DPS Increases \leq 25%	DPS Increases > 25%	Total
1989	5	2	31	173	134	345
1990	14	6	38	191	100	349
1991	22	6	82	173	58	341
1992	30	7	87	162	28	314
1993	26	11	66	148	37	288
1994	16	4	49	180	32	281
1995	5	3	27	177	65	277
1996	11	3	28	184	65	291
1997	7	6	24	181	44	262
1998	3	6	17	166	32	224
1999	3	2	7	132	32	176
Total for Category	142	56	456	1867	627	3148

Table 4.1 - *Continued*

Panel C: The frequencies of the observations by dividend and earnings changes							
		DPS Cuts > 25%	DPS Cuts \leq 25%	DPS Continuations	DPS Increases \leq 25%	DPS Increases > 25%	Total
	N	103	30	307	497	71	1008
Earnings Declines	% within EPS Categories	10.22	2.98	30.46	49.31	7.04	100.00
	% within DPS Categories	72.54	53.57	67.32	26.62	11.32	32.02
	N	5	2	6	6	3	22
Earnings Continuations	% within EPS Categories	22.73	9.09	27.27	27.27	13.64	100.00
	% within DPS Categories	3.52	3.57	1.32	0.32	0.48	0.70
	N	34	24	143	1364	553	2118
Earnings Increases	% within EPS Categories	1.61	1.13	6.75	64.40	26.11	100.00
	% within DPS Categories	23.94	42.86	31.36	73.06	88.20	67.28
	N	142	56	456	1867	627	3148
Total	% within EPS Categories	4.51	1.78	14.49	59.31	19.92	100.00
	% within DPS Categories	100.00	100.00	100.00	100.00	100.00	100.00

Table 4.2: The comparisons of unexpected earnings by dividend changes

This table compares the unexpected earnings per share for the three-year period starting from the year of dividend payment. Dividend changes are the difference of the dividend per share for the previous year and the dividend per share for the current year as a percentage of the dividend per share for the previous year. There are five categories grouped according to the dividend changes. The "N" denotes the numbers of firm-year observations in each category.

Panel A presents the results of the raw earnings changes which are used as the proxy for the unexpected earnings. The raw earnings changes are computed by earnings difference between year t (year 0 is the event year) and year t-1 deflated by the book value per share of year t-1. The unexpected earnings in Panel B are defined as the raw earnings changes for year t minus the 3-year average raw earnings changes of year t-3 to year t-1. Panel C controls the raw earnings changes in year 0 and only employs the observations whose year 0 raw earnings changes are ± 3 percentage points from the average raw earnings changes for the portfolio which does not change dividends. The test on statistical difference between the portfolios employs Student's t test for the means and Mann-Whitney U test for the medians. Statistical significant are compared to the mean (median) estimates of the portfolio which does not change dividends on year 0. Statistical significance at 0.1, 0.05 and 0.01 are marked with *, **, and *** respectively.

Panel A: Raw earnings changes as the proxy for the unexpected earnings

Div. Changes	N	Year 0		Year 1		Year 2	
		Mean	Median	Mean	Median	Mean	Median
Cut >25%	142	-0.1088***	-0.0698***	0.0366***	0.0116***	0.0169	0.0185**
Cut ≤25%	56	-0.0074*	-0.0099**	-0.0187	-0.0031	0.0345	0.0219*
Continuations	456	-0.0363	-0.0245	0.0062	0.0055	0.0210	0.0082
Increase ≤25%	1867	0.0182***	0.0176***	0.0118	0.0130**	0.0088	0.0100
Increase >25%	627	0.0800***	0.0610***	-0.0028	0.0253***	-0.0059	0.0087
Total	3148						

Panel B: Unexpected earnings adjusted by the average past earnings changes

Div. Changes	N	Year 0		Year 1		Year 2	
		Mean	Median	Mean	Median	Mean	Median
Cut >25%	77	-0.0726*	-0.0385	0.0930***	0.0616***	0.0523	0.0594***
Cut ≤25%	29	0.0544***	0.0232**	-0.0014	0.0185	0.0439	0.0230
Continuations	262	-0.0241	-0.0158	0.0301	0.0162	0.0511	0.0212
Increase ≤25%	955	0.0057**	-0.0004***	0.0161	-0.0003***	0.0041	0.0011***
Increase >25%	180	0.0587***	0.0290***	-0.0073**	-0.0110***	-0.0464**	-0.0196***
Total	1503						

Table 4.2 - *Continued*

Panel C: Raw earnings changes by controlling the earnings changes of year 0							
Div. Change	N	Year 0		Year 1		Year 2	
		Mean	Median	Mean	Median	Mean	Median
Cut >25%	31	-0.0291	-0.0260	0.0316	0.0279	0.0078	0.0158
Cut ≤25%	20	-0.0283	-0.0283	-0.0068	-0.0082	0.0318	0.0182
Continuations	466	-0.0363	-0.0245	0.0062	0.0055	0.0210	0.0082
Increase ≤25%	373	-0.0205***	-0.0156**	-0.0034	0.0044	0.0124	0.0080
Increase >25%	53	-0.0174***	-0.0144	0.0302	0.0071	-0.0443	0.0105
Total	943						

Table 4.3: The relations between dividends and earnings performance

This table reports the estimates of regression models which regress raw earnings changes for years 0, 1 and 2 on dividend changes for year 0 (the event year). The raw earnings changes for year t (CE_t) are computed by earnings difference between year t and year $t-1$ deflated by the book value per share at the end of year $t-1$. ΔDiv_0 is the rate of dividend changes, which is computed as the difference of the dividend per share for year -1 and the dividend per share for year 0 as a percentage of the dividend per share for year -1 . DPC_0 (DNC_0) is a dummy, which equals 1 when dividend increases (decrease) in year 0, and equals 0 otherwise.

The models employ the estimation procedure for panel data suggested by Fama and Macbeth (1973). Panel B presents the results of the initial stage of the procedure. The cross-sectional regression coefficients are estimated for each year from 1989 to 1999. Panel A, which presents the results of the second stage, shows the mean regression coefficients estimated by averaging the annual cross-sectional coefficients of each year in Panel B. The t -statistics for the mean coefficients are defined as the mean divided by its standard error (time-series standard deviation of the coefficient divided by $11^{1/2}$). All t -statistics are shown in parentheses. Statistical significance at 0.1, 0.05 and 0.01 are marked with *, **, and *** respectively.

$$CE_t = \beta_0 + \beta_{1P} DPC_0 \times \Delta Div_0 + \beta_{1N} DNC_0 \times \Delta Div_0 + \varepsilon_t \quad (4.5)$$

Panel A: Time-serial means of the cross-sectional regression coefficients

Year	β_0	β_{1P}	β_{1N}	Adj-R ²
t = 0	0.0215* (1.8211)	0.0496** (3.0534)	0.7868*** (3.4801)	0.1114*** (3.2346)
t = 1	-0.0536*** (-3.6825)	0.0147 (0.9082)	-0.9910 (-1.6823)	0.0267* (2.1375)
t = 2	-0.0170 (-1.0863)	-0.0153 (-1.2927)	-0.4370 (-1.3090)	0.0067 (1.5570)

Panel B: Annual cross-sectional regression coefficients of dividend changes

Year	t = 0		t = 1		t = 2	
	β_{1P}	β_{1N}	β_{1P}	β_{1N}	β_{1P}	β_{1N}
1989	0.0368 (0.9473)	2.4181*** (10.2696)	0.0063 (0.7190)	-0.2445*** (-5.0626)	-0.0503*** (-3.4046)	0.0878 (1.0745)
1990	0.0032 (1.2736)	0.2712*** (7.6288)	-0.0005 (-0.0981)	-0.0625 (-0.9970)	0.0018 (0.4117)	-0.1047* (-1.7713)
1991	0.0178* (1.7614)	0.1906*** (4.5909)	0.0058 (0.3948)	-0.1089* (-1.8985)	0.0305 (0.7124)	-0.0159 (-0.0956)

Table 4.3 - *Continued*

1992	0.1074** (2.3296)	0.1981*** (4.0416)	-0.0108 (-0.1464)	-0.1112 (-1.4521)	0.0006 (0.0041)	0.3261** (2.1094)
1993	0.0827 (1.1171)	0.2366*** (2.6974)	0.0445 (0.4931)	-0.1111 (-1.0881)	-0.0732 (-0.3565)	-0.1351 (-0.5822)
1994	0.0202 (0.9108)	0.5836*** (7.6194)	0.0510 (0.1531)	-5.1956*** (-4.7692)	-0.0148 (-0.1271)	0.3728 (0.9778)
1995	0.0165 (0.6819)	1.8798*** (15.2965)	0.0046 (0.1624)	-1.0659*** (-7.3943)	0.0090 (0.0434)	-3.6273*** (-3.4491)
1996	0.1627 (1.4657)	0.5435* (1.7926)	0.0914 (0.2728)	-4.4275*** (-4.8249)	0.0094 (0.0411)	-0.6021 (-0.9638)
1997	0.0945 (0.5794)	0.7001*** (2.9473)	0.0795 (0.1966)	0.5240 (0.8065)	-0.0932 (-0.4451)	-0.3655 (-1.0864)
1998	0.0004 (0.0415)	0.3769*** (3.5258)	-0.0025 (-0.0448)	0.6069 (1.0695)	0.0001 (0.0048)	-0.6460*** (-3.2808)
1999	0.0036 (0.0345)	1.2565*** (5.4843)	-0.1079 (-0.5926)	-0.7046* (-1.7725)	0.0116 (0.2088)	-0.0974 (-0.7999)

Table 4.4: The relations between dividends and earnings performance by controlling the autocorrelation and the omitted correlated variable problem

This table reports the estimates of the regression models, which regress raw earnings changes for years 1 and 2 on dividend changes on year 0 (the event year) as well as lag earnings and raw earnings changes for year 0. The raw earnings changes for year t (CE_t) are computed by annual earnings difference between year t and year $t-1$ as a percentage of the book value per share of year $t-1$. ΔDiv_0 is the rate of dividend changes, which is computed as the difference of the dividend per share for year -1 and the dividend per share for year 0 as a percentage of the dividend per share for year -1 . DPC_0 (DNC_0) is a dummy, which equals 1 when dividend increases (decrease) in year 0, and equals 0 otherwise. ROE_{t-1} is the ratio of earnings to book value of common equity on year $t-1$.

The models employ the estimation procedure for panel data suggested by Fama and Macbeth (1973). Panel B presents the results of the initial stage of the procedure. The cross-sectional regression coefficients are estimated for each year from 1989 to 1999. Panel A, which presents the results of the second stage, shows the mean regression coefficients estimated by averaging the annual cross-sectional coefficients of each year in Panel B. The t -statistics for the mean coefficients are defined as the mean divided by its standard error (time-series standard deviation of the coefficient divided by $11^{1/2}$). All t -statistics are shown in parentheses. Statistical significance at 0.1, 0.05 and 0.01 are marked with *, **, and *** respectively.

$$CE_t = \beta_0 + \beta_{1P} DPC_0 \times \Delta Div_0 + \beta_{1N} DNC_0 \times \Delta Div_0 + \beta_2 ROE_{t-1} + \beta_3 CE_0 + \varepsilon_t \quad (4.6)$$

Panel A: Time-serial means of the cross-sectional regression coefficients

Year	β_0	β_{1P}	β_{1N}	β_2	β_3	Adj-R ²
t = 1	0.1151 (0.9658)	0.0233 (1.3983)	0.0045 (0.0226)	-0.8089 (-1.2196)	0.2713 (0.5758)	0.1353*** (3.3239)
t = 2	0.1255 (1.4281)	-0.0045 (-0.3734)	-0.1168 (-0.8594)	-0.8292 (-1.7009)	-0.0872 (-0.9879)	0.1421* (2.5059)

Panel B: Annual cross-sectional regression coefficients of dividend changes

Year	t = 1		t = 2	
	β_{1P}	β_{1N}	β_{1P}	β_{1N}
1989	0.0111 (1.4485)	0.0135 (0.2503)	-0.0315** (-2.3154)	0.1332 (1.4169)
1990	-0.0013 (-0.3427)	-0.0469 (-0.8220)	0.0014 (0.3344)	-0.0209 (-0.3355)
1991	0.0068 (0.4734)	-0.0707 (-1.1337)	0.0455 (1.1122)	0.2584 (1.4843)

Table 4.4 - *Continued*

1992	0.0143 (0.1987)	-0.0021 (-0.0269)	0.0445 (0.6555)	0.0931 (1.2587)
1993	0.0636 (0.7025)	0.0633 (0.5662)	-0.0506 (-0.2410)	-0.0153 (-0.0596)
1994	0.0207 (0.2764)	-0.9800*** (-3.4226)	0.0077 (0.1484)	-0.0724 (-0.3656)
1995	0.0090 (0.3652)	0.1420 (0.8777)	-0.0183 (-0.1302)	-1.3008 (-1.4123)
1996	0.1015 (0.3633)	-1.0295 (-1.2690)	0.0257 (0.1137)	0.0909 (0.1413)
1997	0.1139 (0.2489)	1.4491** (2.0570)	-0.0859 (-0.3830)	0.1742 (0.5193)
1998	0.0084 (0.1630)	0.3143 (0.5687)	-0.0009 (-0.0503)	-0.5931*** (-3.0474)
1999	-0.0913 (-0.5316)	0.1961 (0.4746)	0.0129 (0.2317)	-0.0324 (-0.2495)

Table 4.5: The relations between dividends and earnings performance by controlling the linear mean reversion and autocorrelation effects

This table reports the estimates of the regression models, which regress raw earnings changes for years 0, 1 and 2 on dividend changes on year 0 (the event year) as well as mean reversion and autocorrelation variables. The raw earnings changes for year t (CE_t) are computed by annual earnings difference between year t and year $t-1$ as a percentage of the book value per share of year $t-1$. ΔDiv_0 is the rate of dividend changes, which is computed as the difference of the dividend per share for year -1 and the dividend per share for year 0 as a percentage of the dividend per share for year -1 . DPC_0 (DNC_0) is a dummy, which equals 1 when dividend increases (decrease) in year 0, and equals 0 otherwise. DFE_t denotes the deviation of the returns on equity from its expected value, which is predicted by market value, market-to-book ratio, total sales adjusted by total assets, and lagged returns on equity.

The models employ the estimation procedure for panel data suggested by Fama and Macbeth (1973). Panel B presents the results of the initial stage of the procedure. The cross-sectional regression coefficients are estimated for each year from 1989 to 1999. Panel A, which presents the results of the second stage, shows the mean regression coefficients estimated by averaging the annual cross-sectional coefficients of each year in Panel B. The t -statistics for the mean coefficients are defined as the mean divided by its standard error (time-series standard deviation of the coefficient divided by $11^{1/2}$). All t -statistics are shown in parentheses. Statistical significance at 0.1, 0.05 and 0.01 are marked with *, **, and *** respectively.

$$CE_t = \beta_0 + \beta_{IP} DPC_0 \times \Delta Div_0 + \beta_{IN} DNC_0 \times \Delta Div_0 + \gamma_1 DFE_{t-1} + \lambda_1 CE_{t-1} + \varepsilon_t \quad (4.7)$$

Panel A: Time-serial means of the cross-sectional regression coefficients

Year	β_0	β_{IP}	β_{IN}	γ_1	λ_1	Adj-R ²
t = 0	0.1181** (2.2845)	0.0254 (0.7152)	0.4245*** (5.2316)	0.0119 (0.0401)	0.4849* (1.9142)	0.2711*** (4.1587)
t = 1	0.0936 (0.8318)	0.0348 (1.1651)	0.2269* (1.7615)	0.6441 (0.6820)	0.6009 (1.4082)	0.1693*** (3.8912)
t = 2	0.0389 (0.6522)	0.0185 (0.8635)	0.1778 (1.2527)	0.0086 (0.0342)	0.7089** (2.4064)	0.2199*** (2.8037)

Panel B: Annual cross-sectional regression coefficients of dividend changes

Year	t = 0		t = 1		t = 2	
	β_{IP}	β_{IN}	β_{IP}	β_{IN}	β_{IP}	β_{IN}
1989	0.1295*** (2.7223)	0.1951** (2.1143)	-0.0106 (-0.4728)	0.0581 (0.2971)	-0.0457 (-1.6112)	-0.0776 (-0.7223)
1990	0.0020 (0.2572)	0.3450** (2.2682)	0.0017 (0.1710)	-0.0129 (-0.1331)	-0.0273 (-0.4959)	0.1524 (0.2881)

Table 4.5 - *Continued*

1991	-0.0001 (-0.0074)	0.2491*** (3.5920)	-0.0176 (-0.3440)	-0.1602 (-0.3955)	0.0152 (0.2208)	0.5415 (1.0372)
1992	-0.2252 (-0.3831)	0.3487 (1.3617)	0.0865 (0.3989)	0.2594 (1.1106)	0.0075 (0.0354)	-0.5290 (-1.3607)
1993	0.1879 (1.0262)	0.8323*** (3.8018)	-0.0449 (-0.1724)	-0.1822 (-0.5038)	0.1989 (0.7551)	0.2645 (0.8707)
1994	0.1244 (0.4133)	0.2464 (0.6891)	0.0156 (0.4108)	0.7176** (2.5648)	-0.0281 (-0.9666)	0.2861 (1.0150)
1995	0.0202 (0.1946)	0.8466*** (2.7415)	-0.0054 (-0.1370)	-0.0961 (-0.2736)	0.0331 (0.4663)	1.2196* (1.9471)
1996	0.1238 (0.7201)	-0.0252 (-0.0443)	0.0479 (1.1086)	-0.0946 (-0.3040)	-0.0063 (-0.1407)	0.0285 (0.1290)
1997	0.0057 (0.2069)	0.6097*** (3.2495)	-0.0110 (-0.3814)	0.1768 (0.6214)	-0.0229 (-0.1088)	0.2938 (0.4070)
1998	-0.1064 (-0.5248)	0.4878** (2.3970)	0.0063 (0.1550)	1.0224 (1.3317)	-0.0148 (-0.6405)	0.2126 (0.4532)
1999	0.0175 (0.3052)	0.5334* (1.8546)	0.3142 (0.3427)	0.8072 (0.1108)	0.0940 (0.9391)	-0.4364 (-0.6837)

Table 4.6: The relations between dividends and earnings performance by controlling the non-linear mean reversion and autocorrelation effects

This table reports the estimates of the regression models, which regress raw earnings changes for years 0, 1 and 2 on dividend changes on year 0 (the event year) as well as mean reversion and autocorrelation variables. The raw earnings changes for year t (CE_t) are computed by annual earnings difference between year t and year $t-1$ as a percentage of the book value per share of year $t-1$. ΔDiv_0 is the rate of dividend changes, which is computed as the difference of the dividend per share for year -1 and the dividend per share for year 0 as a percentage of the dividend per share for year -1 . DPC_0 (DNC_0) is a dummy, which equals 1 when dividend increases (decrease) in year 0, and equals 0 otherwise. DFE_t denotes the deviation of the returns on equity from its expected value, which is predicted by lagged total assets, lagged market-to-book ratio, and lagged returns on equity. $SDFE_{t-1}$ and SCE_{t-1} respectively denote square DFE_{t-1} and square CE_{t-1} .

