UK corporate share repurchases: an empirical analysis of corporate motives and payout policies

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To my father

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Abstract

This thesis investigates the motives behind share buybacks in the UK, and examines this form of corporate payout in relation to dividends by extending traditional corporate dividend behaviour models to include payouts made through share repurchases. Using hand-collected data for 267 firms belonging to the FTSE 350 from 2001 to 2004, we show that the motives of firms in the UK to repurchase their shares appear to be different from those of US firms, which we mainly attribute to differences in corporate governance between the two countries. We find that the most plausible motive behind share buybacks in the UK is the distribution of surplus cash to shareholders although, contrary to US findings, UK share buybacks are related primarily to expected rather than unexpected earnings. Indeed, share buybacks appear to be paid out of the same expected earnings component as are dividends, which suggests that repurchases may be substitutes for (at least part of) regular dividend payouts. When we use behavioural dividend models, such as Lintner (1956) and Fama & Babiak (1968), to determine whether they can be extended to estimate changes in total payouts as opposed to just dividends, we find that firms that repurchase their shares tend to have a smoother dividend policy, which lends support to the substitution hypothesis of share repurchases. Further, we develop modified versions of these models in which we assume that dividends or total payout changes are the result of a full adjustment to expected changes in earnings and a partial adjustment to unexpected changes in earnings. We show that these models appear to better reflect the changes in total payout policy that have occurred in recent years in the UK.

The material contained in this thesis has not been previously submitted for a degree in this or any other university.

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1 INTRODUCTION

This thesis examines the share repurchase behaviour of UK publicly listed companies. Whilst the UK is the largest market for share repurchases in Europe (Lasfer, 2000), corporate buybacks are actually a relatively new phenomenon for the UK and, to date, there has been very little systematic research into either the motivations of UK buyback firms or how their repurchase activities are related to other corporate policies such as dividend or capital structure decisions. There is, however, a substantial body of theoretical and empirical literature on US share repurchase behaviour. Most of this literature has adopted an agency theory perspective to repurchases, i.e., in the absence of shareholder monitoring and/or other control mechanisms, the managers of widely-held firms can be expected to use their decision making discretion to further their own, rather than shareholders, interests. From this perspective, share repurchases are an alternative form of corporate payout to dividend payments, and as such may have the same potential as dividends to significantly alter the risks and incentives of all financial stakeholders. Dividend policies have, of course, long been at the centre of several spirited debates and academic 'quarrels'.

Lintner (1951) produced one of the earliest and most significant pieces of work on corporate dividend behaviour. Lintner posited that firms paid great attention to preserving the stability of their dividend payouts, by conservatively, i.e., only partially, adjusting them to changes in earnings through a target payout ratio. An important aspect of Lintner's model is that, for corporate managers, dividends matter. In particular, because Lintner assumes that managers believe that shareholders would take an unreasonably negative view if the firm reduced its dividends, firms can be expected to adopt dividend policies that minimise the probability that they might have to reduce dividends in the future. Lintner's model also allows for the possibility that managers may be willing to dissipate shareholders' wealth, i.e., incur unnecessarily

high costs, in order to avoid cutting dividends. For example, a firm faced with many profitable investment opportunities but insufficient retained funds may rather resort to costly external financing than to cut its dividends. The remarkably high explanatory power of Lintner's original model and empirical findings have been confirmed by many subsequent studies that have used a wide variety of empirical and survey-like methodologies (Fama & Babiak, 1968; Petit, 1972; Watts, 1973; Baker & Powel, 2000; Brav et al., 2005). Even so, the irrelevancy theory of Miller & Modigliani (1961) has fuelled the disagreement among financial theorists over the importance of dividends and the significance and relevance of Lintner's behavioural model has often been at the forefront of many market efficiency 'controversies'.

Essentially, Miller & Modigliani (1961) show that in a perfect market, shareholders will be indifferent between returns in the form of dividends or capital gains. Arbitrage will ensure that a firm's dividend policy (how its earnings are distributed) will not affect its value (which is determined solely by the size and riskiness of the earnings stream). However, this conclusion is crucially dependent upon the assumption of a "perfect market". In practice, there are several fairly obvious market imperfections that could undermine this "dividend irrelevancy" theory, e.g., transaction costs, taxes, asymmetric information, incomplete markets and contracts (agency problems), and bankruptcy costs[1]. Thus, going back to our initial statement, it is clear that the types of issues central to agency theory have also been used extensively to explain why corporate payouts matter. For example, in their seminal paper that first set out the core propositions of agency theory, Jensen & Meckling (1976) suggested that one of the primary ways that managers of widely-held firms are

[1] For a detailed survey of the literature on payout policy refer to:
Allen, F. and R. Michaely (2003). Payout Policy, The Wharton Financial Institutions Centre.

able to generate agency costs, i.e., can act against the interests of shareholders, is via their control over the use of corporate cash flows. From this initial insight, there followed a stream of research papers on the agency costs of free cash-flow where it is argued that agency costs can be reduced simply by 'forcing' managers to pay all surplus cash to shareholders, thereby leaving managers with fewer resources to waste on unprofitable investments, amongst other things (Grossman & Hart, 1980; Easterbrook, 1984; Jensen, 1986).

Although dividends have traditionally been the main form of returning cash to shareholders, this has been changing over recent years, as share repurchases are becoming a more popular and non-negligible method of cash distribution. The United States (US), being the most documented and researched market in finance, has been the focus of several studies on share repurchases. Research interest in this topic began with studies that examined the price reaction to the announcement of share repurchases. Several studies found that share repurchase announcements were associated with significantly positive abnormal returns (Comment & Jarrell, 1991; Ikenberry, Lakonishok & Vermaelen, 1995; Grullon & Michaely, 2002) and this has led to the development of a body of literature concerned with understanding the reasons driving this positive price reaction and the more recent focus on firms' motivations for repurchasing their shares.

Not surprisingly then, the literature on share repurchases draws many of its hypotheses from the dividend literature. For instance, one of the earliest theories put forward to explain why firms repurchase their shares is the signalling hypothesis, which focuses on information asymmetries that exist between managers (insiders) and the market. Thus, when managers perceive that their firm is undervalued they

repurchase in order to signal to the market this undervaluation, which results in a correction of the share price. This share repurchase model is very similar to the signalling theory of dividends, which also views dividends as a way of signalling to the market the future prospects of the firm. However, in both cases the signalling hypothesis faces many challenges. For example, in the case of share repurchases it is argued that open market repurchases, which are the most common form of repurchases, are weak signals of undervaluation (Comment & Jarrell, 1991; Ikenberry & Vermealen, 1996; Lasfer, 2000; Rau & Vermaelen, 2002), while dividends, though presumed to signal future earnings, have been found to be rather poor in respect of their ability to predict future earnings (Watts, 1973; Gonedes, 1978; Penman, 1983; Benartzi & Michaely, 1997).

As mentioned earlier, both dividends and repurchase studies have often relied upon the same agency theory propositions. Dividends help alleviate the agency costs of free cash-flow, in the sense that they limit the amount of cash in the hands of managers, who would then have to be more disciplined in their investment choices. Similarly, share repurchases are clearly an alternative mechanism by which to distribute corporate free-cash flows (FCF), hence there is generally a positive price appreciation following their announcement.

In a perfect market, dividends and buybacks ought to be perfect substitutes for returning cash to shareholders. Although some researchers have developed theories where share repurchases and dividends serve as interchangeable methods of distributing FCF to shareholders (Bhattacharaya, 1979; Easterbrook, 1984; Miller & Rock, 1985; Jensen, 1986; Grullon & Michaely, 2002), most studies have assumed –

or developed models - that the relationship between these two types of corporate payout and particular components of corporate FCF are different. Some studies have argued that while dividends are used to distribute sustainable earnings i.e. cash flows that the firm expects to continue to generate in the future, share repurchases are (or ought to be) used only to distribute "unexpected", temporary or otherwise "unsustainable" components of current free cash flows (John & Williams, 1985; Bernhaim 1991, Allen, Bernardo, & Welch, 2000; DeAngelo, DeAngelo & Skinner, 2000).

In fact, the historical stability of dividend payouts and evidence of dividend smoothing form the basis of the argument that repurchases are not generally used as substitutes for dividends. Nonetheless, several studies find some evidence of a substitution effect, which is suggestive of a change in how firms formulate their payout strategies. For instance, Fama & French (2001) find that over the 1978-1999 period US firms have become much less prone to distribute dividends, but that this has coincided with a dramatic rise in share repurchases. For example, Grullon & Michaely (2002) report that the number of repurchasing firms, as a percentage of the total number of firms distributing cash to their shareholders, increased from 31% in 1972 to 80% in 2000, while the number of firms only paying dividends decreased from 69% in 1972 to 20% in 2000. Grullon & Michaely (2002) argue that since the number of firms distributing cash has been almost constant overtime, this suggests that for some firms dividend payments have been replaced by share repurchases.

Moreover, in a very recent study Hsieh & Wang (2006) find that payouts increased in proportion to corporate earnings during the 1972-2003 period. They argue that this

reflects an increased concentration of corporate payouts (dividends and repurchases) amongst the highest earners, and that a dramatic increase in share repurchases appears to be responsible for most of the increase in the total payouts.

Apart from the signalling and the FCF hypotheses, several other theories have been put forward in the literature to explain the recent surge in share buybacks. It has been suggested that repurchases are used as a takeover defence mechanism (Denis, 1990; Nohel & Tarhan, 1998), or that they are used to adjust the capital structure of the firm. One of the latest developments of the repurchase literature, though, is that which links repurchases to employee stock options. Previous work such as that of Jolls (1998), Fenn & Liang (1999), Kahle (2002) and Weisbenner (2000) provides evidence that managers have an incentive to cut dividends in order to protect the value of their executive options. As dividend payments reduce share prices they also directly reduce the value of any unexercised stock options and hence, the suggestion that share repurchases are preferred by managers who receive a substantial proportion of their total remuneration in the form of stock options. It has also been argued that, especially following the exercise of stock options, share repurchases have become a popular means of restoring (or enhancing) reported corporate earnings-per-share.

To recapitulate, the existing, largely US, literature suggests that share repurchases and dividends are two different, but often substitute, ways of distributing cash to shareholders where there is currently a mismatch between corporate resources and managerial incentives to wisely utilise these resources for the benefit of shareholders, i.e., in firms where agency costs are high. However, determining whether the choice of payout method has significant value consequences for some types of firms presents

some difficult issues that are still largely unresolved. The first issue is that although the formulation of the arguments is slightly different in each case, essentially identical agency problems provide similar firms with much the same motivations for increasing dividends or share repurchases. The second issue is that, with the exception of the option dilution hypothesis, in most instances dividend and repurchase decisions have much the same financial/managerial incentive consequences. What precisely distinguishes dividend payments from share repurchases and in what circumstances might repurchases be preferred to dividends (or vice versa) are issues that have rarely been addressed. Hence, we have the situation whereby positive empirical support for identical agency-related hypothesis motivations have been found by many studies irrespective of whether the focus has been upon dividends or repurchases.

As we shall show in the literature review, the primary difference between dividends and share repurchases in the US stems from a combination of perceived market expectations regarding the implied sustainability of the two types of payout, the much greater decision and reporting "flexibility" of share repurchases vis-à-vis dividends and other minor differences in their regulatory and tax treatments. It will be noted that both the existence of a large pool of firms with significant agency costs stemming from entrenched managers and surplus cash flows and the conditions that give rise to value/managerial incentive differences between dividends and repurchases, are institutional characteristics that may be specific to the US. It is fairly self-evident that other developed countries have a variety of corporate sectors, corporate governance and ownership systems, disclosure rules, taxes and other regulations and that these are often strikingly different from the US situation. The many studies that have reported empirical support for the various share repurchase motivations have overwhelmingly

examined only US firms and hence these reported results may be applicable only to the US. This suggests that research in a non-US setting may produce significant gains in terms of providing empirical confirmation or otherwise of the main US findings on the relationships between agency costs and the various dividend and share repurchase payout hypotheses and whether any differences with the US appear to be related to country-specific differences in corporate contracting and governance environments.

This thesis focuses on corporate payout policies in the UK. The UK constitutes an appropriate non-US context for evaluating share repurchase behaviour. Firstly, due to comprehensive disclosure rules, share repurchases in the UK are directly observable and easily measurable. Contrary to the US, UK firms are required by law to state in their annual reports the number of shares they repurchase and the cost of the repurchase, together with their motivation(s) for undertaking such repurchases. This is a major advantage that helps us overcome some of the problems that many US studies faced in compiling their repurchase data sets. It has been reported repeatedly that several of the measures used in US studies for share repurchases are severely biased due to poor US disclosure rules (Stephens & Weisbach, 1998; Dittmar, 2000; Jagannathan et al., 2000; Oswald & Young, 2004), which eventually means that their results are open to question.

Moreover, contrary to what is often suggested in the corporate governance literature[2], the US and UK corporate governance systems are not that similar to one another, particularly in terms of the market for corporate control, shareholder rights and their control over the board of directors. In this thesis we argue that these differences in

[2] See for instance Convon and Murphy (2000, p. 668) and Renneboog & Trojanowski (2005, p.3)

corporate governance between the US and UK imply that the types of agency problems highlighted by the FCF and executive share option motivations for repurchases are likely to be less important to the shareholders of UK firms. However, despite the relative lack of these high FCF/high executive options motivations, the UK is after the US, the world's second largest market for share repurchases. Hence, repurchases matter even for the UK and examining precisely why they still matter in this context may further our understanding of their role in the US corporate context.

Leaving aside the differences between the two countries in terms of the relative importance of agency-related motivations of share repurchases, the UK's increased use of repurchases and its large pool of widely-held firms with long histories of regular dividend payments, provides an excellent opportunity to examine hypotheses of the relationship between share repurchases, dividends and earnings. With a UK dataset, we are able to examine issues such as the extent to which share buybacks in the UK are primarily a substitute for dividends, and what the primary additional benefits of repurchases over dividends are (e.g., do they provide firms with greater flexibility to smooth dividend payments?) that might account for their increased popularity in the UK.

Thus, while we analyse UK firms' motivations to repurchase their shares in a framework consistent with that of previous US studies, we subsequently show that treating share repurchases as a component of corporate payout policy much in the same way as we do dividends, can further our understanding of both the motives behind share buybacks, and their impact on, and inter-relationship with dividends.

Indeed, we argue that since the popularity of share repurchases seems to be increasing, it would only be natural for practitioners and academics alike to treat them as components of corporate total payouts and as a consequence, to incorporate them alongside dividends in their modelling of corporate payout behaviour.

While there is a large body of literature that is concerned with building models of corporate dividend behaviour, starting with Lintner (1956) and Fama & Babiak (1968), nothing in this literature acknowledges the challenges that the increasing popularity of buybacks may pose to such models. Likewise, although the body of literature on share repurchases is growing and much of it recognises that the market of corporate payouts is changing, none of these studies considers how these changes may impact on traditional dividend behaviour models or how share repurchases may be incorporated in such models.

Perhaps the reason for this 'negligence' resides in the inherent flexibility of share repurchases. Given that most of the traditional dividend behaviour models, such as Lintner (1956), rely on the principle of dividend smoothing, which results from managers' efforts to keep dividend payouts stable, it is perhaps believed that share repurchases would not withstand the assumptions of these models. Nonetheless, one has to consider that these models were originally developed to reflect the realities of corporate payouts at the time when they were designed. For instance, Lintner (1956) developed his model after carrying out extensive field investigations that revealed, amongst other things, that managers had a target payout ratio and that they were reluctant to cutting dividends. Nowadays, however, the fundamentals of payout policy

have changed, and therefore so should the models that attempt to empirically evaluate corporate behaviour in this area.

Given the gaps in the literature identified above, this thesis contributes to the current corporate payout literature generally, and the repurchase debate in particular, in two ways:

- Firstly, this thesis provides a non US study of the motivations of share repurchases. By using the UK as its data source, this study avoids many of the data biases of previous studies, provides a new perspective on how differences in regulations and corporate governance affect firms' motivations to repurchase, and attempts to overcome some of the methodological weaknesses of prior work.

- Secondly, this thesis investigates the effect of using share repurchases *with* dividends to form total payouts, on the functioning of traditional corporate 'dividend' behaviour models, and suggests modifications to these models in order to reflect changes that have occurred in corporate payout policy over recent years. This investigation also helps determine whether share repurchases are increasingly being used by firms as a means to distribute cash flow that would have traditionally been distributed through dividends, by determining whether firms that repurchase their shares experience smoother dividend payouts than those that do not.

The structure of this thesis is as follows. In chapter 2, we discuss the development of share repurchases in the UK, undertake a review of the theoretical and empirical literature on share repurchases and provide an analysis of the main differences in corporate governance between the US and UK that might affect firms' motivations to repurchase. This chapter only focuses on share repurchases as it forms the basis for the univariate and multivariate investigations of the motives behind share buybacks in chapters three and four respectively. Dividends, on the other hand, are dealt with separately later on in the thesis.

In chapter 3, we describe our data sources, collection methodology and provide some univariate descriptive statistics relating to the data used in the subsequent empirical analyses. Essentially, our data set is composed of all the FTSE 350 firms excluding the financial sector that traded between 2001 and 2004. The list of firms is fixed to April 2004, and given that the FTSE 350 constitutes over 96% of the UK market capitalisation, our results are potentially economically significant. The univariate analysis of the sample reveals that significant differences exist between firms that repurchase and those that do not, and between firms that repurchase frequently and those that only make one-off buybacks. Effectively, it seems that re-purchasers, particularly frequent buyers, are larger, earn more, and pay significantly more dividends than non re-purchasers.

In chapter 4 we expand on the findings of the descriptive chapter by empirically investigating firms' motivations for repurchasing their shares. This analysis uses the findings of previous studies and the chapter 3 univariate analysis to guide our choice of variables, though where relevant we take into account the differences in corporate

governance between the US and UK. We start by examining the sample of firms that repurchased their shares at least once during the sample period, and then move on to examine the total sample with regard to the decision to repurchase, pay dividends, or retain earnings. For the first part of the analysis we use OLS for panal data estimation, and for the second part we use logit regression estimations. We are able to demonstrate that differences between the US and UK do, indeed, affect firms' motivations to repurchase their shares, and that some theories that have found empirical support in the US have relatively weak explanatory power in the UK, which we attribute mainly to differences in corporate governance between the two countries. Overall, we find that the most likely motivation for UK firms to repurchase their shares is to return cash to their shareholders, though the finding in the US that this cash is only temporary does not seem to be the case for the UK, as we find that firms appear to use their expected income as well to fund share repurchases. This leads us to examine the extent to which the flexibility of share repurchases is being used primarily for the purpose of dividend substitution.

In chapter 5 we examine the corporate payout behaviour of our sample firms, we investigate the effect of using total payouts instead of just dividends on the predictive power of traditional corporate dividend behaviour models. We use OLS for panel data to estimate models equivalent to Lintner (1956) and Fama & Babiak (1968), where we first model corporate dividend behaviour, and then total (dividends plus share repurchases) payout behaviour. We demonstrate that the use of share repurchases helps firms smooth their dividend payouts so that these can be predicted mainly from their past values. This finding confirms to some extent our suspicion that there is some substitution taking place, since dividends are smoother for firms that repurchase

than for firms that do not. The fact that total corporate payouts have not fallen appears to indicate that firms are choosing to repurchase their shares rather than to increase dividends when earnings rise. Moreover, we demonstrate that by modifying the traditional corporate dividend behaviour models to reflect changes in payout policies that occurred in recent years we are able to obtain sharper results. We do this by using the individual earnings trends of sample firms to estimate their expected and unexpected earnings, which we then use alongside lagged dividends and total payouts to estimate changes in dividends and changes in total payouts respectively.

In chapter 6, the main findings of the empirical analysis are summarised and contrasted with the previous (largely US) findings on share repurchases. The implications of our UK results are discussed and interpreted in terms of the main differences between the US and UK corporate governance systems and the light they shed on the various hypotheses regarding the motivations for corporate repurchase behaviour. Finally, we discuss some of the limitations of our analysis and suggest areas for future research into this topic.

2 LITERATURE REVIEW

2.1 Introduction

Over the past two decades, corporate payout policy in the US has undergone some dramatic changes as share repurchases have now become one of the most important methods of distributing cash to shareholders. In the US, for example, Grullon & Michaely (2002) report that from 1972 to 2000, the number of repurchasing firms increased from 31% to 80% of total firms distributing cash to shareholders, and that firms initiating a cash distribution using only share repurchases rose from less than 27% to more than 84% of the total firms initiating a cash distribution.

Share repurchase announcements have traditionally been accompanied by a significantly positive price appreciation of the stock and have, justifiably, received much attention from finance and economic researchers. Several hypotheses have been advanced to explain the motivations behind share repurchases, such as the "signalling hypothesis", which views repurchase announcements as a positive signal to the market regarding the firm's future prospects and that this explains the generally positive price changes following repurchase announcements. The 'free cash-flow' (FCF) hypothesis also enjoys considerable support in the financial literature. The FCF model predicts that firms that are most likely to repurchase shares are those that hold excess-cash that would otherwise be invested in unprofitable projects. By distributing this excess cash to shareholders, management are no longer exposed to this moral hazard which accounts for the positive reaction of investors following repurchase announcements.

There are several other hypotheses found in the literature, the most recently developed is the stock option hypothesis, which argues that firms repurchase their shares in order to avoid the dilution of their EPS caused by the exercise of employee stock options, or to avoid the devaluation of executive options that would occur if dividends were used to distribute cash instead. According to Kahle (2002), the average number of options outstanding and exercisable by executives has tripled during the period ranging from 1992 to 1997. The plausibility of this hypothesis is clearly strengthened by the fact that in the US the increased usage of options has more-or-less coincided with the large increase in corporate repurchase activities.

Several studies looking at the link between stock options and share repurchases have already been carried out using US data; Jolls (1998), Weisbenner (2000), Jong, Dijk & Veld (2000), Fenn & Liang (2001), Kahle (2002). All these studies have found support for either argument of the stock option hypothesis to varying degrees.
However, generalising the results of all these studies to other countries is problematic, as there has not been much written on share repurchases outside the US. The UK has shown the next highest growth and absolute level of repurchase announcements after the US, actually peaking in 1999 at over $100bn compared with $60bn in 1998 (Scholey, 2002). Nevertheless, the literature on share repurchases has been predominantly based on US data, which raises the question as to how general these results are since there is a large gap in our knowledge regarding share repurchase activity in the rest of the world. In the UK, researchers are starting to show interest in the area with the recent papers of Rau & Vermealen (2002) and Oswald & Young

(2004a). These have concentrated on the capital markets' reaction to share repurchase announcements and their effects on the announcing firms[3].

Given their obvious similarities in terms of legal traditions and corporate governance, it might be thought that what applies to the US is likely to be also generally applicable to the UK, and therefore, that we should expect firms' motivations for repurchasing their shares in the UK to be much the same as those in the US. However, this is far from certain to be the case in regard to share repurchases. Firstly, because the regulatory environment and rules relating to share repurchases in the UK are different from those in the US, and also because in certain crucial respects corporate governance in the two countries is actually far more different than is often realised. In this chapter, we go over the main motivations of share repurchases that have found support in the US, and we highlight how these motivations are likely to be affected by differences in corporate governance between the two countries. But first, we will start with a brief introduction to the regulatory framework of share repurchases in the UK.

[3] Rau & Vermaelen (2002) find that the total volume of UK share repurchase activity is tiny in comparison to that documented in the US, and that excess returns around the repurchase announcement date are smaller than the values reported in the US, with statistically significant average abnormal returns of only 1.14% in the 11-day window surrounding the announcement. They ascribe this result to tax considerations, which according to them have rendered share repurchases unattractive to pension funds, and to the UK regulatory system which makes it very difficult for firms to take advantage of an undervalued share price, thus, reduces the motive for open market share repurchases.
On the other hand, Oswald & Young (2004a) re-examine Rau and Vermealen's (2002) findings by using a more comprehensive data set and find three and eleven day CARs for first time authorisation announcements of 2.1% and 2.5% respectively, which are higher than the CARs documented by RV. Nevertheless, while Oswald & Young's (2004a) results differ from Rau & Vermaelen (2002)'s in many respects, they also support the hypothesis that the share repurchase activity in the UK has been influenced by the tax regime.

2.2 Regulatory Framework of share repurchases in the UK

The UK has traditionally had a company law system that has discouraged the repayment of capital to shareholders. Prior to 1981, UK companies were unable to repurchase their shares unless the shares were redeemable preference shares. It was only in the early 1980s that UK company law was changed to permit companies to buyback their own shares and it has only been in the 1990s that a considerable number of companies have actually started to do so (Shirley, 1997).

In the UK the legalities of this process are covered in sections 162 and 169 of the Companies Act, 1985, which allows a company to make an equity repurchase as long as the amount does not include all its non redeemable shares, and provided that it is authorised by its articles to do so (Scholey, 2002). The UK law allows two types of repurchases; market repurchases, and off-market repurchases.

Market purchases: these involve repurchasing shares on the Stock Exchange; they are therefore limited to PLC's. Section 166 of the Companies Act 1985 states that before a market purchase is made, an authorisation (conditional or unconditional) by ordinary resolution must be obtained that gives a general authority to purchase the company's own shares or be limited to shares of a particular class or description. The authority lasts only for 18 months, and is usually passed at each AGM[4].

Off-market purchases: These are any purchase of shares other than through the Stock Exchange, including any buy-back by a private company. The statutory provisions are to be found in the Companies Act 1985, sec162 – 170, which allows an off-market

[4] Annual general meeting

purchase to be made only if the terms of the contract of purchase are authorised before the company enters into the contract by a special resolution[5].

Section 263 of the Companies Act limits the financing of the repurchase only to "distributable profits" or the proceeds of a fresh issue of shares (made for the purpose of the repurchase). The legal restrictions of share repurchases by the Companies Act 1985 are reinforced by various other regulatory bodies such as the London Stock Exchange (LSE).

The tax treatment of cash payouts in the UK has undergone several changes in the past ten years. It is rather complicated due to the fact that the UK has an imputation system, which is meant to reduce the double taxation of dividends and on the "distribution element"[6] of share buybacks. It is not so much the tax regime for individual investors that has been changed, but the tax regime for pension funds which has been amended twice in just less than two years; namely on the 7th of October 1996, and the 1st of July 1997.

Shareholders' perception of share buybacks is affected by their tax treatment; it makes a difference to the individual shareholder whether the repurchase is treated as a distribution and thus taxed as an income, or whether it is treated as a capital gain. This, in turn, depends on the repurchasing method- whether it is an on-market repurchase or an off-market repurchase- and on whether the *Inland Revenue* approves of the repurchase being treated as a dividend distribution (Lasfer, 2000).

[5] CompanyLawClub.com
[6] The difference between the market value of the repurchased shares and the book value of the corresponding paid-in-capital

On-market repurchases usually give rise to capital gains taxes while off-market repurchases are usually treated as dividends. The latter is because shareholders know that they are selling to the company, and can therefore claim the tax credit in the same way as they do for dividends. Nonetheless, it should be noted that off-market repurchases are rare in the UK, in comparison to on-market repurchases. Moreover, beneficiaries of off-market repurchases are usually large shareholders, who tend to be holding institutions rather then individual shareholders. It is, therefore, difficult to determine individual shareholders' tax preferences, with regard to dividend payments or share repurchases, since this depends mainly on the individual investor's capital gains tax liability.

Institutional investors, on the other hand, are quite a different story. Prior to September 1994, all repurchases had to be undertaken in the open market, which was an unattractive form of distribution to mutual funds relative to off-market repurchases and dividend payments. On some occasions, however, the *Inland Revenue* allowed some repurchases to be treated as dividends, in which case the repurchasing firm would pay the tax credit in the form of Advanced Corporation Tax (ACT) that can be deducted from the corporation's tax liability and claimed back by shareholders[7].

On 21 September 1994 an innovative method was adopted by Barclays de Zoete Wedd for the repurchase program of Northern Electric PLC. This method became known as the *agency buyback*, and consisted of the repurchase of the company's shares in the open market but through a broker-agent. This way, selling shareholders

[7] For instance, in 1993, The *Inland Revenue* agreed to treat every £1.16 per share repurchased by Reuters at £14 as capital repayment while treating the remaining £12.84 per share as a 'distribution' (Lasfer, 2001).

knew that they were selling indirectly to the company and could claim back the tax credit. This method was soon adopted by many tax-exempt institutions, such as pension funds, and led to a remarkable increase in the repurchase activity, as evidenced by Rau & Vermaelen (2002). However, this tax loophole was detected by the *Inland Revenue* and subsequently abolished in October 1996, making dividends more attractive to pension funds again. This situation did not last for long, as from the third of July 1997 pension funds were not allowed to claim the tax credit on dividends anymore, making them indifferent between dividends and share repurchases.

The main thing to note from this is that in the UK, high taxpayers tend to prefer share repurchases to dividends, mainly because capital gains tax is deferred until the shares are sold while income tax on dividends is paid annually, and they prefer an off-market repurchase (tender-offer or private purchase) to an open-market buyback. And under the current tax code pension funds are indifferent between dividends and share repurchases, because in July 1997, the UK tax authorities eliminated all tax credits for dividends.

Prior to December 2003, shares repurchased had to be cancelled in order to preserve the pre-emption rights of shareholders. However, the Companies (Acquisition of Own Shares) (Treasury shares) Regulations 2003 (SI 2003/1116) changed that; as from the 1st of December 2003, companies that purchase their own shares out of distributable profits have the option of holding them "in treasury" for sale at a later date or of

transferring them for the purposes of an employees' share scheme (Only "qualifying shares" may be held in treasury[8]).

Nevertheless, companies which repurchase their shares and choose to hold them as treasury shares are subject to many requirements, these are highlighted below[9].

According to the first consultative document regarding the change in the law on the cancellation of repurchased shares[10], allowing companies to hold repurchased shares in treasury rather than cancelling them would give them an additional measure of flexibility that would enable them to manage the level of their capital in the same way as they manage other resources such as labour and land. This flexibility of managing debt and equity capital could also help the company find and maintain its optimal average cost of capital throughout the different phases of the business cycle[11].

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[8] "Qualifying shares" are defined in the regulations as shares which:- i) are included in the official list (ie listed on the London Stock Exchange); or ii) are traded on the market known as the Alternative Investment Market; or ii) are officially listed in another EEA State; or iv) are traded on a market established in an EEA State which is a regulated market for the purposes of Article 16 of Council Directive 93/22/EEC on investment services in the securities field (The companies Acquisition of Own shares, treasury shares, Regulations 2003, SI 2003/1116).

[9] Summary of requirements to holding repurchased shares in treasury (THE COMPANIES ACQUISITION OF OWN SHARES) (TREASURY SHARES) REGULATIONS 2003 (SI 2003/1116)):

- The aggregate nominal value of shares held in treasury must not at any time exceed 10% of the nominal value of the issued share capital of the company. If that limit is exceeded, the company must dispose of or cancel the excess shares within 12 months.
- Holding treasury shares does not give rise to the usual voting rights, and the rights to receive dividends or any other distribution of the company's assets. Exercising any rights in respect of treasury shares is void.
- Treasury shares may be sold; or transferred for the purposes of, or pursuant to, an employees' share scheme; or cancelled.
- If the proceeds of the sale of treasury stock are equal to or less than the purchase price paid by the company for the shares, then they should be treated as a realised profit of the company; if, however, they exceed the purchase price paid by the company for the shares, then the part of the proceeds that is equal to the purchase price paid should be treated as a realised profit and the excess sum should be transferred to the company's share premium account.
- The pre-emption rights that apply to the allotment of new shares apply to the sale of treasury shares but may also be forgone with the agreement of shareholders. Repurchasing firms have to indicate any shares that are to be held in treasury and details of those treasury shares that are sold, transferred or cancelled.

[10] Department of Trade and Industry (1998). Share Buybacks: A Consultative Document

[11] Although share repurchases with their subsequent cancellation already allow companies to manage their debt-equity ratio, it is argued this mechanism can be too cumbersome for anything other than

Moreover, allowing treasury stock would lead to a more flexible and effective management of employee stock options and other employee share schemes. At present, the manner in which employee shares schemes involving existing shares - as opposed to newly issued shares - are managed is that funds are advanced by the company to a separate trust for the purchase of the shares. Repurchasing shares and subsequently holding them in treasury would enable the firm to fund the exercise of share options.

On the other hand, allowing companies to hold treasury stock may give rise to some manipulative behaviour on the part of repurchasing firms and their managers. These will have a bigger incentive to create a false market or to manipulate the price of their shares, particularly for short-term gain. Indeed, when share buybacks were first allowed in 1981, holding treasury stock was prohibited for this specific reason. Moreover, directors might be tempted to use share buybacks in order to strengthen the share price of the company so as to increase the value of their share options or any long term incentive plans (LTIPs) based on the performance of the company's share price (Share buybacks: a consultative document, May 1998).

large step reductions in equity capital. Indeed, in the presence of the risk of re-issuance of shares, this exercise may become a very costly one

2.3 Motivations of share repurchases

In this subsection, we review, the main theories discussed in the financial literature that could potentially explain the positive market reaction to the announcement of a share repurchase program.

2.3.1 The Signalling Hypothesis

According to the available financial literature, mainly US-based studies, signalling is the main motivation for share repurchases. This is because of the findings that on the announcement of share repurchases, stock prices increase significantly while the cumulative abnormal returns on the pre-announcement period are generally negative, which suggests that repurchasing firms are undervalued (Lasfer, 2000). According to this hypothesis, the announcement of a share repurchase is motivated by managers' belief that the shares of their company offer the best available investment opportunity. Managers are believed therefore to use their private information to repurchase shares when they are undervalued.

D'Mello & Shroff (2000) test whether firms that repurchase their shares using fixed-price tender offers are undervalued relative to their economic value (EV). They use a sample of 166 fixed-price self-tender offer announcements made during 1970 to 1989, and find that while 74% of repurchasing firms are undervalued with regard to their EV at the beginning of the announcement year, only 51% of control firms are under-priced, and only 58% of repurchasing firms are undervalued relative to their EV based

on available analysts forecast information. This suggests that share repurchases convey information to the market that is not already available to analysts.

However, many have found that the signal of a share repurchase is not always a positive one. According to Pettit (2001), a repurchase announcement can send a negative signal in three situations:

- Other information can contradict, and sometimes swamp, the intended buyback signal.
- In high growth industries a share repurchase may be seen as admittance that there are no other investment opportunities for the firm.
- Managers' participation in the buyback may seriously weaken the credibility of the signal.

It is common knowledge that insiders have superior information about the future prospects of their firms. Therefore, in the case of a potential corporate announcement, insiders have the incentive to trade stocks before the announcement date, the type of trade depending on whether the expected announcement is to have a positive or negative impact on the company's share price. The presence of such information asymmetry encourages markets to closely monitor insider activities. Insiders' increased equity holdings before the repurchase announcement are usually interpreted as a positive signal about the firm's future prospects, while decreased insider holdings before the announcement send a negative signal to the market and weaken the credibility of the repurchase announcement (Raad & Wu, 1995). Comment & Jarrell (1991) build a sample that includes 84% of at-risk fixed-price offers and 46% of at-risk Dutch-auction offers, and find evidence that the at-risk offers have excess returns of about 12% compared with 5% for the no-risk offers[12]. These results are also

[12] Comment & Jarrell (1991) consider officers and directors as being at risk if two conditions hold:

supported by Nohel & Tarhan (1998); who also find that officers being at-risk during the announcement seems to be positively related to the announcement returns, and Raad & Wu (1995) who find that when management ownership is small, the two-day excess return resulting from the repurchase announcement is 1.99%, while it is 3.85% when management's ownership is large, this difference being significant at the 1% level. This evidence is also supportive of the findings of Lee, Mikkelson & Partch (1992) and Lui & Gombola (1998).

Nevertheless, according to Lasfer (2000), Ikenberry & Vermealen (1996) and Rau & Vermaelen (2002) the signalling hypothesis is controversial because open market share repurchases, which are the most popular means of repurchasing shares, are not costly signals and they carry no obligation for the firm to actually repurchase the shares[13]. This is somehow contradictory with the principles of the signalling theory, which views share repurchase announcements as signals of the undervaluation of the firm's share price. Hence, open market repurchase announcements are poor signalling

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- Their collective proportionate ownership interest in their company's stock must increase as a result of the offer (non-participation condition)
- The minimum price that the company can pay in the offer is more than 2% above the closing market price 4 days before the offer is announced (premium-offer condition).

[13] In the US, firms can repurchase their shares in one of three general ways:

- An open-market share repurchase: these are favoured because buying can be easily suspended if better investment opportunities arise. But the lack of commitment inherent in this type of repurchase makes it the least effective when it comes to signalling the undervaluation of the firm. Open market repurchases are also not very useful in restructuring the balance sheet because of the limited amount of shares a company can buy on any one day, which can extremely lengthen the process. Therefore, many argue that open-market repurchases should be used when the primary objective of the repurchase is to distribute excess cash to shareholders just like dividends rather than signalling the firm's undervaluation.
- Fixed-price tender offers: evidence from previous studies shows that this type of repurchase offers the strongest signal. But in the case of a misconception of the buyback, this type of repurchase causes the severest damage.
- Auction-based tender offers: auction tender offers offer a medium solution between the above two types of repurchase. They are good signalling tools but with a reduced chance of transferring wealth between tendering and non-tendering shareholders because there is a smaller chance of a major price decline after the repurchase since investors have themselves participated in setting the repurchase size and price (Pettit, 2001).

techniques if they do not show a strong management's belief in the undervaluation of the firm, which could be better signalled through tender offers.

Comment & Jarrell (1991) find empirical evidence that open-market share repurchases are associated with the lowest returns of the three kinds of stock buybacks, on average about 3%, compared to 11% for fixed self-tender offers and about 8% for Dutch auctions. However, they also find that the sub-sample offering to repurchase more than 20% of the outstanding shares show an announcement excess return of about 6%, which is close to the average of Dutch auction offers. In other words, announcements of large open-market repurchase programmes, which offer no premium over market price, have nearly the same signalling effect as premium Dutch-auctions.

Consistent with the findings of Comment & Jarrell (1991), Stephens & Weisbach (1998) test the signalling hypothesis by regressing three-day abnormal returns of their sample of repurchase announcements on the fraction of the repurchase target as well as on the excess returns for days -40 to -6 prior to the announcement. They find that the larger the announced repurchase targets the larger the associated abnormal returns.

Ikenberry & Lakonishok (2000) use a sample of 1159 repurchase program authorisations announced by firms listed on the Canadian Stock Exchange to construct a portfolio of repurchasing firms for which they calculate monthly returns in calendar time. They add firms to the portfolio at the beginning of the month following their repurchase announcement, and they retain them for the following 3 years (or until the stock no longer trades) and calculate the portfolio returns for each year. They

find that for a three year holding period they observe abnormal returns of 0.62% per month, while for a two-year holding period they observe abnormal returns of 0.70%.

Moreover, when they divide the sample according to the mean value of the book-to-market ratio, the authors find that value companies announcing a repurchase significantly outperform growth companies: the abnormal return for the value sample using the three-factor model is 0.76% per month, while for the growth sample it is 0.28% per month. They also find that the performance of value firms prior to the repurchase announcement is very poor; -0.91% per month, while growth firms do not show any particular sign of undervaluation. The authors interpret this as further evidence in support of the signalling hypothesis.

Most of the studies mentioned above use US data. However, in the UK an early event study was undertaken by Rees (1996), who was the first to analyse the impact of share repurchase announcements on stock prices using UK data. Using a sample of open market repurchase announcements made in the eighties, Rees (1996) finds that, on average, British firms announce repurchases amounting to 0.5% of their equity, which result in a mean positive reaction of 0.25%. He also finds that prior to the repurchase announcement, his sample firms experience a significant decline in their stock prices, and that the market reaction is positively associated with the proportion of shares repurchased. Rees (1996) interprets his findings as offering implicit support to the signalling hypothesis.

2.3.2 The Free Cash-Flow Hypothesis

An alternative explanation for share repurchases is that they reduce the agency costs of free cash flow. Free cash flow (commonly defined as the company's true operating flow) is "the total after tax cash flow generated by the company and available to all providers of the company's capital" (Evans, Evans, & Gentry, 2003). According to the FCF hypothesis, stock repurchases mitigate the agency costs associated with the potential overinvestment of free-cash flow. Jensen & Meckling (1976), Easterbrook (1984) and Jensen (1986) suggest that distributing FCF to shareholders induces managers to be more disciplined in their expenditure. Therefore, share repurchases can be used as a signal of managers' commitment to reducing the potential agency costs of FCF.

Contrary to the argument of the signalling hypothesis, share repurchases do not communicate to the market information about the future prospects of the firm, but they signal managers' intentions about the use of free-cash flow (Opong, 2002). The FCF hypothesis suggests that firms should distribute cash to their shareholders if they perceive an increase in the agency costs of FCF, meaning when agency costs are severe and they experience a contraction in their investment opportunity set (Grullon, Michaely & Swaminathan, 2002). Therefore, the FCF hypothesis predicts that repurchasing firms should be experiencing a decline in their investment opportunities, which is translated into a decline in profitability, systematic risk, and capital expenditure after the repurchase announcement. This hypothesis also predicts that agency costs should be more important among firms that have negative marginal returns on investment since they are more likely to be over-investing (Opong, 2002).

Lang & Litzenberger (1989) review dividend announcements to determine whether the free-cash flow theory has any explanatory power. They show that a Tobbin's Q-ratio[14] of less then unity indicates over-investment by a firm. They find that low-Q (overinvesting) firms announcing dividend increases realise significantly higher returns than high-Q (value-maximising) firms.

Howe, He & Kao (1992) extend the analysis of Lang & Litzenberger to include any cash distribution that is not expected to be repeated i.e. tender offer share repurchases and SDDs (Specially designated Dividends). They follow the same approach as Lang & Litzenberger. However, contrary to the findings of Lang & Litzenberger (1989), Howe et al. (1992) do not find any statistically significant difference in announcement effects across values of Q-ratio in any of the samples. They conclude that the presence of FCF is not the reason why firms undertake share repurchases. However, Perfect, Peterson & Peterson (1995), who also analyse the market reaction to share repurchases using the methodology of Lang & Litzenberger (1989), argue that the results of Howe et al. (1992) are flawed because of their measure of Tobin's Q (the average Q-ratio over the three years preceding the repurchase). Perfect et al. show that low-Q firms experience a stronger market reaction to share repurchases if Tobin's Q is measured in the year immediately preceding the repurchase. They conclude that the FCF hypothesis best explains the motivations behind share repurchases (Nohel & Tarhan, 1998).

Nohel & Tarhan (1998) complement these findings. Using a sample of 242 tender-offer announcements (both fixed-price and Dutch-auctions), made during 1978 to 1991, they find that there is a significant improvement in operating performance after

[14] Tobbin's q is the ratio of a firm's market value to the replacement cost of its assets (Howe & He, 1992)

the repurchase, which seems, however, to be driven mainly by the low-Q firms sample. Moreover, they find that share repurchases are associated with a lower growth rate in assets, and sales of existing assets, but not with a significant change in capital expenditures. The asset sales' pattern is found amongst both groups of high and low-Q firm. These results seem to favour the FCF hypothesis, especially when we consider that even the high-Q firms, which face better growth opportunities, seem to engage in restructuring activities.

Furthermore, based on a sample of 398 share repurchase announcements reported in the Wall Street Journal Index from 01/01/78 to 31/12//95, Evans, Evans & Gentry (2003) find that repurchasing firms undergo a significant reduction in FCF in the period subsequent to the repurchase program, which lends support to the free cash flow theory as a major motivator for share repurchases.

Jagannathan et al. (2000) hypothesise that the inherent financial flexibility of share repurchases renders them an attractive means to distribute potentially temporary cash-flows, as opposed to dividends, which represent a long-term commitment and are thus used to distribute permanent cash flows. They estimate firms' payout decisions using a multinomial logit model, and obtain results in support of their hypothesis; the probability of repurchasing increases with the increase of *non-operating* income, while the probability of increasing dividends increases with the increase of *operating* income. They also find that firms with more volatility in their cash-flows are more likely to repurchase.

Guay & Harford (2000) come to similar conclusions as they test the permanence of cash-flow 'shocks' according to the payout mode chosen by their sample firms. They find that re-purchasers do not exhibit significantly more permanent cash-flow shocks than the control sample, while dividend increasers do. They interpret this as indicating that cash-flow of dividend-increasing firms is less likely to revert back to levels prior to the cash-flow shock, which is just a confirmation of the findings of earlier corporate dividend behaviour models (see Lintner 1956, Fama & Babiak 1968 and others).

2.3.3 The Management Entrenchment Hypothesis

The management entrenchment hypothesis is based on the agency theory, and views targeted share repurchases as one of the many practices used by managers to protect their own interests at the expense of the interests of shareholders. The argument is that by eliminating the threat of a blockholder, hence increasing the control exercised by managers, targeted share repurchases could be an example of an agency cost. Following this line of reasoning we should expect negative abnormal returns on the repurchase date. However, some argue that given that greenmail protects the firm from only one blockholder, other investors may duplicate this strategy, and the anticipation of a third-party takeover attempt could result in a price increase (Klein & Rosenfeld, 1988). Therefore, a negative cumulative average residual over the full initial investment-to-repurchase period would add support to the management entrenchment hypothesis.

Shleifer & Vishny's (1986) theoretical model suggests that defensive tactics such as 'greenmail' can raise expected takeover premiums and enhance shareholder wealth.

They also argue that by undertaking a targeted repurchase programme, the target may induce other firms to consider the possibility of taking it over, and subsequent bids may be enough to compensate shareholders for the elimination of a potential acquirer as well as for the direct costs of discouraging them. Similar arguments are advanced by other authors, for instance, Ang & Tucker (1988) report results suggesting that the positive wealth effects for non-participating shareholders of targeted block share repurchases for the interval encompassing the buy-in and repurchase announcements are caused by the expectation of subsequent acquisition activity. Moreover, Klein & Rosenfeld (1988) use a standard event methodology on a sample of 77 New York and American Exchange target repurchases for the period of 1979-1983. They find that over the full purchase-to-purchase period, non-participating shareholders of the target firm earn abnormal returns in excess of 12%, however, the cumulative abnormal return for the two-day repurchases period is –3.27% and significant at the 1% level. Thus, the results of the analysis do not fully support either hypothesis. Although they show that shareholders, on average, benefit from greenmailer's initial investment, the share prices' decline on the repurchase date points to a negative impact on shareholder wealth.

A more comprehensive study of the marginal impact of the payout announcement on the wealth of target firm shareholders is provided by Denis (1990). He examines abnormal returns during the two-day period including the day before, and the day of the payout announcement in the Wall Street Journal. He uses standard event study methodology to compute excess returns for a full sample of 49 payouts. The results indicate that in a sample of clean events, repurchases are associated with significantly negative abnormal returns (ARs) of -1.45% while special dividend announcements result in average abnormal share price increases of 8.94%. This difference in ARs is

significant at the 1% level. Moreover, when stock returns are measured over the entire control contest, firms which retained their independence following repurchase announcements exhibit substantially lower CARs than those in which a control change took place. When combined with the pre-announcement price effects, this evidence suggests that successfully resisting a takeover through a share repurchase is associated with large losses for the target firm's shareholders.

More recently, Nohel & Tarhan (1998) investigate whether the threat of a takeover has any impact on the outcomes of the repurchase announcement. They find that when firms use repurchase announcements to fight against hostile takeovers investors revise downward the probability that they will be taken over. These results are consistent with the findings of Denis (1990).

2.3.4 The Substitution Hypothesis

According to this hypothesis, investors respond positively to cash distributions in the form of share repurchases because of historically favoured tax treatment and the difficulty of observing future cash flows. It is well documented that companies face heavy penalties for reducing dividends and are therefore cautious about adjusting dividends; as a result, companies with excess free cash are more likely to retire stock than increase dividends (Evans et al., 2003).

Previous literature provides mixed views on whether managers view repurchases and dividends as interchangeable, for instance, John & Williams (1985), Bernheim (1991), and Allen, Bernardo & Welch (2000) support the view that dividends are used to signal the firm's quality, meaning that share repurchases and dividends are not interchangeable. Allen et al. argue that only undervalued firms wish to be monitored, and they achieve this monitoring by attracting institutional investors through the

payment of higher dividends, since institutional investors prefer dividends, this signalling equilibrium cannot be achieved with share repurchases (Grullon & Michaely, 2002). Moreover, DeAngelo, DeAngelo & Skinner (2000) investigate whether the appearance of share repurchases is related to the disappearance of special dividends. They do not find evidence for any substitution effect. Additionally, Jagannathan, Stephens, and Weisbach (2000) find evidence that dividends are usually paid by firms with relatively stable earnings, contrary to share repurchases. They conclude that dividends are used to payout permanent earnings while share repurchases are used to payout extraordinary transitory earnings.

On the other hand, Miller & Modigliani (1961), Bhattacharaya (1979), Easterbrook (1984), Miller & Rock (1985), and Jensen (1986) argue that it is the payout itself which can be a signal of undervaluation, regardless of the form of this payout. At the heart of the corporate finance theory there is the Miller & Modigliani (1961) irrelevancy theory, which implies that, in perfect and complete capital markets, share repurchases and dividends are perfect substitutes. The conclusions of Easterbrook (1984) and Jensen (1986) also support the view that agency costs can be reduced if cash is distributed to shareholders rather than being left to the managers' discretion, regardless of the form in which this cash will be distributed.

Moreover, Grullon & Michaely (2002) examine the distribution of firms by payout method over the period 1972 to 2000 and find that the number of repurchasing firms, as a percentage of the total number of firms distributing cash to their shareholders, increased from 31% in 1972 to 80% in 2000, while the number of firms only paying dividends decreased from 69% in 1972 to 20% in 2000. They argue that since the

number of firms distributing cash has been almost constant overtime, this suggests that dividends are being replaced by share repurchases. As firms repurchase more, their actual dividends are lower than their expected dividends. Moreover, Grullon & Michaely (2002) find that the three-day CAR around the announcement of dividend decreases is significantly less negative for repurchasing firms than for non-repurchasing firms[15], These results suggest that the markets view share repurchases and dividend payments as substitutes. They, thus, penalise less repurchasing firms for dividend cuts then they do non-repurchasing firms.

2.3.5 The Capital Structure Hypothesis

This hypothesis suggests that, since Miller & Modigliani (M&M) (1963) show that in the presence of corporate taxes firms can increase their value by increasing the proportion of debt in their capital structure; firms repurchase their shares in order to benefit from the tax shield on debt (Opong, 2002). Buybacks can affect value by changing a company's capital structure to replace relatively expensive equity funding with cheaper debt funding and move the firm towards a more desirable capital structure. A share repurchase will automatically change the relative proportions of debt and equity held by a company, particularly if the company borrows to fund the repurchase. This will subsequently impact on its weighted average cost of capital (Rau & Vermaelen, 2002; Oswald & Young, 2004a).

[15] Grullon & Michaely (2002) document a mean (median) reaction around the announcement made by non-repurchasing firms of -1.93% (-0.72%), and a mean (median) reaction around the announcement made by repurchasing firms of only -0.45% (0.10%), which is not significantly different form zero

2.3.6 Wealth Expropriation hypothesis

According to this hypothesis, share repurchases allow informed shareholders to acquire shares from uninformed shareholders at less than their full-informative value. Advocates of this hypothesis extend the M&M model by including the differences in the level of information available to shareholders. In a world with no taxes and where market prices reflect 'fair values', M&M (1961) show that any distribution to shareholders will not affect their wealth, regardless of the form of this distribution. Therefore, shareholders should be indifferent between a dividend payment or a share repurchase. However, a share repurchase changes the ownership of the firm. This will affect the preferences for dividends or share repurchases even though the post-distribution wealth is equivalent in both cases. Graham & King (2000) find that when the firm's shares are undervalued, informed shareholders would prefer to repurchase the shares of uninformed shareholders and thus capture the wealth of the latter. A repurchase of this kind encourages the informed shareholders to reveal their private information to the market. This means that when buying the shares of uninformed shareholders at a discount, uninformed shareholders are not expropriated of their wealth but rather they are paying a price to motivate informed shareholders to reveal their information. Therefore, uninformed shareholders may have to tender a portion of their holdings in order to capture some value from the private information of informed shareholders.

2.3.7 Employee/Executive Stock Option Hypothesis

The two largely discussed motives for share repurchases are the signalling theory and the free cash-flow hypothesis. However, neither hypothesis explains the recent

dramatic rise in the repurchase activity whose increasing popularity may yet be explained by the recent innovations in compensation schemes, particularly the growing use of stock options which may have lead many companies to change their payout policy.

An employee stock option (ESO) is the right to purchase a set number of shares of company stock at the "strike" price between the vesting date and the expiration date of the option (Mehran & Tracy, 2001). The vesting being the interval of time between when the option is granted and when it can be first exercised. A vested option is said to be "in-the-money" if its current market value exceeds its strike price, and is said to be "out-of-the-money" if its current market price is below its strike price. If in-the-money options are exercised then the employee can realise a gain, which is the difference between the current market price and the strike price times the number of shares exercised. Although out-of-the-money options would not have a current value if exercised, they still have a positive "option value", which reflects the possibility of future exercise prior to expiration (Mehran & Tracy, 2001).

Originally, ESOs were introduced to limit the agency problems between employees, including executives, and shareholders. It has been argued that employee (executive) stock options help align the interests of managers with those of shareholders, and encourage employees to take appropriate risks in order to achieve better returns, resulting in a better performance and an increased value of the firm's share capital.

In the UK, the Inland Revenue requires that the underlying shares of ESOs be part of the ordinary share capital of the company that has set up the scheme, or the company

that controls it, and that they must carry the same rights (for example to dividends and bonus issues) as other ordinary shares. However, holders of these options are not allowed to receive dividends and are not able to vote at company meetings until they have actually bought the shares. ESOs are also non-tradable and unlike the US, the exercise of ESOs in the UK is usually subject to the achievement of certain performance criteria[16]. For a full definition of the types of stock options with tax relief (approved by the Inland Revenue) refer to the information provided in the chapter appendix.

According to Fenn and Liang (1999), corporate payout policy is affected by managerial stock incentives in one of two ways. Firstly, managerial stock options can result in a higher level of total payouts by better aligning the interests of managers and shareholders. In other words, because they can help reduce the potential costs of FCF, the level of management share ownership and stock options may be positively related to the level of dividends and/or repurchases should be positively related to the level of managerial stock incentives. Secondly, managerial stock incentives can change the composition of corporate payouts. The last few years have witnessed a dramatic increase in the use of share repurchases as a distribution method, which can be due to the growing use of managerial stock options. As a matter of fact, the average number of options outstanding and exercisable by executives has tripled during the period ranging from 1992 to 1997. This pattern is consistent with the

[16] In the UK, each company can decide on the rules to include in its scheme such as when options can be used and whether other conditions like performance targets must be met before the options can be used. Depending on the rules of the scheme, the option holder may be able to use them even if he/she left the company, but often, options are forfeited if their holder leaves the firm before they become exercisable. In the unfortunate case of the death of the option holder, usually the scheme rules will allow whoever is legally responsible for his/her estate to use their share options within one year of the date of death.

increase in repurchases during the same period (Kahle, 2002). According to Weisbenner (2000), for the S&P 500, stock option grants increased from 1% of shares outstanding in 1994 to 1.6% of shares outstanding in 1998. Moreover, the size of stock option programs increased by more than 40% over the same period, with outstanding stock options representing 6.3% of shares outstanding at the end of 1998. This growth in option programs could be related to the growth in the repurchase activity.

It is well known that stock options, just like any other call options, are reduced in value by future dividend payments. This offers management an incentive to distribute cash in the form of share repurchases rather than dividends. This argument was first put forward by Lambert, Lannen & Larcker (1989), who find that dividend payments have decreased relative to their expected levels following the adoption of executive stock option plans, and has since then been adopted and examined by many researchers.

This relationship can be better explained if we decompose the constituents of the option value. These are: the risk-free interest rate, the price of the underlying security, the option's exercise price, time remaining before the expiry of the option, the rate of dividend payment on the underlying security and the volatility of the underlying security[17].

Given that ESOs are call options, their value increases with the underlying share price, which decreases with the payment of dividends (share prices drop immediately after the payment of dividends), and employee (executive) stock options are rarely

[17] Global Investment Strategy; Global Strategy Weekly "Dividend redux; the truth is out there", 12 April 2002. http://dividends.behaviouralfinance.net/Mont02a.pdf

dividend protected. As a result of this, managers have a clear incentive to reduce dividend payments in order to increase the value of their options. This fits well with the arguments presented under the stock option hypothesis which says that share repurchases are being used instead of dividends in order to maximise the value of executive stock options. Moreover, the value of call options increases with the volatility of the underlying equity. Therefore, ESOs provide managers with a strong incentive to increase the firm's volatility. This can be done in one of two ways; either by increasing the leverage of the firm, or by investing in riskier projects.

It has been suggested in the financial literature that one of the reasons for undertaking a share repurchase program, is to move the firm closer to its optimum capital structure. Following the same line of reasoning, it can very easily be suggested that share repurchases are also undertaken to increase the firm's leverage in order to increase the volatility of the firms' returns, which would result in an increased value of ESOs.

Another aspect of the stock option hypothesis is the EPS argument. Although stock option grants are not directly reflected in the firm's earnings, they potentially increase the number of common shares outstanding and common stock equivalents, a figure by which the earnings are divided to get the company's EPS. Thus, granting options dilutes EPS by increasing the denominator without necessarily having any impact on the numerator (earnings). This is crucial because EPS is one of the most widely used measures of firm performance and its dilution can potentially cause a devaluation of the price of the stock.

Weisbenner (2000) argues that the dilutive effect of stock options does not occur at the time of their grant, nor when they are exercised, rather it occurs gradually and

continuously throughout the life of the option as the share price increases above the option's exercise price. As a result of this dilutive effect of option grants, firms may choose to repurchase an equivalent number of shares in order to counter the dilution, especially given that the cash used to finance the repurchase is not deducted from earnings.

It is legitimate to wonder why such a superficial measure as EPS should have so large an impact on firm value even though the fundamental characteristics (i.e., the size and riskiness of earnings) of the firm do not change. This can be explained by the way in which executive compensation is linked to EPS, as advocated by Jolls (1998) and Fenn & Liang (2001). A survey by the Hay Group Inc in 1993 indicates that a quarter of surveyed corporations base annual bonuses at least partly on EPS, and 30% tie long-term performance based plans on EPS (Weisbenner, 2000). Moreover, evidence presented by Healy (1985), Holthousen, Larker & Sloan (1995), and Guidry, Leone & Rock (1999) suggests that managers manipulate earnings to maximise the present value of bonus plan payments. As a matter of fact, Jolls (1998) finds that if the average executive had chosen to increase dividends rather than repurchase the equivalent amount of shares, than his/her stock option portfolio would have lost $345,000 of its value as a consequence of the dilution caused by the dividend distribution[18]. Because dividend payments reduce the stock price and the value of outstanding options, executives holding stock options have a clear incentive to avoid paying dividends and can be expected to choose to distribute cash to their shareholders through share repurchases instead. From 1985 to 1994, annual cash-

[18] Jolls (1998) also finds that a one unit increase (app. One standard deviation) in the option variable will increase the probability of a repurchase by 0.256, while it will decrease the probability of the dividend-increase-and-repurchase alternative by -0.087. Thus, the net effect on the probability of observing a repurchase is 0.169.

based compensation for CEOs at large US firms has increased by about 50% in real terms, while the average value of stock option grants has nearly tripled (Hall & Liebman, 1998). It is also worth noting that now; the value of annual stock based compensation exceeds the value of cash-based salary for many US top executives (Weisbenner, 2000). Therefore, the payout policy of the firm does not only reflect shareholder preferences but also the interests of the agents making the payout decisions.

Previous studies that examine stock options and the payout policy of the firm are numerous, and they all come to different conclusions as to the effects of stock options on the payout method. Lambert, Lanen & Larker (1989) investigate the relationship between the initial adoption of executive stock options and subsequent changes in the firm's dividend policy. The authors examine whether the initial adoption of executive stock option schemes leads to any changes in the corporate dividend policy. Their main hypothesis is that the initial adoption of executive stock options provides managers with an incentive to reduce corporate dividend payments relative to what these payments would have been if there was no executive stock option plan in place. This hypothesis is motivated by the fact that stock options are usually not "dividend-protected", which means that their value decreases with the payment of dividends. The authors come up with the main finding that the adoption at the executive level of stock options, indeed, results in a reduction of actual dividends relative to expected dividends.

Overall, the authors find that dividend payments decrease relative to their expected levels following the initial adoption of senior-level executive stock options. There is also some evidence that the greatest decreases in dividends occur in firms where these

decreases will result in the greatest increases in stock option values. The authors view these results as suggesting that no matter what the dividend policy of the firm is, and regardless of the reasons why stock options are adopted; altering managerial compensation may induce managers to alter the corporate dividend policy.

While Lambert, Lanen & Larker (1989) examine the corporate payout policy of the firm with a particular focus on dividends; Jolls (1998) was amongst the first to investigate the relationship between the use of executive stock options and share repurchases. She attempts to look at the repurchase decision from the perspective of the agents making that decision .i.e. managers. She tests the hypothesis that stock options held by top executives encourage the latter to choose repurchases over dividends. Using a sample that consists of 86 dividend-increase firms, 44 repurchase firms, 170 retention firms (firms that announced neither a dividend increase nor a repurchase), and 24 dividend-increase-and-repurchase firms, she finds that the level of options is over twice as high in the repurchase sample than in the dividend-increase sample. She also finds that executive stock options have a positive and statistically significant effect on repurchases and on retention to the same extent, suggesting that the same economic effect underlies both decisions.

On that respect Weisbenner (2000) comes to slightly different results. He uses data on both total outstanding options and the portion held by the top five executives for a cross-section of over 800 firms at the end of 1994 to examine the impact of option programs upon the payout policy. He finds that outstanding options are significantly and substantially related to share repurchases. Although the author initially finds a strong correlation between executive options and repurchases as documented by Jolls

(1998), he subsequently finds that after accounting for the total size of the option program this correlation disappears.

On average, Weisbenner's results indicate that an increase in outstanding options normalised by shares outstanding of 5% is associated with an increase in the repurchase payout rate the next year of 0.4%. Moreover, the funding of option programs with the repurchased shares seems to be strongest for firms with high stock returns. In other words, options become more in-the-money as the share price increases, accelerating the dilution of EPS. The results indicate, however, that total payouts are boosted, as a reduction in dividends is not enough to offset the option-induced increase in share repurchases. Nevertheless, in spite of the increased payouts and decreased retention associated with option grants, there seems to be a positive relationship between the executives' holdings of stock options and earnings' retention rate; a firm where managers hold options equivalent to 1% of outstanding shares will retain 2.7% more of earnings.

Fenn & Liang (2001) use data on more than 1100 non-financial firms during 1993-97 to examine how managerial stock incentives influence corporate payout policy. They find that the correlation between managerial stock incentives and payouts is negative, especially in the case of dividends and stock options. They find that although management stock incentives do not appear to encourage higher payouts, management stock options seem to alter the payout composition of the sample firms by discouraging dividend payments. In fact, the authors find that a one standard deviation increase in stock options reduces dividend payouts by 38 basis points and increases repurchases by 13 basis points.

When the authors split their sample into four based on values of management ownership and the market-to-book ratio, they find that management stock ownership leads to higher payouts in firms faced with the greatest agency problems i.e. firms with low market-to-book ratios and low management ownership. On the other hand, there is no such evidence for firms with high book-to market ratios and high levels of management stock ownership. Therefore, overall the results of this study seem to suggest that stock options strongly affect the composition of payout policy, by substituting share repurchases for dividends. While management stock incentives have a significant effect only on a group of firms, stock options affect all types of firms. This can be explained by the way in which dividend payments reduce the value of stock options, especially when we consider that most stock options are not dividend protected. Fenn & Liang (2001) argue that while the substitution of repurchases for dividends induced by stock options leads to great ex-post management wealth effects, this does not necessarily imply great losses to shareholders. They argue that substituting repurchases for dividends can affect shareholders adversely in one of two ways: either if the substitution resulted in a net reduction of total payouts, which would increase the agency costs of FCF, or, if such a substitution is not anticipated by shareholders, which would result in wealth being transferred from shareholders to managers.

Another extensive study on the link between stock options and corporate payout policy is by Aboody & Kasznik (2001). They investigate whether the structure of corporate payouts is affected by CEO's stock option holdings. The authors focus on CEO compensation because of the considerable influence that the latter have over their firms' payout policies. Given that stock potions are generally not dividend-

protected, the authors hypothesise and find that CEOs who are compensated primarily with stock options favour share repurchases over cash dividends. They further find that this positive association between stock options and share repurchases mainly holds for unexercisable stock options with a longer expected life, but not exercisable options. This is strong evidence that this relationship between stock options and share repurchases does not stem from the firms' need to obtain shares in order to exercise their options, but rather reflects managers' desire to avoid the dilution of their stock option values that would be caused by the payment of dividends. They also find that this relationship holds only for the firm's CEO but not for other top executives. Finally, the authors find that in firms where CEOs are compensated by restricted stock, which are dividend protected, meaning that CEOs receive dividends and are under no obligation to refund them even if they fail to meet the restricted stock performance criteria, the extent of repurchases relative to dividends is lower than in firms where CEOs are compensated with stock options, which are not dividend protected.

Although the primary objective of Aboody & Kasznik (2001) is similar to that of Jolls (1998), their research design is different in several ways. For instance, Jolls (1998) uses a discrete approach, but Aboody & Kasznik (2001) examine the actual dollar amount of payouts, and are thus able to examine directly whether there is any substitution of share repurchases for dividends. While Jolls (1998) implicitly assumes that the relationship between executive stock options and the choice between share repurchases and dividends is cross-sectionally constant, Aboody & Kasznik (2001) find that this relationship between stock options and share repurchases is driven only by exercisable options with longer expected life and not by vested options, and holds

only for the firm's CEO rather than all the top executives. Finally, while Jolls (1998) uses a sample of just one year, Aboody & Kasznik (2001) use a sample period of six years.

This topic has also been examined by Fenn & Liang (1997), Bartov, Krinsky & Lee (1998), and Barth and Kasznik (1999). These studies, however, focus on total employee stock options and not just on those held by top executives. Therefore, even though these studies also find positive correlation between stock option and share repurchases, it is difficult to explain this finding fully by the option-induced managerial incentive especially given that some companies may decide to repurchase their stock in order to be able to fund the exercise of stock options without having to re-issue shares and thus dilute the EPS of their firm.

Kahle (2002) offers a more recent study where she uses three samples to extend previous literature and also takes into account the excercisability of the option, in order to define a more accurate relationship between stock options and share repurchases. Her first sample consists of 712 open market repurchase announcements for the period 01/01/91 to 31/12/96. The second sample consists of 205 firms that have increased their dividends during the same time period. The third sample is the information on executive compensation and ownership for the S&P 500 beginning 1992.

She finds that for the 40 days preceding the announcement, dividend-increasing firms experience no abnormal returns, while repurchasing firms experience negative abnormal returns averaging –3.6%. Moreover, compared to dividend-increasing

firms, repurchasing firms have double the number of employee stock options outstanding and exercisable in the year of and the year after the announcement.

After dividing the sample into exercisable and unexercisable options; the author finds that repurchases are significantly positively related to total exercisable options, but not to total unexercisable options. This means that firms only repurchase stock to fund options that are likely to be exercised in the near future, contrary to the findings of Aboody and Kasznik (2001). Furthermore, the author finds the repurchase announcement return to be significantly negatively related to total options outstanding. Therefore, it would seem that the market could distinguish when the firm repurchases its share to fund its employee options and not because it is undervalued.

Leaving the argument of the option value aside, and looking at the issue with a focus on the EPS argument, Bens, Nagar & Wong (BNW) (2002) investigate how ESOs plans impact on corporate payout policy and investment decisions. They hypothesise that granting ESOs will shift the resources away from potentially value-enhancing investments towards repurchasing the firm's stock in order to mitigate the EPS dilution caused by the exercises of ESOs.

This paper is motivated by the major assumption that managers are extremely concerned about EPS dilution in equity related compensation and, therefore, managers would repurchase the shares of their company in order to mitigate the EPS dilution effect caused by the exercise of ESOs. The authors argue that when external financing comes at a cost and the firm uses its internal funds to repurchase its shares, this would reduce resources that could have been used for more value-enhancing projects.

The authors select their sample from the S&P 500 industrial companies, excluding utilities, financials, and transportation firms. They assume the sample firms to be

facing severe cash constraints and high financing costs. They use data for the period of 1996-1999. Their findings show that firstly, the repurchase of treasury stock is positively associated with the value of ESOs in the firm. Secondly, they find a negative relationship between the value of ESO exercises and research development (R&D) and capital expenditure, both of these being used as measures of investing activity. This reduction in investment does not seem to be caused by a reduction in investment opportunities because it appears to be only temporary. However, there is no evidence that suggests that these investment cuts are associated with subsequent poor performance.

The assumptions on which the study of BNW (2002) is based are questionable. Guay (2002) offers a critical analysis of BNW, particularly the fact that they emphasise EPS rather than earnings. He argues that investors are aware of all the implications of option grants; therefore, security prices incorporate the value that these informed investors give to the security.

According to Guay (2002), BNW provide no evidence that share repurchases increase the short-term EPS. They merely document a positive relationship between ESO exercises and share repurchases and they use it as evidence that share repurchases are used to counteract the dilution of EPS caused by the exercise of ESOs, which implies that share repurchases increase EPS. Furthermore, Guay (2002) questions whether the proceeds from option exercises would exceed the cash used to repurchase shares, especially if potential compensation-expense-related tax savings upon option exercise are taken into account. It is, finally, also questionable whether the BNW sample really satisfies the assumption of financial constraints, which is so critical to their analysis.

For a brief discussion of employee stock options and their regulatory framework in the UK refer to the information provided in the chapter appendix.

2.4 Corporate governance: a comparison of the US and the UK

The motivations for share repurchases discussed in the previous section may seem very different; signalling the undervaluation of the firm is not really related to distributing free cash-flow, and neither are obviously related to restructuring the firm's capital or avoiding the dilution of EPS. However, all these motivations have two things in common: they all draw their arguments from agency theory, and they all have their origin and support in the US with its very unique corporate history, institutional and legal framework and corporate governance system.

These motivations may, thus, not reflect the reality of share repurchases in the UK, which, contrary to popular belief, has a different corporate governance system to the US. Although both countries emphasise shareholder value and wealth maximisation, and share some similarities such as disclosure requirements and board structure, they are very different in terms of responsibility and accountability, as put forward in the consultation document of the ICAEW[19] (2005, p.5): *"...while there are strong similarities between the US and the UK, the fundamental balance of responsibility, accountability and power accorded to market participants is different. Hence the assertion that Anglo-American corporate governance is, in fact, a myth."*

All of the motivations for share repurchases found in the literature stem from agency theory, and how to mitigate agency costs are the central concerns of any corporate governance system. The system of corporate governance in the UK is very different

[19] ICAEW (2005). Dialogue in Corporate Governance: Beyond the myth of Anglo-American corporate governance – Consultation. The Institute of Chartered Accountants in England and Wales.

to that of the US, and this leads us to ask the following question: what do the differences in corporate governance in the US and the UK entail for firms' motivations to repurchase their shares in the UK?

In this section, we will try to answer this question by first identifying the main differences in corporate governance across the two countries, and then determining what aspects of these differences can affect firms' motivations to repurchase their shares.

In the UK, the general approach to corporate governance is one of 'comply or explain', where companies are expected to comply with the guidelines of the 'Combined Code', or to give reasons for their non-compliance. Although the Code does not have the weight of a binding law, like the Company Law, but it is appended to the Listing Rules of the UK Listing Authority, and all firms listed on the London Stock Exchange (LSE) are expected to abide by its provisions, or else to explain to their shareholders their non-compliance, so that the latter are given the opportunity to decide for themselves whether the management was justified in its decisions.

This mode of governance offers firms the flexibility they need to do what is best for their shareholders given their individual circumstances, but at the same time it ensures that ultimately the shareholders are in a position to scrutinise managers' decisions and discipline them if necessary. The UK's governance system is, thus, very much shareholder-driven, as it puts the regulatory power in the hands of investors rather than the government. For this reason, it is generally referred to as a self-regulatory system.

In that respect, corporate governance in the US could not be more different, as it is regulated and enforced mainly through the Securities Exchange Commission (SEC), the stock exchanges, and State law. While in the UK shareholders play a big role in regulating the behaviour of firms, as they are empowered to do so both by the Company Law and the Combined Code, in the US shareholders have limited scope for action, and it is for this reason that they ultimately often have to take matters of dispute through the courts.

Indeed, nowadays it is not surprising to hear about the shareholders of some firm bringing a law suit against its directors for misconduct, it is estimated that every year about 200 class action law suits are filed in Federal courts[20]. This does not usually happen in the UK, for the simple reason that shareholders in the UK have other methods to bring about changes in their firms' strategies and/or board membership, so that dissatisfaction is usually dealt with at an early stage and rarely reaches the stage of a law-suit.

The fact that corporate governance in the UK is shareholder-led while in the US it is regulator-led means that several differences exist in its application across the two countries; the following are the major differences which will be relevant to our discussion of the motivations of share repurchases:

1. *Takeover defence mechanisms*: this area of corporate finance constitutes one of the main differences between the UK and the US in the way it is regulated. In the UK, consistent with the shareholder-led corporate governance approach

[20] ICAEW (2006). Dialogue in Corporate Governance: Beyond the myth of Anglo-American corporate governance - Business dialogue. The Institute of Chartered Accountants in England and Wales

we described above, the decision to accept or refuse a takeover bid is put in the hands of shareholders, while in the US, where it is believed that it is the duty of the management board to do what is best for shareholders, the decision is, thus, put in the hands of managers. To put it differently, in the UK the success of a takeover depends on whether shareholders want to sell their shares which, according to the Companies Act 1985, have to make up at least 90 percent of the target's share capital[21]. Therefore, when a company is faced with a takeover bid, it has to seek the approval of its shareholders, and has limited scope to use any defence mechanisms. In the US, on the other hand, shareholder's approval is not necessary for a takeover to succeed or fail, so that this decision depends entirely on managers, who can indulge in as many defence tactics as they can spare, such as green mail or poison pills, to ultimately defeat the bidder or make them raise their offering price. In fact, it is very common for firms in the US to have policies on anti-takeover mechanisms.

2. *Board leadership*: in the UK, the board of directors is usually composed of executive directors, non-executive directors (who usually make up two thirds of the board[22]), the chairman and the CEO. In the US the board is made up almost entirely of non-executive directors, while the position of chairman is usually assumed by the CEO. By UK standards, this constitutes a potential conflict of interests, since it gives the leadership advantage to the CEO over and above his/her executive and non-executive colleagues.

[21] ICAEW (2006). Dialogue in Corporate Governance: Beyond the myth of Anglo-American corporate governance - Policy dialogue, The Institute of Chartered Accountants in England and Wales.
[22] ICAEW (2006). Dialogue in Corporate Governance: Beyond the myth of Anglo-American corporate governance - Business dialogue, The Institute of Chartered Accountants in England and Wales.