The model employs the estimation procedure for panel data suggested by Fama and Macbeth (1973). Panel B presents the results of the initial stage of the procedure. The cross-sectional regression coefficients are estimated for each year from 1989 to 1999. Panel A, which presents the results of the second stage, shows the time-series mean of cross-sectional coefficients in Panel B. The t-statistics for the mean coefficients are defined as the mean divided by its standard error (time-series standard deviation of the coefficient divided by $11^{1/2}$). All t-statistics are shown in parentheses. Statistical significance at 0.1, 0.05 and 0.01 are marked with *, **, and *** respectively.

$$CE_t = \beta_0 + \beta_{1P} DPC_0 \times \Delta Div_0 + \beta_{1N} DNC_0 \times \Delta Div_0 + \gamma_1 DFE_{t-1} + \gamma_2 SDFE_{t-1} + \lambda_1 CE_{t-1} + \lambda_2 SCE_{t-1} + \varepsilon_t \quad (4.9)$$

Panel A: Time-serial means of the cross-sectional regression coefficients

Year	β_0	β_{1P}	β_{1N}	γ_1	γ_2	λ_1	λ_2	Adj-R ²
t = 0	-0.0622 (-1.3619)	0.0550** (2.4562)	0.3890*** (5.3845)	-0.2948* (-1.9598)	1.6576 (1.0374)	1.4042*** (3.5359)	-0.5774 (-0.6852)	0.3687*** (4.9335)
t = 1	-0.2980 (-1.0333)	0.0129 (0.2574)	-0.1115 (-0.6014)	-0.0667 (-0.1445)	1.9038 (0.6344)	2.4972 (1.4267)	-0.8912 (-0.4439)	0.2730*** (5.9875)
t = 2	-0.0648 (-1.1464)	0.0044 (0.2547)	-0.0653 (-0.6492)	0.0411 (0.0792)	0.2113 (0.2327)	1.2497*** (3.7245)	0.0514 (0.0634)	0.3761*** (4.7934)

Panel B: Annual cross-sectional regression coefficients of dividend changes

Year	t = 0		t = 1		t = 2	
	β_{1P}	β_{1N}	β_{1P}	β_{1N}	β_{1P}	β_{1N}
1989	0.1543*** (3.3580)	0.1693* (1.9243)	-0.0030 (-0.1207)	0.0746 (0.3654)	-0.0451 (-1.5734)	-0.0968 (-0.8580)
1990	0.0010 (0.1212)	0.3400** (2.2356)	0.0016 (0.1648)	-0.0100 (-0.0992)	-0.0495 (-0.9550)	0.2820 (0.5694)

Table 4.6 - *Continued*

1991	0.0018	0.2539***	-0.0156	0.1517	0.0058	-0.0646
	(0.1528)	(3.7222)	(-0.3222)	(0.3777)	(0.1030)	(-0.1500)
1992	0.1653	0.1301	-0.3188*	-0.2719	0.0332	-0.0845
	(0.3174)	(0.5730)	(-1.7736)	(-1.3754)	(0.1595)	(-0.2041)
1993	0.1293	0.7621***	0.0114	-0.1057	0.0449	-0.0075
	(0.8630)	(3.9486)	(0.0440)	(-0.2901)	(0.1741)	(-0.0237)
1994	0.0926	0.3225	0.0084	0.4294	-0.0352	0.3527*
	(0.3107)	(0.9078)	(0.2254)	(1.4870)	(-1.6149)	(1.6692)
1995	0.0560	0.7169**	0.0061	0.2571	0.0187	0.2117
	(0.5516)	(2.3511)	(0.1810)	(0.8344)	(0.3202)	(0.3986)
1996	0.0456	0.0257	0.0413	-0.1580	-0.0230	0.1770
	(0.4670)	(0.0795)	(0.9444)	(-0.4962)	(-0.5336)	(0.8172)
1997	0.0190	0.5276***	-0.0100	0.1547	-0.0425	-0.4141
	(0.7222)	(2.8818)	(-0.3528)	(0.5492)	(-0.2174)	(-0.5976)
1998	-0.0781	0.4719**	0.0015	0.1199	-0.0067	-0.7714
	(-0.3909)	(2.3502)	(0.0386)	(0.1474)	(-0.3441)	(-1.8277)
1999	0.0184	0.5590**	0.4194	-1.8680	0.1483	-0.3025
	(0.3282)	(1.9929)	(0.5839)	(-0.3270)	(2.0415)	(-0.6551)

Table 4.7: The influence of earnings performance on firms' dividend decisions

This table presents the estimates of binary logit models. The dependent variable is equal to zero for dividend cuts (k) and one for dividend increases (j). The explanatory variables are the earnings changes for year 0 (the event year, CE_0), year 1 (CE_1) and (or) year 2 (CE_2). Log-likelihood measures how well the models fit the data. The less negative the value the better the fit. Wald chi-square statistics test the null hypothesis stating that all coefficients equal to 0. The p-value on the bottom of the table indicates the significance level of Wald test. The value in parentheses is the Z statistic for each coefficient. Statistical significance at 0.1, 0.05 and 0.01 are marked with *, **, and *** respectively.

$$\text{Logit Model: } L_{it} = \text{Ln} \left[\frac{P_{it}(j)}{P_{it}(k)} \right] = \beta^* x_{it} \quad \forall k \neq j \quad (4.14)$$

Earnings	Column	1	2	3	4	5
CE_0		6.6423*** (8.91)			6.5527*** (8.83)	6.4981*** (8.77)
CE_1			0.0102 (0.04)		-0.0731 (-0.25)	-0.0826 (-0.29)
CE_2				0.0084 (0.05)		-0.0299 (-0.17)
Intercept		2.8492*** (17.69)	2.7749 (19.34)	2.7829 (19.34)	2.8436*** (17.75)	2.8568*** (17.65)
Log-Likelihood		-595.4527	-645.0192	-639.0735	-588.5857	-583.4896
Wald X^2		79.38***	0.00	0.00	78.22***	77.24***
p-value		0.0000	0.9665	0.9589	0.0000	0.0000

Chapter 5

Managerial Motives and Shareholders' Wealth Effect of Share Repurchases

5.1. Introduction

Share repurchases (i.e. share buybacks), an alternative payout mechanism to cash dividends, have grown the increasing popularity among payout devices for many firms. Firms distribute cash for buying back a certain proportion of their own shares from shareholders by share repurchases. Unlike cash dividends, share repurchases are not expected to be a recurring or regular event, and thus are viewed as a more flexible payout mechanism. Brav, Graham, Harvey, and Michaely (2005) indicate that, in financial executives' point of view, share repurchases are a "very flexible" payout policy which they do not need to smooth through time. Another element making share repurchases a flexible policy is that firms which announce share repurchases are not obligated to accomplish in the future. Since these flexibility natures are inherent in share repurchases, firms which announce repurchase programmes may have different motives and characteristics from those which announce cash dividends.

To date, the evidence about the motives for announcing share repurchases and the market reactions to the announcements is extensively documented for the US share repurchases while still little attention has yet been paid to the UK share repurchases. However, given the different taxation and regulations, investors' appetite and managers' employment of share repurchases in the UK may be divergent from those in the US. Consequently, this chapter is important in that it aims to provide

incremental and innovative evidence for the share repurchases in the UK market.

In addition, for the UK share repurchases, Rau and Vermaelen (2002) already examine the shareholders' wealth effect around the UK repurchase announcements for various repurchase methods. However, it is criticised by Oswald and Young (2004) that Rau and Vermaelen's (2002) data are short on the numbers of share repurchase announcements. The study carried out by Oswald and Young (2004) use a more complete sample but they only focus on open market share repurchases. Neither of these two studies examines the shareholders' wealth effect of the announcements of tender offer share repurchases. As the findings in the US market suggest that different repurchase methods possess different signalling power³⁷, this chapter is interested in understanding whether the same findings exist in the UK market under the different taxation and regulations framework.

Furthermore, this chapter examines various potential managerial motives, mainly focusing on signalling undervaluation, signalling firms' performance and substituting dividends, for announcing share repurchases. Recent studies on the UK share repurchases mainly examine shareholders' wealth effect³⁸. However, since various motivations for announcing share repurchases have been suggested by the US findings³⁹, examining only the shareholders' wealth effect is insufficient for understanding the managerial motives for announcing share repurchases.

Moreover, for the UK market, this chapter creatively compares the managerial

³⁷ Comment and Jarrell (1991) show that the announcements of tender offer repurchases induce larger market reactions than the announcements of open market repurchases. In addition, prior evidence shows that the market responds significantly to the announcements of privately-negotiated repurchases (Peyer and Vermaelen, 2005; Bradley and Wakeman, 1983).

³⁸ See Rau and Vermaelen (2002), Oswald and Young (2004) and Rees (1996).

³⁹ See Jagannathan, Stephens, and Weisbach (2000), Stonham (2002) and Badrinath, Varaiya, and Ferling (2001).

motives for announcing share repurchases to those for other payout decisions (e.g. no payouts, cash dividends, or both dividends and share repurchases). This comparison is important in that the findings help investors to understand the reasons why managers choose dividends or (and) share repurchases as the payout device.

Of particular interest in this chapter are the examinations on the UK share repurchases focusing on:

1. the market reactions to share repurchase announcements to understand whether the announcements are informative,
2. the long-term price performance preceding and following share repurchase announcements to understand whether the undervaluation is a reason for announcing share repurchases and whether the wealth effect of share repurchases last during a long period after the announcements, and
3. the managerial motives for making share repurchase and (or) dividend announcements to see whether managers make these announcements with the same intentions.

Firstly, the market responses to share repurchase announcements are examined for the full sample and also for different share repurchase methods, including open market share repurchases, privately-negotiated repurchases and tender offer repurchases. The findings of this chapter demonstrate positive and significant abnormal returns associated with all the three repurchasing methods. Consistent with the previous US findings (Comment and Jarrell, 1991), the abnormal returns are larger positive around

tender offer share repurchase announcements than around the announcements of the other repurchasing methods. By comparison, the market reactions to open market repurchase announcements are the smallest amongst the three methods. The evidence of this chapter, therefore, implies that there is positive information implicit in share repurchase announcements regardless of the repurchasing methods. Moreover, the announcements of tender offer share repurchases are more informative than the others.

Additionally, this chapter tests the long-term wealth effect to better understand in 1) whether the firms are under-priced before share repurchases announcements and 2) whether the share price has a long-term uptrend following the announcements. Intuitively, since firms and general shareholders are the counterparts of open market share repurchases, firms could often employ their superior information to buy back own shares with bargain prices. Hence, it could conceivably be hypothesised in this chapter that negative long-term abnormal returns precede and positive abnormal returns follow the open market repurchase announcements.

By contrast, tender offer repurchases often offer a premium higher than the market price. If the undervaluation is the main purpose of making the tender offer repurchases, it is not necessary for the firms to offer the premium. Thus, signalling for the firms' performance may be the other implicit intention of tender offer repurchases. In addition, the tender offer repurchases are often completed within few months, it is not expected that the effect would last long. Consequently, it is possible to hypothesise for tender offer repurchases that the announcements are preceded by negative abnormal returns and followed by positive abnormal returns. However, the positive post-announcement wealth effect is predicted to diminish sooner than that

induced by open market repurchase announcements.

Differently, privately-negotiated share repurchases are the only repurchases which firms do not deal with small shareholders. Interestingly, sometimes the share repurchases are even proposed by the large shareholders. As large shareholders are believed to possess more information than small shareholders, their intention to sell a large amount of their shares to the firms is not necessarily good news to the firms' shareholders. This chapter, consequently, tests the hypothesis predicting that the announcements are preceded by long-term negative abnormal returns but do not place definite prediction for the post-announcement abnormal returns which are determined by whether the large shareholders make a better trading decision than the firms.

The findings of this chapter corroborate that the announcing firms generally have under-performing share prices for two years before they announce the share repurchases. Furthermore, the firms have long-term uptrend on abnormal returns subsequent to open market and privately-negotiated repurchase announcements. Based on the evidence, it is implied that the undervaluation of the firm value is an important factor inducing share repurchasing announcements, which is consistent with the prediction of the tested hypothesis.

The third objective of this chapter is to understand the managerial motives for announcing share repurchases and comparing the various motives with those of announcing dividends. To this end, this chapter employs a multinomial logit model to compare the motivations and characteristics of the firms with different payout decisions. The results of the test show that firms which announce only share repurchases are smaller in size, with higher debt ratios, less profitable, and with lower

market-to-book ratio than firms which announce dividends. Furthermore, firms which announce both dividends and share repurchases are found to be larger, with lower debt ratios, more profitable, more permanent in operating incomes, but with lower market-to-book ratio than firms which announce dividends. Taken together, the overall evidence from examining the multinomial logit model implies that firms are likely to make share repurchase announcements when they are conscious that their share price is undervalued. While the firms intend to signal for their superior operating performance, they tend to impose dividend announcements, or both dividend and share repurchase announcements. In this case, solely announcing share repurchase announcements unlikely signal for operating performance. Besides, as the firms making the different payout announcements are divergent in firm characteristics, the evidence also rejects the hypothesis that share repurchases are made to substitute dividends.

Chapter 5 is organised as follows. Section 5.2 reviews the literature with respect to share repurchases. Data collection and the descriptive statistics for the sample employed are presented in the Section 5.3, followed by the section of methodology and hypotheses development. Section 5.5 presents the empirical results and Section 5.6 concludes the findings of this chapter.

5.2. Background and prior evidence on share repurchases

5.2.1. Regulations and taxation on share repurchases

Regulations of share repurchases in the UK

In the UK, repurchase programmes, after being approved at shareholders' meeting, could be carried out by the firms any time in the following 18-month period. Once repurchases are made, the details of the transactions need to be reported to the United Kingdom Listing Authority (UKLA) immediately. This provision, ensuring that the firms disclose the repurchase information to the market, simultaneously reduces the information asymmetry between the firms and the market.

Another important thing is that the regulation also specifies the price range of share repurchases. The firms are allowed to buyback its own shares in the open market as long as 1) the shares sought do not exceed 15 percent of the number of outstanding shares and 2) the price paid is not more than five percent above the average price of those shares for the ten business days before the repurchase is made. For share repurchases exceeding 15 percent of the number of outstanding shares, the firms have to implement the programmes by tender offer. This regulatory approach prohibits firms' manipulating the share prices by share repurchases.

Furthermore, the UK firms are only allowed to buyback their own shares by using distributable profits or the incomes from new issued shares⁴⁰. This ordinance ensures that the firms will not repurchase by increasing leverage and indirectly harming the

⁴⁰ For example, the firms are not allowed to use the proceeds from debts to repurchase their own shares.

right of their bondholders or creditors. Finally, concerning about pre-empting rights of shareholders, the repurchase firms, under the Companies Regulations 2003, are required to cancel all shares repurchased. However, from 1st December 2003, the firms are allowed to hold up to ten percent of their own share in treasury. These treasury shares can be used for resale, employees' share scheme or cancellation.

From the above regulatory provisions, some further notions could be found for this chapter. Firstly, the almost simultaneously informing investors about the announcements or the execution of share repurchases leaves managers' little chances to manipulate the share price by making share repurchases. It can thus be suggested that the fluctuation of shareholders' wealth around repurchase announcements in the UK market may be due to the changes of investors' evaluations on the shares. Additionally, similar to the US regulation on share repurchases, the firms in the UK market are not allowed to finance for share repurchases by using the proceeds of debts. The funds for share repurchases should be distributable profits or the incomes of issuing new shares. It indirectly provides a good opportunity to test the signalling hypothesis which predicts the announcements of share repurchases signal for higher earnings or profits. However, a notable difference between the UK and the US markets is that, in light of Companies Regulations 2003, repurchasing firms in the UK market have to cancel all the shares repurchased and it was not until 1st December 2003 that treasury shares were allowed. It implies that, before 1st December 2003, the UK firms are unlikely to buyback their own share for employee' share scheme. Therefore, the undervaluation and signalling hypotheses become the main focus of this chapter since this chapter investigates the share repurchases during the period of 1995 and 2004.

Taxation on share repurchases in the UK

Taxation on share repurchases is another factor which may affect investors' appetite for different payout methods⁴¹. In the UK, "advance corporation tax" (ACT), which, for firms, can be set against the firms' subsequent corporation tax liability, and, for shareholders, can be repayable as tax credit, used to play an important role in firms' payout policy before its abolishment on 6th April 1999. The changes of the tax regimes in the UK and its influence on investors' decisions on dividends and share repurchases are illustrated as the followings.

Prior to 7th October 1996, firms, exclusive of making open market repurchases, are required to pay ACT when they distribute dividends or make share repurchases. Relatively, investors can only reclaim tax credit when cash is paid by dividends or off-market repurchase programmes, making open market repurchases less attractive to investors. From 8th October 1996, a tax reform which no longer allows tax-exempt investors to reclaim the tax credits for the off-market repurchase makes tax-exempt investors become indifferent between off-market repurchases and open market repurchases. The tax credits for dividends are also eliminated from tax-exempt institutional investors after 2nd July 1997 and from all other tax-exempt investors after 1st April 1999. The tax credits, after the abolishment of ACT on 6th April 1999, are only available for investors to offset against any tax which may due on their dividend incomes or capital gains from share repurchases⁴².

Similarly, share repurchases in the US are taxed as capital gains but dividends are taxed as ordinary incomes. However, while tax credits made dividends more attractive

⁴¹ See Rau and Vermaelen (2002) and Oswald & Young (2004).

⁴² In tax year 2004 to 2005, investors whose incomes are less than £36,145 or net capital gains are less than £8,200 are not required to pay further tax on dividends incomes or capital gains from share repurchases.

than share repurchases in the UK, the tax advantage possessed by the US share repurchases make them a preferred payout method, compared to dividends. Grullon and Michaely (2002) indicate that the US firms have gradually substituted share repurchases for dividends after Rule 10b-18 provides a safe harbour for share repurchases. In the US, the maximum rate on capital gains dropped below the maximum rate on ordinary incomes in 1991. The long-term capital gains further dropped to 20 percent in 1997, resulting in significant increases in share repurchases (McGrattan and Prescott, 2005). Given the different tax effects on share repurchases in the UK and in the US, this chapter is therefore interested in understanding whether share repurchases, as what have been indicated in the US, are employed as a substitution for dividends in the UK.

5.2.2. Shareholders' wealth effect of repurchase announcements

The wealth effect of share repurchase announcements has been extensively documented in the literature. Generally, markets respond positively to share repurchase announcements, but the magnitude of the responses are varied with the methods of share repurchases. This section focuses on discussing previous findings of short-term shareholders' wealth effect while prior evidence on long-term wealth effect is presented in Section 5.2.2 with undervaluation hypothesis.

Examining the market reactions to tender offer repurchase announcements, Dann's (1981) evidence indicates that, with the average 22.46 percent of tender offer premium, the cumulative abnormal returns on the day and the subsequent day of the announcements are 15.78 percent. Consistent with the findings of Dann (1981), Vermaelen (1981) and Masulis (1980) respectively detects 14.14 and 16.35 percent of

the two-day cumulative abnormal returns around the tender offer repurchase announcements. In 1991, Comment and Jarrell (1991), more specifically, examine the market reactions to Dutch-auction and fixed-price tender offer repurchases. Due to the different methods of determining the purchase prices⁴³, Comment and Jarrell (1991) predict that the market should respond more greatly to the fixed-price tender offer repurchases which provide larger premiums and more creditable signals. Consistent with their prediction, the firms which announce the fixed-price tender offer repurchases averagely earn 11 percent of abnormal returns which are significantly higher than eight percent earned by the firms announcing the Dutch-auction tender offer repurchases.

By comparing the market reactions to tender offer repurchase and special dividend announcements, the findings of Howe, He, and Kao (1992) show that the market reactions to tender offer repurchase announcements are twice larger than those to special dividend announcements. Nevertheless, when they further examine the market reactions by Tobin's Q ratio, no significant differences between the market reactions to the high-Q firms and the low-Q firms are detected for both tender offer repurchase and special dividend announcements. Remarkably, their evidence on the market reactions to tender offer repurchase announcements supports the signalling theory but not the agency theory for share repurchases. Similar examinations are carried out by Chhachhi and Davidson (1997) with further considering preferential tax rate on share repurchases. After the tax reform which eliminates the tax advantage of tender offer repurchases, the cumulative abnormal returns around the tender offer repurchase announcements reduce about 2.5 percent which are still greater than the cumulative abnormal returns around the special dividend announcements.

⁴³ See Comment and Jarrell (1991), p. 1247.

In comparison to the shareholders' wealth effect of the tender offer repurchase announcements, the effect of the open market repurchase announcements is relatively small. Only two percent of the abnormal returns around the open market repurchase announcements is found by Comment and Jarrell (1991) who detect eight and 11 percent of the abnormal returns around the tender offer repurchase announcements. Recently, Peyer and Vermaelen (2005) also document higher market reactions to tender offer repurchase announcements, compared with the reactions to open market repurchase announcements.

Ikenberry, Lakonishok, and Vermaelen (1995) focus on examining open market repurchases and find that 1) the market reactions to the announcements are positively related to the fraction of share sought, and 2) the smaller the firm size of the announcing firms is, the greater the market reactions to the announcements are. The first evidence is consistent with the finding of Comment and Jarrell (1991) while the second evidence indicates that the market reactions to the announcements are dependent on information asymmetry. For the full sample, they present 3.54 percent of the cumulative abnormal returns during the five-day period centred on the announcement days. This evidence is also presented similarly by Otchere and Ross (2002) on examining the open market share repurchase announcements in Australia. Nonetheless, the five-day cumulative abnormal returns found by Rau and Vermaelen (2002) for the UK market are only 1.38 percent which are much smaller than the above findings.

Jagannathan and Stephens (2003) carry out a study which compares the market reactions to the open market repurchase announcements with different announcement frequencies. They find that the first announcements made in the preceding five years

(infrequent repurchases) induce the largest market reactions which are about 3.36 percent of the three-day abnormal returns. By contrast, the second announcements only induce 1.98 percent and the third or the subsequent announcements only induce 1.13 percent of the abnormal returns. By implication, these findings suggest that the market reactions shrink as the frequencies of the open market repurchase announcements increases.

With respect to the market reactions to privately-negotiated share repurchase announcements, no abnormal returns existing around the announcement days are found by Rau and Vermaelen (2002). In 2005, more comprehensive examinations are carried out by Peyer and Vermaelen (2005) by focusing on the privately-negotiated repurchases with different repurchase premiums. Their findings show that, except the greenmail repurchases⁴⁴, the market reacts positively to the announcements regardless of the repurchase premiums. However, the announcements with positive repurchase premiums induce larger market reactions than those with negative premiums. Peyer and Vermaelen (2005) attribute the difference of the market reactions to that the premium repurchases which may convey information to the market are more likely to be proposed by the firms. By contrast, the discounted repurchases, more likely to be initiated by the large shareholders, are not made for the intention of signalling.

To conclude, markets, in general, react positively to share repurchase announcements, indicating that share repurchases signal for positive information to investors. Additionally, tender offer repurchase announcements averagely induce greater market reactions, compared with the other repurchase methods. Repurchase premiums of tender offer repurchases could be responsible for this finding.

⁴⁴ Greenmail repurchases are the repurchases which are made for anti-takeover.

5.2.3. Managerial motives for share repurchases

Undervaluation hypothesis and long-term shareholders' wealth effect

The undervaluation hypothesis is a kind of signalling hypothesis, which predicts that the undervaluation of share prices is the motive for share repurchases. Previous studies indicate that managers possess more information about the firm's true current situation than outsiders do⁴⁵, leading to the possibility that the outsiders evaluate the firm value inaccurately. While managers, with more information, disagree with the performance of the share prices, they expect to get a positive response from the market by announcing share repurchase programmes. Moreover, the undervaluation hypothesis also predicts that the announcements are preceded by negative abnormal returns and sometimes followed by positive abnormal returns.

A number of studies investigate this hypothesis by testing the long-term returns performance. Liano, Huang, and Manakyan (2003) compare the long-term abnormal returns of the repurchasing firms to their industry peers. Contrary to the prediction of the undervaluation hypothesis, the repurchasing firms are not found to outperform their industry peers in long-term returns performance during the post-announcement period. Similarly, in contrast to the prediction, Rau and Vermaelen's (2002) examination on the long-term return performance find negative abnormal returns preceding open market repurchase and privately-negotiated repurchase announcements but the returns are insignificant. Extending Rau and Vermaelen's (2002) study by using more comprehensive data, Oswald and Young's (2004) results present negative (positive) pre-announcement (post-announcement) abnormal returns, supporting the prediction of the undervaluation hypothesis.

⁴⁵ See Jaffe (1974) and Seyhun (1986).

Ikenberry, Lakonishok, and Vermaelen (1995) estimate long-term abnormal returns around open market repurchases in light of firm sizes and book-to-market ratios. The firm size is a proxy for asymmetric information while the book-to-market ratio is employed to indicate the level of undervaluation⁴⁶. Their finding shows that the firms with high book-to-market ratio (value firms) averagely have higher compounded returns (45 percent) than the reference portfolio while the firms with lowest book-to-market ratio (glamour firms) only have an even market performance with their matched firms. This evidence, with the indication that the market revises their evaluation for the value firms after the share repurchase announcements while the revision is unlikely for the glamour firms, concludes that the undervaluation is an important reason motivating share repurchases for the value firms.

Ikenberry, Lakonishok, and Vermaelen (2000) further extend their tests on the open market share repurchases in Canada. Estimating the abnormal returns by using Fama and French's (1993) three-factor model, they find negative abnormal returns (averagely -0.348 percent per month) during the twelve-month period preceding the announcements and positive abnormal returns up to three years following the announcements. Furthermore, consistent with Ikenberry, Lakonishok, and Vermaelen (1995), the value firms are found to have better post-announcement returns performance than the glamour firms. Besides, negative abnormal returns are also detected for the value firms during the twelve-month period preceding the announcements.

In addition to the estimations on the long-term returns performance, Ikenberry, Lakonishok, and Vermaelen (2000) test the undervaluation hypothesis by examining

⁴⁶ High book-to-market ratio indicates the undervaluation of the firms.

the determinants of share repurchase completion rates. The evidence to emerge from their test indicates that the portion of shares repurchased negatively relates to the previous share performance and positively relates to book-to-market ratio. This evidence is later supported by the UK findings of Oswald and Young (2004), suggesting that the undervaluation of the share prices would instigate the firms to buyback more shares. Similarly, the findings of Stephens and Weisbach (1998) likewise suggest negative association between the ratio of shares repurchased to shares announced (or shares outstanding) and the previous-quarter returns. However, Dittmar (2000) do not find the evidence about real repurchases preceded by negative market performances⁴⁷ but her evidence confirms that the actual repurchases are negatively related to market-to-book ratio.

Examining the motives for share repurchases between the firms with frequent and infrequent share repurchases, Jagannathan and Stephens (2003) point out that the firms with less-frequent repurchases have lower market-to-book ratio, suggesting that undervaluation is a reason for these firms to buyback own shares. By contrast, the firms which repurchase frequently (or regularly) are much larger in size, with higher dividend payout ratios and have less volatile operating income. In this case, the undervaluation is unlikely a reason for such firms to make share repurchases.

Following the previous studies, this chapter tests the undervaluation hypothesis by testing long-term abnormal returns and the predictive power of market-to-book ratio on payout decisions. The hypothesis predicts that the share repurchase announcements are preceded by negative long-term abnormal returns, and may be followed by positive abnormal returns as well. Moreover, the repurchasing firms are predicted to

⁴⁷ She estimates the return by using the value-weighted, market-adjusted stock return in the calendar year prior to the repurchase to measure misevaluation.

have lower market-to-book ratio than dividend-paying or non-payout firms.

Signalling hypothesis

Unlike the undervaluation hypothesis, signalling hypothesis of share repurchases predicts that managers engage in share repurchase activities in order to signal for the profits or earnings information of their firms along with showing investors that their firms perform well. Under the prediction, the repurchasing firms are expected to have higher profits or earnings than the firms without paying out cash. The hypothesis also predicts that markets would respond positively to the announcements, resulting in positive abnormal returns around the days of announcement.

A number of studies examine this hypothesis by testing the relation of operating incomes to repurchase. Dann, Masulis, and Mayers (1991) examine the earnings information contained in tender offer repurchase announcements. In their test, the earnings forecast errors posterior to the repurchase announcements mostly appear to be positive. Furthermore, they test the relationship between abnormal returns and the earnings following the repurchase announcements, finding that the abnormal returns have positive relation to the post-announcement earnings for up to four years. Taken together, their evidence implies that not only tender offer repurchase announcements convey information about subsequent earnings, but also this information is perceived by the market while repurchases are announced.

Hertzel and Jain (1991) similarly investigate the earnings information contained in tender offer repurchase announcements⁴⁸. They find that analysts revise upwards their

⁴⁸ Although Dann, Masulis, and Mayers (1991) and Hertzel and Jain (1991) carry out the similar test, the variables they employ to measure operating performance are different. The former use both earnings per share (EPS) and earnings before interests and taxes (EBIT) while the latter use analyst forecasts on earnings performance.

forecasts for both short-term and long-term earnings. Moreover, they also detect positive relation between market reactions and short-term earnings revision, but no significant relation is found between market reactions and long-term earnings revision. They thus conclude that tender offer repurchase announcements only contain information about transitory changes in future earnings.

Examining the earnings signalled in fixed-price and Dutch auction tender offer repurchases, Lie and McConnell (1998) empirically test the signalling difference of these tender offer repurchases originally proposed by Comment and Jarrell (1991)⁴⁹. The evidence of Lie and McConnell (1998) suggest that the operating performance of the repurchase firms are better than their industry peers, and the outperformance continues to exist for up to five years following the announcement. However, the operating performances are not different between the two repurchase methods.

Grullon and Michaely (2004) examine the annual changes in operating performance preceding and following the announcements of open market share repurchase announcements. However, they fail to find evidence supporting the signalling hypothesis. In contrast, a part of their evidence shows that the changes in operating performance appear to be significantly negative up to three years following the announcements.

Recently, Lie (2005) re-examines the changes in operating performance around open market repurchase announcements. In comparison to the control firms matched by industry, prior operating performance, and market-to-book ratio, they find that the

⁴⁹ Basically, Comment and Jarrell (1991) focus their study on undervaluation information signalled by the repurchase with different methods. They suggest due that fixed-price tender offer repurchase pay larger repurchase premium than the other repurchase methods do, the signalling effect from fixed-price repurchase are stronger.

repurchase firms have significant improvement in operating performance over eight quarters (i.e. two years) following the announcements. Furthermore, they test the performance for two sub-samples, which are categorised in light of actual repurchases during the announcement quarter. They find remarkable improvement in operating performance following the announcement for the firms which actually repurchase during the announcement quarter, but find no evidence about the improvement for the firms which do not make repurchases during the announcement quarter. Particularly, they present the evidence that the actual repurchases signal more convinced information about the future improvement in operating performance.

The ratio of operating incomes to total assets is employed in this chapter to measure the firms' performance in the year of repurchase announcements. In light of the signalling hypothesis, it is predicted that firms which announce share repurchases should have higher operating incomes.

Substitution hypothesis

If the UK market is perfect and complete, share repurchases and dividends should be perfect substitutions for each other. According to Miller and Modigliani (1961), dividend policy is irrelevant to firm value in a perfect and complete market. A firm could finance for dividends by issuing new shares or new debts and the only difference between before and after dividend payment is the capital structures rather than the firm value. In contrast, if there is no dividend payment from firms, shareholders could get the cash they need by selling a part of shareholdings to others. And, still, firm value (i.e. total shareholdings) is not affected by this kind of transactions. *Ceteris paribus*, the proposition could also be applied to share repurchases. Thus, dividends and share repurchases should be a perfect substitution

for each other in perfect and complete markets.

In reality, different regulations and taxations are often applied to dividends and share repurchases, making investors prefer the one to the other. Moreover, the sources of cash flow financed for dividends and repurchases are also considered to be different. Since repurchases, unlike dividends, are not regarded as a recurring event and repurchase announcements are not as committed as dividend announcements, the hypothesis predicts that the firms with temporary cash flow prefer to pay out cash via share repurchases, whose flexibility nature gives the firms opportunity to withdraw from repurchase programmes when their cash flow is not sufficient enough in the future.

Some previous evidence is generated from the direct answers of the firms by using survey-based research. Wansley, Lane, and Sarkar (1989) fail to get a confirmative answer from either repurchasing or non-repurchasing firms to support the substitution hypothesis. Instead, their findings are more consistent with the prediction of the signalling hypothesis. A latest survey carried out by Brav, Graham, Harvey, and Michaely (2005) point out that investments and operating decisions are priorities over repurchase decisions, while dividend decisions are priority to investment decisions. This finding indirectly rejects the prediction of the substitution hypothesis. However, their survey also suggests that repurchases appear to be a substitution for dividends, but dividends are unlikely a substitution for repurchases. This evidence supports the “one-way substitution” advanced by Grullon and Michaely (2002).

An alternative method is to examine the firm characteristics between the firms which have different policies. Grullon and Michaely (2002) present that firms which only

pay dividends have similar firm characteristics to firms which pay dividends and buyback shares, while firms which make repurchases only have similar characteristics to firms which do not pay out any cash. This evidence implicitly suggests the fact that firms smooth dividends through time but do not smooth the repurchases. Furthermore, Grullon and Michaely (2002) test the relation between dividend forecast errors and repurchase yields. A significantly negative relation is found to exist between the dividend forecast errors and the repurchase yields. This evidence demonstrates that dividend-paying firms have substituted share repurchases for dividends, and this evidence is later supported by Brav, Graham, Harvey, and Michaely (2005).

Since special dividends and share repurchases are in common nature of nonrecurring, DeAngelo, DeAngelo, and Skinner (2000) hypothesise that the boom of share repurchases are related to the declines in special dividends. Their findings, however, reject this hypothesis. Firstly, their findings show that the declines in special dividends start in the late 1950s while the boom of share repurchases happen in the mid-1980s. The timing of these two events does not match. Secondly, only 20 percent of the firms which previously paid special dividends most frequently make share repurchases within ten years after they cease special dividends. By comparison, 53.7 percent of the firms which previously paid special dividend least often buy back own shares after ceasing special dividends. With these findings, share repurchases are not interpreted as the substitution for special dividends.

The strategy of this chapter to test the substitution hypothesis is to compare the managerial motives and the characteristics of the firms with different payout policies. This chapter hypothesises that the firms should have similar managerial motives and characteristics regardless of which payout policies, dividends or share repurchases,

they intend to distribute cash.

5.3. Data and descriptive statistics

5.3.1. Data

The data are collected from two sources. The first is the SDC database (now supplied by Thomson Financial), which contains the UK share repurchase announcements from 1985 afterwards. However, the SDC does not seem to contain all repurchase announcements in the UK. To ensure the tests could be carried out without the sample selection bias, this chapter further retrieves business news related to the UK share repurchases.

The data collection begins from getting a complete list of the UK firms from the Worldscope supplied by Thomson Research. The news is then retrieved for each firm in LexisNexis™ Academic, which holds a wild range of dated news from different media, including the Financial Times and the Extel Examiner. The search is mainly processed in the section of “business news” by:

1. using keywords “buyback”, “buy-back”, “purchase own shares” or “repurchase”.
2. limiting the search to country: “UK”.
3. filtering out the news of repurchasing bonds, warrants, or other non-equities.

On the other hand, the data obtained from the SDC are searched by the following criteria:

1. The firm is domiciled in the UK.
2. The firm is listed in London Stock Exchange at the time of the announcement.
3. The business description of the firm is not “investment trust” or “investment fund”.
4. The announcement date lies between 1st January 1995 and 31st December 2004.

The fourth criterion is employed since 1995 is the earliest year for the news obtainable from LexisNexis™ Academic. The search via these criteria generates 343 observations after crossing out the overlapping observations from the two databases.

The sample is further filtered for share repurchase announcements. For the observations from LexisNexis™ Academic, once any of the following situations are mentioned in the news, the observation is classified as “repurchase announcements” and included in the sample:

1. The firm considers or intends to buy back this year.
2. The firm indicates that buyback is a possible choice to pay out cash.
3. The board will seek approval of share repurchase programmes from shareholders.

4. The annual general meeting (AGM) has approved the share repurchase programme.

If a share repurchase programme is reported more than once, only the news with the earliest released date is included in the sample. The news is not expected to contain new information about the same repurchase programme if they are not first released.

For the data from the SDC, only the observations whose “announcement date” and “effective date” are recorded on different dates are included in the sample. As share repurchases in the UK have to be approved by shareholders before making actual repurchases, the observations which have the same date on the repurchase announcement and actual share repurchases must be recorded mistakenly by the SDC. Since this chapter focuses on the announcements of share repurchases rather than the actual share repurchases, the observations with the same announcement and effective dates are dropped.

Additionally, the firms included in the sample for the multinomial logit model are required 1) at least announcing share repurchase once over the period of 1995 to 2004, and 2) the data of the firm characteristics and the payout records over the above period feasible in Datastream. The descriptive statistics of this sample are presented in Panel B of Table 5.1.

5.3.2. Descriptive statistics

Panel A of Table 5.1 presents the number of the share repurchase announcements in each year of the sample period. Similar to the US situation, open market repurchase is

the majority of the repurchase programmes while privately-negotiated repurchase announcements happens less frequently compared to the two other repurchase methods.

There are 236 open market repurchases announced over the 10-year period from 1995 to 2004, while there are only 27 private negotiated repurchases and 58 tender offers repurchases announced over this period. Among 236 open market repurchase, 52 are announced in 1998, which is the most comparing to the other years. About 50% of open market repurchases are announced over the period of 1997-1998. The rapid swell on the numbers of the open market repurchase is probably stemmed from the change of the UK tax regime on 2nd July 1997, which eliminated the tax credit for dividends⁵⁰ and indirectly made the open market repurchase become popular.

As to privately-negotiated repurchases, ten were announced in 1997 while only a few numbers were announced in the other years. Remarkably, the numbers of tender offer repurchase announcements are about two times larger than the number of privately-negotiated repurchase announcements, indicating that the tender offer repurchases are relatively popular than the privately-negotiated repurchases.

Panel B of Table 5.1 demonstrates the mean and median firm characteristics and payout ratios by the categories of payout decisions. Similar to the categories designed in Grullon and Michaely (2002), this study divides the sample into four categories, which are 1) firms that do not pay out cash, 2) firms that announce cash dividends, 3)

⁵⁰ When paying dividends, the UK firms are required to pay 25 percent of the dividend payment as the advanced corporate tax (ACT). This means that the firms have to totally pay 1.25 times the original dividend. The shareholders who receive the dividend are levied tax on the basis of 1.25 times the original dividend. Then they can claim the ACT from the Inland Revenue as the "tax credit". More details about ACT and the changes of the tax regimes in the UK can be found in Rau and Vermaelen (2002) and Renneboog and Trojanowski (2005).

firms that announce share repurchases, and 4) firms that announce cash dividends and share repurchases.

Estimates of total assets indicate that the firms which pay dividends (regardless of the share repurchase policy) are much larger than the firms without paying dividends. The firms which announce both dividends and share repurchases conspicuously appear to have the largest total assets which are 7,013 million pounds for the mean and 619 million pounds for the median. Relatively, the repurchasing firms whose mean total assets are 376 million pounds and the non-payout firms whose median total assets are 73 million pounds are the smallest in size among the four categories. The estimates of the natural logarithms of total assets tell a similar story. The mean and median natural logarithms of total assets are about 13 for the firms which pay dividends (categories 1 and 3) and about 11 for the firms which do not pay dividends (categories 0 and 2). Both F test and median test illustrate that the differences across the categories are significant. Moreover, the mean (median) ratio of operating incomes to total assets are 9.1 (8.6) percent for firms which pay dividends but are negative for firms which do not pay dividends. Measuring by mean (about 0.2) or median (about 0.05), the standard deviations of operating income over five years prior to the announcement are larger for firms which do not pay out dividends (regardless of repurchase decisions). The tests on differences across the categories are significant at one percent level. Taken together, the aforementioned firm characteristics suggest that firms which announce dividends are larger, more profitable, and less volatile in operating performance than firms which do not pay dividends regardless of their repurchase policy.