3. *Appointment of directors*: In the UK, not only do shareholders have the right to appoint or remove directors, but they also have the right to nominate them. As a matter of fact, under the Companies Act 1985 all that is needed to appoint or remove a director is a voting majority on an ordinary resolution or an extraordinary meeting called for by shareholders themselves, and for which they need to hold at least 10% of share capital[23]. Shareholders can also call for a resolution at any time if they hold 5% of the share capital, which means that there is a significant amount of power in the hands of shareholders which they can use to exert pressure on the directors or to make material changes such as removing one or more directors. In the US it is a different story, because most firms use a plurality voting system, which means that shareholders do not have the option to vote against a director, they can either approve or abstain, and given that only one vote of approval is needed to appoint a director, it renders the whole voting process quite useless.
4. *Remuneration of directors*: In the UK, executives' pay is generally made up of four components; a fixed salary, annual bonuses, share options and Long Term Incentive Plans (LTIPs). The fixed salary represents the risk-free component of compensation and is still much higher for British executives than their US counterparts[24]. Annual bonuses are usually paid subject to the satisfaction of some accounting performance during the year. LTIPs are grants of shares that are transferred to the executive (when they vest) after some performance objectives have been met. They are also common in the US and take the form of either 'restricted stock' that vests after a period of time without being linked

[23] ICAEW (2006). Dialogue in Corporate Governance: Beyond the myth of Anglo-American corporate governance - Investment dialogue, The Institute of Chartered Accountants in England and Wales.
[24] Using data for 1997, Conyon and Murphy (2000) find that UK CEOs receive 59% of their pay as a fixed salary, while US CEOs receive only 29% of their pay as a fixed salary

to any performance criteria, or multi-year bonus plans that are subject to a combination of three- or five-year accounting performance. It is also relatively common for British firms to offer their executives restricted shares and supplementary retirement plans. Director remuneration has often been on the news, a result of increased corporate scandals that have focused the public's attention on the colossal amounts of money that some executive directors are paying themselves. Although most of the recent scandals involve firms based in the US, like Enron, the UK has also known a time when executive pay was on the spotlight. ESOs became very popular in the UK during the mid-80s and early-90s. However, their use declined noticeably following a series of reports and recommendations in the mid nineties, that were the result of public discontent with the so called 'fat cats pay' which referred to the compensation packages of executives of newly privatised utility companies. This is illustrated in Figure 2-1 where we can clearly see that there was a sharp decline in the initial value of *approved* option grants in 1997[25]. Such reports as the Greenbury report combined with shareholder activism resulted in a general review of executive compensation in the UK which led to the formation of the Combined Code. Prior to the Greenbury report, firms were able to issue options at a discount of up to 15% of the share price. Firms were also not required to disclose detailed information about their executives' options. This situation has changed now as the Combined Code sets a series of recommendations that have expanded the disclosure requirements of executives pay, and that call for options to be linked to some performance

[25] Refer to the information provided in the chapter appendix for the types of options approved by the Inland Revenue i.e. for which there is tax relief. It is important to note that many firms grant unapproved options to their employees, which means that the value of these options exceeds the maximum amount for which tax can be claimed (i.e. £30,000).

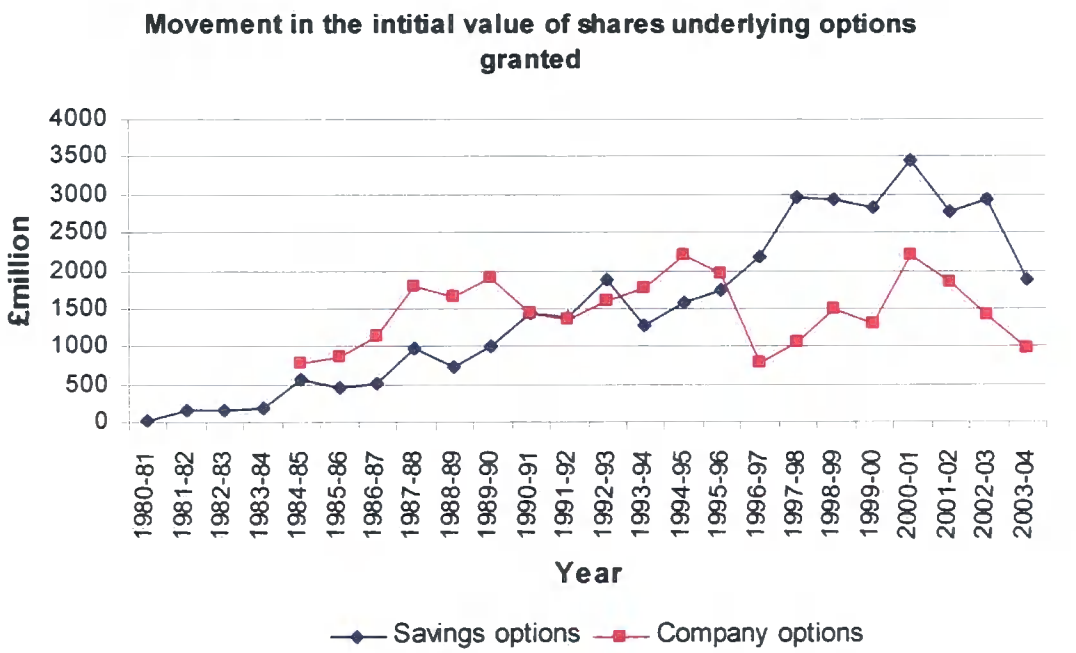
criteria, typically EPS growth or TSR (total shareholder return). The tightening of law has automatically resulted in a sensible reduction in the stock option frenzy of the early nineties. However, this is not to say that options have completely lost ground in the UK. In fact, far from it, compared to other European countries, executives in the UK still receive a relatively high proportion of their salary in the form of options. Nonetheless, using the expression of Conyon and Murphy (2000), British executives are mere paupers by American standards. The difference in executive pay between the two countries is reflected both in the base salary and the share based compensation, especially stock options. These differences in executive compensation reflect both cultural and regulatory differences. Historically, the British public has been very intolerant towards excessive pay, while in the US it is culturally acceptable to reward achievers and attract them using very high pay. On the regulatory level, it is very common in the US to reward *non*-executive directors with options, while in the UK this rarely happens. In the UK, firms listed on the LSE must comply with the Directors' Remuneration Regulations 2002 (DRR)[26], which gives shareholders the right to vote on the remuneration policy of their firm, but there is no such requirement in the US. Moreover, while firms in the UK are required to disclose in detail all their remuneration schemes and how they are tied to performance, the disclosure requirements are weaker in the US, especially in terms of stock options, which leaves room for executives to manipulate their values.

5. *Pre-emption rights*: in the UK, shareholders are protected from the erosion of their wealth when firms decide to issue new shares. The Companies Act 1985

[26] ICAEW (2006). Dialogue in Corporate Governance: Beyond the myth of Anglo-American corporate governance - Business dialogue, The Institute of Chartered Accountants in England and Wales

requires that any new shares should be first offered to existing shareholders in proportion to their shareholdings, before they are offered to other investors[27]. In the US, however, it is believed that pre-emption rights lengthen the process of issuing shares and raising capital, and thus reduce the firm's operating efficiency. Consequently, it is not common for shareholders in the US to have such rights which, again, puts more power in the hands of managers.

Figure 2-1



Source: data obtained from: http://www.hmrc.gov.uk/stats/emp_share_schemes/menu.htm

Thus, it appears that beneath the similarities in their capital markets and their seemingly identical unitary boards of directors, the US and UK harbour significant differences in their corporate governance systems. Initially, these differences may seem unrelated with the topic we're dealing with i.e. share repurchases, but a link

[27] ICAEW (2006). Dialogue in Corporate Governance: Beyond the myth of Anglo-American corporate governance - Investment dialogue, The Institute of Chartered Accountants in England and Wales.

between these differences and firms' motivations to repurchase their shares can be easily established.

As we have seen, shareholders in the UK have considerable rights and are empowered to enforce those rights by the Company Law and the Combined Code. It thus appears more difficult for managers in the UK to exploit their positions, contrary to their counterparts in the US. Moreover, institutional ownership in the UK is quite high; 80% of equities compared to 63% in the US. This means that institutional shareholders in the UK are much more involved in corporate governance than in the US.

Since managers in the UK are not the ones who decide whether to accept or refuse a takeover bid, and since they have limited scope for using anti-takeover devices, the hypothesis that share repurchases can be used as a takeover defence mechanism does not really apply to the UK.

In terms of the signalling hypothesis, as we have seen in the literature review, it is argued that the most effective way to signal undervaluation is through a tender-offer, but tender offers in the UK are quite rare. Although Comment and Jarrell (1991) find that announcements of very large repurchases have nearly the same signalling effect as tender offers, in the UK even large open market repurchases are unlikely to take place, since the maximum number of shares any firm can acquire with a single authority is 15% of its share capital. This means that for larger repurchases managers have to go back to shareholders who would have to vote for another authority in an extraordinary meeting.

Moreover, exploiting price volatilities is made very difficult in the UK, since firms are prohibited from repurchasing their shares during periods of increased information asymmetry, which include the period of two months prior to the preliminary announcement of annual or interim results (Oswald & Young, 2004a). It thus appears that the signalling hypothesis that has enjoyed strong support from empirical studies in the US, especially during the early nineties, may not have a significant explanatory power for share repurchases in the UK.

We have mentioned previously that in the UK shareholders have pre-emption rights. Before December 2003, these rights applied even to repurchased shares, which meant that firms that repurchased their shares had to cancel them immediately after the repurchase. However, as was mentioned at the start of this chapter, after December 2003, firms became able to repurchase their shares and hold them in treasury stock, like in the US[28]. Practically, firms that repurchase their shares to counter the dilution of EPS caused by the exercise of stock options are more likely to cancel these shares, since keeping them in treasury stock means that at some point in the future they will be re-issued. However, using these shares to *fund* stock options instead of issuing new shares can, indeed, limit the dilution of EPS.

The problem is that it is not easy to distinguish between firms that repurchase purely to fund stock options, and those that do so to enhance the value of their EPS. In fact, none of the studies that find support for the EPS dilution argument look at how share repurchases are affecting share retirements, except for Liang and Sharp (1999), who

[28] Shareholders in the UK, however, have pre-emption rights on the sale of shares in treasury stock; refer back to footnote eight.

find that from 1994 to 1998, share repurchases have reduced outstanding shares by 2% annually, but that only half of these shares were retired. Nonetheless, this study suffers from some weaknesses especially in terms of its data, and it measures share retirements as the difference between share repurchases and shares issued for stock option schemes, which is a very vague measure that assumes that all stock option exercises are funded out of shares repurchased, and does not take into account shares that are kept in treasury stock.

In the UK, the situation is less complicated, or at least was prior to December 2003, because all repurchased shares had to be cancelled, and option exercises were generally funded with shares repurchased through independent employee trusts. An Employee Benefit Trust (EBT) can be administered by an elected employee, a member appointed by the company and an outside professional, or the company can choose to have a corporate trustee instead. The role of the trust is to buy shares in the market through a bank loan, or a loan or gift from the company (which may qualify the company for corporation tax relief), and subsequently transfer them to employees or executives when these exercise their options[29].

Therefore, firms in the UK were not likely to repurchase their shares in order to fund option exercises, but it is very likely that they did so to ensure that their EPS was not greatly affected from re-issuing the shares kept in employee trusts at the exercise of stock options.

The second facet of the stock option hypothesis, which posits that share repurchases are used instead of dividends in order to avoid the devaluation of executive options, also faces a challenge in the UK. We mentioned earlier that executive in the US

[29] For more information refer to the Esop Centre at: http://www.mhcc.co.uk

generally receive a large portion of their salaries in stock options, are not required to disclose detailed information about these options, such as how they are tied to performance, and are, thus, immune from the scrutiny of shareholders. In the UK, although stock options still form a component of most executives' compensation packages, their use declined considerably following the publication of the Greenbury report in 1995, which recommended extensive disclosure in annual reports on remuneration, including stock options, and the establishment of a remuneration committee involving non-executive directors[30]. The Inland Revenue also reduced the value of options that could be granted with tax relief from £100,000 to only £30,000. However, many firms still grant options with a value higher than £30,000 to their directors (they are usually referred to as unapproved option schemes), which may indicate that despite restrictions, executive options have far from disappeared.

Given this tighter regulatory environment, testing the substitution argument of the stock option hypothesis in the UK offers many advantages. Evidence from the US suggests that managers tend to repurchase in order to avoid the devaluation of their options caused by dividend payments. It would be, thus, interesting to know whether the shareholder-led corporate governance of British firms fares better in disciplining managers. If it does, at least in relation to their repurchase activity, then we should expect firms in the UK not to repurchase in order to avoid the devaluation of executive stock options, but for other reasons.

Given that the signalling hypothesis is not likely to find strong support in the UK, as we argued earlier, this leaves the free cash-flow hypothesis and the capital structure

[30] ICAEW (2006). Dialogue in Corporate Governance: Beyond the myth of Anglo-American corporate governance - Policy dialogue. The Institute of Chartered Accountants in England and Wales.

hypothesis. Out of all the motivations mentioned in the literature review, these seem to fit most with the interests of shareholders, and in a country where corporate governance is efficient, it is very likely for share repurchases to be linked to either one of these motivations.

2.5 Summary and conclusions

In this chapter, we have looked at the regulatory framework of share repurchases in the UK, the different hypotheses explaining firms motivations to repurchase their share that have found empirical support in the US, and the differences in corporate governance between the UK and the US, and how they can affect firms' motivations to repurchase their shares.

We have established that, despite the fact that there have been several studies already published on the motivations of share repurchases, most of these studies use US data, and given differences in corporate governance between the US and the UK, we expect firms' motivations to repurchase their shares in the UK to be different from those documented in the US. Some of these differences are related to the regulations of share repurchases themselves, for instance, while the signaling theory has received significant backing in the US, it is unlikely to explain a great proportion of share repurchases in the UK. This is because firms in the UK are less able to take advantage of price movement, given that shares cannot be repurchased during periods of high information asymmetry. Moreover, tender-offers, which are said to be the most effective signals of undervaluation, are rare in the UK, while large open-market repurchases cannot take place, given that the maximum number of shares any firm can repurchase with a single authority is 15% of its share capital. All these restrictions make signaling unlikely to be the leading motivation for share repurchases in the UK.

Furthermore, we have also established that other motivations such as that of using share repurchases as a takeover defense mechanism (the wealth expropriation

hypothesis) to be equally unlikely. Given the nature of the shareholder-led corporate governance system in the UK, managers have less opportunity to behave against the interests of shareholders, or at least against their will, contrary to the US, where indeed, there has been evidence that some managers make targeted repurchases to defeat takeover bids.

Another motivation that has recently received strong backing from financial researchers is the stock option hypothesis. We found that managers' incentives to repurchase in order to avoid the devaluation of their stock options are less substantive in the UK. This is because executives in the UK have smaller portions of their salaries in ESOs, and also because shareholders have a greater say in the setting up of these options, which means that they are more likely to discipline managers if they indulge in unhealthy price manipulation.

Nonetheless, despite differences in corporate governance across the two countries, it is still possible for executives in the UK to repurchase in order to avoid the devaluation of their ESOs. Despite stronger disclosure requirements in the UK and the requisite that options be subject to the attainment of some performance criteria, the latter are usually very undemanding. For instance, typical performance criteria require an EPS growth of a mere 2 to 3% in any 3 years of the option's term[31]. This means that though corporate governance in the UK is such that managers in the UK have not as great an incentive to repurchase shares in order to avoid the devaluation of their ESOs as their counterparts in the US do, but there is still a possibility that this

[31] Peter Pope & Steven Young: Executive Remuneration: an investor's guide. International Centre For Research In Accounting, Lancaster University.

incentive, though not very great by US standards, is great enough by *British* standards.

We have also shown that before December 2003, firms in the UK could not keep the shares they repurchased in treasury, which means that they could not fund option exercises with share buybacks. This implies that if there is a relationship between option exercises and share repurchases, then it is more directly related to enhancing EPS.

To conclude, it appears necessary that an empirical investigation is undertaken on the motivations of British firms to repurchase their shares. Not only will the findings be useful in terms of bettering our understanding of the new trends of corporate payout behaviour in the UK, but they will also serve as an indication of how well does the shareholder-led type of corporate governance regulate managers' behaviour. For this reason, investigating the Stock option hypothesis is particularly useful, since executive remuneration forms an area of difference between the US and the UK. Moreover, testing all the hypotheses that have empirical support in the US is also necessary if we are to draw any conclusions on the differences in corporate payouts between the two countries and their relationship with corporate governance.

2.6 Appendix

Employee share schemes in the UK

The Inland Revenue can approve three types of employee stock option schemes:

1. Savings-Related Share Option Schemes

The present tax relief for these share option schemes was introduced in 1980. Under an approved savings-related scheme set up by a company, the strike price of the option must not be less than 80 per cent of the value of the shares at the time of the grant. Participating employees are required to save between £5 and £250 (out of their post-tax pay) per month under a Save As You Earn (SAYE) savings contract with either a bank or building society. These contracts can last for a period of three or five years. Those with five-year SAYE contracts are free to take the proceeds after the fifth year or leave them for another two years to earn an additional bonus which will be tax free. The employee can, therefore, use the resulting lump sum to buy the underlying shares whether they decide to exercise their options after 3, 5 or 7 years, depending on the terms of the option. The exercise of these options will not entail a tax payment on the difference between the strike price and the market value of the share. However, if the option is not exercised the employee receives the proceeds of the SAYE contract in the normal way.

2. Company Share Option Plans

These plans came to replace Discretionary Share Option Schemes in 1996. This scheme limits the value of the underlying shares of the options held by an employee to £30,000. Options granted under these schemes must not have a strike price that is lower than the prevailing market value of the underlying shares at the time of the

grant, but they do not have to be linked to any kind of savings arrangement, and it is up to the company to decide which of its employees or full time directors could participate.

Holders of these options have an income tax and National Insurance relief at the grant and exercise of their options. However, to obtain this relief, employees should not exercise their options less than 3 years, or more than 10 years, after the grant date.

Options satisfying the criteria above are usually granted under an approved option scheme; they entitle their holder to a certain tax relief but they must not exceed £30,000 for each participant. If this amount is exceeded for any participant then the balance is automatically classified under an unapproved option scheme which essentially means that the holder is not entitled to any tax relief. This distinction exists since the Inland Revenue reduced the value of options that could be granted with tax relief from £100,000 to only £30,000.

3. *Enterprise Management Incentives*

This scheme is designed to help small, higher risk companies recruit and retain high calibre employees. It is particularly targeted at small, independent high risk trading companies or groups with gross assets not exceeding £30 million. Under this scheme, an employee can be granted options over shares worth up to £100,000 at the date of grant, and the company granting the options can have up to £3m of shares under EMI options at any one time. In addition, nil cost and discounted options can be used, even though they may carry different tax and National Insurance implications. As with the other option schemes, EMIs offer tax relief on both the grant and the exercise of the options, if they are not offered at a discount, and if the exercise takes place within ten

years. The exercise price is the market value of the shares at the grant date of the option.

Table 2-1: Save As You Earn Share Option Schemes
Save As You Earn Option Schemes approved under Schedule 3 Income Tax (Earnings and Pensions) Act 2003

Year	Number approved in year (1)	Number of employees to whom options granted during year ('000) (2)	Initial value of shares over which options granted during year (£ million)	Average value of shares over which options granted per employee (£)	Number of employees who exercised options during year ('000) (2,3)	Estimated Cost of of income tax relief (£ million)
1980-81	22	11	18	1,600		-
1981-82	115	89	151	1,700		-
1982-83	78	95	175	1,800		-
1983-84	73	105	185	1,800		-
1984-85	114	225	560	2,500		5
1985-86	114	200	460	2,300		15
1986-87	103	290	520	1,800		50
1987-88	90	440	970	2,200		30
1988-89	101	370	740	2,000	70	40
1989-90	84	460	1,020	2,200	275	60
1990-91	81	550	1,430	2,600	160	110
1991-92	83	480	1,400	2,900	165	60
1992-93	95	590	1,880	3,200	185	100
1993-94	104	480	1,290	2,700	235	135
1994-95	144	550	1,590	2,900	225	135
1995-96	116	610	1,730	2,800	320	290
1996-97	176	800	2,170	2,700	310	310
1997-98	141	1,170	2,970	2,500	395	500
1998-99	189	990	2,930	3,000	320	390
1999-00	120	1,000	2,830	2,800	465	445
2000-01	115	1,030	3,460	3,400	325	365
2001-02	101	1,300	2,785	2,100	530	295
2002-03	60	865	2,945	3,400	330	145
2003-04	38	600	1,889	3,100	300	100
Total	**2,457**	**-**	**36,098**	**-**	**-**	**-**

Source: http://www.hmrc.gov.uk/stats/emp_share_schemes/menu.htm
(1) The number of new schemes approved in 2004-2005 was 80.
(2) The total number of employees cannot be calculated since some employees may have been granted options or exercised options in successive years.
(3) The number of employees whom exercised options during the year is not available for years prior to 1988-89.

Table 2-2: Company Share Option Plans and Discretionary Share Option Schemes
Company Share Option Plans approved under Schedule 4 Income Tax (Earnings and Pensions) Act 2003 and Discretionary Share Option Schemes approved under the Finance Act 1984

Year	Number approved in year (2)	Number of employees to whom options granted during year ('000) (3)	Initial value of shares over which options granted during year (£ million)	Average value of shares over which options granted per employee (£)	Number of employees who exercised options during year ('000) (3,4)	Estimated Cost of of income tax relief (£ million)
1984-85	208	50	800	16,000		-
1985-86	1,259	50	870	17,000		-
1986-87	772	55	1,150	21,000		-
1987-88	746	90	1,800	20,000		55
1988-89	855	90	1,660	18,000		30
1989-90	549	105	1,900	18,000		110
1990-91	395	65	1,450	22,000		125
1991-92	305	80	1,350	17,000	20	140
1992-93	243	80	1,600	20,000	25	155
1993-94	348	70	1,760	25,000	35	220
1994-95	488	90	2,200	24,000	25	190
1995-96	347	125	1,970	16,000	35	280
1996-97	422	140	800	5,700	30	280
1997-98	463	330	1,070	3,300	30	315
1998-99	499	280	1,500	5,400	45	315
1999-00	514	240	1,310	5,000	80	250
2000-01	714	415	2,200	5,000	25	80
2001-02	454	280	1,860	7,000	80	155
2002-03	262	185	1,410	8,000	80	95
2003-04	130	220	980	4,500	120	95
Total	9,973	-	29,640	-	-	-

Source: http://www.hmrc.gov.uk/stats/emp_share_schemes/menu.htm
(1) Discretionary Share Option schemes were replaced by Company Share Options Plans in 1996.
(2) The number of new schemes approved in 2004-05 was 169.
(3) The total number of employees cannot be calculated since some employees may have been granted options or exercised options in successive years.
(4) The number of employees whom exercised options during the year is not available for years prior to 1991-92.

3 DATA SOURCES, COLLECTION AND PRELIMINARY RESULTS

3.1 Introduction

In the previous chapter we have looked at the main motivations behind share repurchases. We have seen that most of these motivations enjoy empirical support mainly from US studies. Thus, in order to test their validity in the UK context; in this chapter we go over our data collection process and describe our sample firms with the view of providing a basis for the empirical tests that will be carried out in the following chapters.

We start with a presentation of our sampling methodology, followed by a general description of the sample, where the repurchase behaviour of sample firms is used as a differentiating factor. Then we review the characteristics of our sample firms during each year of the sample period, in order to determine whether these characteristics are consistent across the period. Next, we describe our sample in terms of its industrial composition, and we then analyse the group of firms that repurchase their shares in more detail. Finally, we go over the motives given by sample firms for repurchasing their share, and we summarise the findings of the chapter and offer a few concluding remarks.

3.2 Data collection and description

Our sample of firms consists of all publicly traded companies that belonged to the FTSE 350, excluding the financial sector (apart from a few real estate firms), in April 2004 for which we were able to obtain the required accounting and financial information used in our analyses.

The FTSE 350 is simply a market value weighted combination of the FTSE 100 and the FTSE 250, thus, our sample contains all of the largest non-financial UK listed companies. This means that our results ought to provide a fair reflection of the behaviour of the UK's largest and most economically important firms. This is also a studied choice in the sense that we would expect the share repurchase activity to be higher amongst larger firms that earn more, rather than small firms that do not have much cash to spare. In fact, in a recent paper, Oswald and Young (2004b) find that the share repurchase activity in the UK clusters in cash generative industries, and that the probability and value of a repurchase are highly associated with operating cash flows, which supports our choice of concentrating our study on the largest UK firms .i.e. the FTSE 350 firms.

All data was collected according to each firm's financial year, most sample firms have January to December financial years, but many also have different financial years, for example beginning in April. Combining data from different financial years into our sample was done in the following manner: first we collect the data for each company according to its own financial year, and then we place this data into *calendar* years that would correspond most to the firm's own *financial* year. For instance. British

Airways has a financial year ending in the 31st of March of each year; therefore, the majority of the months of the financial year of this firm can fall within the normal calendar year. Thus, we collect data for the April 2001 financial year (for example) of BA and include it in our sample year of 2001. Similarly, Carnival has a financial year ending in the 30th of November of each year, thus, for the year starting December 2001 we allocate financial year data to our sample year of 2002, since most of Carnival's 2001/2002 financial year falls within the calendar year 2002.

The data collection process was divided into two phases. Firstly, using company annual reports, data was hand collected on stock options and share repurchases from 2004 and going back three years (until 2001). Data from the published financial statements was also collected on other variables such as long-term incentive plans, director shareholdings, major shareholdings and shares held in trusts (refer to the appendix for a full definition of variables).

After data on these variables had been collected, DataStream was used to collect other financial information such as size, EPS, debt, operating income, market capitalisation, returns, etc.

After excluding cases with incomplete information, the resulting dataset consists of an unbalanced panel of 267 firms with a total of 1016 observations spanning over a period of four years from 2001 to 2004.[32] Over the four years, the sample contains 179 repurchase observations; 176 of which are open market repurchases and the

[32] All sample firms belonged to the FTSE 350 in 2004, some however, were not part of the index during the whole sample period, as some companies were not yet listed on the stock exchange at the beginning of the sample period. Mergers and de-mergers were taken into account as far as they were known and the companies concerned listed on the stock exchange

remaining three are tender offers. The total number of firms involved in repurchases over the 4 year period is 88. The relatively small number of firms involved indicates that a high proportion of the repurchase observations consist of firms that routinely repurchase their shares.

It is, however, very common for most firms to ask and obtain authority to purchase their ordinary shares up to the maximum allowed by law, i.e., 15% of the total outstanding share capital. Even so, though most firms pass a repurchase resolution regularly in their yearly (or special) general meetings, this does not necessarily mean that an actual repurchase will take place. Our sample shows that of the 1016 firm-year observations, some 741 have authorisations to repurchase and only 275 do not[33]. Although the maximum allowed by law is 15%, most firms pass resolutions to repurchase not more than 10% or sometimes 5% of the total shares outstanding.

Table 3-1 in the appendix to this chapter presents descriptive statistics for the total sample, the sub-sample of firms that undertook an open market repurchase at least once during the four year sample period, and the sub-sample of firms that never repurchased during the sample period. Overall, sample firms have an average (median) market value (MV) of £3.7 billion (£856 million) and average (median) total assets (TA) of £4 billion (£1 billion). However, firms that repurchased their shares in the market at least once during the sample period (re-purchasers) seem to be much larger than those that never repurchased (non re-purchasers) both in terms of market value and total assets. For instance, re-purchasers have an average (median) MV of £7.4 billion (£1.3 billion), compared to £2 billion (median billion £0.7) for non-re-purchasers.

[33] We defined firms that do not have an authority to repurchase as those that do not mention any information relating to repurchases or authorisations in any of their annual reports during the sample period.

The average (median) long-term debt (LTD) of the sample firms is £828 million (£230 million), though again we notice large differences between re-purchasers and non re-purchasers, as the former have an average (median) LTD of £1.2 billion (£313 million), while the latter have an average (median) LTD of only £0.6 billion (£210 million). Earnings are also noticeably higher in the re-purchasers' sample; both the mean and the median EPS values of the re-purchasers are double those of the non re-purchasers, £0.27 and £0.13 respectively.

Table 3-1 also indicates that the average (median) majority shareholding in our sample is about 28% (25%)[34], and out of the 176 open market repurchases undertaken in the four year sample period, the average (median) repurchase amounts to 3% (2%) of outstanding share capital at the start of the year. Most firms in our sample have some stock option programme in place; out of 267 firms, only two do not offer any options throughout the four years sample period. On average, sample firms grant employee options that represent about 3.5% of their outstanding share capital (median 3.2%), and executive options that represent 0.6% of their outstanding share capital (median 0.35%). Director shareholdings, long-term incentive plans and shares held in trusts represent, on average, 3%, 0.13% and 0.7% of shares outstanding respectively.

Additionally, we can notice that option variables also show some dissimilarity between re-purchasers and non re-purchasers. Consistent with previous studies that have shown that smaller firms tend to make greater use of share options than larger firms, Table 3-1 shows that non re-purchasers tend to offer slightly more options than

[34] Major holdings represent any interest in the firm exceeding 3% of outstanding share capital.

re-purchasers, both in terms of total and executive options. However, at this stage it is not possible to determine whether these and the other differences mentioned above are significant.

Therefore, in order to verify the significance of these differences, a mean comparison test is applied to the two sub-samples. An important consideration before applying such a test is with regard to data assumptions. The ANOVA test assumes that the variances of the groups are equivalent. Although the *F* test is robust to this assumption when the groups are of similar sizes, when the groups are dissimilar in size and their variances also differ the standard *F* statistic can yield incorrect results.

Indeed, this is the case with our two sub-samples; the re-purchasers group contains a total of 330 observations while the non re-purchasers group contains a total of 686 observations. A simple test of the homogeneity of variances (whose results are presented in Table 3-2 in the appendix) also confirms that the two sub-samples have significantly different variances with regard to most variables.

An alternative to the standard *F* statistic is the *Welch* statistic, which is more powerful when sample sizes and variances are unequal. The results of this test are presented in Table 3-3 together with some descriptive statistics of the variables. They indicate that there are significant differences between the two sub-samples. For instance, it appears that re-purchasers are, on average, significantly larger and earn significantly more than non re-purchasers. Contrary to what we found earlier, when debt is normalised by market value it is significantly higher in the non re-purchasers sample

than in the re-purchasers sample, which makes more sense as highly leveraged firms are less likely to buy back their shares and increase their default risk.

On average, re-purchasers also seem to pay significantly more dividends per share than non re-purchasers, and contrary to the predictions of the stock options hypotheses, they grant significantly less options. Possibly due to their larger average size, re-purchasers have significantly smaller percentages of their shares owned by either their managers or large shareholder blocks[35]. This might be interpreted to mean that firms that repurchase their shares are likely to be more exposed to agency problems than those that do not.

The finding that firms that buy back their shares pay more dividends than those that do not and grant fewer options is quite surprising, since they seem to contradict the stock option hypothesis. However, one can easily establish a link between retained earnings and the grant of options. Since the stock option argument hypothesises that firms repurchase their shares in order to avoid the devaluation of options that would result from dividend payments, this devaluation can also be avoided by simply not paying dividends at all, which would fit the results of our data perfectly. Smaller firms with higher levels of debt, do not repurchase and pay less in dividends, but grant more options than larger firms that pay dividends and repurchase their shares. Nonetheless, these are just speculations that still need to be verified by more rigorous empirical tests. What is important to retain from this is that the stock options argument can be used to establish a link between earnings' retention and option grants in the same way it has been used to establish a link between repurchases and option grants.

[35] Large shareholders (or major shareholders) being those that own more than 3% of the share capital of the firm.

Correlations between the different variables are reported in Table 3-6 in the appendix. Again we find that both total options and executive options appear to be significantly negatively correlated with size. This means that larger firms grant relatively fewer options in relation to their share capital than smaller firms. This does not, however, imply that the value of options granted by smaller firms is larger than that of larger firms, since options here are measured as a fraction of total shares outstanding and information about their value is very difficult to obtain.

Options are also significantly negatively correlated with earnings and dividends per share. This further suggests that firms that grant more options, which tend to be smaller firms (possibly high growth firms), are likely to pay less in the form of dividends than other firms. This follows the argument in the stock option hypothesis which suggests that dividends reduce the value of options and therefore in the presence of high levels of options (in particular executive options) managers have an incentive to distribute cash in the form of repurchases or retain it rather than distribute it in the form of dividends. However, despite this negative correlation found between options and dividend payments, it is still too early to suggest that the presence of options encourages firms to retain their earnings or to pay less in dividends, since one can also easily suggest that smaller firms which lack free-cash flow are likely to attract employees and to keep them by offering options, which means that the relationship between dividends and options is not really one of a cause and effect, as would be suggested within the context of the stock option hypothesis.

Finally, total options are also highly positively correlated with major shareholdings, which would suggest that companies with a large institutional shareholding base tend to award more options, whether institutional holders encourage firms to implement option programs is, however, not clear at this stage.

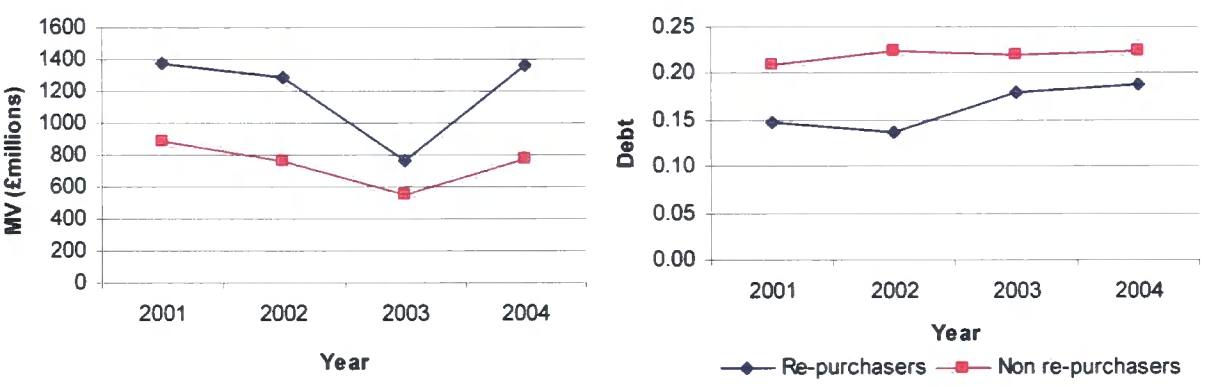
Table 3-7 in the appendix reports the correlations of the same variables but within the two sub-samples of re-purchasers versus non re-purchasers. Correlations for the group of re-purchasers are presented in the bottom left of the matrix, while those for the group of non re-purchasers are presented in the top right corner of the matrix.

It is interesting to note that although options and dividends in both sub-samples are significantly negatively correlated, the magnitude of this correlation is larger in the case of re-purchasers; -0.307 compared to -0.195 in the case of non re-purchasers. It is also interesting to note that the fraction of shares repurchased within the re-purchasers' sample is not significantly correlated to any of the other variables, while the value of shares repurchased (normalised by market value) is only significantly correlated with operating income. This might be due to the fact that even within the re-purchasers' sample, the repurchase variable contains many zero values for the firm/years when a buyback did not take place.

3.3 Yearly descriptive statistics

In order to further investigate the differences that may exist between firms that repurchase their shares and those that do not, we now look at the movement of some of the variables described above throughout the past four years. Firstly, the median market value of firms that repurchase their shares is clearly above that of firms that do not, and has been so throughout the sample period. One can notice that in 2003, firms in both sub-samples experienced a decline in their market value, although re-purchasers experienced a relatively sharper decline than non re-purchasers.

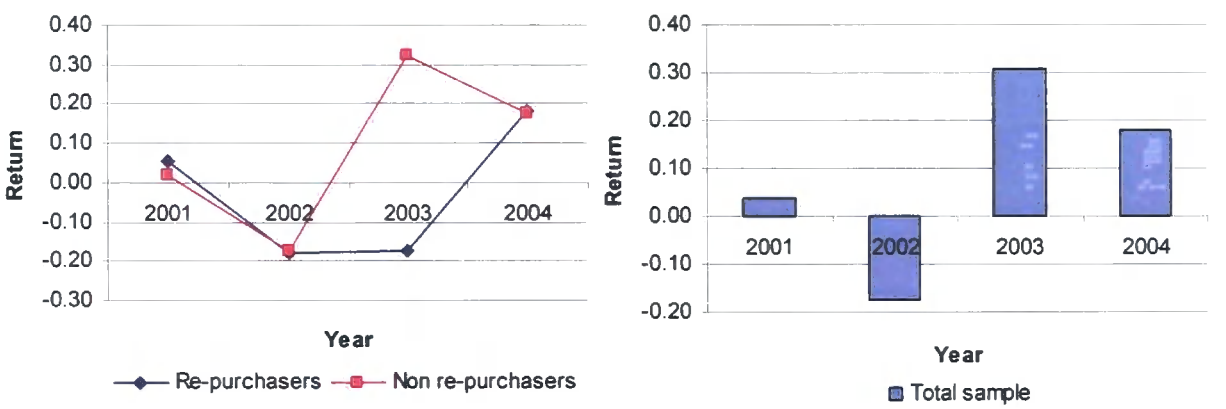
Figure 3-1: Movement of the median market value and median debt over the sample period



Again, we can see that long-term debt relative to total assets has been constantly higher in the non re-purchasers group, as one would expect, throughout the sample period. We can also see that the year 2003 when re-purchasers witnessed the sharpest decline in their market value is also the year which saw the sharpest (in relative terms) increase in their long-term debt.

Figure 3-2, which illustrates the movement of the median return, shows that, although both groups experienced a decline in their median return in 2002, this was followed by an increase in 2003 in the group of non re-purchasers, while re-purchasers did not see their return increase until 2004. One can argue that re-purchasers were undervalued and this is one of the reasons why they undertook to repurchase their shares. However, very little supports this suggestion, since we found earlier that re-purchasers were on average much larger than firms that did not repurchase. It follows from this that the market is unlikely to undervalue the largest and most active of its firms.