Furthermore, the mean (median) ratio of cash and equivalent to total assets is higher

for firms which do not announce dividends (categories 1 and 3). The mean difference of the cash ratio is significant at one percent level but the median difference appears to be insignificant. As for the debt ratios, the only significant difference is found by one way ANOVA on short-term debts across the four categories. The median test does not detect any significant differences on both long-term and short-term debt ratios across the categories. This result is reasonable since the repurchase in the UK could only be financed by distributable profits or the proceeds from new issuing shares but not by debts.

The mean ratio of intangible assets to total assets is the largest for firms which announce repurchases (0.069) but is the lowest for firms which announce both dividends and repurchases (0.037). Nevertheless, the mean difference across the categories is merely marginally significant at ten percent level. Furthermore, firms that announce repurchases also have the lowest mean and median market-to-book ratio, which are -0.224 and 0.740 respectively while the mean market-to-book ratio for the firms that announce both dividends and repurchases is also as low as 0.022. These estimates seem to imply the undervaluation on the repurchasing firms.

Finally, with a number of similar firm characteristics, firms announcing dividends and firms announcing both dividends and share repurchases even have similar payout ratios. The mean payout ratio of the firms which announce both dividends and share repurchases is a little higher than that of the dividend-paying firms but t-statistic indicates that the difference is insignificant. Wilcoxon test further suggests that the median payout ratios of the two categories are not significantly different.

5.4. Methodology and hypotheses development

This chapter essentially imposes two approaches, namely event study and logit model, to respectively test the wealth effect of share repurchase announcements and the managerial motives for payout decisions. Under the event study approach, both short-term and long-term abnormal returns are estimated. The advantage of the event study is that, under the assumption of market efficiency, the test directly estimates the share prices around the event day to determine whether the market respond immediately to the information (MacKinlay, 1997). If the test accurately defines the event dates, the event effect around the event day could be measured by the average abnormal returns of a large sample. Moreover, the average abnormal returns could also mitigate the firm-specific effect. The second approach examines the firm characteristics by using a logit model. It provides an insight into the factors influencing firms to make decisions among various payout policies.

5.4.1. *Estimating market reactions to repurchase announcements*

Short-term abnormal returns for the full sample

The market reactions to the announcements of share repurchases are measured by the abnormal returns around the announcement days. The method imposed in this section is similar to that introduced in Section 3.4.1. Thus, this section only presents the research design specialised for this chapter.

The abnormal returns are estimated for an 81-day event period centred on the announcement day. Unlike the UK dividend announcements, the share repurchase announcements are not announced semiannually, which allows a longer event and

estimation periods for the examinations. Moreover, some previous studies examine the event period with a similar length since they hypothesise that share repurchase announcements are preceded by a downtrend of price performance (Dann, 1981; Comment and Jarrell, 1991)⁵¹.

The estimation period is a 150-day period from 190 days to 41 days prior to the day of repurchase announcements. To avoid incorporating the days around the adjacent repurchase announcements is necessary for consideration when deciding the length of the estimation period. Accordingly, the choice of the 150-day estimation period should be appropriate in that the repurchase announcement is not a regular event which would recur within a short period. Moreover, the long estimation period could improve the prediction power of the market model.

Given the valid semi-strong efficient market hypothesis, the market should respond to the repurchase announcements immediately if the announcements are informative. When the market does not perceive new information, the share prices are expected to follow their normal trends. Consequently, the daily returns of the estimation period are imposed to estimate the normal trend (i.e. the market model) which is not affected by the information conveyed by the share repurchase announcements. The market model is then applied to generate the expected returns for each day of the event period. The abnormal returns are the divergence between the real returns and the expected returns. Based on the signalling theory of payout policy, this chapter hypothesises that positive abnormal returns should be detected around the announcement days, and are expected to be zero over the rest of the event period.

⁵¹ The main interest of examining the short-term abnormal returns is to test whether the share repurchase announcements are informative. The undervaluation hypothesis is examined by the long-term abnormal returns which will be discussed later.

Estimating short-term abnormal returns by the methods of share repurchases

Open market repurchases are the most common repurchase methods in markets. It is indicated that firms, whose repurchase programmes have been approved by shareholders' meeting, could buy back own shares via open market transactions up to 18 months. Shareholders are unlikely to perceive that the repurchases are processing at the time when they sell the shares⁵². Due to this nature of open market repurchases, firms are likely to buyback shares when they think their share prices are bargained.

Privately-negotiated repurchases are the methods less related to small shareholders. The implication is that firms negotiate with large shareholders and buy back a fraction or the all shares of the large shareholders. The repurchases can be initiated by either the firms or the large shareholders.

Tender offer repurchases are often carried out with a high percentage of shares sought and with repurchase premiums. In the UK, firms are allowed to buyback their own shares in the open market as long as 1) the shares sought do not exceed 15 percent of the number of outstanding shares and 2) the price paid is not more than five percent above the average price of those shares for the ten business days before the repurchases. Therefore, for those firms purchasing own shares more than 15 percent limit, the repurchases are required to be implemented by tender offer. The process of the tender offer repurchases starts from firms' offering a certain percentage of shares sought and a fixed price or a range of prices with which they intend to buy back own shares. The shareholders then tender for the repurchases proposed within a specific period. Different from open market repurchases, tender offer repurchases are often completed within one month from the announcements.

⁵² However, once repurchase is made, the firm has to report the details of the repurchase to the United Kingdom Listing Authority (UKLA) before 7:30am on the next business day.

The different characteristics inherent in the three repurchase methods could lead to various market reactions. Shareholders are unlikely to be informed at the time when the open market repurchases are carried out. Thus, capital gains are the only benefits which shareholders may get from open market repurchases. Differently, tender offer repurchases usually provide investors with repurchase premiums, which is normally higher than the market value. Investors who are interested in the offers could tender for selling their shares to the repurchasing firms. The large percentage of shares sought and the repurchase premiums over the market prices make the information conveyed by tender offer announcements more likely confirmed and more favourable than that conveyed by open market repurchase announcements (Vermaelen, 1981; Comment and Jarrell, 1991). As a result, the hypothesis of this chapter predicts that the tender offer repurchase announcements are expected to induce greater positive market reactions than the open market repurchase announcements.

With respect to the privately-negotiated repurchases, the only repurchase method which does not deal with small shareholders could also induce market responses. The underlying reason is that large shareholders are thought to possess more information than small shareholders, the share selling of the large shareholders likely signals that they have bad news about the firms and would like to get rid of the firm shares they hold. Furthermore, if considering from the aspect of agency problem, the large shareholders could reduce agency costs. Nonetheless, Peyer and Vermaelen (2005) point out that, except those made for fighting takeover, the market responds positively to the privately negotiated repurchases regardless of the shares are bought back with a discount or with a premium. They suggest that the privately-negotiated share repurchases are made with an intention of signalling and are more likely initiated by the firms. Differently, Rau and Vermaelen (2002) fail to find explicit market responses

to privately negotiated repurchases for the UK evidence. If the privately-negotiated share repurchase announcements are made with signalling purpose, this chapter hypothesises that the market should react positively to the announcements.

5.4.2. Estimating long-term returns around the announcements

Testing short-term abnormal returns provides the evidence for the market reactions, while testing long-term abnormal returns helps to better understand whether there is unusual performance preceding or following events. Share repurchases, unlike other payout policy, may take one or two years to the implementation. This nature makes the test on long-term performance important since the market may not only react to repurchases on the event month (or day) but also in the subsequent period. Even some repurchase programmes are not implemented after the announcements, repurchase announcements are still a signalling mechanism for managers. They may make repurchase announcements to signal their confidence, firm's undervaluation or future prospects. Consequently, pre-announcement long-term performance could possibly explain managers' motives for announcing repurchases while post-announcement long-term performance helps to detect the signalling effect of the announcements.

Bootstrapping procedure to estimating long-term abnormal returns

The findings of Kothari and Warner (1997) suggest that an inappropriate benchmark may result in systematic biases and misspecification. Particularly, long-term return estimation is more sensitive on the choice of a benchmark than short-term return estimation. By simulating the long-term event studies, Kothari and Warner (1997) detect that the long-term abnormal returns increase monotonously with the length of event periods. They also find that the null hypothesis of zero buy-and-hold abnormal

returns is over-rejected by under-estimated standard deviation, and the situation becomes severer with the increase of the event horizon. Hence, Kothari and Warner (1997, p.336) suggest that:

“Bootstrap procedure, such as those employed by Ikenberry, Lakonishok, and Vermaelen (1995), could be used to address biases in both the measure of abnormal performance and the standard deviation.”

Lyon, Barber, and Tsai (1999) likewise confirm that “pseudo-portfolio approach”⁵³ provides well-specific and powerful test statistics for BHARs. Moreover, this approach generates an abnormal return measure which accurately represents investors' experience. Consequently, this chapter uses the bootstrapping procedure for testing the long-term abnormal returns around the repurchase announcements.

The monthly returns of the sample firms are computed for a 49-month period, which starts from 24 months prior to repurchase (month -24) to 24 month posterior to repurchase (month 24). The equation is as Eq. (5.1):

$$R_{i,t} = \text{Ln}(P_{i,t}) - \text{Ln}(P_{i,t-1}), \quad (5.1)$$

where $P_{i,t}$ denotes the price of firm i at the end of month t in this section. The subsequent events, which are announced within two years, are dropped from this test.

Secondly, the FTSE All Share Index is employed for the first benchmark based on the assumption that the long-term returns of an individual firm equal to the long-term average returns of the whole market. Therefore, the expected return equals the

⁵³ Although using the different term, the approach described is the same with that mentioned in Kothari and Warner (1997).

monthly return of the market, and the divergence between the returns of the firm and the market is regarded as abnormal returns. The equation is expressed as Eq. (5.2)

$$AR_{i,t} = R_{i,t} - R_{m,t}, \quad (5.2)$$

where $R_{m,t}$ denotes the market return on month t . In addition to the monthly market returns as the first benchmark, the test also constructs the reference portfolio for the second and the third benchmarks of the monthly expected returns. The procedure is described as follows.

In January of each year, all the UK firms listed on the London Stock Exchange (LSE) are sorted by size⁵⁴ and are divided into five quintiles on the basis of the size rank. The rank of sizes and the formation of size portfolios are then repeated every January. Each of the size portfolios is further sorted by using market-to-book ratio into five quintiles. The portfolios sorted by using market-to-book ratio are also reconstituted every January. This procedure, therefore, produces twenty-five size and market-to-book ratio portfolios. Each of the repurchase firms is also ranked with the non-repurchasing firms to determine its corresponding reference portfolio.

The second reference portfolios are five size-based portfolios constituted by the size rank. The monthly return of the sample firm is compared to the average monthly return of the corresponding size-based portfolio. The abnormal returns are expressed as Eq (5.3):

$$AR_{i,t} = R_{i,t} - R_{s,t}, \quad (5.3)$$

⁵⁴ Size is measured by market value which is coded "MV" in Datastream.

where $R_{s,t}$ denotes the average monthly return of size-based portfolio s on month t .

The third reference portfolios are twenty-five size/market-to-book ratio portfolios which are constituted by the sequential sort procedure. The expected returns are the average monthly return generated by each of the twenty-five portfolios. The abnormal returns of the sample firms are then compared to the average returns of the corresponding reference portfolio. The abnormal return is computed as Eq. (5.4):

$$AR_{i,t} = R_{i,t} - R_{smb,t}, \quad (5.4)$$

where $R_{smb,t}$ denotes the average monthly return of the reference portfolio smb on month t . The abnormal return on each month t is computed as the cross-sectional average of the $AR_{i,t}$ which can be expressed as Eq. (5.5):

$$AR_t = \frac{1}{N} \sum_{i=1}^N AR_{i,t}. \quad (5.5)$$

The buy-and-hold abnormal returns (BHARs) are then computed over the period of interest. The BHAR compounded from months $M1$ to $M2$ is as Eq. (5.6):

$$BHAR_{M1}^{M2} = \sum_{t=M1}^{M2} AR_t. \quad (5.6)$$

Before testing the significance of the BHARs, the procedure is required to constitute the pseudo-portfolios, which empirically generate the distributions of the average long-term abnormal returns of the non-repurchasing firms. This procedure is particularly important on this test. Without adjusting by the pseudo-portfolios, the

BHARs are upper biased and the test is mis-specific. The procedure is as follows:

For each repurchasing firm in the sample, a firm listed on FTSE All Share Index and sorted in the same size/market-to-book portfolio in the event month is randomly selected with replacement. The process of replacement is repeated for each sample firm until the original repurchasing firms have all been replaced by the firms drawn from reference portfolios. The newly constituted portfolio is so-called "pseudo-portfolio", which consists of one randomly drawn firm for each sample firm, matched in time with same rank of size and market-to-book ratio. The monthly abnormal returns and the BHARs of the pseudo-portfolio are estimated by using the same approach for the original sample. The above procedure is then repeated for 1,000 times, generating 1,000 pseudo-portfolios and 1,000 average abnormal return observations. The average abnormal returns of the original sample are then adjusted and tested by the parameters generated from these 1,000 average abnormal return observations. Kothari and Warner (1997) and Barber and Lyon (1997) indicate that BHARs are likely to have a positive bias over a long-term period. While both original BHARs and the average BHARs of the pseudo-portfolios are likely biased over a long-term period estimation, deducting the average pseudo-BHARs from the original BHARs could eliminate the bias. The equation is as Eq. (5.7)

$$BHAR_{adjusted,M} = BHAR_{original,M} - \overline{BHAR_{pseudo,M}}, \quad (5.7)$$

where M denotes the period over which the abnormal return is compounded. The null hypothesis and the alternative hypothesis are named as Eq. (5.8):

$$H_0: BHAR_{adjusted,M} = 0 \quad \text{versus} \quad H_1: BHAR_{adjusted,M} \neq 0. \quad (5.8)$$

The t-statistics are calculated as the average abnormal return (or the BHAR) divided by the standard error of the 1,000 average abnormal return observations (or BHARs). Given that the variables are independent and identically distributed, the t-statistics are robust and well-specific.

Estimating long-term abnormal returns by using the three-factor model

In addition to use the returns on the reference portfolios and bootstrapping technique to estimate abnormal returns, this chapter applies event study with calendar-time approach and the three-factor model developed by Fama and French (1993) to make the comparison with the aforementioned approaches. The calendar-time approach could eliminate the problem of cross-correlation among the returns of sample firms and, furthermore, is less sensitive to a poorly specific asset pricing model. (Fama, 1998; Lyon, Barber, and Tsai, 1999). Since time-serial portfolios are constituted for each calendar month to aggregate the same month's stock returns, the variations of the portfolio returns automatically account for the cross-correlations in stock returns at each point in calendar time.

The method of constituting the time-serial portfolios is presented as follows. The time-serial portfolio on a given calendar month consists of the monthly returns of the firms whose event period of interest covers the given calendar month. For example, when testing the abnormal returns of the event month, the time-serial portfolio for September 1999 would consist of the monthly returns of the firms which announce repurchases in September 1999. Likewise, when testing the abnormal returns for the period of one to twelve months subsequent to repurchase announcements, the portfolio for September 1999 would consist of the September returns of the firms whose repurchases are announced within previous one to twelve months. The

portfolios are reformed for each calendar month.

The three-factor model uses the monthly returns of the time-serial portfolios minus the monthly returns of risk-free assets as the dependent variable. The model is as Eq.

(5.9):

$$R_{pt} - R_{ft} = \alpha_{pt} + \beta_1(R_{mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \varepsilon_{pt}, \quad (5.9)$$

where R_{pt} is the value or equally-weighted average returns of the time-serial portfolio of the calendar month t , and R_{ft} is the return on one-month Treasury bills. FTSE Aaa Share Index is imposed as the proxy for computing the market returns (R_{mt}). SMB_t (small minus big) and HML_t (high minus low) are respectively the size factor and the book-to-market factor introduced by Fama and French (1993) to control for the size and book-to-market effects on stock returns. The size factor is the returns difference between the portfolios of small stocks and the portfolios of large stocks. The book-to-market factor is the returns difference between the portfolios of high book-to-market stocks and the portfolios of low book-to-market stocks⁵⁵. The time-series regression generates the parameters estimates of α_{pt} , β_1 , β_2 and β_3 . Among these parameters, of main interest is the intercept (α_{pt}) which represents the average monthly abnormal returns of the examined period.

The undervaluation hypothesis predicts that negative BHARs and ARs should precede the share repurchase announcements and positive BHARs and ARs may possibly follow the announcements. The positive post-announcement abnormal returns suggest that the market revises their expectations for firms' future performance after the

⁵⁵ Sincere appreciation is placed for the data provision of SMB and HML from Professor Krishna Paudyal, Durham Business School, Durham University, UK. All remaining errors are mine.

announcements, which is also predicted by the signalling hypothesis. On the month of the repurchase announcements, the predictions of the hypothesis are identical with those for the short-term event-day abnormal returns.

Estimating long-term abnormal returns by the methods of share repurchases

Given the different nature inherent in the three repurchase methods, firms may employ them at different timings. The open market repurchases are the most flexible methods, and thus with the lowest signalling costs among the three. Since the firms buy back their shares with the market value, it implies that the firms which announce open market repurchases do not have intention to offer a price premium to the shareholders. Otherwise, they would make repurchases by using tender offer repurchases. Moreover, the firms' intention to buy back the shares with market price implies that the firms believe that the market under-values their shares and buying back own shares is a bargain at the time of the announcements. Following the announcements, two potential effects would shift the long-term market value. The first effect is that the market would recognise the undervaluation information and revise the evaluation. This effect would make a positive shift on the post-announcement market value. Alternatively, the market does not revise the evaluation, and the firms subsequently buy back their own shares. This effect would also make a positive shift on the post-announcement market value. Overall, the undervaluation hypothesis predicts that the BHARs and ARs should be negative prior to the open market repurchase announcements and be positive following the announcements.

The privately-negotiated repurchases are sometimes proposed by large shareholders. Since the large shareholders are thought to possess superior information than other

shareholders, the shares must be sold in his or her best interest. Therefore, the happening of the privately negotiated repurchases could stem from lack of the share performance preceding the announcements and also signal the large shareholders' pessimistic perspective on the firms. Nevertheless, it is questionable whether the large shareholders could make better anticipations on the firms' future prospects than the firms' managements. Consequently, the chapter hypothesises that the BHARs (and ARs) preceding the privately-negotiated repurchase announcements should be negative, but does not make a definite prediction for the post-announcement returns.

Tender offer repurchases provides repurchase premiums over the market value. A survey carried by Wansley, Lane, and Sarkar (1989) directly asks the managements' views on the repurchase premiums. They find that the premiums are positively associated with the confidence of the repurchasing firms and the percentage of shares sought. Undervaluation is another reason recognised by 35 percent of tender offer respondents. Previous empirical findings also suggest that the tender offer repurchases are followed by earnings improvement (Dann, Masulis, and Mayers, 1991; Lie and McConnell, 1998). If both signalling the future performance and undervaluation are the main purposes for announcing tender offer repurchases, the BHARs and ARs are predicted to be negative preceding to the announcements and be positive following the announcements. Nonetheless, since the tender offer repurchases are often completed within few months, this chapter hypothesises that the wealth effect of the tender offer repurchases announcements should not last as long as the effect of the open market repurchase announcements.

5.4.3. Comparing managerial motives for various payout policies

Share repurchases are a kind of payout mechanism instead of a regular payout policy. Dividends which are paid semi-annually in the UK are more regular than share repurchases. Thus, a question arisen is that why some firms choose repurchases rather than dividends in some occasions. Or, why do some firms decide to distribute cash by both alternatives rather than solely by dividends? The tests on the abnormal returns provide the findings from the perspective of the market, while the logit model provides the understanding from the perspective of the cash-distributing firms. To figure out the determinants which might influence various payout decisions, the logit regression is employed and is considered as a good fit for the test of interest.

Research design

For all repurchasing firms in the sample, this study imposes the panel data of these firms and tests on their payout history over the period of 1995 to 2004. Each sample firm is required to possess at least one firm-year observation of repurchases, and could possess up to ten firm-years if the firm remains listed over the whole sample period. Four various payout decisions including 1) no cash payout, 2) dividends, 3) repurchases, and 4) dividends and repurchases are designed as the four feasible choices available for the firms. Each firm is assumed to have its own payout policy, and the policy is normally consistent over time. As a consequence, if the firms change their payout policies, the multinomial logit model could detect the reasons by testing the firm characteristics. The related variables of the models are discussed as follows.