Figure 3-2: Movement of the median return over the sample period



Finally, Figure 3-3 and Figure 3-4 confirm that, apart from the year 2003 which saw a sharp decline in earnings in the re-purchasers sample, the latter consistently paid higher dividends per share than the non re-purchasers throughout the sample period. The movement of the median fraction of shares underlying total options issued by firms in the two sub-samples also shows that options tend to move in the opposite direction to earnings and dividends per share. This is particularly the case in the year 2003 when both EPS and DPS fell sharply in the re-purchasers group, while at the same time the fraction of shares underlying total options increased. This could either

be because employees are less likely to exercise their options when share prices decline, or because firms grant more options to their employees when prices decline.

Figure 3-3: Movement of the median earnings and dividends per share over the sample period

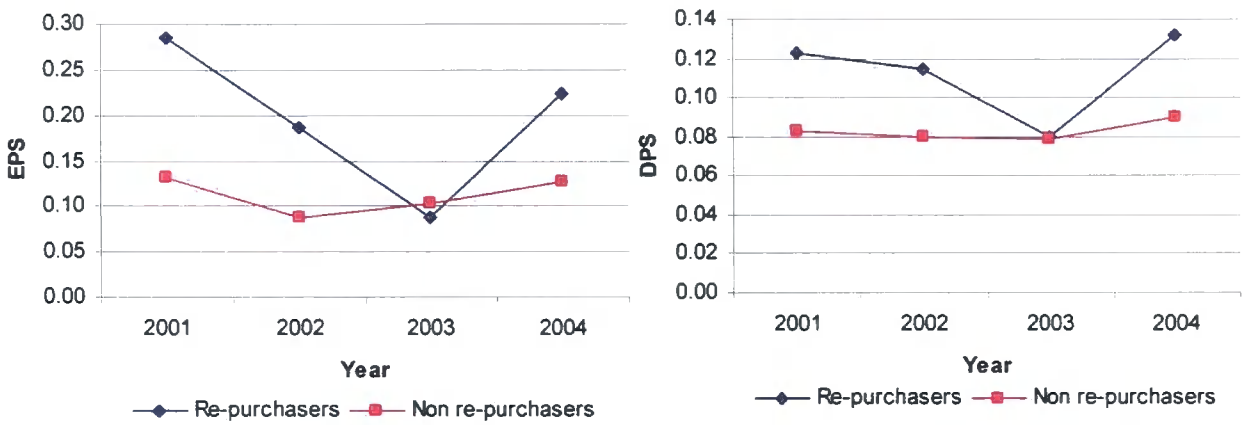
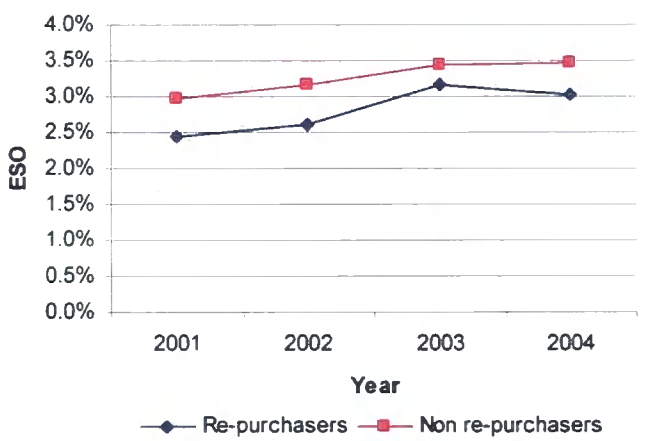


Figure 3-4: Median Total employee stock options



Overall, this historical overview confirms the univariate statistics reported above, since it shows that these statistics are mostly an indication of real differences that exist between firms that repurchase their shares in the market and those that do not throughout the sample period. We found that re-purchasers tend to be larger with smaller long-term debt, and tend to be less controlled by major shareholders, issue fewer options relative to their share capital, and pay higher dividends.

3.4 Industrial composition of the sample

The industrial classification of sample firms was undertaken according to the FTSE Global Classification System, which comprises ten economic groups, equivalent to the DataStream 'level three' industrial classification. As has been said earlier, the sample comprises all FTSE 350 firms that were listed in 2004, excluding the financial sector. Therefore, although the sample is very representative of the FTSE 350 in 2004, there may have been slight differences in the earlier years of the sample period, due mainly to some companies not being listed yet. Figure 3-9 and Figure 3-10 in the appendix present the industrial composition of the FTSE 350 and our sample respectively. We can see that the main difference between the two figures is the large percentage of financial firms in the FTSE 350[36].

The industrial composition of re-purchasers and non re-purchasers is presented in Table 3-4. The cyclical services sector is by far the dominant sector in all samples with about 39% of sample firms, followed by basic industries with 13% of total sample firms. In the re-purchasers sample basic industries are preceded by non-cyclical consumer goods, while the latter is in turn preceded by general industrials in the non re-purchasers group. This seems to suggest some slight differences in the industrial composition of the two sub-samples. For instance, while general industrials represent 12% of the non re-purchasers sample, they represent only 3.6% of firms in the re-purchasers sample. Similarly, information technology is twice as present in the non-re-purchasers group while cyclical consumer goods are nearly four times as present in the re-purchasers group.

[36] The 'Financials' sector in our sample is constructed only of real estate firms, which the FTSE Global classification system classifies as financial firms.

In order to determine whether these differences in industrial composition between the sub-samples are significant, we use a Chi square to test whether each sub-sample is significantly different from one another with regard to its industrial composition. The results indicate that the group of re-purchasers is, indeed significantly different from that of non re-purchasers, with a significance level beyond 0.001. It thus appears that firms in the technology, general and basic industries are less likely to repurchase than those in other industries such as cyclical and non-cyclical consumer goods and utilities (see Table 3-5). This conforms with the predictions of the free-cash flow hypothesis for share repurchases, which claims that firms buy back their shares in order to distribute excess cash to their shareholders; clearly, technology firms are less likely to have excess cash then utility firms for instance.

3.5 Analysis of the re-purchasers sample

The univariate statistics have uncovered a marked difference between the sample of re-purchasers and that of non re-purchasers. However, within the re-purchasers group, there might also exist some differences between firms that buy back their shares only once during the sample period, and those that do it more frequently. There may also exist some differences between re-purchasers according to what motivates them to buy back their shares. In this section, we attempt to reveal whether indeed, there is significant heterogeneity within the sample of re-purchasers, and if so, what are its sources.

As mentioned earlier, the overall number of repurchases is 179, three of which are tender offers and the remainder are open market repurchases. Out of the 176 open market repurchases, 36 were undertaken in 2001, 42 in 2002, 43 in 2003 and 55 in 2004 (as shown in Figure 3-5 below). The average fraction of shares repurchased varied between 2.6 and 3.6% of outstanding share capital, while the median ranged between 2.3 and 2.7% (see Figure 3-6 below).

Figure 3-5: Yearly distribution of open market share repurchases

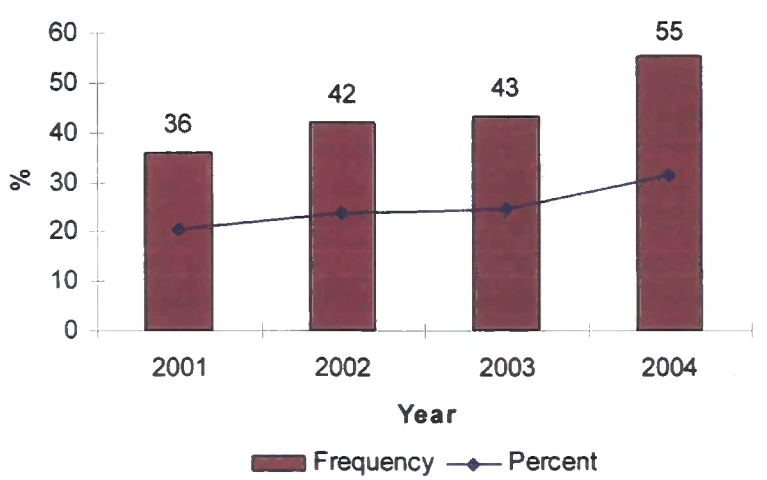
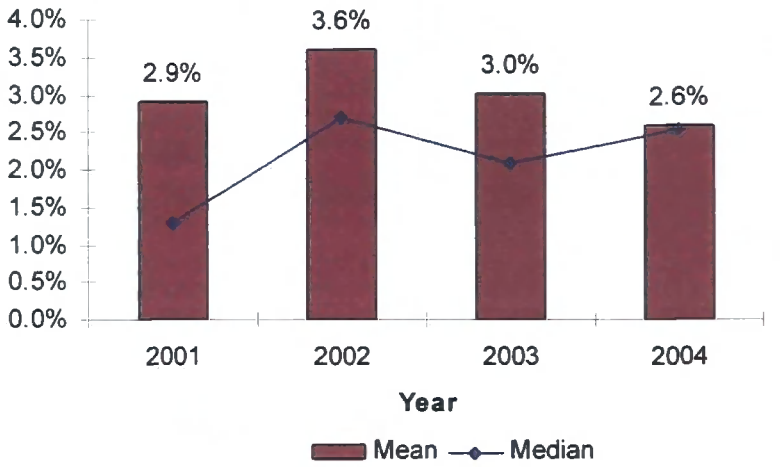


Figure 3-6: Movement of the Mean and the Median of the fraction of shares repurchased over the sample period



Out of the 176 open market repurchases included in our sample, 38 are one-off repurchases undertaken by 38 different firms, while the remaining 138 are repeat repurchases undertaken by 48 companies. Collecting data for each of these firms during the four year sample period yields an unbalanced panel of 330 observations. It is possible that some differences exist between firms that bought back their shares only once during the sample period, and those that regularly repurchased shares. In order to uncover these possible differences, an ANOVA test is applied to the two sub-samples. Although there is not a great difference in size between the two sub-samples, we use the *Welch* statistic instead of the standard F statistic to control for any differences in the variance of the two groups[37]. The results are reported in

Table 3-9, they show that the only notable differences between the two groups relate to their size, their dividends, and the fraction of their shares held by majority shareholders. It appears that frequent re-purchasers are slightly larger than one-off re-purchasers. In fact, if we look back at the mean difference test applied to the overall group of re-purchasers and that of non re-purchasers, we quickly perceive that the size

[37] See Table 3-8 in the appendix for the results of Levene's test of the homogeneity of variance.

of non re-purchasers is nearly the same as that of one-off re-purchasers. Thus, the separation of one-off and repeat re-purchasers seems to suggest that the latter are the ones likely to repurchase their shares to distribute free cash flow, while one-offs may be repurchasing their shares for some other reasons such as signalling or the funding of option exercises.

One-off re-purchasers also seem to pay significantly less dividends than frequent re-purchasers. However, both groups pay more dividends than non re-purchasers. Finally, one-off re-purchasers appear to have significantly more of their shares controlled by major shareholders than frequent re-purchasers. As we compare the means of both groups to that of non re-purchasers, we find that one-off re-purchasers are closer to non re-purchasers in terms of their shareholding base than they are to frequent re-purchasers.

Nonetheless, these are the only variables that show some significant differences between the two groups of re-purchasers, none of the option variables seem to be different across the two groups.

Although not reported here, we also carried out a test on the means of the fraction and the value of shares repurchased across all the 176 open-market repurchases, to test for differences between the group of one-off re-purchasers and the group of frequent re-purchasers. The results did not show any significant differences between the two groups.

3.6 Analysis of the reasons to repurchase

It is interesting to note that even though most repurchasing firms give very precise information as to the number of shares they repurchased and the effect of this on their EPS, they are very vague when it comes to stating the reasons behind such repurchases. In order to obtain the authority to repurchase they mostly use the same arguments and in some cases very similar wordings; mostly stressing how such authority would be used only if directors believe that it would result in an increase in earnings per share and would be in the best interests of shareholders generally. Consequently, it is very difficult to categorise the reasons behind share buybacks from information reported in company annual reports. In addition, several companies give more than one reason for repurchasing their shares, which makes the task of categorising them even harder.

Nonetheless, in this section we broadly define the following motivations:

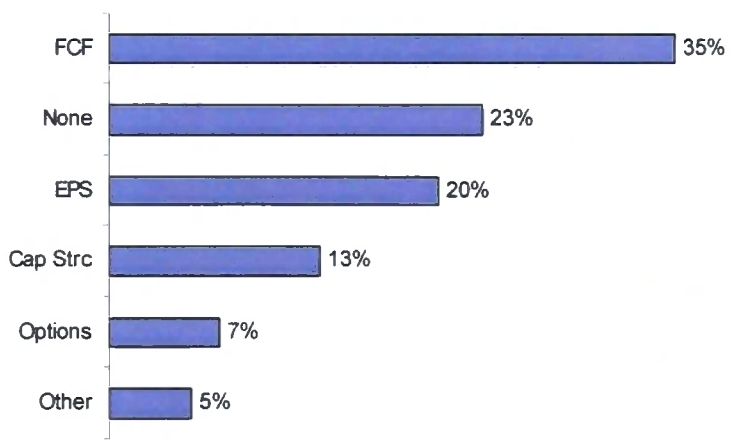
- *Free cash flow*: included under this motivation are all firms that mention repurchasing their shares to return surplus cash to their shareholders or to improve the efficiency of their balance sheet (share capital).
- *Earnings per share*: included under this motivation are all firms that mention repurchasing their shares to enhance earnings per share.
- *Capital structure*: included under this motivation are all firms that mention repurchasing their shares for capital maintenance purposes or to minimise the cost of capital.
- *Options*: included under this motivation are all firms that mention repurchasing their shares in order to fund the exercise of employee/executive

stock options or to counter the devaluation of EPS resulting from the exercise of such options.

- *Other*: included in this category are all firms that mention other reasons for repurchasing their shares that do not fall into any of the above categories, such as buying shares because they are undervalued, or because it is part of the distribution policy of the firm.
- *None*: included in this category are all firms that fail to give any specific reason for repurchasing their shares.

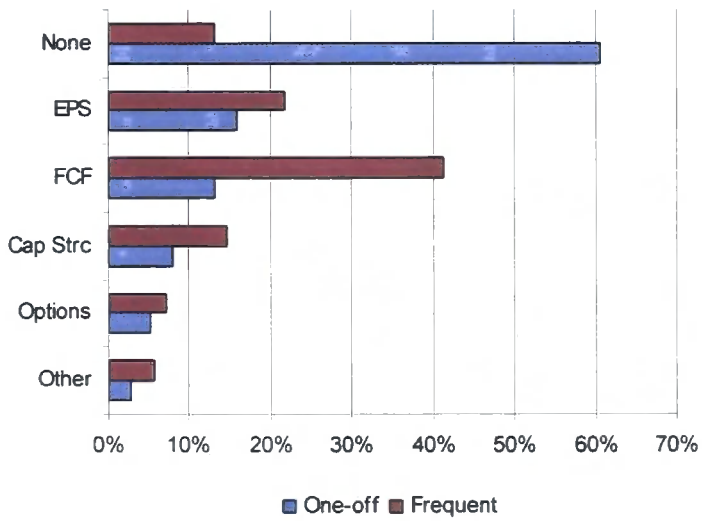
Although we tried to keep as close to this classification as possible, there were a few cases were a personal judgment had to be made. There were also a few other cases where a single firm gave more than one reason for repurchasing its shares. For cases where one reason was more compelling than the others, we just used it as one motivation, however, in other cases where the repurchase had clearly more than one motive, we had to classify it under more than one category. This classification has resulted in the figure below.

Figure 3-7: Motivations of share buybacks (out of 176 repurchases)



It appears from this classification that the most popular motive for share buybacks is the distribution of free cash flow to shareholders, followed by earnings' enhancement, though the latter is a rather vague motive. In only 7% of the repurchase observations is the funding of options mentioned as a motive for share buybacks, while a large number of firms do not mention specific reasons for repurchasing their shares. When the sample is divided into one-off re-purchasers and repeat re-purchasers, we can observe that frequent buyers state the distribution of free cash flow as their motive much more than do one-off buyers. This may indicate a real difference between the nature of repurchases in the two groups, or it could simply be a result of the failure of many one-off re-purchasers to mention specific reasons for their motivations, which could well be related to the distribution of FCF. Nonetheless, taking into account the findings of the mean comparison test between the two groups of re-purchasers, it seems more compelling to believe that frequent re-purchasers are in fact more likely to buy back their shares because they have excess cash than one-off re-purchasers.

Figure 3-8: Motivations of share buybacks in the one-off and repeat re-purchasers



In order to test if re-purchasers differ significantly according to their stated motive for repurchasing their shares, we carried out another mean comparison test. Although

dividing the repurchase observations (176) according to firms' stated motivations results in some very small samples, it is still worth while checking whether any substantial differences emerge, especially between the FCF repurchases and the EPS enhancement repurchases[38].

The results are not reported here, as they do not show many significant differences across the motivation-sub-samples, but a few very interesting differences emerge, particularly between the FCF repurchases and the EPS repurchases (perhaps because these are the largest of the sub-samples).

Firstly, it appears that firms that repurchase their shares in order to enhance their EPS have significantly fewer shares in their employee benefit trusts than firms that repurchase to distribute FCF. This appears very logical, since firms that do not have many shares already available to be transferred to their employees upon exercise of their options are more likely to suffer a devaluation of their EPS upon issuing new shares to satisfy those options. This seems to suggest that these firms, at least those in our sample, are being truthful about their reasons for repurchasing their stock. Although in our classification we also have a group of firms that mentioned repurchasing their shares in order to fund option exercises, it is highly likely that these repurchases occurred after December 2003, when firms in the UK became allowed to keep the shares they repurchased in treasury stock. Therefore, it is highly likely that many firms that mentioned repurchasing their share in order to enhance their EPS did so after their employees had already exercised their options, which were mostly likely funded with a new stock issuance.

[38] The number of observations where the motivation to repurchase was to return FCF is 62. The number of observations where the motivation to repurchase was to enhance EPS is 36. The number of repurchases related to capital restructuring, or some other motivations is 19 and 18 respectively.

Finally, none of the option variables are significant across the sub-samples, while, again, debt appears to be significantly lower in the group that repurchases to distribute FCF than in the group that repurchases to enhance EPS.

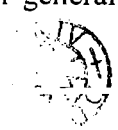
3.7 Summary and conclusions

In this chapter, we have presented our sampling methodology and we have analysed, in a univariate framework, our sample firms. We found that there are some significant differences between firms that repurchase their shares and those do not. It appears that those that do are generally significantly larger and earn significantly more than those that do not. This seems to give credit to the free-cash flow hypothesis of share buybacks. Moreover, we found that re-purchasers are significantly less indebted than non re-purchasers, which seems plausible if these firms repurchase in order to re-adjust their capital structure.

We have also found that re-purchasers pay significantly more in dividends than non re-purchasers and grant significantly less options, which seems to suggest that the hypothesis that firms repurchase their shares instead of paying or increasing dividends in order to avoid devaluating executive stock option may not enjoy empirical support in the UK.

An analysis of the characteristics of firms that repurchase and those that do not across each year of the sample period reveals that the differences identified above are not the result of a particular year driving the results, but rather, these differences are mostly consistent throughout the whole sample period.

We have also found that there are some significant differences between re-purchasers and non re-purchasers in terms of their industrial classification. It appears, for instance, that firms in the technology or general and basic industries sectors are less



likely to repurchase than those in the cyclical and non-cyclical consumer goods and utilities sectors.

Furthermore, we found that some differences also exist within the sample of re-purchasers, which seem to suggest that firms that routinely repurchase their shares are the ones likely to repurchase to distribute free cash flow, while those that make one-off buybacks are likely to repurchase shares for other reasons such as signalling or the funding of option exercises.

Finally, looking at the motives that sample firms give for repurchasing their shares (in their annual reports), we were able to establish that there is an element of truth in these reported motives, especially in relation to repurchases related to enhancing EPS.

These results are, however, preliminary, and are not at all conclusive, since we need to examine them in a multivariate context in order to control for any relationships that exist between different firm characteristics. This will be the objective of the next chapter, where we will build on the findings of this chapter and the findings of previous studies in order to determine the most likely motivations of firms in the UK for repurchasing their shares in the market.

3.8 Appendix

Table 3-1: Descriptive statistics of sample firms[1]

	Total sample (N=1016)				*Sample of re-purchasers (N=330)*				*Sample of non-re-purchasers (N=686)*			
Firm characteristics	Mean	Median	90th Perc	Std.Dev.	Mean	Median	90th Perc	Std.Dev.	Mean	Median	90th Perc	Std.Dev.
Market value (millions £)	3743	856	6751	11906	7399	1279	12309	19900	1984	747	4840	3213
Long-term debt (thousands £)	828587	230100	1919000	1761770	1202610	313100	3036500	2578400	648663	209629	1698000	1142920
Operating income (thousands £)	265414	79450	554500	914325	466730	100200	1418050	1494580	168571	68450	429700	370068
Total assets (thousands £)	4121360	1153700	8662500	12636100	7312240	1406740	16132000	21021300	2586390	1072500	6872500	4134050
Return	0.0422	0.1152	0.4740	0.4829	0.0717	0.1172	0.4364	0.3337	0.0280	0.1137	0.4951	0.5398
Earnings per share	0.1737	0.1535	0.5280	0.4150	0.2693	0.2335	0.5875	0.4506	0.1277	0.1100	0.4875	0.3888
Dividend per share	0.1243	0.0960	0.2915	0.1187	0.1567	0.1230	0.3510	0.1204	0.1087	0.0820	0.2495	0.1148
Major holdings %	27.80%	25.36%	54.51%	18.30%	24.11%	22.47%	48.59%	16.57%	29.58%	26.99%	54.97%	18.83%
Repurchase variables (N=176)[2]												
Fraction of shares repurchased %	3.008%	2.034%	6.699%	2.864%								
Value of repurchases (thousands £)	208555	30000	609053	547086								
Employee compensation												
Total options %	3.446%	3.157%	6.332%	2.360%	3.037%	2.890%	5.660%	2.067%	3.643%	3.277%	6.610%	2.467%
Executive options %	0.624%	0.352%	1.490%	0.839%	0.445%	0.271%	1.175%	0.528%	0.710%	0.390%	1.786%	0.941%
Exercisable executive options %	0.242%	0.100%	0.575%	0.457%	0.162%	0.072%	0.429%	0.230%	0.281%	0.122%	0.671%	0.529%
Long-term plans %	0.134%	0.000%	0.392%	0.295%	0.124%	0.001%	0.372%	0.265%	0.138%	0.000%	0.401%	0.308%
Director shareholdings %	3.233%	0.152%	9.549%	9.063%	2.473%	0.127%	5.669%	6.563%	3.598%	0.162%	11.261%	10.030%
Shares in trust %	0.709%	0.248%	1.983%	1.187%	0.805%	0.358%	2.248%	1.138%	0.663%	0.220%	1.787%	1.208%

[1] All variables reported as percentages are fractions of total shares outstanding at the start of the year.
[2] These statistics exclude tender offers

Definition of variables:

Firm characteristics:
All these variables (apart from major shareholdings) have been collected form DataStream at the start of each financial year.

- Market value (data item MV): the share price multiplied by the number of ordinary shares in issue.
- Long-term debt (data item WC03251): all interest bearing financial obligations, excluding amounts due within one year. It is shown net of premium or discount.
- Operating income (data item WC01250): represents the difference between sales and total operating expenses, net of income taxes.
- Total assets (data item WC02999): the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
- Return: is calculated as the Log (RI in year1)-log (RI in year 0), where RI is the return index.
- Earnings per share (data item WC18193):
- Dividend per share (data item WC05101): total dividends per share declared during the fiscal year. It includes extra dividends declared during the year.
- Major holdings: the aggregation of fractions of shares exceeding 3% of outstanding shares owned by individuals or corporations. This variable is collected mainly from annual reports at the start of each financial year.

Repurchase variables:
These variables have been collected from annual reports, and represent repurchases made during each financial year.

- Fraction of shares repurchased %: the number of shares repurchased during the year divided by the number of shares outstanding at start of the financial year, all multiplied by a hundred.
- Value of repurchases (thousands £): the pound value of the shares repurchased as reported in the financial statements.

Employee compensation:
These variables have been collected from annual reports, and represent values at the start of each financial year.

- Total options %: (Number of shares underlying total options / number of shares outstanding)*100
- Executive options %: (Number of shares underlying executive options / number of shares outstanding)*100
- Exercisable executive options %: (Number of shares underlying exercisable executive options/ number of shares outstanding)*100
- Long-term plans %: (Number of shares underlying other long-term plans / number of shares outstanding)*100
- Director shareholdings %: (Number of shares held by executive directors / number of shares outstanding)*100
- Shares in trust %: (Number of shares in trust / number of shares outstanding)*100

Table 3-2: Test of Homogeneity of Variances
This table reports the result of the Levene test for homogeneity of variances between the re-purchasers and the non re-purchasers groups.

	Levene Statistic	*df1*	*df2*	*Sig.*
SIZE	24.108	1	1014	0
DEBT	9.639	1	1014	0.002
OPINCOME	7.687	1	1014	0.006
RETURN	17.178	1	1014	0
MB	2.25	1	1014	0.134
EPS	0.101	1	1014	0.751
DPS	6.883	1	1014	0.009
MSH	5.776	1	1014	0.016
ESO	1.329	1	1014	0.249
EXSO	30.661	1	1014	0
EXSOEX	26.793	1	1014	0
LTIP	0.882	1	1014	0.348
MO	10.81	1	1014	0.001
STRUST	2.924	1	1014	0.088

Table 3-3: Robust test of equality of means between re-purchasers and non re-purchasers

		Means	*Mean Diff*	*Welch statistic*[1]	*df1*	*df2*	**Sig.**
	Re-purchasers	Non-re-purchasers					
SIZE	21.2124	20.6114	0.6010	38.8450	1	531.41	**0.0000**
DEBT	0.3252	0.4848	-0.1596	14.4320	1	983.72	**0.0000**
OPINCOME	0.1060	0.0777	0.0283	7.3260	1	865.50	**0.0070**
RETURN	0.0717	0.0280	0.0437	2.5000	1	953.19	0.1140
EPS	0.2693	0.1277	0.1416	23.9960	1	571.74	**0.0000**
DPS	0.1567	0.1087	0.0480	36.5090	1	622.66	**0.0000**
MSH	0.2411	0.2958	-0.0546	22.1380	1	729.37	**0.0000**
ESO	0.0304	0.0364	-0.0061	16.8100	1	762.53	**0.0000**
EXSO	0.0045	0.0071	-0.0026	32.7960	1	991.39	**0.0000**
EXSOEX	0.0016	0.0028	-0.0012	24.8950	1	1005.89	**0.0000**
LTIP	0.0012	0.0014	-0.0001	0.5900	1	745.77	0.4430
MO	0.0247	0.0360	-0.0112	4.5630	1	923.65	**0.0330**
STRUST	0.0081	0.0066	0.0014	3.3460	1	686.00	0.0680

[1] Asymptotically F distributed.
Re-purchasers→N=330 obs
Non re-purchasers→N=686 obs
Small significance values (<.05) indicate group differences.
Description of variables: SIZE=Log of market value, DEBT=Long-term debt / market value, OPINCOME=Operating income / market value, RETURN= (Log RI y_1 – Log RI y_0), EPS=Earnings per share, DPS=Dividend per share, MSH=Number of shares held by major shareholders / number of shares outstanding, ESO=Number of shares underlying total options / number of shares outstanding, EXSO=Number of shares underlying executive options / number of shares outstanding, EXSOEX=umber of shares underlying exercisable executive options/ number of shares outstanding, LTIP=Number of shares underlying long-term plans / number of shares outstanding, MO=Number of shares help by executive directors / number of shares outstanding, STRUST=Number of shares held in trusts / number of shares outstanding.

Table 3-4: Industrial composition of samples

	Total sample		*Re-purchasers*		*Non re-purchasers*	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Cyclical services	393	38.7	128	38.8	265	38.6
Basic industries	130	12.8	39	11.8	91	13.3
Non-cyclical consumer goods	106	10.4	44	13.3	62	9.0
General industrials	95	9.4	12	3.6	83	12.1
Financials	70	6.9	27	8.2	43	6.3
Resources	57	5.6	20	6.1	37	5.4
Information technology	56	5.5	11	3.3	45	6.6
Utilities	44	4.3	20	6.1	24	3.5
Non-cyclical services	43	4.2	15	4.5	28	4.1
Cyclical consumer Goods	22	2.2	14	4.2	8	1.2
Total	1016	100	330	100	686	100

Table 3-5: Differences in industrial composition- comparing the group of re-purchasers to that of non re-purchasers

Industry	*Re-purchasers*		
	Observed N	Expected N	Residual
Cyclical services	128	127.253	0.747
Non-cyclical consumer goods	44	29.670	14.330
Basic industries	39	43.846	-4.846
Financials	27	20.769	6.231
Resources	20	17.802	2.198
Utilities	20	11.538	8.462
Non-cyclical services	15	13.516	1.484
Cyclical consumer Goods	14	3.956	10.044
General industrials	12	39.890	-27.890
Information technology	11	21.758	-10.758
Total	330		

Chi-Square 66.2891
Asymp. Sig. 0.0000
df = 9

Table 3-6: Correlation matrix for the explanatory variables (total sample, N=1016)

		SIZE	DEBT	OPINCOME	RETURN	MB	EPS	DPS	MSH	ESO	EXSO	EXSOEX	LTIP	MO
DEBT	Pearson Corr	**-0.145**												
	Sig. (2-tailed)	0.000												
OPINCOME	Pearson Corr	0.034	**-0.170**											
	Sig. (2-tailed)	0.278	0.000											
RETURN	Pearson Corr	**-0.230**	**0.078**	**0.127**										
	Sig. (2-tailed)	0.000	0.013	0.000										
MB	Pearson Corr	0.030	-0.022	-0.008	-0.044									
	Sig. (2-tailed)	0.341	0.491	0.809	0.162									
EPS	Pearson Corr	**0.120**	**-0.173**	**0.332**	**0.091**	0.043								
	Sig. (2-tailed)	0.000	0.000	0.000	0.004	0.172								
DPS	Pearson Corr	**0.285**	**-0.076**	**0.148**	**0.140**	0.055	**0.553**							
	Sig. (2-tailed)	0.000	0.015	0.000	0.000	0.079	0.000							
MSH	Pearson Corr	**-0.333**	0.026	-0.006	**0.088**	0.000	**-0.066**	**-0.167**						
	Sig. (2-tailed)	0.000	0.405	0.858	0.005	0.994	0.036	0.000						
ESO	Pearson Corr	**-0.166**	-0.041	**-0.163**	**-0.112**	-0.027	**-0.223**	**-0.244**	**0.115**					
	Sig. (2-tailed)	0.000	0.196	0.000	0.000	0.386	0.000	0.000	0.000					
EXSO	Pearson Corr	**-0.363**	0.001	-0.053	-0.019	-0.002	**-0.108**	**-0.247**	**0.281**	**0.562**				
	Sig. (2-tailed)	0.000	0.985	0.092	0.540	0.954	0.001	0.000	0.000	0.000				
EXSOEX	Pearson Corr	**-0.253**	-0.051	**-0.077**	-0.042	-0.017	**-0.066**	**-0.177**	**0.183**	**0.412**	**0.675**			
	Sig. (2-tailed)	0.000	0.106	0.014	0.182	0.580	0.037	0.000	0.000	0.000	0.000			
LTIP	Pearson Corr	**-0.130**	-0.049	**0.074**	**0.070**	0.004	0.015	**-0.115**	**0.095**	-0.034	-0.013	-0.012		
	Sig. (2-tailed)	0.000	0.115	0.018	0.025	0.906	0.642	0.000	0.002	0.283	0.669	0.711		
MO	Pearson Corr	**-0.209**	**-0.075**	**-0.082**	-0.036	0.051	0.014	**-0.102**	**0.108**	-0.039	0.046	-0.016	-0.049	
	Sig. (2-tailed)	0.000	0.017	0.009	0.246	0.107	0.651	0.001	0.001	0.215	0.140	0.615	0.116	
STRUST	Pearson Corr	0.015	**-0.098**	0.017	-0.021	0.006	-0.042	0.035	0.047	**0.167**	0.007	**-0.066**	**0.177**	0.016
	Sig. (2-tailed)	0.632	0.002	0.581	0.509	0.857	0.176	0.271	0.132	0.000	0.818	0.036	0.000	0.621

Description of variables: SIZE=Log of market value, DEBT=Long-term debt / market value, OPINCOME=Operating income / market value, RETURN= (Log RI y_t – Log RI y_{t-1}), EPS=Earnings per share, DPS=Dividend per share, MSH=Number of shares held by major shareholders / number of shares outstanding, ESO=Number of shares underlying total options / number of shares outstanding, EXSO=Number of shares underlying executive options / number of shares outstanding, EXSOEX=umber of shares underlying exercisable executive options/ number of shares outstanding, LTIP=Number of shares underlying long-term plans / number of shares outstanding, MO=Number of shares help by executive directors / number of shares outstanding, STRUST=Number of shares held in trusts / number of shares outstanding.