Payout decisions

The dependent variable (Y_{it}) of the logit model is a category variable indicating the discrete choices of payout policy. Four discrete choices are available for each firm on

each payout decision. The choices include, category 0: no payout; category 1: dividend announcements (hereafter dividends); category 2: repurchase announcements (hereafter repurchases) and category 3: both dividend and repurchase announcements (hereafter dividends and repurchases). This design is capable of testing the substitution hypothesis in a direct way. If dividends and share repurchases are treated indifferently by the firms, the hypothesis predicts that the categories 1, 2 and 3 should have similar firm characteristics. That is, while comparing these categories, the coefficients on the explanatory variables should be insignificant to support the substitution hypothesis. If any coefficients are found to be significant, it implies that certain of the firm characteristics instigate firms to make different choices between dividends and share repurchases, and the substitution hypothesis is thereby rejected. The design of the payout categories are similar to that in Grullon and Michaely (2002) and De Jong, Van Dijk, and Veld (2003). The explanatory variables of the multinomial logit model are discussed as follows.

Total Assets

In light of the previous literatures (e.g. Vermaelen, 1981; Dittmar, 2000; Guay and Harford, 2000; Mougoue and Rao, 2003), large firms are expected to have less information asymmetry, and thus suffer less miss-valuation. Consequently, large firms have less incentive to signal. Nonetheless, Grullon and Michaely (2002) suggest the firms which pay dividends are larger than the firms which do not pay dividend regardless of their repurchase policies. The evidence from Jagannathan, Stephens, and Weisbach (2000) show that dividend-paying firms have larger firm sizes than repurchasing firms which are in turn larger than firms that do not distribute cash. Furthermore, according to Fenn and Liang (1997) , Kahle (2002) and Ooi (2001), large firms are regarded as posing less risk of agency problem and thus more likely to

have low financing costs, making them capable of paying out more cash to shareholders⁵⁶. Overall, the signalling hypothesis predicts that, under the circumstances of asymmetric information, the firms which do not distribute cash should be larger in size than the firms distributing cash.

Total Cash

The ratio of total cash and equivalents to total assets tests the suggestion from Guay and Harford (2000), predicting that repurchases are more financed from temporary cash flow while dividends are more financed by permanent cash flow. The model created by Brennan and Thakor (1990) suggests that firms make small payouts through dividends, intermediate payouts through open market repurchases and large payouts through tender offer repurchases. The findings of Stephens and Weisbach (1998) present that actual repurchase is carried out in condition of sufficient cash level. The survey of Baker, Powell, and Veit (2003) suggest that open market repurchases are mainly paid by cash (71.1 percent). Dittmar (2000) indicates that firms with more cash flow are more likely to buyback own shares. Accordingly, the hypothesis predicts that repurchasing firms are expected to have more cash than dividend-paying firms which in turn have more cash flow than firms that do not distribute cash.

Debts

Debts ratios test the relation between payout policy and firm leverage. The model includes 1) long-term debt ratio which is all loans repayable in more than one year measured by total assets and 2) short-term debt ratio which is the borrowing repayable within one year scaled by total assets. Some empirical findings suggest that repurchases are mainly made from temporary cash flows, and short-term debt is a

⁵⁶ The firms with low financing cost are more likely to pay out large amount of cash (e.g. repurchases) since they could finance with a lower costs than others if necessary in the future.

main source of the temporary cash (Nohel and Tarhan, 1998; Baker, Powell, and Veit, 2003). However, due that the UK repurchases are not allowed to finance by issuing debts, share repurchases are unlikely the reason for the UK firms to raise debts. Hence, the share repurchases in the UK are unlikely to link with debts via this route.

Another prediction in the light of Jensen (1986) implies that firms which have more debts are less likely to distribute cash since the interest for debts are more committed than other cash payouts. Brav, Graham, Harvey, and Michaely (2005), more specifically, suggest that external funds would be raised before cutting dividends but after reducing repurchases. If the firms are with high debt ratio, they are not going to make share repurchases. The suggestion of Brav, Graham, Harvey, and Michaely (2005) predicts that firms which announce repurchases are more likely to be with lower debt ratio than dividend-paying firms. Overall, the hypothesis of testing the debt ratios predicts that the firms which do not distribute cash should have the highest debt ratios among the four categories while the dividend-paying firms possess higher debt ratios than the repurchasing firms.

Operating Income

The ratio of operating income to total assets mainly tests the signalling hypothesis but also tests the temporary cash flow hypothesis. The signalling hypothesis predicts that dividends and share repurchases are made to signal for the firms' more superior performance than the firm's rivals. Consequently, the categories with cash distribution are expected to have higher operating income than the category of no cash payout. Moreover, Jagannathan, Stephens, and Weisbach (2000) suggest that the operating income is a kind of permanent cash flow and thus is more likely to distribute by dividends than share repurchases. They also propose that uncertainty about cash flow

makes firms decide not to distribute cash or prefer to pay by repurchases which is a more flexible policy.

To examine the above prediction, this chapter hypothesises that the firms announcing dividends or announcing both dividends and repurchases have higher operating income than the firms announcing share repurchases which in turn possess higher income than the non-paying firms. Furthermore, using the standard deviation of operating income to total assets ratio measured over a five-year period from year -4 to year 0 as the proxy for the volatility of operating income, the hypothesis of this chapter predicts that the firms announcing dividends should have the most permanent operating income while the income of the firms which do not pay out cash should be the most volatile.

Intangible Assets

Intangible to total assets ratio tests the undervaluation hypothesis which predicts that repurchasing firms are more likely to be undervalued. As proposed by Barth and Kasznik (1999), firms with more intangible assets are more likely to be undervalued, and thus firms have more motives for repurchases. If their proposition is valid for the UK, firms which announce repurchases are predicted to have larger intangibles than firms which do not announce repurchase regardless of their dividend policy.

Market-to-book ratio

Dittmar (2000) employs market-to-book ratio as a proxy for the firms' undervaluation and presents negative relation between the market-to-book ratio and the volume of share repurchases. Ikenberry, Lakonishok, and Vermaelen (1995; 2000) examine the long-term returns performance in light of book-to-market ratio (the inverse of

market-to-book ratio) and show that undervaluation is likely the reason for high book-to-market firms to announce share repurchases. Moreover, market-to-book ratio could also be a proxy for investment opportunity. Kahle (2002), Fenn and Liang (1997; 2001), and Ooi (2001) propose that the firms with higher market-to-book ratio have more investment opportunities and are less likely to distribute cash.

Based on the above implications, this chapter hypothesises that the firms which distribute cash (categories 1, 2, and 3) have lower market-to-book ratio than the firms which do not payout (Category 0). Moreover, if the undervaluation hypothesis is supported, firms that announce share repurchases are predicted to have lower market-to-book ratio than firms that do not announce share repurchases.

The multinomial logit model

The model is designed to test whether the various payout decisions are driven by different firm characteristics. The firms are assumed to make the decisions in their own interest and maximize the utility of the payout decisions. The utility function can be expressed as Eq. (5.10):

$$U_{ijt} = V_{ijt} + \varepsilon_{ijt}, \quad (5.10)$$

where U_{ijt} denotes the utility of the announcing firm i that chooses one of the payout policy j on time t . The V_{ijt} denotes representative utility developed by this chapter to predict the utility U_{ijt} which is only known by the firms. More specifically, the representative utility is constituted by the aforementioned firm characteristics (denoted as x_{ijt}) relating to the payout policy j , which can be written as Eq. (5.11):

$$V_{ijt} = \beta' x_{ijt}. \quad (5.11)$$

The ε_{ijt} of Eq. (5.10) denotes the residuals, which are unobserved by this chapter but known by the announcing firm i . The multinomial logit assumes that the residuals are independently, identically distributed (*iid*) extreme value (i.e. Gumbel distribution) over parameters i, j and t .

Since the firms are assumed to maximize their own utility, the U_{ijt} must be the maximum among J utilities. Consequently, the choice probability of the payout policy j can be expressed as Eq. (5.12):

$$P_{it}(U_j > U_k) \text{ for all other payout policy } k \neq j. \quad (5.12)$$

On the basis that the residuals are *iid* extreme value, the choice probability derived from McFadden (1974) is as Eq. (5.13):

$$P_{it}(j) = \frac{e^{V_{ijt}}}{\sum_J e^{V_{ijt}}} \text{ for } J = 0, 1, 2, \dots, j. \quad (5.13)$$

The equation (5.13) is the multinomial logit model. For any two alternative payout policies j and k , the ratio of the probabilities (odd ratio) is as Eq. (5.14):

$$\frac{P_{it}(j)}{P_{it}(k)} = \frac{\exp(V_{ijt})}{\exp(V_{ikt})} = \exp(V_{ijt} - V_{ikt}) = \exp((\beta'_j - \beta'_k)x_{it}) = \exp(\beta'' x_{it}) \quad \forall k \neq j. \quad (5.14)$$

And the logit L is the natural logarithm of Eq (5.14), expressed as Eq. (5.15):

$$L_{it} = \ln \left[\frac{P_{it}(j)}{P_{it}(k)} \right] = \beta^* x_{it} \text{ for } k \neq j. \quad (5.15)$$

If the increase in the firm characteristics x_{it} raises the choice probability of payout policy j , the coefficient β^* appears to be positive. By contrast, a negative β^* implies increase in x_{it} would raise the choice probability of alternative payout policy k .

Applying the model to this test, k is the base category while j could be each of the other three categories. Each of the four categories of the payout policy is required to be the base category by turns to compare with the other categories of payout policy. For example, while the category of the firms which announces repurchases (k) is tested as the base category, the negative coefficient indicates that increase in that variable makes the firms more likely to announce repurchases rather than the counterpart category (j). In contrast, positive coefficient indicates that firms are less likely to announce repurchase while the firm characteristics x_{it} increases.

5.5. Empirical results

This section demonstrates the results of various analyses. The results of this chapter generally suggest that repurchases announcements convey good news to investors. The major motive for announcing repurchases is undervaluation of current share price, which is consistent with the prediction of the undervaluation hypothesis. Additionally, tender offer repurchases appear to induce the largest positive market reactions among the three repurchase methods. The large positive abnormal returns may result from price premiums offered by tender offer repurchases. Nonetheless, the wealth effect of tender offer repurchases falls away sooner than the effect of the other repurchase methods. Moreover, the evidence by estimating logit model implies that dividends rather than repurchases are the main mechanism for signalling earnings performance.

5.5.1. Market reactions to share repurchase announcements

Market reactions to share repurchase announcements for the full sample

According to the signalling theory, this chapter hypothesises that positive market reactions should exist around the announcement days if share repurchase announcements convey new information to the market. Consistent with the prediction and most of the previous findings⁵⁷, Panel A of Table 5.2 indicates that the largest market response to share repurchase announcements are found on the announcement day. The average abnormal returns on the announcement days are 2.13 percent for the full sample. Figure 5.1 shows that the pre-announcement shareholders' wealth has an upwards trend while the largest boost happens on the announcement day. The

⁵⁷ See the UK findings of Rau and Vermaelen (2002); Lasfer (2002); Oswald and Young (2004), the US findings of Vermaelen (1981); Ikenberry, Lakonishok, and Vermaelen (1995), Japan findings of Hatakeda and Isagawa (2004), Australia findings of Otchere and Ross (2002), and Hong Kong findings of Zhang (2005) etc.

pre-announcement buy-and-hold abnormal returns (BHARs) of the various intervals shown in Panel A are all significantly positive but not big enough in size. For example, the average daily abnormal returns over the period of 40 days to 2 days prior to announcements are only 0.06 percent (2.44 percent divided by 39 days), which are much smaller than the abnormal returns on the day of announcements. The upwards drift continues after the repurchase announced as the post-announcement BHARs appear to be significantly positive. Shareholders who buy the shares two days after the announcements and sell one (two) month(s) after the announcements would profit 3.53 percent (2.5 percent). The estimates in Panel B provide the evidence about the shareholders' wealth for various event periods centred on the event day. For the three-day event period from day -1 to day 1, shareholders earn 2.63 percent of abnormal returns. However, if shareholders extend their holding period to 81 days, they could enjoy 8.61 percent of abnormal returns induced by share repurchase announcements.

Overall, during the event period, the most prominent market reactions to share repurchase announcements are found on day 0 (i.e. 2.12 percent), which is unequivocally consistent with the prediction of this chapter. Nonetheless, the unanticipated findings are that, beyond the event day, small but positive wealth effect is found over the rest of the event period (e.g. 8.61 percent for the 81-day period). This finding suggests that shareholders of the firms which announce share repurchases could profit more by holding their shares for a longer event period.

Market reactions to share repurchase announcements with various buyback methods

Comparing the market reactions to the share repurchase announcements with different repurchasing methods, Panel A of Table 5.2 indicates that the announcements of the

three methods of repurchases induce different degrees of market reactions on the day of announcements. Abnormal returns on day 0 are 5.93 percent for the firms which announce tender offer repurchases. By comparison, the abnormal returns for the open market repurchase announcements are 1.12 percent and are 2.71 percent for the privately-negotiated repurchase announcements. All the event-day abnormal returns are significantly positive, and are also significantly different in magnitude (F statistic equals 21.92).

As the results shown in Panel A of Table 5.2, the significantly positive BHARs are found over the various intervals prior to the open market repurchase announcements. The BHARs compounded from 40 and 20 days to 2 days prior to the announcements are 1.32 and 1.58 percent respectively, which are relatively smaller in size compared to the event-day abnormal returns. Figure 5.1 reveals that the BHARs turn to be negative over the period from 20 days to 10 days prior to the announcements and start to grow up afterwards. The BHARs following the announcements still remain upwards trends starting from around 2.7 percent on the day of announcements and reaching about 6.6 percent two months after the announcements. The evidence in Panel B of Table 5.2 confirms the positive shareholders' wealth effect induced by open market share repurchase announcements. Nonetheless, over the various event periods estimated, the wealth of shareholders whose firms announce open market repurchases increases less, comparing to shareholders whose firms announce privately-negotiated or tender offer share repurchases.

With respect to the privately-negotiated repurchase announcements, Panel A of Table 5.2 presents that the BHARs for both pre- and post-announcement event periods appear to be positive but the BHARs are only found to be significant over three of the

periods. Particularly, the BHARs for the post-announcement period from day 2 to day 40 are 7.10 percent and statistically significant. On day 0, the announcements induce 2.71 percent of abnormal returns which are also significant at one percent level. Panel B shows that shareholders of the firms announcing privately-negotiated share repurchases earn about 13.69 percent of abnormal returns over the 81-day event period. For the other periods, the shareholders' wealth also appears to be positive and significant. Figure 5.1 indicates that the BHARs for privately-negotiated repurchases have a more fluctuant and steeper uptrend than those for open market repurchases.

Moreover, Panel A of Table 5.2 shows that shareholders of the firms which announce tender offer repurchases only receive abnormal returns before and on the day of the announcements. The results signify that the BHARs over a period of from 40 days to 2 days prior to the announcements are 6.26 percent, which are significantly positive. By the day of tender offer repurchase announcements, the shares of the announcing firms generally provide 12 percent increases in shareholders' wealth. After the announcements, the BHARs all appear to be small in size and insignificant. Panel B confirms the evidence presented in Panel A. Over the 81-day period, shareholders are found to earn 14.12 percent of abnormal returns. Moreover, around the three-day period centred on the announcement day, the announcements induce 6.78 percent of BHARs which are much greater than the wealth effect induced by open market and privately-negotiated share repurchase announcements.

The abnormal returns on the announcement day indicate that the market is not indifferent towards the three repurchasing methods. Supporting the prediction of this chapter, the evidence in Panel A of Table 5.2 confirms that the tender offer repurchase announcements are the most favourite announcements among the three, while open

market repurchases induces the smallest market response. This evidence is also consistent with the findings of Comment and Jarrell (1991), indicating that the large percentage of shares sought and the premiums offered by the announcements of tender offer repurchases convey more confirmed and more favourable information to the market. Furthermore, consistent with the findings of Peyer and Vermaelen (2005), the market reactions to privately-negotiated repurchase announcements are found to be positive, implying that the information signalled by the announcements is still positive although the large shareholders' selling shares may not be good news. Overall, the evidence generally supports the signalling theory of payout policy and the prediction of this chapter, indicating that share repurchase announcements are viewed as good news for the market while tender offer repurchase announcements are the most welcome among the three repurchasing methods.

5.5.2. Long-term shareholders' wealth effect of share repurchases

Accordingly, the evidence of the long-term wealth effect generally supports the initial prediction of this chapter, indicating that undervaluation is an important reason for announcing share repurchases. That the announcements are preceded by a long-term downtrend of returns performance furnishes strong evidence in support of the undervaluation hypothesis. Moreover, the open market repurchase and privately-negotiated repurchase announcements are followed by an uptrend returns performance over the two-year period after the announcements. The post-announcement wealth effect of the tender offer repurchases, however, diminish six month after the announcements, which is remarkably consistent with the prediction of this chapter.

Long-term wealth effect of the full sample

Table 5.3 demonstrates the estimates of the abnormal returns and BHARs for a 49-month period centred on the month of announcements. The first three panels present the results generated by FTSE-index reference portfolios, size reference portfolios and size/market-to-book ratio reference portfolios respectively. Generally, the employment of the reference portfolios does not generate different results, so the report will be mainly emerged from Panel C unless additional notice. The last two panels present the results by estimating the three-factor model. Note that the estimates by this model are the average monthly abnormal returns rather than BHARs. As a consequence, the estimates would be analogous to the BHARs when they time the length of the intervals.

The BHARs compounded over the various intervals appear to be significant regardless of pre- or post-announcement. Consistent with the prediction, repurchase announcements are generally preceded by a downtrend of price performance and followed by an uptrend of price performance. The announcing firms suffer from approximate 8.7 percent declines in abnormal returns over two years before announcing share repurchases. Over the one-year period and six-month period prior to the announcement, the firms experience declines in abnormal returns about 4.3 percent and 2.5 percent. In contrast to the pre-announcement returns, the post-announcement returns increase about 6.2 percent in two years and about 4.3 percent in one year. The increases in the abnormal returns are both statistically and economically significant. Figures 5.2, 5.3, and 5.4 plot the buy-and-hold abnormal returns (BHARs) compounded from two years prior to the announcements. Based on the figures, it is shown that a downwards trend exists until two months prior to the announcement, following with a long-term and steeper uptrend which also includes a

sudden boost on the month of announcements.

The results by estimating the three-factor model do not totally agree with those by reference portfolios. Panel D of Table 5.3 presents the estimates of equally-weighted average abnormal returns. Since the abnormal returns and BHARs in the above panels are equally-weighted, the estimates in Panel D could make a corresponding comparison. In general, the pre-announcement and the event-month abnormal returns in Panel D do not seem to differ apparently from those presented in the previous three panels. The firms averagely earn 4.71 percent of abnormal returns on the month of announcing repurchases. The pre-announcement abnormal returns for the previous two-year period are averagely -0.26 percent per month, which is about -6.24 percent for the whole period. Similarly, the abnormal returns for the one-year period prior to repurchase announcements are -0.56 percent per month and those for the previous six-month period are -0.59 percent per month. The evidence, in agreement with the prediction of undervaluation hypothesis, suggests that the sample firms suffer long-term declines in stock prices before they announce repurchases.

The post-announcement abnormal returns estimated by the three-factor model differ to some extent from those by reference portfolios. The average abnormal returns for the subsequent six-month period are 0.36 percent per month, which is analogous to 2.20 percent for the whole period. This result is not far different from that by reference portfolios. Nevertheless, the average monthly abnormal returns for the subsequent one-year and two-year periods are respectively 0.04 percent and -0.04 percent (respectively about 0.59 and -1.04 percents for the whole period), which are much divergent from the estimates of the reference portfolios. Take the corresponding estimates in Panel C as example, the BHARs for the subsequent one-year and

two-year periods are 4.30 and 6.26 percents respectively.

In Panel E of Table 5.3, the estimates are similar to those presented in Panel D, except the estimates for the two-year periods preceding and following the announcements. The different results obtained may stem from various price performances between large and small firms during the second year preceding and following the announcements. However, for the rest periods, given the similar results of equally-weighted and value-weighted returns, the large firms and small firms seem to have consistent price behaviours.

Taken together, the overall results, on one hand, completely support the prediction of the undervaluation hypothesis, indicating that the undervaluation of firm price is a major motive for announcing share repurchases. On the other hand, positive abnormal returns following the announcements also tell a possible story about that the market may revise their evaluation of the firm value. Although the evidence by estimating the three-factor model is not as explicit as that generated by the reference portfolios, the abnormal returns during the subsequent six month is remarkably observable. Finally, consistent with the results of short-term abnormal returns, the abnormal returns of the event month is positive, suggesting that repurchase announcements are generally viewed as good news to the market.

Long-term wealth effect by the methods of share repurchases

Table 5.3 likewise presents the estimates of the abnormal returns by three repurchase methods. The estimates by the reference portfolios suggest that firms which announce tender offer repurchases experience about 5.4 percent increase in abnormal returns on the month of announcements while firms which announce the other repurchase

methods only experience 3 to 4 percent increase in abnormal returns. The estimates in Panel C and D provide similar evidence, but they indicate higher abnormal returns around tender offer repurchase (about 7.5 percent). These results are consistent with the prediction as well as the results of short-term abnormal returns, indicating that tender offer repurchases are more favourable to the market.

As predicted by the undervaluation hypothesis, Figures 5.2, 5.3, and 5.4 illustrate that negative abnormal returns start appearing on 18 months prior to the open market repurchase announcements and reach the bottom by a month prior to the announcement. The Panel C estimates indicate that shareholders of the firms which announce open market repurchases would suffer about 6.68 percent declines in abnormal returns over the two-year pre-announcement period. By contrast, they would profit about 8.48 percent over the post-announcement period if they hold the shares for two years. However, even if they hold the share for only one year after the announcement, their pre-announcement loss could be almost offset by the post-announcement profits. The estimates in Panels D and E furnish similar results for the one-year pre-announcement period and the estimates in Panel D further provide consistent results for the one-year post-announcement period. Based on the evidence, it is suggested that the announcements of open market repurchases are preceded by at least one year of downtrend price performance and are followed by at least six months of upward price performance. It seems possible that undervaluation is a determinant reason for announcing open market repurchases. The market seems to perceive this signal and revise their evaluation following the announcements.

The estimates by the reference portfolios and the estimates by the three-factor model provide more consistent evidence for privately negotiated repurchase announcements.

The results obtained reveal that, for a long horizon, the announcement is not bad news to the firms and the market. Positive abnormal returns appear on the month of announcements and two of three examined post-announcement intervals. Over the two-year period following the announcement, the Panel C estimate indicates that the firms earn 12.82 percent of abnormal returns while the Panel D estimate indicates 0.98 percent of average monthly abnormal returns (about 23.5 percent for the whole period).

Although negative abnormal returns appear over the first six months following the announcements, the abnormal returns are small in size and insignificant. However, firms which announce privately-negotiated repurchases suffer much more severe loss in share returns than firms which announce open market repurchases over the pre-announcement period. The estimates in Panel C of Table 5.3 reveal that they suffer 26.65 percent loss for the preceding two-year period, 14.18 percent for the preceding one-year period and 8.65 percent for the preceding six-month period. Although the estimates in Panels D and E of Table 5.3 are more conservative, they also indicate -1.3 percent of average monthly abnormal returns for the preceding six-month period. Figures 2, 3, 4 reveal that the BHARs of the firms have a sharp drop over the pre-announcement period, and are unable to recover to the original returns level over the post-announcement period. The evidence for privately negotiated repurchases implies that, no matter who (either the firms or their large shareholders) propose the share repurchases, undervaluation of the share price is still a determinant of announcing the share repurchases. The positive post-announcement abnormal returns during one- or two-year subsequent period indicate that the firms, which possess superior information, make a better decision than their large shareholders over a long-term period.

The wealth effect of the tender offer share repurchases appear to be divergent from the other two repurchase methods. The estimates in Panel C of Table 5.3 suggest that firms which announce tender offer repurchases experience -7.93 percent of BHARs for the two-year pre-announcement period. Nonetheless, the BHARs for the one-year and six-month pre-announcement periods are respectively 7.65 and 5.27 percent. By comparison, the estimates in Panel D present negative average monthly abnormal returns for these two periods, but they are insignificant and close to zero. Figures 5.2, 5.3, and 5.4 clearly demonstrate the pattern of the return performance. The most negative abnormal returns appear during the period of 24 to 18 months prior to the announcements. Positive abnormal returns (about 13 percent) start appearing from six months prior to the announcement and reach the top on six months post to the announcement. After the six months following the announcement, the effect of the announcement seems to be disappearing and the abnormal returns drop again. The estimates in Panels D and E present larger negative abnormal returns for the post-announcement period. The results obtained reveal that tender offer repurchases are an effective mechanism to raise the share price after the long-term undervaluation. In the event month, the announcements generate five to seven percent of abnormal returns for the investors. However, the effect disappears soon after the announcements. This finding is consistent with the initial prediction of this chapter stating that the positive wealth effect of the tender offer announcements do not last long as the wealth effect of the open market repurchase announcements does.

Overall, the results indicate that undervaluation is a factor which induces the announcements of share repurchases. The findings of the negative pre-announcement abnormal returns are consistent with Oswald and Young (2004) while the findings of the positive post-announcement abnormal returns are consistent with the findings of

Ikenberry, Lakonishok, and Vermaelen (1995; 2000) and Peyer and Vermaelen (2005). As for the announcements of tender offer repurchases, the results present positive abnormal returns in the event month, which should be attributed to the repurchase premium and large fraction of shares sought offered by the repurchases. However, the effect of the announcement does not last long after the announcements.

5.5.3. Managerial motives for various payout policies

The multinomial logit model employs a variety of firm characteristics to predict the chance of the firms' payout policy. It is found that low market-to-book ratio is common to firms which announce share repurchases while the characteristic of high operating incomes is inherent in dividend-paying firms. This evidence implies that undervaluation is a determinant for announcing share repurchases while signalling for firms' operating performance is for announcing dividends.

Table 5.4 presents the results of the multinomial logit model. The category of firms which do not pay out cash (category 0) is the smallest in size while firms which announce both dividends and repurchases have the largest size among the firms. The sizes of the firms announcing dividends are the second largest among the four categories. The results, opposing to the prediction from the aspect of information asymmetry, seem to imply that large firms are more likely to pay out cash. Besides, consistent with Fenn and Liang (1997) and Kahle (2002), an implicit indication to emerge from the evidence indicates that low financing cost (of the large firm) may be one of the factors motivating cash payouts.

The results of debt ratios only partially support the prediction. As predicted, firms

which do not pay out cash have more debts than firms which announce dividends and repurchases. This result, therefore, supports the prediction that firms with higher debt ratios have less incentive to pay out cash. However, inconsistent with the suggestions of Kahle (2002) and Brav, Graham, Harvey, and Michaely (2005), firms which only announce repurchases have higher debt ratios than firms which announce dividends and also firms which announce both dividends and repurchases. It is interesting to note that firms announcing both dividends and repurchases have lower debt ratios than firms announcing only repurchases. Due that 1) the repurchase in the UK is not allowed to finance from debts, and 2) repurchase announcement is not as compulsory as dividend announcement, comparing these two categories implicitly indicates that firms which only announce repurchases may not have real intention to buyback their own shares.

By implication, the result of operating incomes demonstrates that the signalling hypothesis seems to predict dividend policy well. The firms with paying out dividends are likely more profitable than firms without paying out dividends regardless of their repurchase policy. This evidence indicates that the signalling hypothesis does not predict repurchase policy well.

The volatility of the operating profits is expected to be higher for firms that announce repurchases than firms that announce dividends. The results shows that firms which announce repurchases are more volatile in operating incomes than firms which announce dividends, but the evidence is not significant enough (*p-value* equals 0.598). However, the result points out that firms announcing both dividends and repurchases, compared to the other three categories, have relatively permanent operating incomes.

The results from comparing intangibles assets are not completely consistent with Barth and Kasznik (1999). Firms which announce repurchases have more intangibles assets than firms which do not pay out cash. Nevertheless, firms which announce both dividends and repurchases have fewer intangibles than firms which announce dividends. The latter result is inconsistent with the prediction of Barth and Kasznik (1999), presenting that intangibles may not be an appropriate firm characteristic to predict repurchase policy.

Finally, firms without paying out cash, consistent with the prediction, appear to have the highest market-to-book ratio among the categories. If market-to-book ratio is a proxy for investment opportunity, higher market-to-book ratio means more investment opportunities, which would result in less cash payouts. The evidence is consistent with the findings of Kahle (2002) in this context. Furthermore, market-to-book ratio also indicates undervaluation. Firms announcing repurchases (regardless of their dividend policy) have lower market-to-book ratio than firms announcing dividends (and firms without paying out cash). This evidence unequivocally supports the prediction of the undervaluation hypothesis.

The only coefficients which are not significant throughout the model are those of total cash and equivalents. Firms that announce repurchases (categories 2 and 3) have more cash than firm that announce only dividends. However, the levels of significance for the coefficients are only 0.142 and 0.122 respectively.

In conclusion, the overall evidence in Table 5.4 demonstrates that firms with more cash, higher operating incomes, lower debts, and lower market-to-book ratio are more likely to announce both dividends and repurchases. On the other hand, firms with

higher debts, lower operating incomes, and lower market-to-book ratio are more likely to announce share repurchases. Firms that announce dividends have some similar characteristics but they are larger in size, with more debts, higher operating incomes, little less cash, and, more importantly, higher market-to-book ratio. As for firms that do not pay out cash, they are with higher debts, lower operating incomes and higher market-to-book ratio. Comparing the firm characteristics among these firms, low market-to-book ratio is the common characteristic for firms that announce repurchases, indicating that firms which suffer from undervaluation would impose repurchase announcement to communicate with the market.

5.6. Conclusion

The main contribution of this chapter is to clarify the wealth effect of and the managerial motives for share repurchase announcements in the UK. Particularly, investigating and contrasting the managerial motives for announcing share repurchases to those for other payout decisions are innovative for the empirical studies on the UK share repurchases. This chapter provides clear evidence supporting the undervaluation hypothesis from the perspectives of investors and repurchasing firms.

This chapter begins from testing short-term abnormal returns around the share repurchase announcements in the UK. Consistent with most previous findings, the evidence shows that share repurchase announcements induce significantly positive abnormal returns around the announcement day. When the abnormal returns are estimated in light of repurchasing methods, the evidence suggests that the market reactions to tender offer repurchase announcements are much greater than the reactions to open market and privately negotiated repurchase announcements. The findings of the greater market reactions to the tender offer repurchases can be attributed to the more convinced information guaranteed by the repurchase premiums and the large fraction of shares sought (Comment and Jarrell, 1991). Moreover, consistent with the findings of Peyer and Vermaelen (2005), the market also responds positively to the announcements of privately negotiated repurchases, indicating that the announcements are more likely good news to the market.

Testing long-term abnormal returns provides clear evidence supporting the undervaluation hypothesis. The employment of both the “bootstrapping” technique

and the three-factor model helps to mitigate the estimation bias of long-term abnormal returns (Lyon, Barber, and Tsai, 1999) and thus makes the evidence robust. Share repurchase announcements are found to be preceded by negative buy-and-hold abnormal returns and followed by positive abnormal returns. Furthermore, the undervaluation hypothesis predicts all the repurchase methods well but the patterns of return performance for the three repurchase methods are not the same during the sample period. Firms which announce open market repurchases and privately-negotiated repurchases have suffered from long-term loss in returns before the announcement but have a long increase in returns after the repurchases are announced. By contrast, the firms announcing tender offer repurchases also experience undervaluation prior to the announcements and the share price rises sharply around the month of the announcements. However, this positive wealth effect diminishes six months after the announcements. If share repurchase announcements are employed for signalling firms' undervaluation, tender offer share repurchases, considering their higher costs but short-lasting effect, are not an efficient device.

The multinomial logit model likewise provides the evidence supporting the undervaluation hypothesis. Firms which announce only share repurchases are smaller in size, with higher debt ratios, less profitable, and with lower market-to-book ratio than firms which announce dividends. This finding implies that signalling operating performance is unlikely the purpose of repurchases for firms which only announce repurchases. On the other hand, firms which announce both dividends and repurchases are larger in size, with less debt ratios, more profitable, more permanent in operating performance, but with lower market-to-book ratio. Consequently, for such firms, signalling both operating performance and undervaluation are likely the motives for announcing share repurchases. Moreover, comparing the firms which announce

dividends to the firms which announce both dividends and repurchases indicates that these firms are similar in operating performance but are different in market-to-book ratio. The overall evidence implies that share repurchases are employed for signalling undervaluation and dividends are employed for signalling operating performance. Furthermore, since dividends and share repurchases are found to be announced for different motivations, the evidence implicitly rules out the possibility that repurchases are made to substitute dividends.

Table 5.1: Descriptive statistics

This table presents the descriptive statistics of the sample. Panel A shows the frequencies of repurchase announcements distributed in each year. The repurchase announcements are grouped by the repurchase methods. Panel B shows the statistics of the firm characteristics which, except payout ratio, are employed as the dependent variables of the logit model. The statistical differences of the payout ratios between the categories of “dividend” and “dividend/repurchase” are tested by independent sample t test for mean, and Wilcoxon test for median. Total assets themselves are calculated by using natural logarithm. Standard deviation of the ratio of operating income to total assets is measured over a five-year period from year -4 to year 0. All the other variables, except market-to-book ratio, are scaled by total assets. One-way ANOVA and median test are applied to test the statistical differences of the mean and median across the categories. The tests are based on a null hypothesis which the means or medians of each variable equal across the categories.

Panel A: The frequency of share repurchase announcements

Year	Open-Market	Privately-Negotiated	Tender Offers	Total Repurchase
1995	12	5	0	17
1996	28	2	4	34
1997	42	10	4	56
1998	52	4	6	62
1999	34	1	3	38
2000	14	2	9	25
2001	8	0	3	11
2002	13	0	15	28
2003	17	3	11	31
2004	16	0	3	19
Total	236	27	58	321

Table 5.1 – *Continued*

Panel B: Descriptive statistics of the firm characteristics												
Payout Policy	No Payout		Dividends		Repurchases		Dividends/Repurchases		t	Sig.	Wilcoxon W	Asymp. Sig.
	Mean	Median	Mean	Median	Mean	Median	Mean	Median				
N	121		1,380		19		238					
Payout Ratio			0.333	0.468			0.507	0.440	-0.206	0.837	184,693	0.245
Variables									F	Sig.	Chi-Square	Asymp. Sig.
Total Assets (1,000 GBP)	702,869	73,153	5,972,735	484,803	376,354	120,838	7,013,536	619,767	1.845	0.137	61.285	0.000
Ln(Total Assets)	11.391	11.200	13.133	13.091	11.306	11.702	13.352	13.337	30.772	0.000	61.285	0.000
Cash & Equivalent/Total Assets	0.212	0.092	0.112	0.071	0.205	0.073	0.120	0.073	20.557	0.000	2.613	0.455
Short-Term Debt Ratio	0.084	0.028	0.062	0.040	0.099	0.036	0.056	0.033	4.593	0.003	3.980	0.264
Long-Term Debt Ratio	0.166	0.065	0.152	0.115	0.195	0.139	0.139	0.101	1.476	0.219	3.640	0.303
Operating Income/Total Assets	-0.202	-0.003	0.091	0.086	-0.006	-0.007	0.095	0.089	52.297	0.000	98.204	0.000
SD(Operating Income/Total Assets)	0.202	0.058	0.035	0.019	0.251	0.056	0.024	0.017	35.277	0.000	68.492	0.000
Intangible Assets/Total Assets	0.051	0.000	0.057	0.000	0.069	0.000	0.037	0.000	2.019	0.109	10.215	0.017
Market-to-Book Ratio	3.008	0.960	2.634	1.630	-0.224	0.740	0.022	1.545	1.695	0.166	29.976	0.000

Table 5.2: The market reactions to share repurchase announcements

This table presents the results of testing the short-term abnormal returns (ARs) and the buy-and-hold abnormal returns (BHARs) for different portfolios. Abnormal returns are estimated using market model. The $BHAR(t_1, t_2)$ denotes the buy-and-hold abnormal return, which is calculated by accumulating the AR over the period t_1 to t_2 while t is the day relative to the announcement date. AR_t denotes the average abnormal return on day t of each portfolio. Statistical test of significance of AR (different from 0) and BHAR (different from 0) are carried out with t test, using the standard deviation of the abnormal returns over the estimation period. The bottom row is F statistics testing the AR or BHAR difference among three repurchase methods. The null test is ARs or BHARs are indifferent among these repurchase methods. Student t statistics or F statistics are reported in parentheses, and the significance levels are marked with ***, **, and * for 0.01, 0.05 and 0.1 respectively.

$$\text{Market Model: } R_i = \alpha + \beta R_m + \varepsilon_i$$

Panel A: Abnormal returns and buy-and-hold abnormal returns for various event days and event periods

Repurchase Methods	N	BHAR(-40,-2)	BHAR(-20,-2)	BHAR(-10,-2)	BHAR(-5,-2)	AR-1	AR0	AR1	BHAR(2,5)	BHAR(2,10)	BHAR(2,20)	BHAR(2,40)
ALL	321	2.4478%*** (3.5068)	1.8949%*** (3.8895)	1.0834%*** (3.2310)	0.6034%*** (2.6991)	0.3495%*** (3.1272)	2.1273%*** (19.0328)	0.1547% (1.3842)	0.4325%* (1.9347)	1.2141%*** (3.6208)	2.5063%*** (5.1443)	3.5335%*** (5.0622)
Open Market RP	236	1.3288%* (1.8397)	1.5801%*** (3.1343)	1.1640%*** (3.3549)	0.5806%** (2.5101)	0.3686%*** (3.1871)	1.1241%*** (9.7193)	0.1263% (1.0921)	0.6606%*** (2.8557)	1.4960%*** (4.3116)	2.7082%*** (5.3719)	3.7286%*** (5.1624)
Privately Negotiated RP	27	4.0286% (1.6094)	2.5950% (1.4853)	2.1031%* (1.7490)	0.6252% (0.7800)	-0.1181% (-0.2946)	2.7108%*** (6.7631)	-0.0285% (-0.0712)	0.0862% (0.1075)	1.0564% (0.8785)	4.0505%** (2.3183)	7.1043%*** (2.8382)
Tender Offer RP	58	6.2653%** (2.1475)	2.8502% (1.3997)	0.2807% (0.2003)	0.6857% (0.7339)	0.4896% (1.0480)	5.9378%*** (12.7103)	0.3556% (0.7612)	-0.3342% (-0.3577)	0.1406% (0.1003)	0.9663% (0.4745)	1.0772% (0.3692)
F (2,318)		(2.6107)*	(0.5814)	(0.5976)	(0.0271)	(0.3211)	(21.9221)***	(0.1876)	(0.9447)	(0.7376)	(0.6517)	(0.9700)