Table 3-7: Correlation matrix for the explanatory variables in the re-purchasers and the non re-purchasers samples

		SIZE	DEBT	OPINCOME	RETURN	MB	EPS	DPS	MSH	ESO	EXSO	EXSOEX	LTIP	MO	STRUST
SIZE	Pearson Corr		**-0.154**	**0.081**	**-0.265**	0.027	**0.098**	**0.288**	**-0.308**	**-0.126**	**-0.358**	**-0.259**	**-0.155**	**-0.177**	0.066
	Sig. (2-tailed)		0.000	0.034	0.000	0.482	0.010	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.085
DEBT	Pearson Corr	-0.103		**-0.180**	0.068	-0.016	**-0.184**	-0.070	0.009	-0.035	-0.016	**-0.074**	-0.056	-0.068	**-0.107**
	Sig. (2-tailed)	0.061		0.000	0.076	0.673	0.000	0.067	0.815	0.365	0.677	0.053	0.145	0.075	0.005
OPINCOME	Pearson Corr	**-0.313**	**0.111**		**0.109**	-0.005	**0.363**	**0.144**	0.002	**-0.177**	-0.054	**-0.081**	**0.095**	**-0.097**	0.008
	Sig. (2-tailed)	0.000	0.045		0.004	0.894	0.000	0.000	0.967	0.000	0.155	0.034	0.012	0.011	0.844
RETURN	Pearson Corr	**-0.235**	**0.212**	**0.364**		-0.050	**0.114**	**0.131**	0.071	**-0.128**	-0.033	-0.050	**0.089**	-0.030	-0.042
	Sig. (2-tailed)	0.000	0.000	0.000		0.193	0.003	0.001	0.063	0.001	0.395	0.188	0.020	0.439	0.277
MB	Pearson Corr	**0.107**	**-0.156**	-0.068	0.021		0.042	0.046	-0.007	-0.036	-0.001	-0.015	0.002	0.049	0.005
	Sig. (2-tailed)	0.051	0.004	0.217	0.704		0.266	0.227	0.852	0.344	0.990	0.697	0.966	0.196	0.905
EPS	Pearson Corr	0.077	**-0.139**	**0.428**	0.017	**0.111**		**0.570**	-0.040	**-0.204**	**-0.087**	-0.045	0.041	0.020	-0.055
	Sig. (2-tailed)	0.161	0.011	0.000	0.764	0.044		0.000	0.292	0.000	0.023	0.237	0.282	0.608	0.150
DPS	Pearson Corr	**0.207**	-0.036	**0.220**	**0.162**	**0.205**	**0.488**		**-0.166**	**-0.195**	**-0.240**	**-0.174**	**-0.088**	**-0.109**	0.042
	Sig. (2-tailed)	0.000	0.509	0.000	0.003	0.000	0.000		0.000	0.000	0.000	0.000	0.021	0.004	0.276
MSH	Pearson Corr	**-0.337**	0.045	0.018	**0.190**	0.057	-0.054	-0.097		**0.093**	**0.251**	**0.190**	0.070	**0.101**	0.020
	Sig. (2-tailed)	0.000	0.414	0.740	0.001	0.304	0.325	0.078		0.015	0.000	0.000	0.066	0.008	0.599
ESO	Pearson Corr	**-0.191**	**-0.177**	-0.066	-0.032	0.028	**-0.225**	**-0.307**	**0.117**		**0.574**	**0.445**	-0.069	-0.044	**0.106**
	Sig. (2-tailed)	0.000	0.001	0.232	0.564	0.617	0.000	0.000	0.033		0.000	0.000	0.073	0.248	0.005
EXSO	Pearson Corr	**-0.388**	0.013	0.082	0.103	-0.040	-0.105	**-0.209**	**0.352**	**0.502**		**0.688**	-0.006	0.047	-0.008
	Sig. (2-tailed)	0.000	0.816	0.139	0.061	0.466	0.057	0.000	0.000	0.000		0.000	0.881	0.221	0.833
EXSOEX	Pearson Corr	**-0.253**	0.075	**0.114**	0.064	-0.089	-0.074	**-0.137**	0.092	**0.241**	**0.535**		-0.010	-0.023	-0.064
	Sig. (2-tailed)	0.000	0.177	0.038	0.243	0.107	0.180	0.013	0.095	0.000	0.000		0.803	0.553	0.095
LTIP	Pearson Corr	-0.084	-0.042	-0.050	0.006	0.024	-0.028	**-0.171**	**0.156**	0.055	-0.067	-0.045		**-0.077**	**0.166**
	Sig. (2-tailed)	0.127	0.452	0.361	0.917	0.658	0.608	0.002	0.005	0.316	0.226	0.412		0.043	0.000
MO	Pearson Corr	**-0.295**	**-0.190**	**0.115**	-0.057	0.081	0.038	-0.051	0.102	-0.056	-0.010	-0.028	0.045		-0.006
	Sig. (2-tailed)	0.000	0.001	0.037	0.302	0.144	0.488	0.360	0.065	0.313	0.854	0.618	0.410		0.869
STRUST	Pearson Corr	-0.105	-0.050	0.077	0.041	0.025	-0.048	-0.012	**0.145**	**0.358**	**0.111**	-0.054	**0.211**	0.105	
	Sig. (2-tailed)	0.057	0.368	0.163	0.459	0.654	0.389	0.830	0.008	0.000	0.043	0.331	0.000	0.057	
REPUR	Pearson Corr	-0.016	-0.015	0.071	0.001	-0.015	0.043	-0.013	-0.023	0.017	-0.049	-0.040	-0.013	0.000	-0.025
	Sig. (2-tailed)	0.774	0.784	0.198	0.991	0.787	0.432	0.818	0.678	0.756	0.380	0.472	0.810	0.996	0.656
VALREP	Pearson Corr	-0.041	0.000	**0.114**	0.061	-0.011	0.028	0.003	-0.029	0.001	-0.050	-0.039	-0.013	0.008	-0.033
	Sig. (2-tailed)	0.460	1.000	0.039	0.272	0.841	0.613	0.952	0.600	0.982	0.365	0.480	0.813	0.884	0.555

Sample of re-purchasers (bottom half of the matrix, N=330) Sample of non re-purchasers (Top half of the matrix, N=686)

Figure 3-9: Industrial composition of the FTSE 350 as at 04/04/05

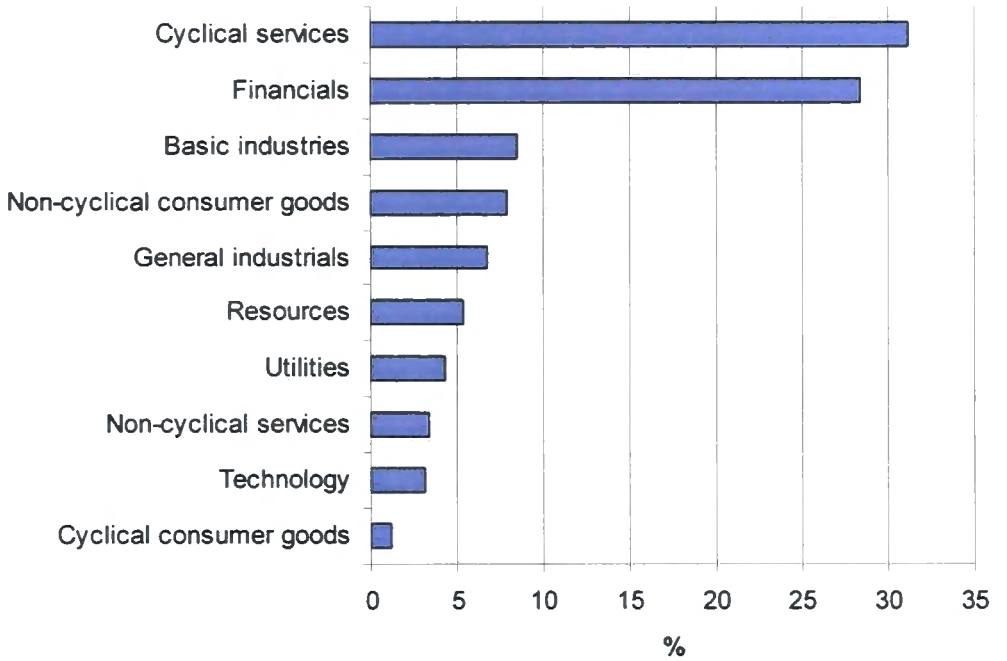


Figure 3-10: Industrial composition of the sample

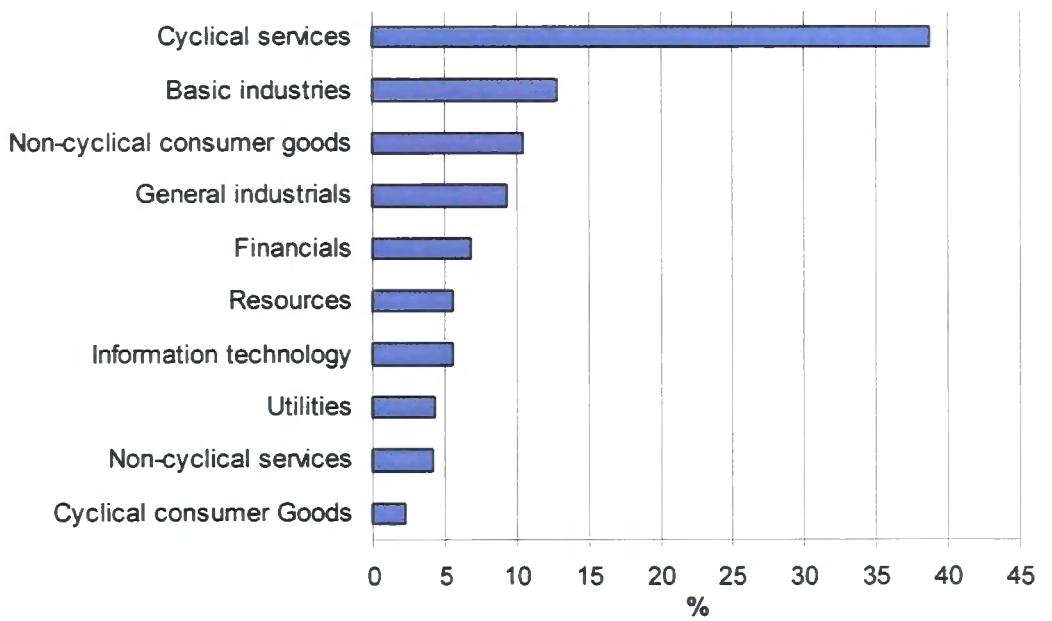


Table 3-8: Test of Homogeneity of Variances

This table reports the result of the Levene test for homogeneity of variances between the one-off re-purchasers and the frequent re-purchasers.

	Levene Statistic	*df1*	*df2*	*Sig.*
SIZE	21.44	1	328	0
DEBT	0.793	1	328	0.374
OPINCOME	2.039	1	328	0.154
RETURN	6.562	1	328	0.011
MB	1.346	1	328	0.247
EPS	0.051	1	328	0.822
DPS	18.29	1	328	0
MSH	1.81	1	328	0.179
ESO	0.161	1	328	0.688
EXSO	7.238	1	328	0.008
EXSOEX	0.85	1	328	0.357
LTIP	0.023	1	328	0.88
MO	2.689	1	328	0.102
STRUST	7.376	1	328	0.007

Table 3-9: Robust Tests of Equality of Means: one-off re-purchasers *vs.* frequent re-purchasers

	Mean		*Mean Difference*	*Welch statistic*[1]	*df1*	*df2*	***Sig.***
	One-off (N=142)	Freq (N=188)					
SIZE	20.6121	21.6658	-1.0537	47.6700	1	323.4470	**0.0000**
DEBT	0.3431	0.3116	0.0316	0.5650	1	298.2330	0.4530
OPINCOME	0.1106	0.1026	0.0080	1.1700	1	325.5420	0.2800
RETURN	0.0755	0.0688	0.0067	0.0310	1	265.6450	0.8610
EPS	0.2134	0.3115	-0.0981	3.6930	1	274.4740	0.0560
DPS	0.1262	0.1797	-0.0535	17.7750	1	326.7570	**0.0000**
MSH	0.2815	0.2106	0.0709	14.9660	1	284.0680	**0.0000**
ESO	0.0322	0.0290	0.0032	1.9610	1	311.8560	0.1620
EXSO	0.0049	0.0041	0.0007	1.4020	1	261.3600	0.2370
EXSOEX	0.0016	0.0017	-0.0001	0.1490	1	271.2740	0.7000
LTIP	0.0013	0.0012	0.0001	0.0820	1	311.9000	0.7750
MO	0.0208	0.0277	-0.0069	0.9170	1	319.3720	0.3390
STRUST	0.0095	0.0070	0.0025	3.6500	1	246.2600	0.0570

[1] Asymptotically F distributed.
Re-purchasers→N=330 observations
Non re-purchasers→N=686 observations
Small significance values (<.05) indicate group differences.
Description of variables: SIZE=Log of market value, DEBT=Long-term debt / market value, OPINCOME=Operating income / market value, RETURN= (Log RI y_1 – Log RI y_0), EPS=Earnings per share, DPS=Dividend per share, MSH=Number of shares held by major shareholders / number of shares outstanding, ESO=Number of shares underlying total options / number of shares outstanding, EXSO=Number of shares underlying executive options / number of shares outstanding, EXSOEX=umber of shares underlying exercisable executive options/ number of shares outstanding, LTIP=Number of shares underlying long-term plans / number of shares outstanding, MO=Number of shares help by executive directors / number of shares outstanding, STRUST=Number of shares held in trusts / number of shares outstanding.

4 INVESTIGATION OF THE MOTIVATIONS OF SHARE REPURCHASES IN THE UK

4.1 Introduction

In the literature review we examined the main hypotheses put forward and empirically tested by finance researchers to explain why firms repurchase their shares. We found that although the empirical literature on share buybacks is extensive, virtually all of it is restricted to the US and the testing of agency and signalling related hypotheses that reflect concerns largely specific to US corporate incentives and governance characteristics and practices. As such, neither the results nor the implications of these studies can necessarily be generalised to other countries – even, as we shall demonstrate, to an institutionally closely related country, such as the UK.

An additional complication with the existing literature is that several distinct motivations for share buybacks appear to enjoy some empirical support. It appears that different types of firms may repurchase for different reasons. For example, it has been argued that large firms with liquid balance sheets and relatively few investment opportunities are most likely to repurchase their shares as a means of returning excess cash to their shareholders, while small firms with low financial analysts' coverage may wish to repurchase in order to signal their undervaluation to the market. Whilst either or both of these hypotheses may be true in relation to some share repurchases, as we have seen in the previous chapter, many firms mention repurchasing their shares simply in order to enhance their earnings-per-share. As increases in corporate leverage and reported earnings per share are a direct and measurable result of any share repurchase programme, there is a need to distinguish between this motivation and the more complex behavioural hypotheses that suggest that share buybacks have additional economic significance, such as reducing agency costs, protecting the value of unexercised executive share options or signalling undervaluation, in relation to

firms with particular corporate characteristics and managerial incentives. In terms of determining why firms repurchase their shares, this implies that the composition and particular characteristics of the research sample are likely to have an influence on which hypotheses receive the strongest empirical support. Moreover, as none of these individual motivations are actually mutually exclusive, categorising share buyback firms on the basis of their characteristics and presumed motivations, is not without problems since it is possible for some firms whose characteristics appear to best fit one type of motivation to actually repurchase for an entirely different reason. For instance, it is possible that a large firm with excess cash (or indeed, any firm with unused borrowing capacity) may decide to repurchase its shares to counteract the dilution of its EPS resulting from the exercise of employee stock options.

Despite the above concerns, in this chapter we build on the findings of the existing published papers that have been summarised in the literature review and, with the aid of the univariate analysis of our sample of UK firms presented in the previous chapter, empirically evaluate the different motivations that firms in the UK might have to repurchase their shares. It is expected that the results of this investigation will contribute not only to our general understanding of share buybacks but, due to the surprising lack of empirical studies on the UK - which constitutes the largest setting for share repurchases in Europe (Lasfer, 2000)- it may also offer a new and more complete picture of share repurchase activity in the UK. Apart from Oswald & Young (2004a/b), who had first dealt with the topic of share buybacks in response to Rau & Vermaelen (2002), the UK has not attracted a great deal of interest from researchers. Although Oswald and Young make a very convincing case for the "free cash flow" (FCF) hypothesis in their 2004 working paper, they dismiss other motivations,

including the stock option hypothesis, without first attempting to investigate their possible empirical validity.

In this chapter we also highlight how differences in corporate governance systems can be expected to influence corporate payout strategies. We show that some motivations which have received strong support from US studies appear to lack empirical support when applied to UK firms and that such differences are due mainly to differences in tax and corporate governance across the two countries.

In addition to enriching the corporate payout policy literature in the UK, this study uses a dataset that has been mostly hand collected and thus avoids the biases of machine-readable data that many electronic databases are prone to when reporting information outside the US (see Oswald & Young, 2004a/b). Moreover, this study, in addition to taking into account the major motivations for share repurchases, uses data on executive remuneration to control for possible agency effects. To the best of our knowledge, no study to date in either the UK or the US, has looked at the motivations for share buybacks, and specifically the stock options hypotheses, while controlling for the different ownership interests that the decision makers i.e. executives, have in their firm.

The empirical analysis is divided into three main sections. Each of the three sections examines a different set of issues that arose out of the empirical findings of the univariate analysis concerning the characteristics and distribution of share repurchases across our sample of firms presented in the previous chapter. In the first part, the focus is on the sub-sample of firms that repurchased their shares at least once during

the sample period (re-purchasers). The objective in this section is to identify whether any relationships exist within the subset of UK firms that have at any time engaged in any share repurchases and the individual variables used to test specific hypotheses or control for factors identified in the literature. In the second section, the total UK sample of firms is used and divided into the re-purchasers sub-sample used in section 1, and the remaining firms (non re-purchasers). This section uses a binomial Logit model to estimate the probability of a firm with particular characteristics being either a share repurchaser or a non-share repurchaser. The choice of explanatory variables has been based on a combination of the findings of the published literature and the findings of the univariate analysis on the characteristics of our sample of UK firms. In the last section, the group of non re-purchasers is further divided into firms that never repurchased but continuously paid dividends and firms that never repurchased and did not continuously pay dividends. Using these two groups together with the group of re-purchasers sheds more light on factors that were previously thought to encourage firms to repurchase their shares, and which, as we will show, appear to equally 'encourage' them not to repurchase.

The reminder of the chapter is structured as follows. We start with a brief summary of the main hypotheses regarding the motivations for share repurchases identified in the literature, and then go on to formulate appropriate hypotheses and empirical measures that are then used and tested throughout the 3 stage empirical analysis.

4.2 Theoretical framework

In the literature review we found that the main motivations for US share repurchases consist of the following:

- *The free cash-flow hypothesis*: it is argued that firms repurchase their shares when they have excess cash and no profitable investment opportunities; such repurchases reduce the agency costs of free cash flow and therefore benefit shareholders generally.
- *The signalling hypothesis*: this is one of the earliest hypotheses of share repurchases; it suggests that repurchases are used by firms to signal their undervaluation to the market. Thus managers repurchase the shares of their companies when they perceive that these are cheap.
- *The capital structure hypothesis*: this hypothesis claims that share repurchases are used as a mechanism for adjusting the capital structure of the firm. Of course, all share repurchases necessarily change the capital structure (and reported earnings per share) of the firm; however, as using excess corporate cash to fund share repurchases would also change the asset structure of the firm, only repurchases paid for via increasing debt would constitute a pure capital structure decision.
- *The employee stock option hypothesis*: this is one of the most recent hypotheses regarding the motivations for share repurchases. It posits two main arguments. The first suggests that firms repurchase their shares in order to avoid the dilution of their EPS following the exercise of employee stock options; it thus focuses on employee options generally. The second claims that

share repurchases are used by managers as a substitute for dividends in order to avoid the dilution of their stock options that would result from dividend payments. Thus, this second argument focuses on managerial options.

In the literature, we also mentioned several other hypotheses for share buybacks; however, none of these alternative ideas have received the same level of support as those listed above.

With several studies already having been published on the motivations for share repurchases, our contribution to this literature consists of the following. Firstly, although investigations of firms' motivations for repurchasing their shares are numerous, many findings come with strong caveats with regard to their methodology and/or their data. Secondly, as was mentioned previously, most of these studies examine repurchases in the US. While the UK and the US are commonly thought of as having similar capital markets, financial institutions and corporate sectors, corporate law and governance in the two countries though superficially very similar, are in fact very different in ways that render many of the assumptions and findings of the US studies inapplicable to the UK.

If we take the example of the signalling hypothesis, which claims that firms repurchase their shares when these are cheap, we find several inconsistencies in the arguments put forward by authors supporting this theory when we try to apply it to the UK. For instance, many of these studies, such as Comment & Jarrell (1991) and Li & McNally (2000), argue that the most effective type of repurchase that signals to the market a firm's undervaluation is a fixed price-tender offer, or a tender-offer in

general. While tender-offers do happen in the UK, compared to open market share repurchases they are relatively rare. Moreover, Comment and Jarrell (1991) find that very large open market repurchases can be just as effective signalling tools as tender-offers. However, in the UK, the maximum number of shares any firm can repurchase with a single authority is 15% of its share capital. As detailed in the univariate analysis, many firms typically obtain authority to repurchase less than 10% of their share capital, while the actual number of shares repurchased in our sample is on average only some 3% of share capital. In addition, as documented by Rau & Vermaelen (2002), the regulatory environment in the UK makes it very difficult for firms to exploit their share price movements, rendering the signalling argument rather weak.

Moreover, another example of differences in corporate governance between the UK and US that can impact on firms' motivations to repurchase relates to stock options. The stock option hypothesis has received a great deal of support from US researchers lately, whether in relation to its dividend substitution argument or its EPS dilution argument. However, testing this hypothesis in the UK will be challenging since the value of options granted to UK executives is typically tiny in comparison to that of US executives[39]. Moreover, until December 2003, any shares bought back by firms in the UK had to be cancelled, unlike in the US. Prior to 2004, therefore, share repurchases provided UK boards with relatively less flexibility than their US counterparts.

[39] Refer to the paper by Conyon and Murphy (2000) for more information on this.

Naturally, firms in the UK must repurchase for a reason, or several reasons. What we are suggesting is that these reasons may be different to those driving US share repurchases because of differences in the corporate governance systems of the two countries. We therefore, analyse firms' motivations to repurchase while controlling for the major factors identified in US studies proposed to affect the repurchase decision. We focus particularly on the employee/executive stock option hypothesis, since the methodology used in several previous papers, such as Weisbenner (1998), appears inappropriate and may render their conclusions questionable. Moreover, testing the EPS dilution argument in the UK setting offers many advantages. According to that argument firms repurchase to counter the dilution of EPS resulting from option exercises. Theoretically, this can be done either by funding option exercises with the shares repurchased, in which case it would not be easy to prove the link with EPS. Or it can be done by simply repurchasing shares after the options are exercised to enhance the value of EPS. It is not possible, using US data, to distinguish between firms that repurchase simply to fund their option exercises and those that do so specifically to increase their EPS. In the UK, as firms previous to 2004 were not allowed to use the shares they repurchased to fund option exercises, any link between options and repurchases would thus more easily be interpreted as an indication that firms repurchase to enhance their EPS. As a matter of fact, we found in the univariate analysis that some 20% of our sample firms report repurchasing their shares primarily to enhance the value of their EPS. Comparable figures for the US are not possible to obtain since US firms do not have to publish any reason(s) for repurchasing their shares. Therefore, in the UK we have a plausible basis for making the assumption that firms (with or without option exercises) repurchase to enhance their EPS.

4.2.1 Control Variables

In order to disentangle the different factors driving the repurchase decision of our sample firms, we need to appropriately account for all of these motivations. Moreover, given that one of the contributions of this analysis is the fact that it tests the stock option hypotheses, we also need to control for other factors related to executive remuneration, so that our results are free from any previously identified missing variable biases.

According to the substitution hypothesis, firms have a motive to substitute share repurchases for dividends in order to minimise shareholders' tax liability. Accordingly, many authors (such as Fenn & Liang 1997, Weisbenner 2000; Grullon & Michaely 2000; Aboody & Kasznik 2001; Kahle 2002;) control for investor tax implications in their estimation strategies. However, these studies focus on the US, where the tax legislation is different from that in the UK.

As mentioned in the fiscal legislation section in chapter 2, in the UK, it is difficult to determine the tax implications of share repurchases to individual shareholders, because these very much depend on each individual's capital gains tax liability. It is, however, reasonable to assume that, all else being equal, high taxpayers would prefer buybacks to dividends because the net present value of the capital gains generated by repurchases would tend to be lower than the NPV of the income tax resulting from the dividend payments.

Since the UK tax authorities eliminated all tax credits for dividends, institutional shareholders ought to be indifferent between share repurchases and dividends. It is, therefore, safe to assume that share repurchases are preferred by investors to dividend

payments so long as they do not generate excessively high capital gains tax. Since information on the average capital gains to individual investors cannot be obtained, it is not possible to determine whether it has an effect on the repurchase activity of our sample firms. However, we are able to use a proxy for institutional shareholders tax preferences. Although as we have said previously, institutional shareholders should be indifferent between share buybacks and dividend payments, in practice it might be a different story. Therefore, we hand collected the percentage of shares held in each sample firm during every year of the sample period, that were in excess of 3% of the total outstanding share capital. This may not be a perfect measure of institutional shareholdings, since some institutions may hold less than 3% of the share capital, but it is the closest proxy we are able to obtain given the unavailability of this information on any financial database.

Moreover, it is unlikely that institutional shareholders that hold an interest of less than 3% in sample firms would have a great influence on corporate payout policy. Given that we do not know whether UK institutional shareholders have any payout preferences, we cannot hypothesise on what the direction of the relationship between share repurchases and institutional shareholdings (more appropriately major shareholdings) should be, and we use this solely as an empirical control. In addition, major shareholdings can also serve as a measure of the extent of agency problems in sample firms, or more appropriately, the role of large shareholders in the corporate governance of the firms where they hold relatively large ownership stakes.

We include lagged return as an explanatory variable in order to control for any effects arising from the signalling hypothesis. This hypothesis has been extensively tested in

the literature and enjoys strong empirical support (Vermaelen, 1981; Comment & Jarrell, 1991; Barth & Kasznik, 1999). If managers repurchase the shares of their companies in order to signal to the market their undervaluation, then we should expect repurchase announcements to follow poor stock returns. Alternatively, positive stock returns followed by share repurchases can be indicative of the increase of the number of in-the-money options, which, in turn, increases the probability of option exercises.

Another factor that may affect managers' payout decision is free cash flow. The FCF hypothesis has also received strong backing from researchers in the field and managers alike. We have seen in the descriptive statistics section that the most commonly cited reason for share repurchases among sample firms is that of distributing excess cash to shareholders. The FCF hypothesis predicts a positive relationship between share repurchases and free cash flow. There are many ways we could measure this relationship. Many like Weisbenner (2000), Guay et al. (2000), Jagannathan et al. (2000), Fenn & Liang (1997) and Liljeblom & Pasternack (2002) disintegrate cash flow into two components: operating income and non-operating income. The hypothesis is that repurchases are preferred to dividends to distribute cash flow that is not likely to be sustained in the future. This ties repurchases to temporary cash flows, with the latter being identified as non-operating income. In the UK, the equivalent of non-operating income would be extraordinary items, yet this would be somewhat inappropriate as a measure of temporary income, since the vast majority of extraordinary items are negative, i.e., they overwhelmingly represent extraordinary losses. As a result, we only use operating income to proxy for cash-flow. This measure was also found by Oswald and Young (2004b) to be the primary driver of share repurchases in the UK. However, in separate estimations, we use

estimated values of expected and unexpected earnings. The results of these estimations, as will be shown later, do not contradict the findings generated when only operating income is used.

Repurchasing shares out of free cash-flow can also be indicative of managers' commitment to reducing the potential agency costs associated with these cash-flows. Repurchases associated with high levels of FCF should indicate a lack of good investment opportunities. The most frequently used measure for marginal investment opportunities is the market to book ratio (Weisbenner, 2000; Kahle, 2001; Fenn & Liang, 1997). However, using the market-to-book ratio (MB) as it is reported in most databases such as DataStream does not contribute to the explanatory power of our models, as will be demonstrated in the results section.

Other factors suggested in previous work also include firm size and leverage. It is argued in the literature that larger firms are more likely to distribute cash in the form of dividends because they enjoy more stable earnings, lower levels of information asymmetry, and lower financing costs. However, larger firms may also have more excess cash, contrary to smaller firms which are more likely to invest in their growth. As we have seen in the univariate analysis, the firms that repurchase their shares tend to be amongst the largest in our sample, we thus expect a positive relationship between share repurchases and firm size, which we measure as the natural logarithm of market value.

Highly leveraged firms are also less likely to make a repurchase since they face a higher risk of financial distress. Leverage can also be considered as a substitute to cash distributions since it alleviates the agency problems of free cash flow. We expect therefore a negative relationship between share repurchases and outstanding debt.

The final group of control variables is used to proxy for managerial interests in sample firms. Firstly, we use total employee options to test for the EPS dilution argument, and we use executive stock options- both the total number and the number of options exercisable- to test for the substitution argument. For all the option variables we use the actual number of shares underlying the options scaled by total shares outstanding at the start of the financial year, since information on the value of these options would be problematic to use given that it changes throughout the life of the options.

We control for the number of shares held in trusts designed to fund the exercises of options. These trusts were used mainly prior to December 2003[40] to fund different employee remuneration schemes. However, their use does not mean that the EPS dilution argument does not hold, as was suggested by Oswald and Young (2004b). As we have seen in the descriptive statistics section, a large number of firms report repurchasing their shares to enhance the value of their EPS.

Moreover, we control for other interests that executives might have in their firms. These are measured with executive directors' beneficial shareholdings in their firms, and their interests in long-term incentive plans (LTIPS). These variables are of particular importance to the argument presented in this research. According to the stock option hypothesis managers have an incentive to repurchase shares instead of distributing dividends in order not to dilute their option holdings. However, if these managers also have large stakes in their companies' shares, then their payout decision

[40] After this date an amendment to Company Law made it possible for firms to keep the shares they repurchase in treasury stock and reissue it at a later date.

will certainly be affected by their shareholdings. For instance, Rozeff (1982) finds evidence of a negative relationship between dividends and managers' shareholdings. Aboody and Kasznik (2001) also use this variable to control for managers' attempt at keeping control of their firms when facing takeover threats. At this stage, it is unclear what the direction of the relationship between share repurchases and managerial shareholdings should be.

In the robustness checks we also control for dividend changes, which should mostly be dividend increases. The purpose of this is to test whether there is a direct relationship between share repurchases and dividend increases, which according to the substitution hypothesis should be negative. The reason why we do not control for dividends in the main estimations is that we do not expect this relationship, as we will show, to be significant, since as we have seen in the descriptive statistics chapter; not only do most firms that repurchase also regularly pay dividends, but they are actually the largest dividend payers in our sample.

4.2.2 Methodology

As was mentioned in the previous section, published studies that have focused on the stock option hypothesis have suffered from many inconsistencies, which we try to take into consideration in our methodology. Below we briefly review some of these problematic issues.

Firstly, many of these studies, like Weisbenner (1998), Aboody & Kasznik (2001) and Bens et al. (2003), use reduced form regressions to study the relationship between share repurchases and a set of independent variables, because the dependent variable (being some measure of share repurchases) contains many zeros. One has to be very

careful when using models such as the Tobit model, since they are specifically designed for censored variables and we believe that the definition of a censored variable does not apply to share repurchases. We expect that this will have introduced some degree of bias in the reported results of these studies.

Secondly, some studies, like Kahle (2002), while they appropriately use logit models for decision variables such as repurchasing shares versus increasing dividends, the way they measure these decisions is questionable. For instance, Kahle (2002) measures the repurchase decision as the announcement of the repurchase rather than the actual repurchase. It goes without saying that, as has been documented in the literature review, repurchase announcements are not always followed by actual repurchases, which also puts into question the validity of any conclusions one can draw from these studies.

Moreover, because of a lack of disclosure requirements, most US based studies only use approximate measures of share repurchases that they collect from secondary sources. It was found in previous studies (Dittmar, 2000; Stephens & Weisbach, 1998; Jagannathan et al., 2000; Oswald & Young, 2004a) that these kinds of measures are prone to a great deal of bias. For instance, Jagannathan et al. (2000) find that the Compustat measure overstates actual open market repurchases because it is an aggregation of several other transactions like conversions of other classes of stock into common stock, purchases of Treasury stock (which also include tender offers and privately negotiated buybacks), retirements of common or preferred stock, and redemptions of redeemable preferred stock. The authors also find several caveats with the repurchase data provided by the SDC. Apart from the fact that the SDC reports

repurchase announcements and not the actual repurchase transactions, it also overstates the value of the announced repurchase programs because it includes announcements from a variety of sources which leads to the inclusion of the same announcements several times. Finally, the SDC measure also includes privately negotiated and withdrawn buybacks, which adds to its biasness. Our analysis is free from these problems since we hand collected all the repurchase data from each company's annual reports.

In addition to biases with regard to repurchase data, Many US studies have been over reliant upon financial databases to construct their samples, deleting most firms for which they do not find observations or patching up data from different sources that may not have used the same coding or reporting methods. The result of this is that the data collection process defeats the aims of these studies in the sense that they appear to generate samples of firms that are unrepresentative of the populations for which they want to make statistical inferences.

In our methodology, we take into account the issues mentioned above. In order to examine whether there is a relationship between the number and value of shares repurchased and the fraction of shares underlying stock options, we use an OLS for panel data rather than a Tobit model, for the reasons mentioned above. The use of fixed affects in our models has several advantages. Statistically speaking, fixed effects help us deal with firm specific heterogeneity, given that we study the same group of firms over the period of fours years, it makes sense to expect firm specific differences to drive the results if these are not controlled for. Several previous studies on share repurchases overlook this issue, with the result that they identify several significant

relationships, which would not have been significant had firm fixed effects differences been properly controlled for (see for example Kahle (2002) and Oswald & Young (2004b)). The use of panel data also alleviates the multicollinearity problem in our sample, which ought to allow a more thorough analysis of the dynamics of share repurchases[41].

Since in the univariate analysis we documented significant differences between the sample of re-purchasers and that of non re-purchasers, we empirically investigate these findings in a multivariate context by using Logit estimations. We start first by estimating the effects of our regressors on the probability of being a re-purchaser vs. the probability of being a non re-purchaser. Then we divide the group of non re-purchasers into those that continuously paid dividends and those that didn't, and we then use a multinomial Logit on a three-group decision variable. As our decision variables are invariant through time, it is not possible to control for firm specific effects in these estimations. Given the complexity of interpreting the log odds coefficients of Logit regressions, we only report the marginal effects in our results.

Throughout the analysis, we only use measures of events when they take place. For instance, we do not measure the group of re-purchasers as those that announced a repurchase during the sample period, but we only focus on firms that did repurchase their shares during the sample period. Thus, we avoid the problem identified in the previous chapter whereby many UK firms that announce a repurchase do not actually follow through with any share repurchases.

[41] For a simple overview of panel data estimation refer to Peter Kennedy: A guide to Econometrics, fifth edition.

All the regression models are estimated three times, first with total options as an independent variable (and shares in trusts as a control), then with executive options as an independent variable (and LTIPs and director shareholdings as controls), and finally with executive options *exercisable* as an independent variable (and LTIPs and director shareholdings as controls). We use these option variables in separate regressions because they are highly correlated and we are interested to see the contribution of each of these variables to our models separately. In the next sections we go through the results of all these models, starting with the OLS regression of the re-purchasers sample.

4.3 Empirical results

4.3.1 Re-purchasers

In this section we look exclusively at the sub-sample of firms that repurchased some of their shares in the market at least once during the sample period, which extends from 2001 to 2004. The reason we focus only on open market repurchases is the rarity of tender offers in the UK, combined with the fact that according to US studies, tender offers are typically initiated as a takeover defence mechanism, an area beyond the scope of this study.

We measure share repurchases as the value of shares repurchased scaled by the market value of the firm at the start of the financial year. However, we also report results where we measure share repurchases as the number of shares repurchased scaled by total shares outstanding at the start of the financial year. The explanatory variables are scaled by market value, except for major shareholdings and variables indicating the interests of executives in their firms i.e. options, LTIPS, shares in trusts and managerial ownership (MO), which are scaled by lagged total shares outstanding. All variables are measured at the start of the financial year except for share repurchases. The sample consists of an unbalanced panel of 330 firm/year observations, 176 of which are open market repurchase observations.

Firstly, we use an OLS with fixed effects to regress the value of shares repurchased on a vector of explanatory and control variables, including dummies to control for any common time effects. Although using a fixed effects model greatly reduces the number of degrees of freedom, our sample is large enough to withstand this

drawback[42]. Using a fixed effects model also means that we cannot control for industry effects, since these are time invariant. However, any industry effects will be captured by the firm specific fixed effects.

We estimate three models, in the first we focus on the EPS dilution hypothesis by regressing the value of shares repurchased on total options together with shares held in trusts. In the second and third we focus on the substitution argument by regressing the value of shares repurchased on *executive* options and on executive options *exercisable*, while controlling for other managerial interests.

The results are reported in Table 4-1. They show that, apart from shares held in trusts and operating income, none of the independent variables seem to have any explanatory power in relation to both the value and fraction of shares repurchased. Shares held in trusts seem to be significantly negatively related to the value and the fraction of share repurchased. This estimated relationship seems reasonable since firms that have a large number of shares held in employee trusts clearly do not need to repurchase more shares in order to fund their employee remuneration schemes or in order to counter the dilution of earnings resulting from the option exercises arising from such schemes. On the other hand, firms that do not operate such trusts or do not hold a large number of shares in them appear more likely to repurchase their shares in order to counter the devaluation of their EPS resulting from the exercises of different employee remuneration schemes.

[42] Our sample is an unbalanced panel of 330 observations, the number of parameters in our OLS estimations is about 96 to 98 parameters, which leaves us with a respectable 234 to 232 degrees of freedom.

Operating income, which we use as a measure of cash flow, is significantly positively related to both the value and fraction of shares repurchased. This confirms the findings of previous studies that used US data, and also confirms the findings of Oswald & Young (2004b) that firms repurchase their shares to distribute free cash-flow to shareholders. However, it is still surprising that none of the other variables are significant, and their signs in some cases differ from one model to the other. A possible explanation for this is that our sample contains many firm/year observations where the dependent variable equals zero. A number of repurchase studies, such as Weisbenner (2000), Liljeblom & Pasternack (2002) and Aboody & Kasznik (2001), chose to use censored model estimations –such as a tobit model- to overcome this problem. However, we do not think that using such models is appropriate when the share repurchase variable is not a censored variable; for example, it is not possible for share repurchases to take negative values.

Since the only cash measure we include in our models is operating income, we also check whether using another measure of cash changes the results. We use an OLS regression to estimate an earnings function for our total sample of UK firms. The objective of this estimation is to separate earnings into earnings that are expected (the predicted values using the parameters of the earnings function) and earnings that are unexpected (the unexplained residuals from the earnings function estimation).

We thus use the total sample to regress current net income on lagged net income and size, controlling for time and industry effects. The resulting predicted values and residuals are saved to be used in the repurchase estimations as expected and unexpected earnings respectively. A simple OLS model is used without controlling

for fixed effects because we are using a lagged dependent variable as a regressor, in which case the use of fixed effects would produce biased estimates. The results of the estimation are reported in the appendix to the chapter. The model seems to explain a lot of the variation in the dependent variable, with an adjusted R squared of 0.66, and F statistic of 144.31, that is obviously highly significant. Despite the simplicity of this model, we believe that the predicted values and residuals obtained are good estimations of expected and unexpected income to be used in our repurchase regressions.

The new results obtained from using these estimations of expected and unexpected earnings are reported in Table 4-2. They are almost identical to those reported in Table 4-1. Surprisingly, predicted earnings seem to be most significantly positively related to share repurchases, as opposed to unexpected earnings which, although positive, are not significant in any of the estimations. The magnitude of the coefficients of expected earnings in the repurchase value estimations is very similar to that of the coefficients of operating income shown in Table 4-1. However, in the estimations of the fraction of shares repurchased, the coefficients of operating income are larger but less significant.

These results are surprising since the FCF hypothesis predicts that share repurchases should be driven by excess cash-flow, while our estimations seem to suggest that share repurchases in our sample are driven by predicted cash flow. An explanation for this could be that most of the repurchases in our sample which, as shown in the descriptive statistics section, are repeat repurchases, are part of the long-term payout

strategies of the sample firms, or that share repurchases are being used primarily as substitutes for dividends.

In order to verify this we re-estimate the same models but using the change in dividends (current dividends minus last year's dividends) as an explanatory variable. The results are reported in Table 4-15. Although we will come back to them in the robustness checks, we can briefly note that the change in dividends is not significant in any of the estimations. However, it does have a negative relationship with both the value and number of shares repurchased, which may suggest that there is a substitution effect that is too small to be of any significance.

Moreover, our results only seem surprising if they are compared to the results of studies undertaken using US data. They are, however, generally consistent with the findings of Oswald and Young (2004b) who also find that share repurchases in the UK are more likely to be financed with cash from operating activities, which are associated with cash inflows to a greater extent than non-operating activities.

In order to check the validity of these results further, and to shed more light on why none of the option coefficients seem to be significant, we re-estimate all the models with new estimated values of options. These are obtained from OLS estimations of the total and executive option variables on a vector of control variables; size, debt, return, EPS, major shareholdings, and managerial ownership, while controlling for time and industry effects. Both estimations of total and executive options result in models that explain more than 20% of the variability in the dependent variables, which we believe provides strong enough residuals to be used for our repurchase estimations.

The reasoning behind the use of estimated residuals of options in the repurchase estimations is quite simple. It has become common practice for most firms in the UK, whether large or small, to grant stock options to their employees. Given that we measure options using the number of shares underlying them rather their value, there is a risk that we are losing information on the grounds that a small number of options in one firm could well be worth much more than a large number of options in another firm. Given that we cannot measure the weight of options in each firm, nor their importance to each executive, one way to account for these differences is that rather than taking the actual number of shares underlying these options, we estimate what element of these options is expected, and what element is unexpected. In other words, we estimate what constitutes a normal level of option holdings for each firm, and we use the residual in our repurchase estimations, to measure the effect of any abnormal option holdings on the repurchase activity of the firm.

The findings, reported in Table 4-3, show similar coefficients to those reported in tables 1 and 2, and again, none of the option variables seem to have any significant effect on the value or the fraction of shares repurchased. Even more surprising, is the fact that both total and executive options seem to have a negative relationship with share repurchases, especially with regard to their value, which was also the case in the previous estimations. This suggests that the more options a firm has, especially executive options, the smaller the value of shares it tends to repurchase. However, given that this relationship is very far from being significant, no inferences can be made at this stage of the analysis.