Table 5.2 - *Continued*

Panel B: Shareholders' wealth during the various periods centre on the announcement day						
Repurchase Methods	N	BHAR(-1,1)	BHAR(-5,5)	BHAR(-10,10)	BHAR(-20,20)	BHAR(-40,40)
ALL	321	2.6316% ^{***} (13.5932)	3.6674% ^{***} (9.8931)	4.9291% ^{***} (9.6233)	7.0328% ^{***} (9.8267)	8.6129% ^{***} (8.5620)
Open Market RP	236	1.6190% ^{***} (8.0821)	2.8602% ^{***} (7.4564)	4.2790% ^{***} (8.0736)	5.9072% ^{***} (7.9768)	6.6764% ^{***} (6.4141)
Privately Negotiated RP	27	2.5642% ^{***} (3.6935)	3.2756% ^{**} (2.4640)	5.7237% ^{***} (3.1161)	9.2096% ^{***} (3.5884)	13.6970% ^{***} (3.7970)
Tender Offer RP	58	6.7830% ^{***} (8.3828)	7.1345% ^{***} (4.6046)	7.2043% ^{***} (3.3652)	10.5995% ^{***} (3.5434)	14.1255% ^{***} (3.3596)

Figure 5.1: Shareholders' wealth around share repurchase announcements

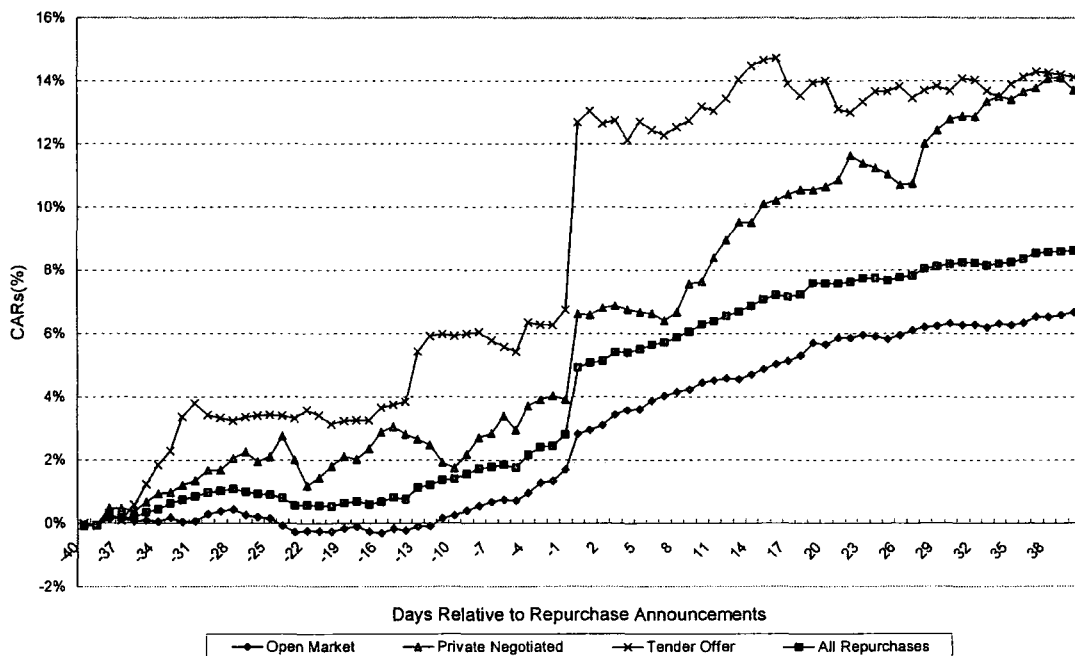


Figure 5.2: Long-term wealth effect adjusted by market returns of FTSE-Index

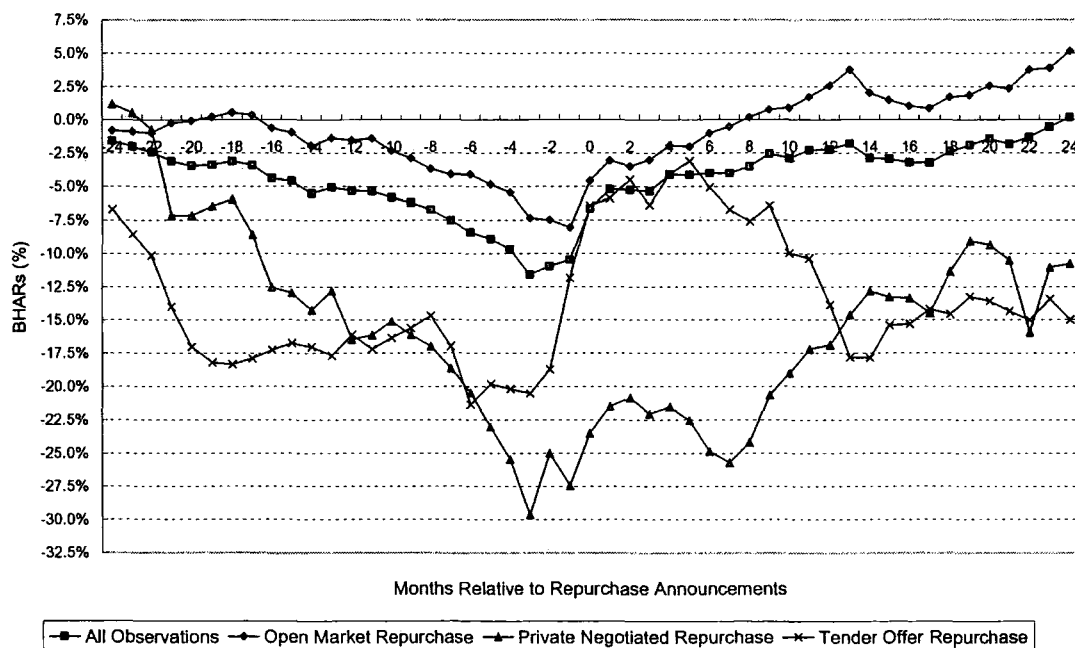


Figure 5.3: Long-term wealth effect adjusted by the returns of size reference portfolios

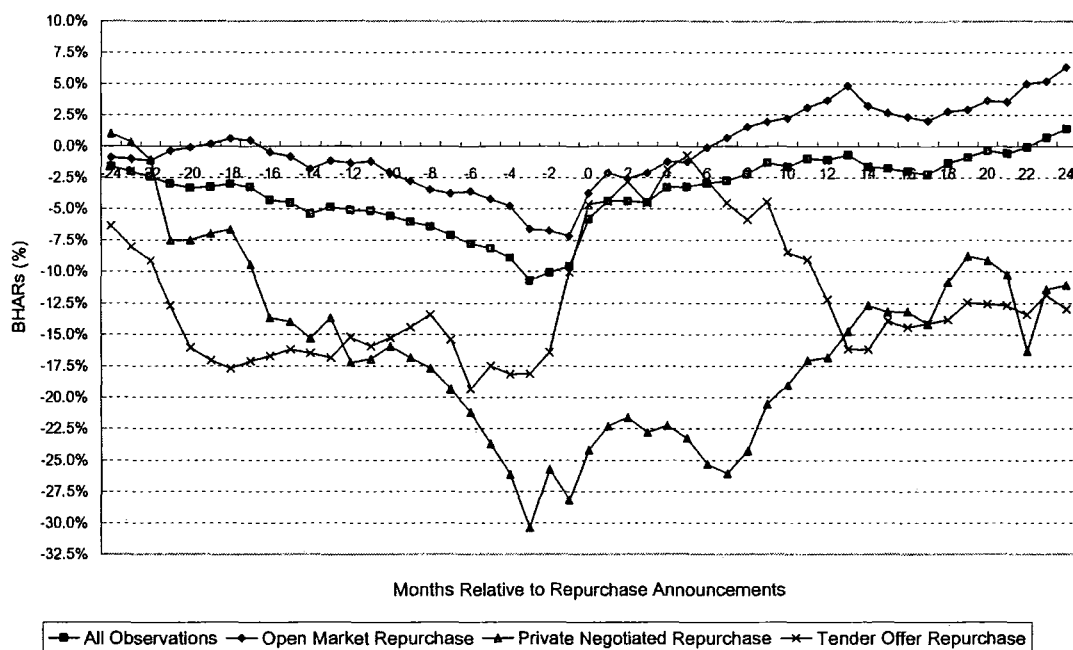


Figure 5.4: Long-term wealth effect adjusted by the returns of size/market-to-book reference portfolios

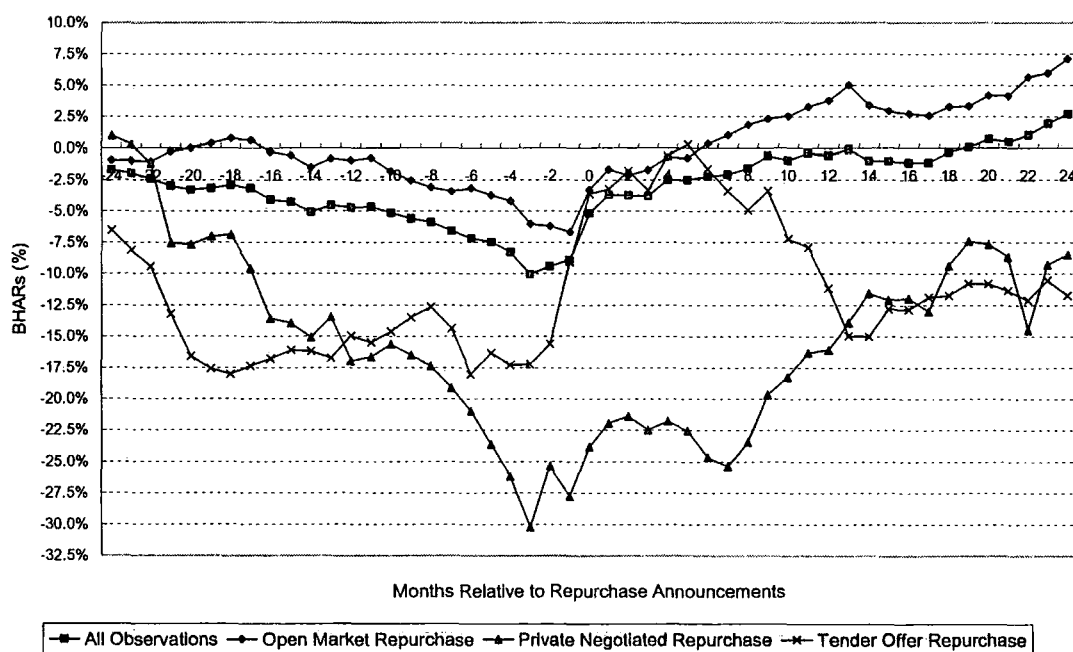


Table 5.3: Long-term wealth effect of share repurchase announcements

This table presents the long-term abnormal returns estimated from 24 months prior to repurchase announcements to 24 months posterior to repurchase announcements. The table consists of five panels. Panels A, B and C present the BHARs by using event-time approach event study and bootstrapping technique. The expected monthly returns are generated by using the average returns of various reference portfolios which are respectively FTSE All Share Index (FTSE), the portfolios sorted by size rank (size) and the portfolios sorted by the ranks of size and market-to-book ratio. Since the long-term abnormal returns are biased for long-horizon estimation, the abnormal returns (ARs) and the buy-and hold abnormal returns (BHARs) are adjusted by the average abnormal returns of 1000 pseudo-portfolios (see “bootstrapping procedure” in Section 3.1.3). Statistical test of significance of AR (different from 0) and BHAR (different from 0) are measured by the standard deviation of the average ARs or average BHARs of the 1000 pseudo-portfolios over the corresponding period. Panels D and E present the abnormal returns estimated by calendar-time approach event study. The estimation of abnormal returns imposes Fama and French’s (1993) three-factor model. The equally-weighted average ARs are shown in panel D while the value-weighted average ARs in panel E. Student t statistics are reported in parentheses, and the significance levels are marked with a, b, and c for 0.01, 0.05 and 0.1 respectively.

Panel A: BHARs adjusted by the market returns of FTSE All Share Index

Market Adjusted Returns: $AR_{i,t} = R_{i,t} - R_{m,t}$ (5.2)								
Repurchase Methods	N	BHAR(-24,-1)	BHAR(-12,-1)	BHAR(-6,-1)	AR0	BHAR(1,6)	BHAR(1,12)	BHAR(1,24)
ALL	260	-10.0789%*** (-2.8740)	-5.4039%** (-2.2877)	-2.9311%* (-1.8797)	3.8447%*** (6.0483)	2.6955%* (1.6483)	4.4440%** (1.9609)	6.4428%* (1.8807)
Open Market RP	191	-7.8952%** (-2.2103)	-6.6816%** (-2.5415)	-3.9679%** (-2.1877)	3.4969%*** (4.9212)	3.5985%** (1.9837)	6.9643%*** (2.6361)	8.9085%** (2.2422)
Private Negotiated RP	25	-26.0426%** (-2.3301)	-14.4073%* (-1.9110)	-8.7752% (-1.6914)	3.9128%* (1.8680)	-1.2037% (-0.2620)	6.4158% (0.8535)	12.7908% (1.1564)
Tender Offer RP	44	-10.5104% (-0.9711)	5.8525% (0.8411)	5.1500% (1.1221)	5.4263%*** (3.1994)	1.4273% (0.3523)	-6.1552% (-0.9948)	-6.4429% (-0.6718)

Table 5.3 – Continued

Panel B: BHARs adjusted by the returns of size reference portfolios								
Size Reference Portfolios Adjusted Returns: $AR_{i,t} = R_{i,t} - R_{s,t}$ (5.3)								
Repurchase Methods	N	BHAR(-24,-1)	BHAR(-12,-1)	BHAR(-6,-1)	AR0	BHAR(1,6)	BHAR(1,12)	BHAR(1,24)
ALL	260	-9.4784%*** (-2.6987)	-4.7037%** (-1.9882)	-2.4694% (-1.5825)	3.7896%*** (5.9616)	2.7260%* (1.6665)	4.0937%* (1.8061)	4.5641% (1.3554)
Open Market RP	191	-7.2333%** (-2.0275)	-6.0068%** (-2.2872)	-3.4036%*** (-1.8813)	3.4200%*** (4.8130)	3.5167%* (1.9457)	6.5546%** (2.4849)	7.3628%* (1.8860)
Private Negotiated RP	25	-27.1446%** (-2.4368)	-14.3185%* (-1.9041)	-8.8131% (-1.6996)	3.9852%* (1.9026)	-1.0349% (-0.2253)	6.7560% (0.8988)	10.0343% (0.9214)
Tender Offer RP	44	-9.1473% (-0.8459)	6.7925% (0.9765)	5.3630% (1.1688)	5.4059%*** (3.1874)	1.9388% (0.4786)	-6.5708% (-1.0619)	-9.1344% (-0.9707)
Panel C: BHARs adjusted by the returns of size and market-to-book ratio reference portfolios								
Size and Market-to-Book ratio Adjusted Returns: $AR_{i,t} = R_{i,t} - R_{smb,t}$ (5.4)								
Repurchase Methods	N	BHAR(-24,-1)	BHAR(-12,-1)	BHAR(-6,-1)	AR0	BHAR(1,6)	BHAR(1,12)	BHAR(1,24)
ALL	260	-8.7269%** (-2.4814)	-4.3730%* (-1.8473)	-2.3392% (-1.4998)	3.7468%*** (5.8942)	2.8731%* (1.7566)	4.3088%* (1.9010)	6.2638%* (1.8577)
Open Market RP	191	-6.6865%* (-1.8793)	-5.8376%** (-2.2209)	-3.2476%* (-1.7935)	3.3489%*** (4.7130)	3.5681%** (1.9741)	6.5634%** (2.4874)	8.4857%** (2.1738)
Private Negotiated RP	25	-26.6508%** (-2.3865)	-14.1873%* (-1.8866)	-8.6518% (-1.6680)	3.9395%* (1.8807)	-0.7083% (-0.1542)	7.1568% (0.9522)	12.8252% (1.1795)
Tender Offer RP	44	-7.9336% (-0.7346)	7.6513% (1.1012)	5.2786% (1.1505)	5.4391%*** (3.2070)	2.1159% (0.5223)	-5.9720% (-0.9652)	-5.7590% (-0.6076)

Table 5.3 - Continued

Panel D: Equally-weighted average abnormal returns estimated by Fama-French's three-factor model								
Three-Factor Model: $R_{pt} - R_{ft} = \alpha_{pt} + \beta_1(R_{mt} - R_{ft}) + \beta_2SMB_t + \beta_3HML_t + \varepsilon_{pt}$ (5.9)								
Repurchase Methods	N	AR(-24,-1)	AR(-12,-1)	AR(-6,-1)	AR0	AR(1,6)	AR(1,12)	AR(1,24)
ALL	260	-0.2602% (-0.7486)	-0.5649% (-1.4505)	-0.5947% (-1.4371)	4.7111%*** (4.3074)	0.3672% (0.9173)	0.0493% (0.1703)	-0.0437% (-0.2007)
Open Market RP	191	-0.0483% (-0.1378)	-0.4035% (-0.9319)	-0.5326% (-1.0961)	4.0869%*** (3.6603)	0.5314% (1.1335)	0.2743% (0.7850)	0.0169% (0.0688)
Private Negotiated RP	25	-0.4625% (-0.6253)	-1.0531% (-1.3045)	-1.3534% (-1.1943)	4.2167% (1.5012)	-0.3634% (-0.4328)	0.9039% (1.3069)	0.9822% (1.6357)
Tender Offer RP	44	-0.7789% (-1.5525)	-0.0628% (-0.1048)	-0.1445% (-0.1738)	7.5798%*** (3.3722)	-1.4536%** (-2.1509)	-1.5513%** (-2.5614)	-0.7456%* (-1.7345)
Panel E: Value-weighted average abnormal returns estimated by Fama-French's three-factor model								
Repurchase Methods	N	AR(-24,-1)	AR(-12,-1)	AR(-6,-1)	AR0	AR(1,6)	AR(1,12)	AR(1,24)
ALL	260	0.4576% (1.0002)	-0.4245% (-0.8274)	-0.0826% (-0.1375)	4.6538%*** (4.0729)	0.2679% (0.5259)	-0.0108% (-0.0226)	-0.1567% (-0.2559)
Open Market RP	191	0.5320% (1.1030)	-0.5495% (-1.0807)	-0.2794% (-0.4216)	3.9339%*** (3.3484)	0.2106% (0.3979)	-0.0937% (-0.1885)	-0.1738% (-0.2773)
Private Negotiated RP	25	0.2464% (0.4155)	-0.6452% (-0.8710)	-1.3321% (-1.3931)	4.1936% (1.4747)	-0.4521% (-0.4855)	1.8170%** (2.1082)	0.8549% (1.1485)
Tender Offer RP	44	-0.2160% (-0.3712)	-0.0015% (-0.0022)	0.3955% (0.4636)	7.3097%*** (3.2348)	-1.1151% (-1.5389)	-0.9098% (-1.3823)	-0.7874% (-1.2209)

Table 5.4: Managerial motives for the various payout policies

This table presents the results from the estimation of the potential firm's characteristics affecting the firm's payout policy by using a multinomial logit model as Eq. (5.15). The table comprises four columns, which respectively presents the coefficients estimated by setting one of the four categories (payout choices) as the base category in the logit model. The categories represent four different payout policies, which include category 0 for the firm-years with no payout, category 1 for the firm-years with dividend payouts, category 2 for the firm-years with repurchase announcements, and category 3 for the firm-years with both dividend payout and repurchase announcements. The variable, total assets, itself is calculated by using natural logarithm. In addition, the variable, standard deviation of the ratio of operating income to total assets, is measured over a five-year period from year -4 to year 0. All the other independent variables, except market-to-book ratio, are scaled by total assets. The predicted sign of coefficients are presented with "+", "-", or "N/A". The 'N/A' represents that the coefficients are not predicted by the hypotheses of this chapter.

$$\text{Multinomial Logit Model: } L_{it} = \text{Ln} \left[\frac{P_{it}(j)}{P_{it}(k)} \right] = \beta^* x_{it} \text{ for } k \neq j \quad (5.15)$$

	Base Categories															
	Category 0				Category 1				Category 2				Category 3			
	+/-	Coeffici	Wald Z	p-value	+/-	Coeffici	Wald Z	p-value	+/-	Coeffici	Wald Z	p-value	+/-	Coeffici	Wald Z	p-value
Category 0: No Payouts																
Ln(Total Assets)					-	-0.410	-3.290	0.001	-	0.109	0.650	0.515	-	-0.485	-3.750	0.000
Cash & Equivalent/Total Assets					-	1.295	1.140	0.253	-	-0.469	-0.420	0.677	-	0.623	0.510	0.607
Short-Term Debt Ratio					+	4.449	3.310	0.001	+	-0.724	-0.650	0.517	+	5.999	3.880	0.000
Long-Term Debt Ratio					+	2.945	2.420	0.016	+	-0.911	-0.640	0.522	+	3.826	2.790	0.005
Operating Income/Total Assets					-	-20.05	-5.900	0.000	-	-2.493	-1.460	0.144	-	-20.91	-6.000	0.000
SD(Operating Income/Total Assets)					+	-0.335	-0.650	0.515	+	-0.670	-1.780	0.075	+	6.373	2.210	0.027
Intangible Assets/Total Assets					N/A	-0.217	-0.160	0.872	-	-1.908	-1.690	0.091	-	1.250	0.800	0.424
Market-to-Book Ratio					+	0.005	1.490	0.136	+	0.021	3.790	0.000	+	0.014	2.840	0.005
Intercept						2.551	1.770	0.077		1.031	0.560	0.574		4.987	3.290	0.001
Category 1: Dividends																
Ln(Total Assets)	+	0.410	3.290	0.001					+	0.519	2.790	0.005	+	-0.075	-2.780	0.005
Cash & Equivalent/Total Assets	+	-1.295	-1.140	0.253					-	-1.764	-1.470	0.142	-	-0.672	-1.540	0.122
Short-Term Debt Ratio	-	-4.449	-3.310	0.001					+	-5.172	-3.510	0.000	+	1.550	1.620	0.106
Long-Term Debt Ratio	-	-2.945	-2.420	0.016					+	-3.855	-2.620	0.009	+	0.882	1.820	0.069
Operating Income/Total Assets	+	20.051	5.900	0.000					+	17.559	4.580	0.000	-	-0.865	-0.970	0.333
SD(Operating Income/Total Assets)	-	0.335	0.650	0.515					-	-0.335	-0.530	0.598	-	6.708	2.340	0.019
Intangible Assets/Total Assets	N/A	0.217	0.160	0.872					-	-1.692	-1.000	0.319	-	1.467	2.100	0.035

Table 5.4 - Continued

Market-to-Book Ratio	-	-0.005	-1.490	0.136					+	0.015	3.460	0.001	+	0.009	2.150	0.031
Intercept		-2.551	-1.770	0.077						-1.520	-0.730	0.463		2.435	6.230	0.000
Category 2: Repurchases																
Ln(Total Assets)	+	-0.109	-0.650	0.515	-	-0.519	-2.790	0.005					-	-0.594	-3.110	0.002
Cash & Equivalent/Total Assets	+	0.469	0.420	0.677	+	1.764	1.470	0.142					-	1.092	0.840	0.402
Short-Term Debt Ratio	-	0.724	0.650	0.517	-	5.172	3.510	0.000					-	6.722	4.120	0.000
Long-Term Debt Ratio	-	0.911	0.640	0.522	-	3.855	2.620	0.009					-	4.737	3.040	0.002
Operating Income/Total Assets	+	2.493	1.460	0.144	-	-17.55	-4.580	0.000					-	-18.42	-4.730	0.000
SD(Operating Income/Total Assets)	-	0.670	1.780	0.075	+	0.335	0.530	0.598					+	7.043	2.460	0.014
Intangible Assets/Total Assets	+	1.908	1.690	0.091	+	1.692	1.000	0.319					N/A	3.158	1.650	0.099
Market-to-Book Ratio	-	-0.021	-3.790	0.000	-	-0.015	-3.460	0.001					N/A	-0.006	-2.490	0.013
Intercept		-1.031	-0.560	0.574		1.520	0.730	0.463						3.955	1.830	0.067
Category 3: Dividends and Repurchases																
Ln(Total Assets)	+	0.485	3.750	0.000	-	0.075	2.780	0.005	+	0.594	3.110	0.002				
Cash & Equivalent/Total Assets	+	-0.623	-0.510	0.607	+	0.672	1.540	0.122	+	-1.092	-0.840	0.402				
Short-Term Debt Ratio	-	-5.999	-3.880	0.000	-	-1.550	-1.620	0.106	+	-6.722	-4.120	0.000				
Long-Term Debt Ratio	-	-3.826	-2.790	0.005	-	-0.882	-1.820	0.069	+	-4.737	-3.040	0.002				
Operating Income/Total Assets	+	20.917	6.000	0.000	+	0.865	0.970	0.333	+	18.424	4.730	0.000				
SD(Operating Income/Total Assets)	-	-6.373	-2.210	0.027	+	-6.708	-2.340	0.019	-	-7.043	-2.460	0.014				
Intangible Assets/Total Assets	+	-1.250	-0.800	0.424	+	-1.467	-2.100	0.035	N/A	-3.158	-1.650	0.099				
Market-to-Book Ratio	-	-0.014	-2.840	0.005	-	-0.009	-2.150	0.031	N/A	0.006	2.490	0.013				
Intercept		-4.987	-3.290	0.001		-2.435	-6.230	0.000		-3.955	-1.830	0.067				
Observations		1758														
Log Pseudo-likelihood		-1028.267														
Pseudo R ²		0.157														

Chapter 6

Summary and Conclusions

6.1. Overview of the Research

The major thrust of this thesis has been to explain the central importance of the signalling power and the information contents of firms' payout announcements. Returning to the questions mentioned at the beginning of this thesis, it is now possible to answer that both dividend and share repurchase announcements possess signalling power and the information signalled has been received by the market. Nonetheless, while dividend announcements mainly signal for firms' operating performance, share repurchase announcements more likely signal for the undervaluation of firm value.

A considerable amount of literature with respect to dividend and share repurchases has been reviewed in Chapter 2. A number of studies investigating the relative theoretical models and empirical findings have reported a good understanding on the background of the research. Chapter 3 begins by testing the shareholders' wealth effect of the simultaneous dividend and earnings announcements and looks at whether dividends remain informative while earnings information is disclosed at the same time. For the purpose of detecting whether the information conveyed by dividend announcements is about current or future earnings, investigations are carried out in Chapter 4. Chapter 5 focuses on the signalling of share repurchase announcements, examining the shareholders' wealth effect and comparing the managerial motives for different payout methods.

6.2. Shareholders' wealth effect of simultaneous dividend and earnings announcements

Previous research findings into the shareholders' wealth effect around dividend announcements have been well documented. Nevertheless, there is increasing concern about that the dividend effect is not necessarily "pure" if the information contained in earnings has not been well measured. In an attempt to investigate the shareholders' wealth effect "purely" induced by the information implicit in dividends, Chapter 3 takes advantage of the simultaneous dividend and earnings announcements to test the effects of dividends and earnings on the same information set. Additionally, to find out whether the dividend, earnings, or interaction effect is the main factor affecting shareholders' wealth, the relative contributions of the effects on the event-day market reactions are explicitly examined by using the regression analysis. In the test on the interaction effect, it is assumed that the investors jointly evaluate the information conveyed by the simultaneous announcements. Moreover, separate variables are set on the earnings effect in the light of earnings increases, earnings declines and future earnings. The split of the earnings effects distinguishes the signalling power of earnings increases, earnings declines and prospect for future earnings. It could conceivably be argued that the more informative these earnings effects are, the less prominent the dividend effect is expected to be.

Additionally, this study has been drawn attention on the relation between the level of information asymmetry and market reactions. Based on the notion that the information about large firms is more obtainable than that about small firms, market capitalisations are used as the proxy for information asymmetry. This study tests the differential information hypothesis which predicts that the market reactions to the

announcements made by small firms should be larger in magnitude than those made by large firms.

The findings of Chapter 3 can be outlined as follows:

1. The results suggest the existence of both dividend effect and earnings effect. However, dividend effect is more prominent in that the market reactions are more dependent on the information implicit in dividend announcements when dividends and earnings signal for contradictory information.
2. The differential information hypothesis is supported by the inverse relation between the level of information asymmetry and the market reactions to the announcements of dividend increases. The inverse relation appears to be the most prominent in the portfolio of simultaneous increases in dividends and earnings, indicating that the announcements made by small firms are more informative to investors. This evidence confirms that the market reactions to the simultaneous announcements are dependent on the level of information asymmetry between managers and shareholders.
3. The evidence confirms the existence of the dividend effect and the interaction effect between dividends and earnings information. No significant earnings effect is found before the test partitions the effects into earnings increases and earnings declines. Nonetheless, when the test considers the effect of earnings increases and declines individually, the effect of earnings declines is remarkably manifest. This finding, consistent with the initial prediction, maintains that the earnings declines are more informative than earnings

increases. Moreover, this result implicitly suggests that dividends play a confirmative role for earnings increases.

4. The significant relation between the event-day abnormal returns and the earnings changes of the following half-year is apparently presented by the evidence of the findings. Moreover, the effect of future earnings does not influence the effect of dividend announcements on the event-day abnormal returns. Combined with the above findings, it can thus be implied that dividends may only convey the confirmative information for current earnings increases but do not signal for future earnings changes. Nevertheless, the market updates the expectations for future earnings based on the information signalled by the simultaneous announcements.

6.3. Earnings information signalled by dividends

To investigate whether current earnings are represented or future earnings changes are signalled by dividend changes, Chapter 4 furthermore examines directly the association of dividends with current and future earnings. Difficulties arise in previous studies when an attempt is made to apply methods to control for the mean reversion and autocorrelation in earnings process. This, however, may result in spurious findings on the relation between dividends and earnings. To this end, this thesis attempts various methods on controlling the mean reversion and autocorrelation in earnings process and aims to provide incremental evidence for the association of dividends with current and future earnings. Three empirical methods, namely, categorical analysis, multivariate regression models and binary logit models, are applied to test the information content in dividends. For these examinations, the

signalling hypothesis predicts that 1) the earnings performance of the firms with dividend continuations should be better (worse) than that with dividend cuts (increases), 2) dividend changes signal for current and future earnings changes, and 3) managers should take current and future earnings changes into account when making dividend decisions.

The evidence in Chapter 4 is found to be consistent with the findings of Benartzi, Michaely, and Thaler (1997) and Grullon, Michaely, Benartzi, and Thaler (2005). The findings are documented as follows:

1. Except the firms with small dividend cuts, the evidence that dividends represent the performance of current earnings is confirmed by the categorical analysis. In comparison to the firms with dividend continuations, the firms with large dividend cuts have inferior current earnings performance while the firms with dividend increases experience better performance on current earnings.
2. Controlling the mean reversion and autocorrelation in earnings process, the multivariate models provide more explicit results for the associations of dividend changes with current and future earnings changes. No matter which models are employed to control for the mean reversion and the autocorrelation, the findings are robust and show that the relation between dividends changes and current earnings changes is explicit while the relation between dividend changes and future earnings changes is trivial.
3. The findings of the logit model manifestly illustrate that the increases

(declines) in current earnings promote the likeliness of dividend increases (cuts). Nonetheless, no obvious evidence about future earnings possessing influence on managers' dividend decisions is detected in the models.

6.4. Managerial motives for and market reactions to share repurchase announcements

Chapter 5, implementing the investigations on share repurchase announcements, not only focuses on the shareholders' wealth effect but also compares the managerial motives for various payout decisions. A number of new evidence on the UK share repurchases, which has been drawn little attention in previous studies, is well presented in this chapter. Firstly, the shareholders' wealth effect is examined in terms of three repurchase methods (open market, privately-negotiated and tender offer). It is innovative to examine both the long-term and short-term shareholders' wealth effect of the tender offer share repurchase announcements in the UK and, furthermore, compare the signalling power of the three repurchase methods. More particularly, the long-term abnormal returns directly test the undervaluation hypothesis which states that share repurchases are announced to signal for the firms' undervaluation of share prices. On the other hand, to examine whether the substitution relation exists between share repurchases and dividends as well as to compare the managerial motives for the different payout decisions, the multinomial logit model is applied to test the association between the firms' characteristics and four payout decisions naming 1) no payouts 2) cash dividends 3) share repurchases and 4) both dividends and share repurchases.

The findings of Chapter 5 generally support the undervaluation hypothesis of share

repurchases, maintaining that the undervaluation of the firm value is the main reason for announcing share repurchases. The findings can be presented as follows:

1. For all three share repurchase methods, the market reacts positively on the day of share repurchase announcements. In light of this result, the evidence obtained confirms that share repurchase announcements convey good news about the firms to their shareholders. Furthermore, it is suggested that the wealth effect of the tender offer repurchase announcements is the largest among the three methods, which may stem from the repurchase premiums and hence stronger signals provided by tender offer share repurchases. This finding is consistent with the findings of Masulis (1980) and Comment and Jarrell (1991).
2. From the findings on long-term abnormal returns, it shows that the undervaluation hypothesis predicts all the repurchase methods well. Consistent with the prediction of the undervaluation hypothesis, the repurchase announcements are found to be preceded by long-term downtrend of return performance, and the open market and privately-negotiated repurchase announcements are further followed by positive long-term returns performance. The wealth effect of the tender offer repurchase announcements does not last long and diminishes six months after the announcements.
3. The evidence of the multinomial logit model indicates that the primary motive for share repurchases is to signal the undervaluation of firm value. By comparison, the managerial motive for announcing dividends is to signal for firms' operating performance. The two payout methods do not seem to be the

substitute for each other.

6.5. Limitations and further research

Managerial prospect and future earnings

Throughout this thesis, the examinations are carried out by testing the historical data of the sample firms. The objective historical data help to furnish the evidence reflecting authentically the firms' or the market's previous recorded behaviours. However, this thesis was limited by those behaviours which have not been formally recorded. For instance, historical data are not able to formally record managerial prospect of future earnings in that managers' prospect is a kind of private information which is only known by insiders. Consequently, this thesis imposes the real subsequent earnings performance as the proxies for managers' prospect of future earnings. The underlying assumption is that managers are capable of anticipating their firms' future performance. A main drawback of this assumption is that it neglects the possibility that the real future performance of the firms may be sometimes far divergent from what managers expect. As a consequence, the real subsequent earnings performance is not always an appropriate proxy for managerial prospect.

Conroy, Eades, and Harris (2000) do not encounter similar problem on testing the signalling of dividends on future earnings performance. They examine Japanese sample whose dividends, earnings and managerial prospect of future earnings are announced simultaneously. As a result, the data of managerial prospect of future earnings are feasible for Japanese sample and thus can be examined without using proxies. Nonetheless, similar data are not feasible for the UK market.

Alternatively, the method undertaken by De Jong, Van Dijk, and Veld (2003) could be

a feasible approach to get the data of managerial prospect. Firstly, they carry out a survey on managers' prospect which is normally unknown by outsiders. Then, the managers' responses to the survey are employed for empirical examinations. The main advantage of this approach is that it examines the first-hand data from managers and thus its findings are not influenced by the employment of proxies. However, some drawbacks are inherent in this approach. Firstly, this approach may take several years to complete a sufficient sample, and the costs of the data collection should be enormous. Secondly, survivor bias may be caused when the rate of usable responses are low. Thirdly, even with a prudent design on the questionnaire, managers may not truly reveal their attitudes (particularly about bad news), making this method feasible but inefficient.

To conclude, this thesis employs firms' future earnings performance as the proxy for managerial prospect. This limitation was raised in that managerial prospect of future earnings are not formally announced and thus not formally recorded in the UK market. This problem can be solved when someday managers are regulated to announce their prospect of future earnings with dividends and earnings.

More speculations on the UK share repurchases

This study successfully distinguishes the motives for announcing dividends and for announcing share repurchases. The findings are based on the assumption that the firms could only choose 1) not to distribute cash, 2) to pay dividend solely 3) to make share repurchases only, or 4) to pay by both dividends and share repurchases. Although this grouping is rational, further research on this issue is suggested to consider more payout decisions. For example, Jagannathan, Stephens, and Weisbach (2000) consider the changes in dividends and share repurchases when splitting the

tested sample. This grouping offers a more sophisticated examination on the motives for payout decisions but it requires a large sample of share repurchases and dividends.

Additionally, except open market repurchases, previous studies pay less attention to tender offer repurchases and privately-negotiated repurchases in the UK market. The US findings suggest that each of the repurchase methods conveys different information to the market (Comment and Jarrell 1991). In this study, it has unequivocally presented the findings of the market's different reactions to the announcements of the various methods of share repurchases, and has also concluded that the undervaluation is the main information signalled by share repurchases. Nonetheless, it would be interesting to examine further on the difference between these repurchase methods. For example, why do managers pay the price premium through tender offer repurchases when they can distribute the cash less costly by open market repurchases? Or, similar to what is examined in Peyer and Vermaelen (2005), does the divergence between the market price and the negotiated price of the privately-negotiated share repurchases signal for any valuable information about the firms? Or, does the liberalisation of treasury shares increase managers' propensity or change their purpose of making share repurchases? The UK share repurchases merit further investigations to answer the riddles as their growth in the future.

6.6. Summary of implications

Overall, this thesis examines both dividend and share repurchase announcements in the UK, and the results indicate manifest implications for both managers and investors.

The first implication for managers suggests that earnings increases announcements have to be backed by the announcements of dividend increases. The signals solely relying on the announcements of earnings increases are not creditable enough to earn investors' trust. The earnings increases announcements induce strong and positive market reactions only when they are announced with dividend increases. For those earnings increase announcements with dividend cuts or dividend continuations, the market relatively reacts weakly. By contrast, the dividend signalling for earnings declines is not as important as that for earnings increases. The underlying reason should be that earnings decline announcements more likely convey true information to the investors, which indirectly reduces the importance of dividend signalling.

Moreover, managers are suggested to incorporate their prospects of firms' future performance in the simultaneous dividend and earnings announcements. The evidence indicates that current earnings performances are not investors' only concern when they evaluate the new information signalled by the announcements. Relatively, they jointly evaluate the information implicit in dividend and earnings changes. Furthermore, they revise their expectations for future earnings accordingly.

Furthermore, this thesis suggests that, under the scenario of differential information, investors of small firms are more anxious for the firms' information than those of large firms. The evidence shows that the market reactions to the announcements of dividend increases magnify as the firm size becomes smaller. Consequently, the third implication for managers suggests that small firms with good news are in more need to make the announcements and signal their superiority in operating performance.

Fourthly, if managers intend to signal for the undervaluation of firm value by

announcing share repurchases, tender offer share repurchases are not a recommended mechanism based upon the findings of this thesis. By comparison, open market and privately-negotiated share repurchases should be better choices. The evidence on share repurchases presents that announcing tender offer repurchases elicits larger wealth effect, which indirectly represents that the information signalled by tender offer share repurchases is stronger than the other repurchase methods (open market and privately-negotiated). Nevertheless, the long-term wealth effect of the tender offer share repurchase announcements is also found to diminish rapidly six months following the announcements. In addition, due to repurchase premiums, repurchasing firms normally incur larger cash outflow when buying back own shares by tender offers.

This thesis also provides two implications for investors. Firstly, dividend changes only reflect current earnings performance but do not signal for future earnings changes. The evidence does not show any explicit association between dividend changes and the changes in future earnings. Relatively, the relation between dividend changes and the changes in current earnings is manifest. When making dividend decisions, managers likely take account of current rather than future earnings performance.

Secondly, comparing dividends and share repurchases announcements implies that these two announcements are employed for signalling different information. The recurrence and regularity nature of dividends make them a better mechanism for signalling firms' operating performance which is likewise announced regularly. As what this thesis mentions above, dividend increase announcements are capable of making the announcements of earnings increases reliable. By contrast, share repurchase announcements which are not necessarily completed afterward may not be

sufficient enough for corroborating the announcements of earnings increases. However, managers take advantage of share repurchase announcements to signal for the undervaluation of firm value and may even buy back own shares with bargain prices. This unique function is what dividends announcements do not possess. From the perspective of signalling, dividends and share repurchases are not substitutes for each other.

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