What we can retain from this analysis is that the main factor that drives share repurchases in our sample is operating income, or expected income. While we found that shares held in employee trusts have a negative and significant relationship with share repurchases, none of the option variables seem to have a significant effect on buybacks. Furthermore, it appears that options generally lead to smaller repurchases, even if this relationship is insignificant. According to the stock option hypothesis, we should expect options to lead to more repurchases for two reasons; because they would counter the dilution of EPS resulting from exercising these options, and they would avoid the devaluation of executive options that would result from distributing cash in the form of dividends.

There are two reasons that might explain why this does not seem to be the case for our sample. As was mentioned earlier, before December 2003, firms in the UK were not allowed to keep the shares they repurchased in treasury stock. Therefore, they did not have the option of buying back their shares in order to reissue them at a later date to fund the exercises of employee stock options. Moreover, given the fact that many firms in our sample had employee trusts whose whole purpose was to fund different share-based remuneration schemes, it appears that the EPS dilution argument becomes rather weak in these cases.

However, it is highly likely that after December 2003, as firms start to become aware of the new legislation, they will make use of it and, therefore, the motivations behind share repurchases in the UK may shift more towards the stock option hypotheses.

As a quick test of whether we should start to expect more firms to repurchase in order to fund their employee stock options, we replicate the previous models but we also include two interaction terms between the dummy for the year 2004 and total and executive stock options. The results show that, as a matter of fact, both total employee and executive options in 2004 are positively related to the value and fraction of shares repurchased, while options in the total sample period are still negatively related to the value of shares repurchased. Although the differential coefficients of the interaction terms are not very significant, their positive sign is a major indication that repurchases are starting to be used as a means to fund employee stock options and avoid the dilution of EPS. When an interaction term is also used between the dummy for the year 2004 and executive options exercisable, we obtain the same result; a positive but insignificant relationship.

It thus appears that, as managers become familiar with the law amendment regarding treasury stock, they will be more likely to repurchase to fund their employee stock options or to avoid the dilution of their firms' EPS. Such a development, which brings the UK rules on repurchases in line with US practices, will tend to align the motivations for share repurchases in the two countries and we might therefore reasonably expect that future empirical results relating to the UK will become more similar to US findings than they have been to date.

The other facet of the stock option hypothesis that posits that executives have an incentive to repurchase shares rather than pay dividends in order to protect the value of their options may be quite problematic to prove given the nature of our data. Although we specifically use information on the options of executive directors,

separating them from other long-term incentive schemes, and though we also use information on which of these options are exercisable, this is still not sufficient information to reliably indicate whether these options are likely to be exercised in the same year as the share repurchase takes place. In other words, options may well be exercisable, but they may still not be in the money and therefore not worth exercising. It is possible that our models do not adequately capture the relationship between the actual decision criteria and the decision variable, i.e., executive options that are in the money and share repurchases.

Finally, another possible explanation for our results is that executives in the UK have simply no incentive to repurchase in order to avoid the devaluation of their options. If one compares the value of the options granted to US executives to that of options granted to UK executives it becomes very clear that the former have a much stronger incentive to find ways to avoid devaluating their options. This is not to say that the stock option hypothesis has no explanatory grounds at all in the UK, it simply means that its explanatory power is likely to be much more limited than in the US. In addition, we have seen from the univariate analysis that share repurchases in our sample are concentrated among the largest firms, while smaller firms grant significantly more options. This seems to suggest that if executives in UK have any incentive to protect their options from the devaluation caused by dividends, then according to our data they are more likely to retain all their earnings rather than to simultaneously pay dividends and to repurchase shares.

Indeed, the mean comparison tests of the group of re-purchasers versus the group of non re-purchasers revealed that the former pay significantly more dividends.

Therefore, in order to shed more light on this issue, in the next two sections we use the total sample of both re-purchasers and non re-purchasers to empirically investigate whether options and other selected variables are significantly different among the two groups. We thus test whether the payout mode of firms affects or is affected by their ownership structure, executive interests, size, profitability etc.

4.3.2 Re-purchasers vs. Non re-purchasers

According to the results found using the sample of re-purchasers, options do not seem to significantly affect the value or the number of shares repurchased. In fact, the results even suggest that if any relationship exists between the two, it is in the opposite direction to our expectations. Therefore, in this section we use the total sample to test for any differences in options and other variables among firms that repurchase their shares and those that do not. Since the value or the number of shares repurchased is no longer the variable of interest, we use a binomial Logit where the dependent variable takes the value of one for all firms that repurchased their shares at least once during the sample period and zero otherwise. The results are reported in Table 4-4.

For ease of interpretation, we only report the marginal effects on the probability of being a re-purchaser (y = 1), which are computed at the means of the explanatory variables using all observations. We report results of estimations where we use operating income and options as explanatory variables in Table 4-4[43], and results of estimations where we use estimated expected and unexpected earnings in Table 4-5.

[43] We also report results where we use estimated unexpected options (total and executives) instead of the actual observable options (scaled by shares outstanding) as explanatory variables in Table 4-4

The results of the Logit estimations seem to confirm the findings of the OLS regressions. It appears that the probability of being a re-purchaser decreases with the increase of the number of shares underlying total options, and the increase in the number of shares underlying *executive* options to a greater extent. Although all option variables decrease the probability of being a re-purchaser, the magnitude of their marginal effects and their significance levels are quite different. While the marginal effect of total employee stock options is of the magnitude of -1.46, significant only at the 10% level, executive options have a marginal effect of the magnitude of -6.16 that is significant at the 1% level, and executive options exercisable have a marginal effect of -12.62, significant at the 5% level. This means that, holding all other variables constant at their means, a one unit increase in the number of executive options exercisable would result in a decrease equivalent to 12.62 in the likelihood of being a re-purchaser. This negative effect that stock options seem to have on the probability of being a re-purchaser is also present when we use estimated values of unexpected options (see models 4 and 5 in Table 4-4).

Overall, the results confirm the findings of the mean comparison test in the descriptive statistics chapter, where we found that the group of re-purchasers and the group of non re-purchasers differ significantly in relation to several variables. It appears that the probability of being a re-purchaser decreases significantly with the increase of majority shareholdings, which we are also using as a proxy for institutional shareholdings. This finding can have several interpretations; it is possible that institutional shareholders, contrary to our expectations, are not indifferent between share repurchases and dividends, and would still rather receive extra cash in the form of dividends, or special dividends than in the form of share repurchases.

However, we believe that it is much more likely that this negative relationship of major shareholdings with the probability of being a re-purchaser is the result of major shareholdings capturing differences in size between re-purchasers and non re-purchasers, despite the fact that we are already directly controlling for size differences. In the univariate analysis, we found that re-purchasers are significantly larger than non re-purchasers, which is also confirmed in the binomial Logit estimations, and we also found that major shareholdings are significantly larger in the group of non re-purchasers. Given that larger firms are more likely to have a diverse shareholding base, major shareholdings could simply be an indication of the size of the firm, hence, their seemingly negative effect on the probability of being a re-purchaser.

As mentioned already, it appears that the larger the firm, the more likely it is to be a re-purchaser, and the more indebted it is, the less likely it is to be a re-purchaser. This latter point is plausible since firms that are already highly leveraged are not likely to run the risk of increasing their debt further, thus, increasing their insolvency risk.

Operating income and return are significantly positively related to the probability of being a re-purchaser, at the 1% and 10% levels respectively. When earnings are broken up into expected and unexpected, both are found to significantly increase the likelihood of being a re-purchaser, although at different significance levels. Holding all other variables at their means, a one unit increase in expected income would lead to a 1.5 increase in the likelihood of being a re-purchaser, at the 1% level, while a one unit increase in unexpected earnings increases the likelihood of being a re-purchaser

by about 0.36, significant only at the 10% level. However, when we set all the negative values of unexpected income to zero, and re-estimate the same regressions we find that the marginal effects of 'positive' unexpected income on the probability of being a re-purchaser is over 0.7, and significant at the 5% (see models 4 to 6 in Table 4-5).

To summarise, it appears that the findings of the binomial Logits confirm the previous results of the OLS models, indicating that the more options a firm has, the less likely it is to repurchase, and the more income it earns, the more likely it is to repurchase. We also found that larger firms with smaller debt are significantly more likely to repurchase, and that the larger is the share of major shareholders in a company's capital, the less likely it is to repurchase.

Caution has to be exercised when interpreting causality in these results. For instance, it would be rather odd for a firm not to repurchase its shares simply because it grants many options to its employees. In order to investigate this issue further, in the next section we further divide the group of non re-purchasers into those that pay dividends regularly, and those that do not. This will allow us to determine whether variables such as options really do have an effect on the repurchase activity of sample firms, or whether they are simply more associated with earnings' retention. It is possible that firms that operate many option schemes, which as we found earlier, tend to be smaller firms, are also those that do not pay dividends regularly, so that these firms are unlikely to repurchase simply because the value of their executive options will not be affected by dividend payments anyway.

4.3.3 Re-purchasers vs. Dividend payers vs. Income Retainers

In this section we divide the total sample into three groups according to whether a firm repurchased its shares at all during the sample period (re-purchasers), or whether it paid dividends regularly during the sample period (at least three times), or it never repurchased and it did not pay dividends regularly (only twice or less). Dividing the sub-sample of non re-purchasers according to their dividend policies can allow us to see whether options really are negatively related to share buybacks, or whether this relationship is simply a residue of an unobserved positive relationship between options and earnings retainers.

We start off with a mean comparison test, the results of which indicate that indeed, all selected variables show some significant differences among the three groups (see Table 4-6). The most significant and pronounced differences are between the group of re-purchasers and the group of retainers. For instance, options are significantly higher in the group of retainers than in the other two groups, and so are executive and majority shareholdings. The statistics also confirm that retainers are the smallest of the three groups, with the largest debt to market value. Interestingly, it appears that operating income and return are not only significantly lower for the group of retainers, but on average, they are actually negative, suggesting that these firms are not very profitable, that they are investing heavily in themselves, or that they are undervalued.

Next, we conduct a multinomial logit where the dependent variable takes the value of '0' for firms that never repurchased and never paid dividends or paid dividends irregularly (only twice or less during the sample period), '1' for firms that never repurchased but paid dividends regularly (at least three times during the sample period), and '2' for firms that repurchased their share at least once during the sample

period, the vast majority of which also regularly paid dividends[44]. The results are presented in Table 4-7.

For ease of interpretation, we only report the marginal effects on the probability of the dependent variable belonging to one of the three groups while holding the other variables at their means.

The results clearly point to discrepancies between the group of re-purchasers and the group of retainers in relation to several variables. Total options have a positive and significant effect (at the 1% level) on the probability of not distributing cash to shareholders, while it has a negative and significant effect (at the 5% level) on the probability of being a re-purchaser. The effect is also noted with regard to executive options, although economically larger. This effect is also much larger in magnitude with regard to executive options that are exercisable. Long-term incentive plans do not seem to significantly contribute to the probability of occurrence of any of the three outcomes, while executives' shareholdings appear to significantly increase the likelihood of being a retainer at the 1% level.

The more shares a firm holds in its employee trusts, the larger its likelihood of being a re-purchaser, while the opposite applies to the probability of being a retainer. Previously, we found in the OLS estimations that the value of repurchases is negatively related to shares in trusts. Thus it would seem that as the number of shares in trusts increases, the likelihood of a firm being a re-purchaser increases, but the

[44] We believe that a multinomial logit is more appropriate for our data than an ordered logit. However, we also report summarised results for equivalent ordered logit estimations; we mention their results briefly at the end of this section.

value of share repurchases decreases the more shares a re-purchaser holds in its employee trusts.

In accordance with the findings of the binomial logits, majority shareholdings appear to have a positive and significant marginal effect (at the 1% level) on the likelihood of retaining earnings, while they have a negative and significant effect (at the 5% level) on the likelihood of repurchasing. In addition, the larger the firm, the more likely it is to repurchase, while the smaller it is, the less likely it is to make any cash distribution. While it does not appear that an increase in operating income or return increases the probability of being a re-purchaser, it does seem to decrease the probability of retaining earnings at the 1% level. For instance, a one unit increase in operating income is associated with about 0.45 decrease in the probability of being a retainer.

When we use estimated values of expected and unexpected earnings instead of operating income, we obtain similar relationships and significance levels but with slightly different coefficients (see Table 4-8 and Table 4-9). Expected income has a positive and significant marginal effect on the probability of being a re-purchaser, while it has a negative and significant marginal effect on the probability of being a retainer. Although unexpected income was found to significantly increase the probability of repurchasing in the binomial logits, this relationship does not appear to be significant in the multinomial logits. On the other hand, unexpected income does seem significantly negatively related to the probability of retaining earnings. This may be due to the fact that unexpected earnings, which are nothing but the residuals obtained from the earlier earnings estimations, contain many negative values, which

may shadow the positive relationship that this variable is hypothesised to have with share repurchases.

In fact, when we replace unexpected earnings by a variable of *positive* unexpected earnings, the results indicate that, holding all other variables at their means, a one unit increase in positive unexpected earnings leads to an increase of 0.635 in the probability of being a re-purchaser, significant at the 10% level.

Using the estimated unexpected values of options in the multinomial logits results in mostly similar results, except for slightly smaller marginal coefficients for the option variables (see Table 4-10). Total options also lose their significant effect on the probability of repurchasing, although this effect remains negative. On the other hand, the marginal effect of executive options on the probability of being a re-purchaser increases both in value and in significance. It thus appears that, holding all other variables constant at their means, a one unit increase in the fraction of unexpected options results in a decrease of 5.5 in the likelihood of being a re-purchaser.

Some may argue that our dependent variable can be ordered, and that using an ordered logit model would produce results that are more efficient than those obtained using a multinomial logit. Although it may seem that the decision not to distribute any cash to shareholders, to distribute only dividends, or to also repurchase shares, follows an ordered pattern, we do not think that this calls for the use of an ordered logit for the following reasons.

Firstly, it seems rather unlikely that managers i.e. the decision makers think of cash distribution in this ordered pattern, it is possible that a firm that has never paid dividends decides to repurchase, despite this not being common in our sample, thus moving from one end of the spectrum to the other end. Moreover, the assumption of proportional odds, or parallel regressions of the ordered logit models seems untenable in the case of our data. For instance, the effect that operating income has on the cumulative odds of repurchasing vs. paying dividends is unlikely to be the same as that of paying dividends vs. not distributing any cash.

Thus, it seems much more appropriate to use a Multinomial logit at the risk of losing some efficiency, rather than to use an ordered logit at the risk of obtaining biased results. Nevertheless, we do report summarised results where we use ordered logit models, these are reported in Table 4-11, and they are qualitatively the same as those obtained using multinomial logits[45].

[45] Note that only the logit coefficients are reported here, not the marginal effects

4.4 Robustness checks

Previously, we mentioned that several papers on share repurchases used the market to book (MB) ratio to control for investment opportunities. We have not included this variable in any of the regressions reported in this paper, because, as we mentioned earlier, the values of MB reported in DataStream are very extreme, which made us question the comparability of the reporting of US and UK data. However, to make sure that we are not missing any information, we transformed the MB ratio into an indicator variable that takes the value of one for all observations where MB is greater than the total sample median (that is 1.86), and zero otherwise. This transformation allows us to capture only the information we need i.e. where each firm stands in terms of its MB ratio in relation to the rest of the sample.

We replicated all the models reported in the analysis with the MB indicator as an extra control. The results, which are not reported here to save space, did not show the indicator as being of any significance in any of the models. Overall, the MB dummy does not contribute to the explanatory power of the models, and its inclusion or exclusion does not materially change any of the reported results.

Although we use market value as the scaling variable throughout the analysis, the results are not very different when we scale by total assets instead. These results are reported in Table 4-12 and Table 4-13 The logit estimations show mostly similar relationships, though the magnitudes of the marginal effects are slightly larger when we scale by total assets, especially in the case of operating income. The OLS results on the whole do not show significant relationships with the dependent variable apart

from shares in trusts and size. Unlike when we scale by market value, operating income is not significantly positively related with the value or the fraction of shares repurchased. Although our reason for scaling the variables is purely statistical, using market value for that matter is much more in line with the matter we are analysing here, since the value of shares repurchased ultimately depends on the value of these shares before the repurchase takes place, hence the use of market value as a scaling variable makes more sense than using total assets.

It could be argued that the manner in which we constructed our dependent variable in the multinomial logits is inappropriate. We divide observations according to firm payout behaviour throughout the sample period. Therefore, if a firm has made a repurchase any time during the sample period, then it would automatically belong to the group of re-purchasers during all sample years, and the same goes for the other two groups. Constructing the dependent variable in this way enables us to avoid losing information about individual firms by letting them shift from one group to the other. Nonetheless, we also conduct multinomial logits where we specifically look at the payout mode of sample firms in any one year, rather than throughout the whole sample period. The results are reported in Table 4-14, and as is immediately apparent, they are generally the same as what we found previously.

Finally, we have mentioned in the methodology section that we do not include dividends as a regressor in our estimations because we do not expect it to have a significant impact on the decision to repurchase, not because we believe that firms are unlikely to use repurchases as substitutes for dividends, but rather because if this substitution effect exists than it might be quite difficult to disentangle using our

current sample. Firstly, because most firms that repurchase their shares in our sample are also amongst the largest dividend payers. Secondly, because the length of our sample period (being four years) does not allow for an extensive time series study of the relationship between dividend payments and share repurchases.

Nonetheless, for the sake of completeness, we do report results of the main models estimated throughout the analysis but using the change in dividends as an extra explanatory variable.

The results, reported in Table 4-15 through to Table 4-17, indicate that dividend changes are negatively, though insignificantly, related to the value/fraction of shares repurchased, and they are also negatively but insignificantly related to the probability of repurchasing. This result is consistent throughout all the estimations, and had this relationship been significant, it would have been a clear indication that firms that repurchase their shares do so at the expense of dividend increases.

4.5 Summary and conclusions

Although several papers have been written on share repurchases, they mostly focus on the US. Given that several regulatory tax and corporate governance aspects of buybacks are different across the two countries, and given that the UK is the second largest market for share buybacks, it is indispensable for our understanding of corporate payout policy and corporate governance to determine what motivates managers in the UK to repurchase, rather than pay dividends.

In this chapter, we explored the different motivations for share repurchases in the UK. We used a dataset drawn from the FTSE 350 excluding the financial sector spanning over four years (from 2001 to 2004). While controlling for the major motivations that have been found to affect the repurchase decision in previous studies, we explored which – if any - of these motivations had any significant explanatory power in respect of UK corporate repurchase behaviour.

Given the growing support that the stock option hypothesis has been enjoying lately, we collected several variables from company annual reports in order to empirically evaluate its relevance in relation to UK share repurchase activities. Our empirical analysis of this issue goes farther than most other studies as we not only control for the number of total options, but we also specifically use information about executive options and exercisable executive options. We also control for other executive shareholdings that most other studies overlook.

We first examined the sub-sample of firms that repurchased at least once during the sample period. While most other studies ignore firm-specific fixed effects, we specifically control for them. Our results indicate that share repurchases in the UK are mainly driven by operating income, which lends support to the free cash-flow hypothesis. Although we do not find support for the stock option hypothesis, our results show a clear change in the direction of the relationship between the value of shares repurchased and stock options after December 2003. This means that firms in the UK may begin repurchasing their shares to fund employee stock options now that UK company law has been amended to allow shares repurchased to be kept in treasury stock.

Then, we used binomial and multinomial logits to measure the relationship between our explanatory variables and the probability of repurchasing versus just paying dividends versus retaining earnings. We found that the probability of retaining earnings increases with options, director, and majority holdings and debt, while it decreases with size, operating income and return.

Although it might be reasonable to suppose that firms will tend to retain their earnings in order not to devaluate their executive options, in practice this is not very likely. It seems more reasonable that these firms, which also happen to be relatively small and lacking cash, are in fact growth firms that need to retain talented employees by granting them stock options. Thus the reason why they do not pay dividends is because they do not have sustainable cash resources rather than because they are avoiding the devaluation of their executive options.

We have made a case in the literature review of the differences in corporate governance between the UK and the US. It is highly likely that the results obtained from our analysis are simply a reflection of these differences. We hypothesised that given the shareholder led corporate governance system in the UK we should expect the repurchase behaviour of UK corporations to be less driven by agency problems, and our results seem to confirm this.

Thus, we have found that share repurchases in the UK appear not to be motivated by any need to protect executive options from being devaluated following dividend payments. It is possible that in future, firms will repurchase to fund their employee stock options, but we have no reason to believe that they will repurchase to avoid the devaluation of their stock options.

Moreover, according to our results, the most likely motivation for share repurchases in the UK is to distribute excess cash, which is more in line with shareholders' interests. However, this finding is rather intriguing when we consider that these re-purchasers seem to be distributing 'excess' cash mainly from expected income. In other words, it does seem rather odd that most firms in our sample are using their expected income to repurchase their shares, while the theory suggests that share repurchases ought to be more closely related to unexpected income.

This, combined with the finding that re-purchasers are large firms that also pay dividends, suggests that there may be a substitution effect taking place. In other words, it is very likely that these firms are distributing cash in the form of share repurchases that, traditionally, they would have distributed as dividends. The reasons

for this substitution would be very obvious, given the flexibility and 'no string attached' nature of repurchases.

In order to verify whether this is the case, in the next chapter we investigate the impact of share repurchases on UK corporate total (i.e., dividends and share repurchases) payout policies. We apply traditional dividend behavioural models to explain total payouts in order to determine whether the determinants of dividend payments and share repurchases differ substantially. In the case where these models are still able to predict corporate payouts, then this would be a clear indication that share repurchases are more than a tool to distribute temporary cash flow, since they also contain an element of predictability that, until recently, was exclusive to dividends.

4.6 Appendix

Definition of variables

Firm characteristics:
All these variables (apart from major shareholdings) have been collected form DataStream at the start of each financial year.

- Market value (data item MV): the share price multiplied by the number of ordinary shares in issue.
- Long-term debt (data item WC03251): all interest bearing financial obligations, excluding amounts due within one year. It is shown net of premium or discount.
- Operating income (data item WC01250): represents the difference between sales and total operating expenses, net of income taxes.
- Total assets (data item WC02999): the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
- Return: is calculated as the Log (RI in year1)-log (RI in year 0), where RI is the return index.
- Earnings per share (data item WC18193)
- Dividend per share (data item WC05101): total dividends per share declared during the fiscal year. It includes extra dividends declared during the year.
- Major shareholdings %: the aggregation of fractions of shares exceeding 3% of outstanding shares owned by individuals or corporations. This variable is collected mainly from annual reports at the start of each financial year.
- Net income:

Repurchase variables:
These variables have been collected from annual reports, and represent repurchases made during each financial year.

- Fraction of shares repurchased %: the number of shares repurchased during the year divided by the number of shares outstanding at start of the financial year, all multiplied by a hundred.
- Value of repurchases (thousands £): the pound value of the shares repurchased as reported in the financial statements.

Employee compensation:
These variables have been collected from annual reports, and represent values at the start of each financial year.

- Total options %: (Number of shares underlying total options / number of shares outstanding)*100
- Executive options %: (Number of shares underlying executive options / number of shares outstanding)*100
- Exercisable executive options %: (Number of shares underlying exercisable executive options/ number of shares outstanding)*100
- Long-term incentive plans %: (Number of shares underlying other long-term plans / number of shares outstanding)*100
- Managerial ownership %: (Number of shares held by executive directors / number of shares outstanding)*100
- Shares in trust %: (Number of shares in trust / number of shares outstanding)*100

Codification of variables

ESO = Total options % , EXSO = Executive options %, EXSOEX = Executive options exercisable %, LTIP = Long-term incentive plans %, MO = Managerial ownership %, STRUST = Number Shares in trust %, MSH = Major shareholdings % SIZE = Log of market value, DEBT = Long-term debt / market value, OPINCOME = Operating income / market value, RETURN = (Log RI y_1 – Log RI y_0)

OLS Earnings estimation:

Income $_t$ =	0.1437 +	0.4110 Income $_{t-1}$ - 0.0066 Size - 0.2261 Positive Income $_{t-1}$		
Std.Err.	0.0818	0.2469	0.0037	0.2474
t-ratio	1.7561	1.6647	-1.7822	-0.9140

Adj R squared	0.66
F statistic	144.31
N	1016

Including year and industry controls
Income $_{t-1}$ = lagged net income scaled by lagged market value
Income $_t$ = current income (at the start of the financial year) scaled by lagged market value
Positive Income $_{t-1}$ = is a variable that equals Income $_{t-1}$ when the latter is greater than zero and equals zero otherwise.

OLS Options estimations

T Options =	0.1197 -	0.0023 Size -	0.0001 Debt -	0.0038 Return -	0.0066 EPS +	0.0126 MSH -	0.0254 MO
Std.Err.	0.0152	0.0007	0.0008	0.0031	0.0018	0.0045	0.0081
t-ratio	7.8531	-3.3927	-0.1719	-1.2343	-3.5910	2.8066	-3.1420

Year and industry controls	
Adj R squared	0.27
F statistic	21.97
N	1016

Exec Options =	0.0559 -	0.0021 Size -	0.0007 Debt -	0.0019 Return -	0.0004 EPS +	0.0073 MSH -	0.0058 MO
Std.Err.	0.0064	0.0002	0.0004	0.0014	0.0005	0.0014	0.0029
t-ratio	8.7431	-8.6591	-1.7973	-1.4331	-0.7771	5.2335	-1.9888

Adj R squared	0.22
F statistic	16.48
N	1016

Including year and industry controls

Table 4-1: Estimations of the value and fraction of shares repurchased using the re-purchasers sample

This table reports the results of OLS regressions with fixed effects on the value and fraction of shares repurchased using different combinations of the following variables:
ESO = Total options % , EXSO = Executive options %, EXSOEX = Executive options exercisable %, LTIP = Long-term incentive plans %, MO = Managerial ownership %, STRUST = Number Shares in trust %, MSH = Major shareholdings %, SIZE = Log of market value, DEBT = Long-term debt / market value, OPINCOME = Operating income / market value, RETURN = (Log RI y_1 – Log RI y_0). This definition of variables applies throughout the rest of the tables, except where indicated otherwise (in the robustness checks). Time effects are controlled for throughout all the tests without exception. Included in the sample are all firms that repurchased their shares at least once during the period 2001 to 2004, which make up a total of 330 observations. The constant in the case of the fixed effects models refers to the intercept resulting from the equivalent model without the use of fixed effects.
** indicates a significance level of 1% or below, * indicates a significance level between 1 and 5%.

		Sample of re-purchasers N = 330					
		Y = Value of repurchases			Y = Fraction of repurchases		
		[1]	[2]	[3]	[4]	[5]	[6]
Constant	Coeff.	0.0280	0.0308	0.0269	0.0165	0.0232	0.0201
	Std.Err.	0.0261	0.0277	0.0268	0.0255	0.0272	0.0263
	t-ratio	1.0736	1.1108	1.0048	0.6481	0.8537	0.7654
ESO	Coeff.	-0.0251			-0.0087		
	Std.Err.	0.1283			0.1453		
	t-ratio	-0.1954			-0.0596		
EXSO	Coeff.		-0.2992			-0.0773	
	Std.Err.		0.3258			0.2942	
	t-ratio		-0.9185			-0.2628	
EXSOEX	Coeff.			-1.1488			-0.9440
	Std.Err.			0.6903			0.6408
	t-ratio			-1.6642			-1.4732
LTIP	Coeff.		-0.0131	-0.0079		0.0009	0.0108
	Std.Err.		0.6254	0.6277		0.6149	0.6166
	t-ratio		-0.0209	-0.0125		0.0015	0.0175
MO	Coeff.		-0.0354	-0.0259		-0.0083	0.0014
	Std.Err.		0.0455	0.0483		0.0468	0.0486
	t-ratio		-0.7790	-0.5368		-0.1780	0.0279
STRUST	Coeff.	**-0.9171****			**-0.8782****		
	Std.Err.	0.2825			0.3360		
	t-ratio	-3.2460			-2.6137		
MSH	Coeff.	0.0216	0.0149	0.0131	0.0180	0.0122	0.0100
	Std.Err.	0.0175	0.0172	0.0168	0.0156	0.0156	0.0153
	t-ratio	1.2346	0.8630	0.7773	1.1547	0.7831	0.6536
SIZE	Coeff.	-0.0081	-0.0064	-0.0073	-0.0003	0.0016	0.0006
	Std.Err.	0.0081	0.0086	0.0086	0.0078	0.0092	0.0093
	t-ratio	-1.0086	-0.7463	-0.8410	-0.0443	0.1768	0.0609
DEBT	Coeff.	-0.0033	-0.0030	-0.0055	-0.0029	-0.0028	-0.0048
	Std.Err.	0.0076	0.0075	0.0081	0.0075	0.0075	0.0080
	t-ratio	-0.4400	-0.3945	-0.6826	-0.3817	-0.3777	-0.5977
OPINCOME	Coeff.	**0.0887***	**0.0933***	**0.1000***	**0.0861***	**0.0917***	**0.0968***
	Std.Err.	0.0428	0.0448	0.0464	0.0433	0.0475	0.0483
	t-ratio	2.0709	2.0832	2.1540	1.9874	1.9319	2.0059
RETURN	Coeff.	-0.0029	-0.0028	-0.0026	-0.0061	-0.0058	-0.0057
	Std.Err.	0.0060	0.0061	0.0059	0.0064	0.0064	0.0063
	t-ratio	-0.4846	-0.4637	-0.4322	-0.9587	-0.8972	-0.8921
Adj R squared		0.164	0.137	0.141	0.178	0.150	0.154
F statistic		1.680	1.550	1.560	1.750	1.610	1.620

Table 4-2: Estimations of the value and fraction of shares repurchased using the re-purchasers sample (using estimated values of earnings)

This table reports the results of OLS regressions with fixed effects on the value and fraction of shares repurchased using different combinations of the variables already defined in table 1, with the only difference that instead of using actual values of operating income we use estimated values of income: Expec income = the predicted values obtained from the earnings estimation, Unexp income = the residuals obtained from the earnings estimations. Time effects are controlled for throughout all the tests without exception. The constant in the case of the fixed effects models refers to the intercept resulting from the equivalent model without the use of fixed effects.

** indicates a significance level of 1% or below, * indicates a significance level between 1 and 5%.

		Sample of re-purchasers N = 330					
		Y = Value of repurchases			Y = Fraction of repurchases		
		[1]	[2]	[3]	[4]	[5]	[6]
Constant	Coeff.	0.0329	0.0346	0.0307	0.0170	0.0231	0.0202
	Std.Err.	0.0258	0.0274	0.0267	0.0251	0.0268	0.0260
	t-ratio	1.2755	1.2625	1.1523	0.6743	0.8639	0.7762
ESO	Coeff.	-0.0007			0.0214		
	Std.Err.	0.1194			0.1289		
	t-ratio	-0.0059			0.1662		
EXSO	Coeff.		-0.3477			-0.1290	
	Std.Err.		0.3362			0.2943	
	t-ratio		-1.0341			-0.4384	
EXSOEX	Coeff.			-0.9598			-0.7476
	Std.Err.			0.6870			0.6379
	t-ratio			-1.3972			-1.1720
LTIP	Coeff.		0.1668	0.1803		0.1755	0.1901
	Std.Err.		0.6162	0.6183		0.5861	0.5878
	t-ratio		0.2706	0.2916		0.2994	0.3234
MO	Coeff.		-0.0392	-0.0331		-0.0103	-0.0038
	Std.Err.		0.0469	0.0489		0.0491	0.0506
	t-ratio		-0.8376	-0.6769		-0.2091	-0.0757
STRUST	Coeff.	**-0.8787****			**-0.8162****		
	Std.Err.	0.2688			0.3109		
	t-ratio	-3.2691			-2.6250		
MSH	Coeff.	0.0210	0.0147	0.0131	0.0197	0.0144	0.0126
	Std.Err.	0.0168	0.0166	0.0163	0.0152	0.0151	0.0148
	t-ratio	1.2500	0.8842	0.8069	1.2994	0.9519	0.8488
SIZE	Coeff.	-0.0100	-0.0091	-0.0097	-0.0026	-0.0015	-0.0023
	Std.Err.	0.0082	0.0085	0.0084	0.0071	0.0078	0.0079
	t-ratio	-1.2244	-1.0811	-1.1475	-0.3622	-0.1965	-0.2887
DEBT	Coeff.	-0.0017	-0.0012	-0.0032	-0.0018	-0.0015	-0.0030
	Std.Err.	0.0079	0.0078	0.0082	0.0076	0.0076	0.0080
	t-ratio	-0.2206	-0.1516	-0.3870	-0.2377	-0.2002	-0.3718
Expec income	Coeff.	**0.1058****	**0.1155****	**0.1148****	**0.1399***	**0.1489***	**0.1485***
	Std.Err.	0.0386	0.0455	0.0461	0.0651	0.0722	0.0727
	t-ratio	2.7372	2.5397	2.4892	2.1493	2.0627	2.0426
Unexp income	Coeff.	0.0101	0.0111	0.0089	0.0209	0.0220	0.0204
	Std.Err.	0.0212	0.0231	0.0237	0.0321	0.0339	0.0343
	t-ratio	0.4752	0.4819	0.3764	0.6522	0.6505	0.5949
RETURN	Coeff.	0.0001	0.0001	0.0007	-0.0039	-0.0036	-0.0032
	Std.Err.	0.0055	0.0055	0.0055	0.0061	0.0062	0.0061
	t-ratio	0.0153	0.0109	0.1247	-0.6356	-0.5889	-0.5312
Adj R squared		0.17	0.15	0.15	0.20	0.18	0.18
F statistic		1.70	1.58	1.59	1.86	1.73	1.74

Table 4-3: Estimations of the value of shares repurchased using the re-purchasers sample (using estimated number of options)

This table reports the results of OLS regressions with fixed effects on the value and fraction of shares repurchased using different combinations of the variables already defined in table 1, with the only difference that instead of using actual values of options we use estimated values of unexpected options: TOPTIONS = the residuals obtained from the employee stock option (ESO) estimation, EXOPTIONS = the residuals obtained from the executive stock option (ESXO) estimation. Time effects are controlled for throughout all the tests without exception. The constant in the case of the fixed effects models refers to the intercept resulting from the equivalent model without the use of fixed effects.
** indicates a significance level of 1% or below, * indicates a significance level between 1 and 5%.

		Sample of re-purchasers N = 330			
		Y = Value of repurchases		Y = Fraction of repurchases	
		[1]	[2]	[3]	[4]
Constant	Coeff.	0.0235	0.0115	0.0158	0.0079
	Std.Err.	0.0250	0.0266	0.0244	0.0260
	t-ratio	0.9399	0.4339	0.6456	0.3019
TOPTIONS	Coeff.	-0.0220		0.0318	
	Std.Err.	0.1340		0.1374	
	t-ratio	-0.1645		0.2316	
EXOPTION	Coeff.		-0.3001		-0.0634
	Std.Err.		0.3316		0.2996
	t-ratio		-0.9048		-0.2116
LTIP	Coeff.		-0.0138		0.0003
	Std.Err.		0.6256		0.6153
	t-ratio		-0.0221		0.0004
MO	Coeff.		-0.0336		-0.0081
	Std.Err.		0.0454		0.0468
	t-ratio		-0.7401		-0.1732
STRUST	Coeff.	**-0.9177****		**-0.8986****	
	Std.Err.	0.2841		0.3377	
	t-ratio	-3.2306		-2.6606	
MSH	Coeff.	0.0213	0.0126	0.0184	0.0118
	Std.Err.	0.0173	0.0167	0.0156	0.0153
	t-ratio	1.2307	0.7564	1.1773	0.7712
SIZE	Coeff.	-0.0080	-0.0057	-0.0002	0.0018
	Std.Err.	0.0079	0.0082	0.0080	0.0090
	t-ratio	-1.0031	-0.6943	-0.0205	0.2012
DEBT	Coeff.	-0.0034	-0.0028	-0.0031	-0.0028
	Std.Err.	0.0075	0.0076	0.0074	0.0075
	t-ratio	-0.4482	-0.3692	-0.4095	-0.3732
OPINCOME	Coeff.	**0.0896***	**0.0940***	0.0852	**0.0919***
	Std.Err.	0.0452	0.0450	0.0455	0.0476
	t-ratio	1.9831	2.0862	1.8737	1.9327
RETURN	Coeff.	-0.0028	-0.0022	-0.0062	-0.0056
	Std.Err.	0.0059	0.0059	0.0064	0.0063
	t-ratio	-0.4797	-0.3828	-0.9747	-0.8972
Adj R squared		0.16	0.14	0.18	0.15
F statistic		1.68	1.55	1.75	1.61

Table 4-4: Binomial logit estimations of the probability of repurchasing

This table reports the results of binomial logit regressions on the probability that a firm repurchases its shares at least once during the sample period (Y = 1) versus the probability that it does not repurchase its shares at all during the whole sample period (Y = 0). The coefficients reported are the marginal effects of each variable on the probability of being a re-purchaser while holding the other variables constant at their means. The definition of variables used can be found in tables 1 and 3.
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%. We control for time and industry effects throughout all the binomial regressions.

		Marginal effects on Prob [Y = 1] N = 1016				
		[1]	[2]	[3]	[4]	[5]
Constant	Coeff.	**-1.4171****	**1.1367****	**1.2048****	**-1.5830****	**-1.4813****
	Std.Err.	0.2936	0.3151	0.3053	0.2854	0.2962
	t-ratio	-4.8270	-3.6070	-3.9470	-5.5470	-5.0000
ESO	Coeff.	**-1.4601**				
	Std.Err.	0.7994				
	t-ratio	-1.8260				
EXSO	Coeff.		**-6.1608****			
	Std.Err.		2.5187			
	t-ratio		-2.4460			
TOPTIONS	Coeff.				**-1.3886**	
	Std.Err.				0.8070	
	t-ratio				-1.7210	
EXOPTION	Coeff.					**-6.0492***
	Std.Err.					2.5117
	t-ratio					-2.4080
EXSOEX	Coeff.			**-12.6189***		
	Std.Err.			5.2893		
	t-ratio			-2.3860		
LTIP	Coeff.		-2.5374	-2.2960		-2.5419
	Std.Err.		5.1200	5.1036		5.1198
	t-ratio		-0.4960	-0.4500		-0.4960
MO	Coeff.		-0.2671	-0.2617		-0.2309
	Std.Err.		0.1935	0.1911		0.1930
	t-ratio		-1.3800	-1.3690		-1.1960
STRUST	Coeff.	1.9045			1.8614	
	Std.Err.	1.2228			1.2183	
	t-ratio	1.5570			1.5280	
MSH	Coeff.	**-0.2200***	**-0.1848***	**-0.1990***	**-0.2378****	**-0.2296****
	Std.Err.	0.0921	0.0929	0.0924	0.0923	0.0924
	t-ratio	-2.3890	-1.9900	-2.1540	-2.5770	-2.4840
SIZE	Coeff.	**0.0630****	**0.0497****	**0.0525****	**0.0660****	**0.0630****
	Std.Err.	0.0131	0.0141	0.0138	0.0130	0.0135
	t-ratio	4.8150	3.5220	3.8090	5.0670	4.6780
DEBT	Coeff.	**-0.1975****	**-0.2188****	**-0.2210****	**-0.2011****	**-0.2151****
	Std.Err.	0.0480	0.0488	0.0482	0.0480	0.0488
	t-ratio	-4.1170	-4.4790	-4.5810	-4.1910	-4.4030
OPINCOME	Coeff.	**0.7234****	**0.7229****	**0.7421****	**0.7421****	**0.7281****
	Std.Err.	0.2242	0.2235	0.2249	0.2241	0.2236
	t-ratio	3.2270	3.2340	3.3000	3.3120	3.2570
RETURN	Coeff.	**0.0828**	**0.0776**	**0.0788**	**0.0873**	**0.0893***
	Std.Err.	0.0454	0.0452	0.0452	0.0454	0.0453
	t-ratio	1.8240	1.7170	1.7450	1.9240	1.9710
Log likelihood function		-575.25	-573.62	-573.47	-575.44	-573.73
Restricted log likelihood		-640.52	-640.52	-640.52	-640.52	-640.52
Chi-squared [df]		130.56[19]	133.81[20]	134.11[20]	130.17[19]	133.59[20]
Significance level		0.0000	0.0000	0.0000	0.0000	0.0000

Table 4-5: Binomial logit estimations of the probability of repurchasing (using expected and unexpected earnings)

This table reports the results of binomial logit regressions on the probability that a firm repurchases its shares at least once during the sample period (Y = 1) versus the probability that it does not repurchase its shares at all during the whole sample period (Y = 0). The coefficients reported are the marginal effects of each variable on the probability of being a re-purchaser while holding the other variables constant at their means. The definition of variables used can be found in tables 1 and 2. Positive unexpected income = unexp income * dummy (equals 1 if unexp income>0).

** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%. We control for time and industry effects throughout all the binomial regressions.

		Marginal effects on Prob [Y = 1], N = 1016					
		[4]	[5]	[6]	[4]	[5]	[6]
Constant	Coeff.	**-1.5263****	**-1.2211****	**-1.3107****	**-1.5999****	**-1.3004****	**-1.3939****
	Std.Err.	0.2971	0.3174	0.3082	0.2979	0.3179	0.3096
	t-ratio	-5.1380	-3.8470	-4.2530	-5.3710	-4.0910	-4.5020
ESO	Coeff.	**-1.4794**			**-1.6147***		
	Std.Err.	0.7722			0.7728		
	t-ratio	-1.9160			-2.0890		
EXSO	Coeff.		**-6.4145****			**-6.7730****	
	Std.Err.		2.4261			2.4252	
	t-ratio		-2.6440			-2.7930	
EXSOEX	Coeff.			**-12.5932****			**-13.0185****
	Std.Err.			5.1042			5.0948
	t-ratio			-2.4670			-2.5550
LTIP	Coeff.		-1.8883	-1.7365		-1.5133	-1.4009
	Std.Err.		5.0443	5.0445		5.0762	5.0762
	t-ratio		-0.3740	-0.3440		-0.2980	-0.2760
MO	Coeff.		-0.2969	-0.2865		-0.2954	-0.2851
	Std.Err.		0.1910	0.1888		0.1921	0.1899
	t-ratio		-1.5540	-1.5170		-1.5380	-1.5020
STRUST	Coeff.	**2.4424***			**2.4640***		
	Std.Err.	1.2370			1.2439		
	t-ratio	1.9740			1.9810		
MSH	Coeff.	**-0.2101***	**-0.1737**	**-0.1878***	**-0.2084***	**-0.1708**	**-0.1849***
	Std.Err.	0.0904	0.0911	0.0910	0.0908	0.0915	0.0914
	t-ratio	-2.3250	-1.9060	-2.0650	-2.2950	-1.8660	-2.0230
SIZE	Coeff.	**0.0687****	**0.0548****	**0.0583****	**0.0714****	**0.0576****	**0.0612****
	Std.Err.	0.0133	0.0143	0.0140	0.0133	0.0142	0.0140
	t-ratio	5.1590	3.8460	4.1730	5.3610	4.0400	4.3750
DEBT	Coeff.	**-0.1413****	**-0.1646****	**-0.1634****	**-0.1541****	**-0.1778****	**-0.1757****
	Std.Err.	0.0453	0.0468	0.0460	0.0455	0.0471	0.0462
	t-ratio	-3.1170	-3.5160	-3.5540	-3.3900	-3.7760	-3.8060
Expec income	Coeff.	**1.5251****	**1.5185****	**1.5305****	**1.5694****	**1.5928****	**1.5962****
	Std.Err.	0.5108	0.5154	0.5214	0.4815	0.4861	0.4953
	t-ratio	2.9860	2.9470	2.9350	3.2600	3.2770	3.2220
Unexp income	Coeff.	**0.3689**	**0.3689**	**0.3546**			
	Std.Err.	0.2011	0.2027	0.2005			
	t-ratio	1.8340	1.8200	1.7680			
Positive unexp	Coeff.				**0.7419***	**0.7521***	**0.7037**
income	Std.Err.				0.3777	0.3776	0.3789
	t-ratio				1.9640	1.9920	1.8570
RETURN	Coeff.	0.0729	0.0665	0.0707	0.0732	0.0678	0.0730
	Std.Err.	0.0472	0.0475	0.0474	0.0467	0.0463	0.0464
	t-ratio	1.5440	1.4000	1.4890	1.5680	1.4640	1.5730
Log likelihood function		-573.96	-572.34	-572.45	-574.25	-572.54	-572.77
Restricted log likelihood		-640.52	-640.52	-640.52	-640.52	-640.52	-640.52
Chi-squared [df]		133.13^{20}	136.38^{21}	136.14^{21}	132.54^{20}	135.96^{21}	135.52^{21}
Significance level		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Table 4-6: Mean comparison test of re-purchasers *vs.* dividend payers *vs.* earnings retainers:

Panel a: Descriptive statistics

	Y	N	Mean	Std. Dev
ESO	0	119	0.0533	0.0369
	1	567	0.0329	0.0195
	2	330	0.0304	0.0207
	Total	1016	0.0345	0.0236
STRUST	0	119	0.0040	0.0068
	1	567	0.0072	0.0129
	2	330	0.0081	0.0114
	Total	1016	0.0071	0.0119
EXSO	0	119	0.0125	0.0153
	1	567	0.0060	0.0072
	2	330	0.0045	0.0053
	Total	1016	0.0062	0.0084
MO	0	119	0.0657	0.1613
	1	567	0.0297	0.0808
	2	330	0.0247	0.0656
	Total	1016	0.0323	0.0906
SIZE	0	119	20.2789	1.3626
	1	567	20.6812	1.1643
	2	330	21.2124	1.5377
	Total	1016	20.8066	1.3539
DEBT	0	119	0.9920	2.0707
	1	567	0.3783	0.3884
	2	330	0.3252	0.3757
	Total	1016	0.4329	0.8188
OPINCOME	0	119	-0.0621	0.5624
	1	567	0.1070	0.0906
	2	330	0.1060	0.0687
	Total	1016	0.0869	0.2141
RETURN	0	119	-0.1774	0.9852
	1	567	0.0711	0.3736
	2	330	0.0717	0.3337
	Total	1016	0.0422	0.4829
MSH	0	119	0.3537	0.2392
	1	567	0.2837	0.1736
	2	330	0.2411	0.1657
	Total	1016	0.2780	0.1830

Panel b: Robust Tests of Equality of Means

	Welch Stat*	df1	df2	Sig.
ESO	20.5711	2	282	0.0000
STRUST	11.8659	2	425	0.0000
EXSO	19.9761	2	285	0.0000
MO	3.7612	2	286	0.0244
SIZE	22.9471	2	302	0.0000
DEBT	7.5701	2	271	0.0006
OPINCOME	5.3383	2	277	0.0053
RETURN	3.7211	2	279	0.0254
MSH	13.8973	2	297	0.0000

* Asymptotically distributed.

Y = 0 for all firms that did not repurchase their shares, and paid dividends less than three times during the sample period. Y =1 for all firms that paid dividends at least three times during the sample period but never repurchased its shares. Y = 2 for all firms that repurchased their shares at least once during the sample period, regardless of whether they paid dividends or not.

Table 4-7: Multinomial logit estimations of the probability of repurchasing (Y=2) *vs.* only paying dividends (Y=1) *vs.* retaining earnings (Y=0)

This table reports the results of multinomial logit regressions on the probability that a firm repurchases its shares at least once during the sample period (Y = 2), the probability that it does not repurchase its shares at all during the whole sample period but continuously pays dividends (meaning at least twice during the sample period) (Y = 1), or the probability that it retains its earnings (no repurchases at all during the sample period, and no/or irregular dividends) (Y = 0). The coefficients reported are the marginal effects of each variable on the probability of being a retainer (Y = 0), dividend payer (Y = 1), or a re-purchaser (Y = 2) while holding the other variables constant at their means. For a brief definition of the variables used refer back to table 1. Only time effects are controlled for throughout the multinomial regressions. Y = 0 → 119 observations, Y = 1 → 567 observations, Y = 2 → 330 observations.
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Marginal affects on Pr [Y = 0], Pr [Y = 1], and Pr [Y = 2]								
		[1]			[2]			[3]		
		Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2
Constant	Coeff.	0.1235	**1.1354****	**-1.2589****	0.0160	**1.1585****	**-1.1745****	0.1104	**1.1075****	**-1.2179****
	Std.Err.	0.1642	0.2953	0.2819	0.1840	0.3224	0.3080	0.1797	0.3107	0.2965
	t-ratio	0.7520	3.8450	-4.4650	0.0870	3.5930	-3.8140	0.6150	3.5650	-4.1070
ESO	Coeff.	**1.8909****	-0.0232	**-1.8677***						
	Std.Err.	0.3240	0.8089	0.8106						
	t-ratio	5.8370	-0.0290	-2.3040						
EXSO	Coeff.				**4.1835****	0.3187	-4.5022			
	Std.Err.				0.8889	2.6688	2.7531			
	t-ratio				4.7060	0.1190	-1.6350			
EXSOEX	Coeff.							**8.0659****	2.4054	-10.4712
	Std.Err.							1.7915	5.5072	5.7458
	t-ratio							4.5020	0.4370	-1.8220
LTIP	Coeff.				1.7366	0.5084	-2.2450	2.4168	-0.2355	-2.1813
	Std.Err.				2.9807	5.5447	5.3936	2.8327	5.4867	5.3525
	t-ratio				0.5830	0.0920	-0.4160	0.8530	-0.0430	-0.4080
MO	Coeff.				**0.1880****	-0.1318	-0.0562	**0.1902****	-0.1382	-0.0521
	Std.Err.				0.0763	0.1982	0.1961	0.0740	0.1963	0.1945
	t-ratio				2.4640	-0.6650	-0.2870	2.5710	-0.7040	-0.2680
STRUST	Coeff.	**-3.0804****	0.2152	**2.8652***						
	Std.Err.	0.9557	1.3747	1.2807						
	t-ratio	-3.2230	0.1570	2.2370						
MSH	Coeff.	**0.1124****	0.1027	**-0.2151***	0.0831	0.0969	-0.1799	**0.0909***	0.0977	**-0.1886***
	Std.Err.	0.0410	0.0945	0.0939	0.0443	0.0963	0.0951	0.0440	0.0954	0.0945
	t-ratio	2.7440	1.0860	-2.2920	1.8730	1.0070	-1.8920	2.0650	1.0240	-1.9970
SIZE	Coeff.	**-0.0147***	**-0.0465****	**0.0611****	-0.0086	**-0.0474****	**0.0561****	-0.0130	**-0.0450****	**0.0580****
	Std.Err.	0.0076	0.0131	0.0124	0.0085	0.0144	0.0136	0.0083	0.0139	0.0132
	t-ratio	-1.9400	-3.5460	4.9190	-1.0230	-3.3030	4.1210	-1.5700	-3.2390	4.4050
DEBT	Coeff.	**0.0745****	0.0152	**-0.0897***	**0.0879****	0.0070	**-0.0949***	**0.0936****	0.0046	**-0.0982****
	Std.Err.	0.0132	0.0386	0.0398	0.0141	0.0383	0.0394	0.0148	0.0386	0.0394
	t-ratio	5.6410	0.3940	-2.2560	6.2170	0.1830	-2.4090	6.3170	0.1190	-2.4900
OPINCOME	Coeff.	**-0.4473****	0.1600	0.2873	**-0.4738****	0.1672	0.3065	**-0.4800****	0.1530	0.3271
	Std.Err.	0.0754	0.2002	0.2007	0.0810	0.2013	0.2020	0.0843	0.2017	0.2023
	t-ratio	-5.9300	0.8000	1.4320	-5.8470	0.8310	1.5170	-5.6950	0.7590	1.6160
RETURN	Coeff.	**-0.0783****	-0.0150	0.0933	**-0.0895****	-0.0072	**0.0966***	**-0.0963****	-0.0027	**9.90E-02***
	Std.Err.	0.0174	0.0487	0.0490	0.0181	0.0478	0.0479	0.0182	0.0479	4.80E-02
	t-ratio	-4.4940	-0.3070	1.9020	-4.9540	-0.1500	2.0170	-5.2780	-0.0570	2.061
Log likelihood function		-812.53			-823.61			-822.16		
Restric log likelihood		-957.01			-957.01			-957.01		
Chi-squared [df]		288.96[20]			266.79[22]			269.70[22]		
Significance level		0.0000			0.0000			0.0000		

Table 4-8: Multinomial logit estimations of the probability of repurchasing (Y=2) *vs.* only paying dividends (Y=1) *vs.* retaining earnings (Y=0) – Using predicted and unpredicted earnings
Refer to table 6 for a description of the information reported, and to tables 1 and 2 for a definition of the variables used.
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Marginal effects on Prob [Y = 0, 1,2] N = 1016								
		[1]			[2]			[3]		
		Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2
Constant	Coeff.	0.2583	**1.1317****	**-1.3900****	0.0980	**1.1720****	**-1.2701****	0.1828	**1.1246****	**-1.3074****
	Std.Err.	0.1671	0.2957	0.2825	0.1868	0.3210	0.3068	0.1814	0.3099	0.2959
	t-ratio	1.5460	3.8260	-4.9200	0.5250	3.6510	-4.1390	1.0080	3.6290	-4.4180
ESO	Coeff.	**1.8092****	-0.1908	**-1.6184***						
	Std.Err.	0.3274	0.7966	0.7954						
	t-ratio	5.5250	-0.2400	-2.0350						
EXSO	Coeff.				**4.6591****	-0.2515	**-4.4076**			
	Std.Err.				0.9052	2.6394	2.7084			
	t-ratio				5.1470	-0.0950	-1.6270			
EXSOEX	Coeff.							**9.3366****	1.3366	**-10.6733**
	Std.Err.							1.8902	5.5265	5.7117
	t-ratio							4.9400	0.2420	-1.8690
LTIP	Coeff.				1.7360	1.0478	-2.7838	2.4091	0.3477	-2.7569
	Std.Err.				2.9179	5.4941	5.3404	2.7923	5.4479	5.3095
	t-ratio				0.5950	0.1910	-0.5210	0.8630	0.0640	-0.5190
MO	Coeff.				**0.2293****	-0.1546	-0.0748	**0.2345****	-0.1634	-0.0712
	Std.Err.				0.0761	0.1977	0.1953	0.0732	0.1961	0.1941
	t-ratio				3.0140	-0.7820	-0.3830	3.2040	-0.8330	-0.3670
STRUST	Coeff.	**-3.7069****	0.4870	**3.2199****						
	Std.Err.	0.9795	1.3750	1.2722						
	t-ratio	-3.7850	0.3540	2.5310						
MSH	Coeff.	**0.1206****	0.0880	**-0.2086***	**0.0893***	0.0862	**-0.1755**	**0.0956***	0.0864	**-0.1820***
	Std.Err.	0.0410	0.0928	0.0921	0.0444	0.0946	0.0933	0.0437	0.0940	0.0929
	t-ratio	2.9380	0.9490	-2.2660	2.0110	0.9110	-1.8810	2.1880	0.9190	-1.9580
SIZE	Coeff.	**-0.0211****	**-0.0446****	**0.0656****	-0.0129	**-0.0466****	**0.0595****	**-0.0167***	**-0.0444****	**0.0611****
	Std.Err.	0.0076	0.0131	0.0124	0.0085	0.0143	0.0136	0.0083	0.0138	0.0131
	t-ratio	-2.7580	-3.4030	5.2820	-1.5130	-3.2600	4.3860	-2.0090	-3.2100	4.6550
DEBT	Coeff.	**0.0456****	0.0188	**-0.0644**	**0.0571****	0.0128	**-0.0699**	**0.0633****	0.0083	**-0.0716**
	Std.Err.	0.0114	0.0370	0.0382	0.0124	0.0371	0.0382	0.0127	0.0373	0.0382
	t-ratio	3.9890	0.5080	-1.6850	4.6150	0.3450	-1.8280	4.9920	0.2240	-1.8750
Expec	Coeff.	**-0.5843****	-0.2234	**0.8076****	**-0.6439****	-0.1940	**0.8379****	**-0.6832****	-0.1797	**0.8628****
income	Std.Err.	0.1190	0.2985	0.3036	0.1249	0.2962	0.3023	0.1302	0.3012	0.3055
	t-ratio	-4.9100	-0.7480	2.6600	-5.1570	-0.6550	2.7720	-5.2460	-0.5970	2.8240
Unexp	Coeff.	**-0.2400****	-0.0880	0.3280	**-0.2762****	-0.0534	0.3297	**-0.2550****	-0.0708	0.3258
income	Std.Err.	0.0674	0.2177	0.2248	0.0715	0.2145	0.2222	0.0711	0.2113	0.2189
	t-ratio	-3.5610	-0.4040	1.4590	-3.8630	-0.2490	1.4830	-3.5840	-0.3350	1.4880
RETURN	Coeff.	**-0.0623****	-0.0003	0.0626	**-0.0690****	0.0063	0.0626	**-0.0767****	0.0095	0.0672
	Std.Err.	0.0183	0.0508	0.0512	0.0192	0.0507	0.0511	0.0192	0.0504	0.0508
	t-ratio	-3.4040	-0.0050	1.2220	-3.6020	0.1250	1.2260	-3.9980	0.1890	1.3220
Log likelihood function		-814.56			-822.02			-819.51		
Restric log likelihood		-957.01			-957.01			-957.01		
Chi-squared [df]		284.89[22]			269.98[24]			274.99[24]		
Significance level		0.0000			0.0000			0.0000		

Table 4-9: Multinomial logit estimations of the probability of repurchasing (Y=2) *vs.* only paying dividends (Y=1) *vs.* retaining earnings (Y=0) – Using predicted and *positive* unpredicted earnings
Refer to table 6 for a description of the information reported, and to tables 1 and 2 for a definition of the variables used.
Positive unexpected income = unexp income * dummy (that equals 1 if unexp income>0).
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Marginal effects on Prob [Y = 0, 1,2], N = 1016								
		[1]			[2]			[3]		
		Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2
Constant	Coeff.	**0.3214**	**1.1194****	**-1.4408****	0.1970	**1.1378****	**-1.3349****	0.2731	**1.1048****	**-1.3779****
	Std.Err.	0.1663	0.2962	0.2840	0.1840	0.3207	0.3081	0.1777	0.3097	0.2976
	t-ratio	1.9330	3.7790	-5.0740	1.0710	3.5480	-4.3330	1.5360	3.5670	-4.6310
ESO	Coeff.	**1.9411****	**-0.1744**	**-1.7667***						
	Std.Err.	0.3344	0.7966	0.7949						
	t-ratio	5.8040	-0.2190	-2.2230						
EXSO	Coeff.				**4.8431****	-0.1662	**-4.6769**			
	Std.Err.				0.9338	2.6304	2.6959			
	t-ratio				5.1870	-0.0630	-1.7350			
EXSOEX	Coeff.							**9.6108****	1.3851	**-10.9960**
	Std.Err.							1.8822	5.5002	5.7126
	t-ratio							5.1060	0.2520	-1.9250
LTIP	Coeff.				1.0483	1.3534	-2.4017	1.9290	0.4542	-2.3832
	Std.Err.				3.0744	5.5230	5.3565	2.9162	5.4756	5.3279
	t-ratio				0.3410	0.2450	-0.4480	0.6610	0.0830	-0.4470
MO	Coeff.				**0.2347****	-0.1718	-0.0629	**0.2421****	-0.1843	-0.0578
	Std.Err.				0.0750	0.1986	0.1964	0.0720	0.1972	0.1955
	t-ratio				3.1310	-0.8650	-0.3200	3.3630	-0.9340	-0.2960
STRUST	Coeff.	**-3.6348****	0.4377	**3.1972****						
	Std.Err.	0.9856	1.3789	1.2760						
	t-ratio	-3.6880	0.3170	2.5060						
MSH	Coeff.	**0.1075****	0.0972	**-0.2047***	0.0733	0.0972	**-0.1705**	**0.0829**	0.0952	**-0.1781**
	Std.Err.	0.0413	0.0929	0.0923	0.0452	0.0948	0.0936	0.0437	0.0942	0.0933
	t-ratio	2.6060	1.0460	-2.2180	1.6220	1.0250	-1.8210	1.8960	1.0110	-1.9090
SIZE	Coeff.	**-0.0239****	**-0.0438****	**0.0677****	**-0.0171****	**-0.0448****	**0.0619****	**-0.0205****	**-0.0433****	**0.0638****
	Std.Err.	0.0076	0.0131	0.0125	0.0084	0.0143	0.0136	0.0082	0.0138	0.0132
	t-ratio	-3.1380	-3.3410	5.4300	-2.0310	-3.1440	4.5540	-2.5160	-3.1320	4.8430
DEBT	Coeff.	**0.0530****	0.0197	**-0.0727**	**0.0633****	0.0138	**-0.0771**	**0.0677****	0.0105	**-0.0782***
	Std.Err.	0.0113	0.0371	0.0383	0.0121	0.0370	0.0383	0.0124	0.0372	0.0383
	t-ratio	4.6860	0.5320	-1.8990	5.2220	0.3730	-2.0150	5.4430	0.2810	-2.0400
Expec	Coeff.	**-0.6556****	-0.2266	**0.8822****	**-0.7326****	-0.1873	**0.9200****	**-0.7576**	-0.1778	**0.9355****
Income	Std.Err.	0.1290	0.3035	0.3052	0.1400	0.3043	0.3052	0.1437	0.3100	0.3100
	t-ratio	-5.0820	-0.7470	2.8900	-5.2320	-0.6160	3.0150	-5.2740	-0.5740	3.0180
Positive unexp	Coeff.	**-0.2767**	-0.3586	**0.6353**	**-0.3009**	-0.3120	0.6128	-0.2080	-0.3856	0.5936
income	Std.Err.	0.1517	0.3788	0.3753	0.1730	0.3776	0.3738	0.1759	0.3815	0.3734
	t-ratio	-1.8240	-0.9470	1.6930	-1.7390	-0.8260	1.6400	-1.1820	-1.0110	1.5890
RETURN	Coeff.	**-0.0736****	0.0123	0.0614	**-0.0842****	0.0198	0.0644	**-0.0920****	0.0228	0.0692
	Std.Err.	0.0183	0.0504	0.0508	0.0184	0.0496	0.0498	0.0186	0.0496	0.0499
	t-ratio	-4.0180	0.2430	1.2070	-4.5760	0.4000	1.2920	-4.9450	0.4590	1.3860
Log likelihood function		-822.73			-832.24			-828.44		
Restricted log likelihood		-957.01			-957.01			-957.01		
Chi-squared [df]		268.55[22]			249.53[24]			257.13[24]		
Significance level		0.0000			0.0000			0.0000		

Table 4-10: Multinomial logit estimations of the probability of repurchasing (Y=2) *vs.* only paying dividends (Y=1) *vs.* retaining earnings (Y=0) – Using unexpected options
Refer to table 6 for a description of the information reported, and to tables 1 and 3 for a definition of the variables used.
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Marginal effects on Prob [Y = 0, 1,2] N = 1016					
		[1]			[2]		
		Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2
Constant	Coeff.	**0.3617***	**1.0899****	**-1.4516****	0.2555	**1.1616****	**-1.4171****
	Std.Err.	0.1630	0.2871	0.2740	0.1725	0.2995	0.2853
	t-ratio	2.2190	3.7970	-5.2980	1.4810	3.8790	-4.9670
TOPTIONS	Coeff.	**1.6251****	-0.3529	-1.2722			
	Std.Err.	0.3553	0.8495	0.8440			
	t-ratio	4.5740	-0.4150	-1.5070			
EXOPTION	Coeff.				**4.1263****	1.3850	**-5.5113***
	Std.Err.				0.9090	2.6464	2.7362
	t-ratio				4.5390	0.5230	-2.0140
LTIP	Coeff.				1.5907	0.7880	-2.3787
	Std.Err.				2.9950	5.5271	5.3806
	t-ratio				0.5310	0.1430	-0.4420
MO	Coeff.				**0.1652***	-0.1294	-0.0358
	Std.Err.				0.0757	0.1976	0.1958
	t-ratio				2.1820	-0.6550	-0.1830
STRUST	Coeff.	**-2.7269****	0.2903	**2.4366**			
	Std.Err.	0.9782	1.3591	1.2569			
	t-ratio	-2.7880	0.2140	1.9390			
MSH	Coeff.	**0.1216****	0.1003	**-0.2219***	**0.1158****	0.1015	**-0.2173***
	Std.Err.	0.0422	0.0947	0.0940	0.0443	0.0953	0.0943
	t-ratio	2.8800	1.0590	-2.3600	2.6130	1.0650	-2.3040
SIZE	Coeff.	**-0.0226****	**-0.0444****	**0.0671****	**-0.0190***	**-0.0475****	**0.0665****
	Std.Err.	0.0076	0.0130	0.0123	0.0080	0.0135	0.0127
	t-ratio	-2.9710	-3.4220	5.4440	-2.3750	-3.5250	5.2150
DEBT	Coeff.	**0.0725****	0.0099	**-0.0824***	**0.0866****	0.0072	**-0.0938***
	Std.Err.	0.0128	0.0376	0.0386	0.0142	0.0383	0.0393
	t-ratio	5.6510	0.2630	-2.1330	6.0940	0.1880	-2.3840
OPINCOME	Coeff.	**-0.4888****	0.1639	0.3249	**-0.4957****	0.1579	0.3378
	Std.Err.	0.0792	0.1984	0.1985	0.0827	0.2013	0.2019
	t-ratio	-6.1720	0.8260	1.6370	-5.9920	0.7840	1.6730
RETURN	Coeff.	**-0.0988****	-0.0072	**0.1060***	**-0.1009****	-0.0088	**0.1097***
	Std.Err.	0.0179	0.0483	0.0486	0.0184	0.0479	0.0480
	t-ratio	-5.5200	-0.1490	2.1830	-5.4860	-0.1830	2.2830
Log likelihood function		-823.89			-824.66		
Restricted log likelihood		-957.01			-957.01		
Chi-squared [df]		266.23[20]			264.70[22]		
Significance level		0.0000			0.0000		

Table 4-11: Robustness checks- Ordered estimations of the probability of repurchasing (Y=2) *vs.* only paying dividends (Y=1) *vs.* retaining earnings (Y=0)

This table reports the results of ordered logit regressions on the probability that a firm repurchases its shares at least once during the sample period (Y = 2), the probability that it does not repurchase its shares at all during the whole sample period but continuously pays dividends (meaning at least twice during the sample period) (Y = 1), or the probability that it retains its earnings (no repurchases at all during the sample period, and no/or irregular dividends) (Y = 0). The coefficients reported are the logit coefficients. For a brief definition of the variables used refer back to table 1. Only time effects are controlled for in all the regressions. Y = 0 → 119 observations, Y = 1 → 567 observations, Y = 2 → 330 observations

** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Index function for probability N=1016		
		[1]	[2]	[3]
Constant	Coeff.	**-3.1608****	**-2.3044**	**-2.6474***
	Std.Err.	1.2177	1.2993	1.2272
	t-ratio	-2.5958	-1.7736	-2.1573
ESO	Coeff.	**-18.3030****		
	Std.Err.	2.9715		
	t-ratio	-6.1596		
EXSO	Coeff.		**-42.6110****	
	Std.Err.		9.4493	
	t-ratio		-4.5094	
EXSOEX	Coeff.			**-85.4571****
	Std.Err.			17.6672
	t-ratio			-4.8371
LTIP	Coeff.		-10.9501	-11.1756
	Std.Err.		19.4949	19.6871
	t-ratio		-0.5617	-0.5677
MO	Coeff.		**-1.2460**	**-1.4195***
	Std.Err.		0.6978	0.6915
	t-ratio		-1.7857	-2.0527
STRUST	Coeff.	**18.3553****		
	Std.Err.	5.1683		
	t-ratio	3.5515		
MSH	Coeff.	**-1.2683****	**-0.9424****	**-1.0568****
	Std.Err.	0.3664	0.3750	0.3770
	t-ratio	-3.4614	-2.5128	-2.8029
SIZE	Coeff.	**0.3021****	**0.2465****	**0.2617****
	Std.Err.	0.0552	0.0588	0.0561
	t-ratio	5.4715	4.1937	4.6671
DEBT	Coeff.	**-0.8514****	**-0.8996****	**-0.9400****
	Std.Err.	0.1345	0.1287	0.1311
	t-ratio	-6.3312	-6.9923	-7.1672
OPINCOME	Coeff.	**3.9624****	**3.9381****	**3.9655****
	Std.Err.	0.6645	0.6571	0.6606
	t-ratio	5.9627	5.9931	6.0030
RETURN	Coeff.	**0.8187****	**0.8544****	**0.8911****
	Std.Err.	0.1646	0.1584	0.1597
	t-ratio	4.9732	5.3941	5.5787
Threshold	Coeff.	**3.3162****	**3.2913****	**3.2956****
	Std.Err.	0.1429	0.1441	0.1441
	t-ratio	23.2005	22.8329	22.8745
Log likelihood function		-837.02	-845.49	-843.33
Restricted log likelihood		-957.01	-957.01	-957.01
Chi-squared [df]		239.97[10]	223.03[11]	227.35[11]
Significance level		0.0000	0.0000	0.0000

Table 4-12: Robustness checks: Scaling by total assets- OLS and binomial logit estimations of the value of shares repurchased and the probability of being a re-purchaser respectively

Variables are as defined in table 1, with the only difference that SIZE=log of total assets, DEBT and OPINCOME are scaled by total assets instead of market value. In the OLS we control for time and fixed effects, while in the Binomial logits we control for time and industry effects.
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		OLS of re-purchasers			Binomial logits		
		Y = value of shares repurchased			Marginal effects on Prob [Y = 1]		
		[1]	[2]	[3]	[4]	[5]	[6]
Constant	Coeff.	-0.0118	0.0156	0.0258	**-1.6086****	**-1.3554****	**-1.4312****
	Std.Err.	0.0361	0.0394	0.0377	0.3000	0.3219	0.3128
	t-ratio	-0.3263	0.3944	0.6846	-5.3630	-4.2110	-4.5760
ESO	Coeff.	0.1776			**-1.4050**		
	Std.Err.	0.1445			0.8194		
	t-ratio	1.2296			-1.7150		
EXSO	Coeff.		0.3776			**-5.6131***	
	Std.Err.		0.3743			2.5950	
	t-ratio		1.0088			-2.1630	
EXSOEX	Coeff.			-0.7427			**-10.4528***
	Std.Err.			0.6030			5.2839
	t-ratio			-1.2318			-1.9780
LTIP	Coeff.		0.7227	0.7102		-2.3529	-2.0164
	Std.Err.		0.8090	0.8085		5.2541	5.2441
	t-ratio		0.8934	0.8784		-0.4480	-0.3850
MO	Coeff.		0.0243	0.0353		-0.3121	-0.3033
	Std.Err.		0.0421	0.0445		0.2029	0.2007
	t-ratio		0.5771	0.7936		-1.5380	-1.5110
STRUST	Coeff.	**-0.7018**			1.5997		
	Std.Err.	0.3799			1.2861		
	t-ratio	-1.8471			1.2440		
MSH	Coeff.	-0.0252	-0.0282	-0.0320	**-0.2249***	**-0.1942***	**-0.2123***
	Std.Err.	0.0198	0.0195	0.0199	0.0958	0.0966	0.0960
	t-ratio	-1.2725	-1.4434	-1.6093	-2.3490	-2.0110	-2.2110
SIZE	Coeff.	**0.0120***	**0.0150****	**0.0131***	**0.0710****	**0.0587****	**0.0619****
	Std.Err.	0.0057	0.0055	0.0055	0.0137	0.0146	0.0143
	t-ratio	2.1001	2.7119	2.3916	5.1950	4.0130	4.3150
DEBT	Coeff.	-0.0518	-0.0611	-0.0602	**-0.5057****	**-0.5329****	**-0.5318****
	Std.Err.	0.0404	0.0416	0.0415	0.1058	0.1058	0.1057
	t-ratio	-1.2813	-1.4684	-1.4489	-4.7810	-5.0360	-5.0320
OPINCOME	Coeff.	-0.0554	-0.0710	-0.0714	**1.4946****	**1.4742****	**1.4895****
	Std.Err.	0.0769	0.0777	0.0792	0.2431	0.2410	0.2413
	t-ratio	-0.7198	-0.9142	-0.9019	6.1490	6.1170	6.1720
RETURN	Coeff.	0.0024	0.0026	0.0034	0.0558	0.0556	0.0540
	Std.Err.	0.0065	0.0063	0.0064	0.0440	0.0443	0.0442
	t-ratio	0.3598	0.4189	0.5267	1.2690	1.2550	1.2210
Adj R squared		0.42	0.42	0.42			
F statistic		3.54	3.45	3.45			
Log likelihood function					-564.44	-562.79	-563.04
Restricted log likelihood					-640.52	-640.52	-640.52
Chi-squared [df]					152.16[19]	155.46[20]	154.96[20]
Significance level					0.0000	0.0000	0.0000
Number of observations		330	330	330	1016	1016	1016

Table 4-13: Robustness checks: Scaling by total assets- Multinomial logit estimations of the probability of repurchasing (Y=2) *vs.* only paying dividends (Y=1) *vs.* retaining earnings (Y=0)

Variables are as defined in table 1, with the only difference that SIZE=log of total assets, DEBT and OPINCOME are scaled by total assets instead of market value. The coefficients reported are the marginal effects of each variable on the probability of being a retainer (Y = 0), dividend payer (Y = 1), or a re-purchaser (Y = 2) while holding the other variables constant at their means. Only time effects are controlled for throughout the multinomial regressions. Y = 0 → 119 observations, Y = 1 → 567 observations, Y = 2 → 330 observations.

** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Marginal effects on Prob [Y = 0, 1,2] N=1016								
			[5]			[6]			[7]	
		Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2
Constant	Coeff.	**0.2922***	**1.1091****	**-1.4013****	0.2443	**1.0887****	**-1.3329****	**0.2881**	**1.0678****	**-1.3559****
	Std.Err.	0.1338	0.2827	0.2789	0.1517	0.3088	0.3046	0.1480	0.2977	0.2931
	t-ratio	2.1850	3.9230	-5.0240	1.6100	3.5250	-4.3750	1.9470	3.5870	-4.6260
ESO	Coeff.	**1.6805****	0.0762	**-1.7567***						
	Std.Err.	0.3120	0.8058	0.8109						
	t-ratio	5.3870	0.0950	-2.1660						
EXSO	Coeff.				**3.1638****	0.5485	-3.7123			
	Std.Err.				0.8093	2.6448	2.7445			
	t-ratio				3.9090	0.2070	-1.3530			
EXSOEX	Coeff.							**6.1004****	3.1225	-9.2229
	Std.Err.							1.5395	5.3604	5.6407
	t-ratio							3.9630	0.5830	-1.6350
LTIP	Coeff.				0.0237	2.7780	-2.8017	0.6500	2.0325	-2.6825
	Std.Err.				2.9475	5.4452	5.3136	2.8542	5.4092	5.2785
	t-ratio				0.0080	0.5100	-0.5270	0.2280	0.3760	-0.5080
MO	Coeff.				**0.1612***	-0.0936	-0.0675	**0.1731****	-0.1066	-0.0664
	Std.Err.				0.0717	0.1968	0.1977	0.0695	0.1955	0.1964
	t-ratio				2.2460	-0.4760	-0.3420	2.4910	-0.5450	-0.3380
STRUST	Coeff.	**-2.6717****	0.1478	**2.5240***						
	Std.Err.	0.8880	1.3614	1.2830						
	t-ratio	-3.0090	0.1090	1.9670						
MSH	Coeff.	**0.0954****	0.1165	**-0.2119***	**0.0696**	0.1112	**-0.1808**	**0.0742**	0.1152	**-0.1895***
	Std.Err.	0.0376	0.0935	0.0939	0.0406	0.0954	0.0957	0.0400	0.0943	0.0947
	t-ratio	2.5370	1.2460	-2.2560	1.7130	1.1660	-1.8900	1.8560	1.2210	-2.0020
SIZE	Coeff.	**-0.0224****	**-0.0436****	**0.0661****	**-0.0188****	**-0.0428****	**0.0616****	**-0.0207****	**-0.0420****	**0.0627****
	Std.Err.	0.0062	0.0126	0.0123	0.0070	0.0137	0.0134	0.0068	0.0133	0.0130
	t-ratio	-3.6310	-3.4750	5.3660	-2.6970	-3.1250	4.5880	-3.0330	-3.1630	4.8300
DEBT	Coeff.	**0.1986****	0.1535	**-0.3521****	**0.2096****	0.1436	**-0.3532****	**0.2207****	0.1377	**-0.3583****
	Std.Err.	0.0410	0.1002	0.1003	0.0419	0.0988	0.0990	0.0422	0.0989	0.0989
	t-ratio	4.8380	1.5310	-3.5100	5.0050	1.4530	-3.5680	5.2260	1.3920	-3.6240
OPINCOME	Coeff.	**-0.5791****	**-0.5426***	**1.1216***	**-0.6469****	**-0.4962***	**1.1430****	**-0.6708****	**-0.4860***	**1.1569****
	Std.Err.	0.0955	0.2211	0.2235	0.0965	0.2187	0.2229	0.0986	0.2186	0.2218
	t-ratio	-6.0640	-2.4540	5.0180	-6.7060	-2.2690	5.1290	-6.8020	-2.2240	5.2150
RETURN	Coeff.	**-0.0678****	0.0179	0.0499	**-0.0781****	0.0213	0.0568	**-0.0785****	0.0216	0.0568
	Std.Err.	0.0157	0.0452	0.0457	0.0159	0.0445	0.0450	0.0160	0.0445	0.0450
	t-ratio	-4.3220	0.3960	1.0910	-4.9140	0.4780	1.2620	-4.9160	0.4860	1.2630
Log likelihood function		-824.86			-837.05			-835.23		
Restricted log likelihood		-957.01			-957.01			-957.01		
Chi-squared [df]		264.30[20]			239.92[22]			243.55[22]		
Significance level		0.0000			0.0000			0.0000		

Table 4-14: Robustness checks- different sample division: Multinomial logit estimations of the probability of repurchasing (Y=2) *vs.* only paying dividends (Y=1) *vs.* retaining earnings (Y=0)

This table reports the results of multinomial logit regressions on the probability of repurchasing (rather than the probability that a firm repurchases its shares at least once during the sample period) (Y = 2), the probability of only paying dividends (Y = 1), and the probability of not making any distribution (Y = 0). The coefficients reported are the marginal effects For a definition of the variables used refer back to table 1. Only time effects are controlled for throughout all the regressions. Y = 0 → 108 observations, Y = 1 → 732 observations, Y = 2 → 176 observations.
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Marginal effects on Prob [YT = 0, 1,2], N = 1016								
		[1]			[2]			[3]		
		Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2
Constant	Coeff.	0.0543	**0.9383****	**-0.9926****	-0.0036	**1.0000****	**-0.9964****	0.1223	**0.8805****	**-1.0027****
	Std.Err.	0.1651	0.2376	0.1945	0.1799	0.2616	0.2166	0.1766	0.2514	0.2063
	t-ratio	0.3290	3.9490	-5.1030	-0.0200	3.8230	-4.5990	0.6920	3.5020	-4.8610
ESO	Coeff.	**1.5842****	-0.6396	-0.9446						
	Std.Err.	0.3035	0.6279	0.5924						
	t-ratio	5.2200	-1.0190	-1.5950						
EXSO	Coeff.				**3.3558****	-1.3537	-2.0021			
	Std.Err.				0.8075	2.1453	2.1357			
	t-ratio				4.1560	-0.6310	-0.9370			
EXSOEX	Coeff.							**4.9346****	0.3293	-5.2639
	Std.Err.							1.4035	4.1945	4.2989
	t-ratio							3.5160	0.0790	-1.2240
LTIP	Coeff.				3.9880	-4.3834	0.3954	4.1712	-4.5831	0.4119
	Std.Err.				2.5254	4.4573	3.9586	2.4716	4.4042	3.9233
	t-ratio				1.5790	-0.9830	0.1000	1.6880	-1.0410	0.1050
MO	Coeff.				0.0843	-0.0841	-0.0002	0.0913	-0.0912	-0.0001
	Std.Err.				0.0785	0.1547	0.1440	0.0775	0.1532	0.1423
	t-ratio				1.0740	-0.5440	-0.0020	1.1780	-0.5960	-0.0010
STRUST	Coeff.	**-2.3478****	1.2600	1.0878						
	Std.Err.	0.9448	1.2055	0.9290						
	t-ratio	-2.4850	1.0450	1.1710						
MSH	Coeff.	**0.0810**	0.0895	**-0.1705***	0.0539	0.1040	**-0.1579***	0.0679	0.0918	**-0.1597***
	Std.Err.	0.0424	0.0766	0.0698	0.0447	0.0785	0.0710	0.0448	0.0776	0.0700
	t-ratio	1.9110	1.1690	-2.4410	1.2050	1.3250	-2.2240	1.5160	1.1830	-2.2810
SIZE	Coeff.	-0.0119	**-0.0326****	**0.0444****	-0.0083	**-0.0355****	**0.0437****	**-0.0140**	**-0.0301****	**0.0440****
	Std.Err.	0.0075	0.0105	0.0084	0.0082	0.0116	0.0094	0.0081	0.0113	0.0090
	t-ratio	-1.5730	-3.0990	5.2880	-1.0020	-3.0470	4.6400	-1.7170	-2.6750	4.8800
DEBT	Coeff.	**0.0654****	0.0098	**-0.0752***	**0.0751****	0.0006	**-0.0757***	**0.0775****	-0.0004	**-0.0771***
	Std.Err.	0.0117	0.0308	0.0311	0.0125	0.0310	0.0311	0.0130	0.0309	0.0308
	t-ratio	5.6110	0.3180	-2.4210	6.0130	0.0200	-2.4370	5.9700	-0.0140	-2.5040
OPINCOME	Coeff.	**-0.5208****	0.2657	0.2551	**-0.5645****	**0.2955**	**0.2690**	**-0.5849****	**0.3034**	**0.2814**
	Std.Err.	0.0859	0.1710	0.1612	0.0900	0.1720	0.1612	0.0947	0.1724	0.1595
	t-ratio	-6.0620	1.5540	1.5830	-6.2740	1.7180	1.6690	-6.1760	1.7600	1.7640
RETURN	Coeff.	-0.0226	-0.0243	0.0469	**-0.0326***	-0.0175	0.0501	**-0.0386***	-0.0119	0.0506
	Std.Err.	0.0151	0.0369	0.0361	0.0158	0.0363	0.0352	0.0159	0.0362	0.0351
	t-ratio	-1.4960	-0.6580	1.3010	-2.0720	-0.4820	1.4240	-2.4330	-0.3290	1.4410
Log likelihood function		-661.78			-668.99			-671.60		
Restricted log likelihood		-790.62			-790.62			-790.62		
Chi-squared [df]		257.69^{20}			243.26^{22}			238.04^{22}		
Significance level		0.0000			0.0000			0.0000		

Table 4-15: Robustness checks- OLS estimations of the value and fraction of shares repurchased using the re-purchasers sample- Controlling for dividends
Variable definition can be found in tables 1, 2 and 3. Δ Dividend = this year's dividends normalised by market value at the start of this year minus last year's dividends normalised by market value at the start of last year, Δ DPS = this year's dividends per share minus last year's dividends per share. Fixed and time effects are controlled for in all regressions. Number of observations=330. ** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Y = Value of repurchases			Y = Fraction of repurchases			Y = Value of repurchases			Y = Fraction of repurchases			Y = Value of repurchases		Y = Fraction of repurchases	
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]
Constant	Coeff.	0.0266	0.0297	0.0259	0.0166	0.0228	0.0198	0.0314	0.0335	0.0296	0.0169	0.0230	0.0201	0.0228	0.0111	0.0156	0.0076
	Std.Err.	0.0262	0.0278	0.0269	0.0256	0.0272	0.0263	0.0258	0.0274	0.0267	0.0252	0.0268	0.0261	0.0250	0.0266	0.0245	0.0261
	t-ratio	1.0180	1.0706	0.9636	0.6499	0.8391	0.7534	1.2170	1.2211	1.1069	0.6726	0.8570	0.7694	0.9136	0.4188	0.6384	0.2910
ESO	Coeff.	-0.0303			0.0020			-0.0122			0.0345						
	Std.Err.	0.1289			0.1411			0.1206			0.1263						
	t-ratio	-0.2351			0.0140			-0.1012			0.2731						
EXSO	Coeff.		-0.2820			-0.0518			-0.3192			-0.0912					
	Std.Err.		0.3278			0.2901			0.3386			0.2861					
	t-ratio		-0.8604			-0.1786			-0.9427			-0.3187					
TOPTIONS	Coeff.													-0.0262		0.0433	
	Std.Err.													0.1349		0.1342	
	t-ratio													-0.1942		0.3225	
EXOPTION	Coeff.														-0.2820		-0.0376
	Std.Err.														0.3335		0.2964
	t-ratio														-0.8456		-0.1270
EXSOEX	Coeff.			-1.1240			-0.9465			-0.9012			-0.7509				
	Std.Err.			0.6911			0.6396			0.6869			0.6364				
	t-ratio			-1.6264			-1.4798			-1.3118			-1.1800				
LTIP	Coeff.		-0.0306	-0.0236		-0.0071	0.0035		0.1467	0.1606		0.1517	0.1668		-0.0313		-0.0077
	Std.Err.		0.6172	0.6192		0.6205	0.6217		0.6092	0.6108		0.5944	0.5956		0.6174		0.6209
	t-ratio		-0.0496	-0.0381		-0.0114	0.0056		0.2409	0.2629		0.2553	0.2800		-0.0506		-0.0124
MO	Coeff.		-0.0343	-0.0250		-0.0092	0.0008		-0.0374	-0.0316		-0.0110	-0.0041		-0.0326		-0.0091
	Std.Err.		0.0448	0.0476		0.0464	0.0481		0.0461	0.0479		0.0483	0.0498		0.0448		0.0465
	t-ratio		-0.7640	-0.5253		-0.1980	0.0164		-0.8114	-0.6605		-0.2270	-0.0820		-0.7272		-0.1965
STRUST	Coeff.	**-0.9069****			**-0.8883****			**-0.8517****			**-0.8284****			**-0.9081****		**-0.9097****	

	Std.Err.	0.2837			0.3370			0.2681			0.3106			0.2858			0.3391	
	t-ratio	-3.1969			-2.6355			-3.1770			-2.6675			-3.1778			-2.6831	
MSH	Coeff.	0.0215	0.0149	0.0131	0.0187	0.0129	0.0106	0.0208	0.0147	0.0132	0.0212	0.0158	0.0139	0.0212	0.0128	0.0193	0.0127
	Std.Err.	0.0174	0.0172	0.0168	0.0157	0.0157	0.0154	0.0167	0.0165	0.0162	0.0155	0.0154	0.0151	0.0172	0.0167	0.0157	0.0155
	t-ratio	1.2349	0.8665	0.7795	1.1911	0.8231	0.6901	1.2461	0.8895	0.8144	1.3693	1.0241	0.9192	1.2299	0.7661	1.2242	0.8217
SIZE	Coeff.	-0.0084	-0.0068	-0.0076	-0.0007	0.0013	0.0002	-0.0108	-0.0101	-0.0106	-0.0030	-0.0019	-0.0027	-0.0082	-0.0062	-0.0006	0.0014
	Std.Err.	0.0084	0.0088	0.0088	0.0077	0.0090	0.0090	0.0085	0.0086	0.0086	0.0071	0.0077	0.0078	0.0082	0.0085	0.0079	0.0087
	t-ratio	-1.0056	-0.7765	-0.8646	-0.0888	0.1477	0.0214	-1.2748	-1.1736	-1.2318	-0.4189	-0.2401	-0.3460	-0.9977	-0.7291	-0.0739	0.1654
DEBT	Coeff.	-0.0034	-0.0031	-0.0056	-0.0030	-0.0029	-0.0049	-0.0017	-0.0013	-0.0031	-0.0022	-0.0018	-0.0032	-0.0034	-0.0029	-0.0032	-0.0029
	Std.Err.	0.0076	0.0076	0.0081	0.0075	0.0075	0.0081	0.0079	0.0078	0.0082	0.0077	0.0076	0.0081	0.0075	0.0076	0.0075	0.0075
	t-ratio	-0.4419	-0.4076	-0.6878	-0.3964	-0.3856	-0.6028	-0.2166	-0.1610	-0.3815	-0.2825	-0.2341	-0.4017	-0.4510	-0.3836	-0.4234	-0.3832
OPINCOME	Coeff.	**0.0904***	**0.0967***	**0.1030***	**0.0821***	**0.0884***	**0.0933***							**0.0914***	**0.0973***	**0.0806**	**0.0885***
	Std.Err.	0.0434	0.0448	0.0463	0.0417	0.0456	0.0463							0.0458	0.0451	0.0437	0.0456
	t-ratio	2.0837	2.1570	2.2214	1.9676	1.9383	2.0144							1.9944	2.1597	1.8454	1.9382
Expec income	Coeff.							**0.1113****	**0.1233****	**0.1222****	**0.1404***	**0.1493***	**0.1488***				
	Std.Err.							0.0398	0.0463	0.0469	0.0639	0.0710	0.0715				
	t-ratio							2.7953	2.6627	2.6065	2.1979	2.1010	2.0822				
Unexp income	Coeff.							0.0106	0.0118	0.0097	0.0241	0.0249	0.0233				
	Std.Err.							0.0212	0.0231	0.0238	0.0318	0.0337	0.0341				
	t-ratio							0.5027	0.5108	0.4093	0.7573	0.7372	0.6852				
RETURN	Coeff.	-0.0030	-0.0029	-0.0026	-0.0061	-0.0057	-0.0056	0.0001	0.0001	0.0007	-0.0043	-0.0039	-0.0036	-0.0029	-0.0024	-0.0062	-0.0056
	Std.Err.	0.0060	0.0061	0.0059	0.0064	0.0064	0.0063	0.0055	0.0055	0.0054	0.0061	0.0061	0.0061	0.0059	0.0059	0.0064	0.0063
	t-ratio	-0.4930	-0.4769	-0.4458	-0.9524	-0.8876	-0.8845	0.0181	0.0212	0.1275	-0.7007	-0.6415	-0.5898	-0.4861	-0.4018	-0.9729	-0.8959
Δ Dividend	Coeff.	-0.0212	-0.0403	-0.0366				-0.0516	-0.0741	-0.0705				-0.0205	-0.0400		
	Std.Err.	0.0837	0.0820	0.0823				0.0893	0.0877	0.0878				0.0837	0.0820		
	t-ratio	-0.2532	-0.4912	-0.4452				-0.5783	-0.8455	-0.8034				-0.2450	-0.4887		
Δ DPS	Coeff.				-0.0295	-0.0253	-0.0261				-0.0412	-0.0360	-0.0373			-0.0308	-0.0254
	Std.Err.				0.0468	0.0514	0.0514				0.0466	0.0501	0.0504			0.0472	0.0515
	t-ratio				-0.6296	-0.4915	-0.5079				-0.8853	-0.7185	-0.7397			-0.6514	-0.4935
Adj R squared		0.16	0.13	0.14	0.18	0.15	0.15	0.17	0.14	0.15	0.20	0.18	0.18	0.16	0.13	0.18	0.15
F statistic		1.66	1.53	1.54	1.73	1.59	1.60	1.68	1.56	1.57	1.84	1.72	1.73	1.66	1.53	1.73	1.59

Table 4-16: Robustness checks- Binomial logits estimations of the probability of repurchasing- Controlling for dividends

This table reports the results of binomial logit regressions on the probability that a firm repurchases its shares at least once during the sample period (Y = 1) versus the probability that it does not repurchase its shares at all during the whole sample period (Y = 0). The coefficients reported are the marginal effects of each variable on the probability of being a re-purchaser while holding the other variables constant at their means. The definition of variables used can be found in tables 1, 2 and 3. Positive unexpected income = unexp income * dummy (equals 1 if unexp income>0). Δ Dividend = this year's dividends normalised by market value at the start of this year minus last year's dividends normalised by market value at the start of last year. We control for time and industry effects throughout all the binomial regressions. ** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		Marginal effects on Prob [Y = 1]										
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Constant	Coeff.	**-1.4300****	**-1.1448****	**-1.2132****	**-1.5368****	**-1.2262****	**-1.3172****	**-1.6121****	**-1.3066****	**-1.4014****	**-1.5918****	**-1.4897****
	Std.Err.	0.2938	0.3151	0.3053	0.2972	0.3176	0.3083	0.2980	0.3180	0.3096	0.2855	0.2965
	t-ratio	-4.8680	-3.6330	-3.9730	-5.1700	-3.8610	-4.2720	-5.4100	-4.1090	-4.5260	-5.5750	-5.0250
ESO	Coeff.	**-1.4240**			**-1.4550**			**-1.5892***				
	Std.Err.	0.7998			0.7723			0.7728				
	t-ratio	-1.7800			-1.8840			-2.0570				
EXSO	Coeff.		**-6.1653****			**-6.4436****			**-6.8065****			
	Std.Err.		2.5263			2.4345			2.4327			
	t-ratio		-2.4400			-2.6470			-2.7980			
Unex ESO	Coeff.										**-1.3561**	
	Std.Err.										0.8074	
	t-ratio										-1.6800	
Unex EXSO	Coeff.											**-6.0567***
	Std.Err.											2.5195
	t-ratio											-2.4040
EXSOEX	Coeff.			**-12.5648***			**-12.5936****			**-13.0263****		
	Std.Err.			5.2825			5.0995			5.0873		
	t-ratio			-2.3790			-2.4700			-2.5610		
TIP	Coeff.		-2.8233	-2.5868		-2.1595	-2.0142		-1.7748	-1.6710		-2.8287
	Std.Err.		5.1547	5.1425		5.0821	5.0851		5.1148	5.1181		5.1544
	t-ratio		-0.5480	-0.5030		-0.4250	-0.3960		-0.3470	-0.3260		-0.5490
MO	Coeff.		-0.2672	-0.2621		-0.2972	-0.2870		-0.2960	-0.2859		-0.2310
	Std.Err.		0.1941	0.1919		0.1917	0.1896		0.1928	0.1906		0.1936
	t-ratio		-1.3770	-1.3660		-1.5500	-1.5140		-1.5350	-1.5000		-1.1930

STRUST	Coeff.	1.9407			**2.4861***			**2.5137***			1.8991		
	Std.Err.	1.2262			1.2408			1.2476			1.2217		
	t-ratio	1.5830			2.0040			2.0150			1.5540		
MSH	Coeff.	**-0.2272****	**-0.1910***	**-0.2050***	**-0.2172***	**-0.1798***	**-0.1938***	**-0.2159***	**-0.1774***	**-0.1912***	**-0.2446****	**-0.2358****	
	Std.Err.	0.0924	0.0932	0.0928	0.0907	0.0914	0.0913	0.0911	0.0919	0.0917	0.0926	0.0927	
	t-ratio	-2.4580	-2.0490	-2.2100	-2.3940	-1.9670	-2.1220	-2.3700	-1.9310	-2.0840	-2.6410	-2.5440	
SIZE	Coeff.	**0.0634****	**0.0501****	**0.0529****	**0.0691****	**0.0551****	**0.0586****	**0.0718****	**0.0578****	**0.0616****	**0.0664****	**0.0634****	
	Std.Err.	0.0131	0.0141	0.0138	0.0133	0.0143	0.0140	0.0133	0.0142	0.0140	0.0130	0.0135	
	t-ratio	4.8490	3.5510	3.8370	5.1860	3.8620	4.1930	5.3930	4.0600	4.3990	5.0960	4.7060	
DEBT	Coeff.	**-0.1950****	**-0.2160****	**-0.2179****	**-0.1373***	**-0.1605****	**-0.1590****	**-0.1503****	**-0.1737****	**-0.1712****	**-0.1984****	**-0.2123****	
	Std.Err.	0.0477	0.0486	0.0480	0.0451	0.0466	0.0458	0.0451	0.0468	0.0458	0.0477	0.0486	
	t-ratio	-4.0860	-4.4470	-4.5430	-3.0460	-3.4420	-3.4720	-3.3330	-3.7130	-3.7360	-4.1580	-4.3710	
OPINCOME	Coeff.	**0.7428****	**0.7434****	**0.7633****							**0.7613****	**0.7487****	
	Std.Err.	0.2245	0.2239	0.2253							0.2243	0.2239	
	t-ratio	3.3090	3.3200	3.3890							3.3940	3.3430	
Expec income	Coeff.				**1.5352****	**1.5257****	**1.5439****	**1.5854****	**1.6063****	**1.6150****			
	Std.Err.				0.5104	0.5145	0.5217	0.4791	0.4832	0.4933			
	t-ratio				3.0080	2.9660	2.9600	3.3090	3.3250	3.2740			
Unexp income	Coeff.				**0.3687**	**0.3682**	**0.3523**						
	Std.Err.				0.2009	0.2026	0.2002						
	t-ratio				1.8350	1.8170	1.7600						
Positive	Coeff.							**0.7611***	**0.7710***	**0.7218**			
Unexp income	Std.Err.							0.3766	0.3768	0.3781			
	t-ratio							2.0210	2.0460	1.9090			
RETURN	Coeff.	**0.0862**	**0.0808**	**0.0821**	0.0762	0.0699	0.0743	0.0759	0.0705	0.0759	**0.0906***	**0.0925***	
	Std.Err.	0.0455	0.0452	0.0453	0.0474	0.0477	0.0476	0.0468	0.0465	0.0465	0.0455	0.0454	
	t-ratio	1.8950	1.7850	1.8130	1.6090	1.4670	1.5610	1.6220	1.5190	1.6310	1.9930	2.0380	
Δ Dividend	Coeff.	-1.0983	-1.1062	-1.1050	-1.0070	-1.0011	-1.0038	-1.0780	-1.0726	-1.0773	-1.1047	-1.1081	
	Std.Err.	0.8379	0.8265	0.8278	0.8385	0.8248	0.8271	0.8503	0.8360	0.8387	0.8370	0.8265	
	t-ratio	-1.3110	-1.3380	-1.3350	-1.2010	-1.2140	-1.2140	-1.2680	-1.2830	-1.2840	-1.3200	-1.3410	
Log likelihood function		-574.31	-572.65	-572.50	-573.17	-571.54	-571.65	-573.38	-571.65	-571.87	-574.49	-572.75	
Restricted log likelihood		-640.52	-640.52	-640.52	-640.52	-640.52	-640.52	-640.52	-640.52	-640.52	-640.52	-640.52	
Chi-squared[df]		132.43[20]	135.76[21]	136.05[21]	134.70[21]	137.98[22]	137.74[22]	134.29[21]	137.75[22]	137.32[22]	132.06[20]	135.55[21]	
Significance level		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	

Table 4-17: Robustness checks- Multinomial logit estimations of the probability of repurchasing *vs.* only paying dividends *vs.* retaining earnings – Controlling for dividends

This table reports the results of multinomial logit regressions on the probability that a firm repurchases its shares at least once during the sample period (Y = 2), the probability that it does not repurchase its shares at all during the whole sample period but continuously pays dividends (meaning at least twice during the sample period) (Y = 1), or the probability that it retains its earnings (no repurchases at all during the sample period, and no/or irregular dividends) (Y = 0). The coefficients reported are the marginal effects of each variable on the probability of being a retainer (Y = 0), dividend payer (Y = 1), or a re-purchaser (Y = 2) while holding the other variables constant at their means. For a brief definition of the variables used refer back to table 2. Positive unexpected income = unexp income * dummy (equals 1 if unexp income>0). Δ Dividend = this year's dividends normalised by market value at the start of this year minus last year's dividends normalised by market value at the start of last year. Only time effects are controlled for throughout the multinomial regressions. Y = 0 → 119 observations, Y = 1 → 567 observations, Y = 2 → 330 observations.

** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

		[1]			[2]			[3]			[1]			[2]			[3]		
		Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2	Y = 0	Y = 1	Y = 2
Constant	Coeff.	0.2523	**1.1500****	**-1.4024****	0.0943	**1.1827****	**-1.2769****	0.1821	**1.1338****	**-1.3159****	**0.3131**	**1.1423****	**-1.4554****	0.1921	**1.1519****	**-1.3440****	0.2712	**1.1172****	**-1.3884****
	Std.Err.	0.1676	0.2964	0.2828	0.1871	0.3216	0.3070	0.1816	0.3102	0.2961	0.1668	0.2970	0.2842	0.1841	0.3213	0.3083	0.1780	0.3100	0.2976
	t-ratio	1.5060	3.8800	-4.9580	0.5040	3.6780	-4.1590	1.0030	3.6550	-4.4450	1.8770	3.8470	-5.1210	1.0440	3.5860	-4.3600	1.5240	3.6040	-4.6650
ESO	Coeff.	**1.8186****	-0.2551	**-1.5635***							**1.9523****	-0.2395	**-1.7128****						
	Std.Err.	0.3282	0.7983	0.7963							0.3349	0.7981	0.7955						
	t-ratio	5.5410	-0.3190	-1.9630							5.8300	-0.3000	-2.1530						
EXSO	Coeff.				**4.6775****	-0.2620	-4.4154							**4.8600****	-0.1782	**-4.6818**			
	Std.Err.				0.9076	2.6466	2.7161							0.9347	2.6375	2.7029			
	t-ratio				5.1540	-0.0990	-1.6260							5.2000	-0.0680	-1.7320			
EXSOEX	Coeff.							**9.3325****	1.2603	**-10.5928**							**9.6010****	1.3250	**-10.9260**
	Std.Err.							1.8903	5.5217	5.7036							1.8825	5.4948	5.7031
	t-ratio							4.9370	0.2280	-1.8570							5.1000	0.2410	-1.9160
LTIP	Coeff.				1.6880	1.3457	-3.0337	2.4075	0.6326	-3.0402				0.9782	1.6369	-2.6151	1.9117	0.7195	-2.6312
	Std.Err.				2.9347	5.5271	5.3757	2.8003	5.4787	5.3484				3.0914	5.5579	5.3915	2.9264	5.5081	5.3662
	t-ratio				0.5750	0.2430	-0.5640	0.8600	0.1150	-0.5680				0.3160	0.2950	-0.4850	0.6530	0.1310	-0.4900
MO	Coeff.				**0.2301****	-0.1541	-0.0761	**0.2349****	-0.1624	-0.0725				**0.2359****	-0.1713	-0.0646	**0.2430****	-0.1833	-0.0596
	Std.Err.				0.0762	0.1980	0.1957	0.0733	0.1964	0.1945				0.0750	0.1989	0.1969	0.0721	0.1975	0.1959
	t-ratio				3.0220	-0.7780	-0.3890	3.2070	-0.8270	-0.3730				3.1450	-0.8610	-0.3280	3.3710	-0.9280	-0.3040
STRUST	Coeff.	**-3.7008****	0.4358	**3.2651****							**-3.6261****	0.3774	**3.2487****						
	Std.Err.	0.9821	1.3775	1.2749							0.9886	1.3816	1.2786						
	t-ratio	-3.7680	0.3160	2.5610							-3.6680	0.2730	2.5410						

MSH	Coeff.	**0.1213****	0.0945	**-0.2158***	**0.0894***	0.0918	**-0.1812***	**0.0958***	0.0920	**-0.1878***	**0.1085****	0.1037	**-0.2122***	0.0735	0.1031	**-0.1766**	**0.0832**	0.1010	**-0.1842***
	Std.Err.	0.0410	0.0931	0.0923	0.0444	0.0949	0.0935	0.0437	0.0943	0.0932	0.0412	0.0932	0.0925	0.0451	0.0951	0.0939	0.0438	0.0945	0.0936
	t-ratio	2.9580	1.0150	-2.3370	2.0120	0.9680	-1.9370	2.1910	0.9760	-2.0150	2.6350	1.1120	-2.2930	1.6280	1.0840	-1.8820	1.9010	1.0690	-1.9690
SIZE	Coeff.	**-0.0208****	**-0.0451****	**0.0660****	-0.0128	**-0.0469****	**0.0597****	**-0.0167***	**-0.0447****	**0.0614****	**-0.0236****	**-0.0445****	**0.0681****	**-0.0169***	**-0.0453****	**0.0622****	**-0.0205****	**-0.0436****	**0.0641****
	Std.Err.	0.0077	0.0131	0.0124	0.0085	0.0143	0.0136	0.0083	0.0139	0.0131	0.0076	0.0131	0.0125	0.0084	0.0143	0.0136	0.0082	0.0138	0.0132
	t-ratio	-2.7240	-3.4390	5.3040	-1.4950	-3.2770	4.3980	-2.0040	-3.2250	4.6720	-3.0930	-3.3880	5.4590	-2.0090	-3.1690	4.5720	-2.5050	-3.1560	4.8650
DEBT	Coeff.	**0.0454****	0.0173	**-0.0627**	**0.0570****	0.0117	**-0.0686**	**0.0632****	0.0068	**-0.0700**	**0.0527****	0.0186	**-0.0713**	**0.0629****	0.0132	**-0.0761***	**0.0674****	0.0094	**-0.0768***
	Std.Err.	0.0114	0.0369	0.0380	0.0124	0.0370	0.0381	0.0127	0.0372	0.0381	0.0113	0.0370	0.0381	0.0121	0.0369	0.0381	0.0124	0.0372	0.0382
	t-ratio	3.9830	0.4680	-1.6490	4.6090	0.3160	-1.8020	4.9820	0.1840	-1.8380	4.6670	0.5030	-1.8720	5.2040	0.3570	-1.9980	5.4220	0.2530	-2.0140
Expec income	Coeff.	**-0.5788****	-0.2232	**0.8020****	**-0.6382****	-0.1927	**0.8309****	**-0.6809****	-0.1764	**0.8574****	**-0.6485****	-0.2342	**0.8827****	**-0.7263****	-0.1927	**0.9190****	**-0.7545****	-0.1809	**0.9355****
	Std.Err.	0.1197	0.2984	0.3024	0.1257	0.2961	0.3010	0.1307	0.3011	0.3045	0.1294	0.3035	0.3042	0.1406	0.3045	0.3043	0.1441	0.3101	0.3092
	t-ratio	-4.8350	-0.7480	2.6520	-5.0770	-0.6510	2.7610	-5.2090	-0.5860	2.8160	-5.0120	-0.7720	2.9020	-5.1660	-0.6330	3.0210	-5.2370	-0.5830	3.0260
Unexp income	Coeff.	**-0.2379****	-0.0899	0.3278	**-0.2748****	-0.0547	0.3295	**-0.2542****	-0.0705	0.3247									
	Std.Err.	0.0674	0.2180	0.2249	0.0717	0.2149	0.2225	0.0712	0.2116	0.2190									
	t-ratio	-3.5320	-0.4120	1.4580	-3.8350	-0.2550	1.4810	-3.5700	-0.3330	1.4830									
Positive	Coeff.										**-0.2709**	-0.3903	**0.6612**	**-0.2952**	-0.3435	**0.6387**	-0.2034	-0.4164	**0.6198**
Unexp income	Std.Err.										0.1519	0.3797	0.3749	0.1741	0.3790	0.3737	0.1767	0.3826	0.3733
	t-ratio										-1.7830	-1.0280	1.7640	-1.6960	-0.9060	1.7090	-1.1510	-1.0880	1.6610
RETURN	Coeff.	**-0.0618****	-0.0048	0.0665	**-0.0687****	0.0019	0.0668	**-0.0768****	0.0052	0.0716	**-0.0729****	0.0086	0.0643	**-0.0839****	0.0164	0.0675	**-0.0919****	0.0194	0.0725
	Std.Err.	0.0184	0.0509	0.0513	0.0192	0.0507	0.0511	0.0192	0.0505	0.0509	0.0183	0.0504	0.0508	0.0184	0.0496	0.0498	0.0186	0.0496	0.0499
	t-ratio	-3.3650	-0.0940	1.2980	-3.5870	0.0380	1.3060	-3.9950	0.1030	1.4070	-3.9730	0.1700	1.2660	-4.5630	0.3310	1.3540	-4.9380	0.3910	1.4530
Δ Dividend	Coeff.	-0.1618	1.3811	-1.2193	-0.1473	1.3678	-1.2205	-0.0368	1.2648	-1.2280	-0.2339	**1.5083**	-1.2743	-0.2139	1.4822	-1.2683	-0.1144	1.3878	-1.2734
	Std.Err.	0.4032	0.8989	0.8822	0.4459	0.8955	0.8696	0.4465	0.8862	0.8670	0.4153	0.9117	0.8911	0.4600	0.9064	0.8770	0.4624	0.8989	0.8748
	t-ratio	-0.4010	1.5360	-1.3820	-0.3300	1.5270	-1.4030	-0.0820	1.4270	-1.4160	-0.5630	1.6540	-1.4300	-0.4650	1.6350	-1.4460	-0.2470	1.5440	-1.4560
Log likelihood function		-813.27			-820.73			-818.34			-821.22			-830.77			-827.11		
Restricted log likelihood		-957.01			-957.01			-957.01			-957.01			-957.01			-957.01		
Chi-squared[df]		287.47[24]			272.55[26]			277.34[26]			271.56[24]			252.46[26]			259.79[26]		
Significance level		0.0000			0.0000			0.0000			0.0000			0.0000			0.0000		

Comparison of selected studies on the motivations for share repurchases[46]

Paper	Hypotheses tested	Methodology	Findings	Caveats
Comment & Jarrell (1991) Li and McNally (2000)	Signalling	Focus on the announcement returns of: tender offers (TO) versus open market repurchases (OMR).	OMR are associated with the smallest announcement returns, though if they are large in value they can be as effective in signalling undervaluation as TO.	In the UK most buybacks are on the market, and the maximum number of shares that can be bought with a single authority is 15% of share capital. The arguments of these studies being mostly based on the market reaction to tender offers, their results are thus unlikely to apply to the UK.
D'Mello & Shroff (2000)	Signalling	Focus only on TO, they estimate the economic value (EV) of repurchasing firms using earnings forecasts and hypothesise that firms repurchase occur when their EV is greater than the prevailing stock price.	Repurchasing firms are significantly more undervalued than non repurchasing firms.	
Jagannathan et al (2000)	FCF	Focus on the characteristics of firms that repurchase vs. those that increase dividends vs. those that do both vs. those that do neither.	Dividends are used to pay out permanent cash flows while repurchases are used to pay out temporary cash flows.	They focus their analysis entirely on the FCF argument, neglecting to control for factors like managerial interests and capital structure.
Guay and Hardford (2000)	FCF	Focus on the information content of repurchases vs. dividends in relation to market's expectations of the permanence of the cash-flow.	Large dividend increases are associated with a larger permanent component of cash flow than repurchases.	They make the implicit assumption that the market adjusts its expectations following the announcement of the event (repurchase or dividend increase) only according to the permanence of cash-flow information content of the event. Thus ignoring other information.
Weisbenner (1998)	Options	Uses reduced form regression on a cross-sectional sample and an unbalanced panel to measure the effect of total and executive options on repurchases, total payouts and earnings	Stock option programs are associated with increased repurchases and decreased earnings retention. But the larger the executive options the more likely a	The results of this study are unreliable because of the unreliability of the data it uses (obvious problems with the cross-sectional analysis and selection bias in the panel data, not having been randomly selected). Moreover, the use of a reduced

[46] This table only includes studies that focus on the motivations for share buybacks. Another trend in the share repurchase literature, which we are not concerned with, is the announcement effect of share repurchases on share prices.

		retention.	firm is to retain its earnings	form regression is inappropriate since the payout variable is not a censored variable. Finally, measuring repurchases as any negative change in shares outstanding is inappropriate.
Khale (2002)	Options	Uses logit models to estimate the probability of repurchasing vs. increasing dividends.	Repurchases are significantly positively related to total exercisable options and repurchase announcement return is significantly negatively related to total options outstanding.	Measuring the decision variable according to the *announcement* of repurchases or dividend increases is inappropriate given that announcements are not always followed by actual repurchases.

5 SHARE REPURCHASES, DIVIDENDS AND CORPORATE PAYOUT BEHAVIOUR MODELS

5.1 Introduction

In the literature review chapter we focused on an analysis of the main explanations, assumptions, hypotheses and empirical results to be found in the academic literature dealing with board/managerial motivations to repurchase their companies' shares. We found that the free-cash flow hypothesis, whereby firms with significant free cash flows are hypothesised to use share repurchases primarily as a means by which to return some of this surplus cash to their shareholders, enjoys considerable empirical support from several US studies. However, several studies have also produced conflicting evidence for this hypothesis. In the previous chapter we looked at UK firms' motivations to repurchase their shares and, although the FCF hypothesis seemed tenable given our results, there remained the issue that most firms seem to repurchase not out of excess cash flow, as should be the case according to the argument of the FCF hypothesis, but rather out of permanent income. The free cash flow model also suggests that this form of distributing (surplus) cash to shareholders ought to represent an incremental (additional) distribution rather than being a substitute for regular dividend payments. The empirical evidence from both existing published studies and the current paper indicates however that some share repurchases may be substitutes for dividend payments, or at least, dividend increases.

The widespread use of share repurchases and the evidence that repurchases are a substitute for dividends suggests that the free cash flow hypothesis is not likely to account for the majority of these repurchase decisions. Nevertheless, both these factors appear to imply that this form of distributing surplus cash to shareholders must have attractive additional features relative to the traditional alternative of simply

increasing dividend payments on all currently issued shares. Later in the chapter a discussion of the inherent (financial) flexibility of share repurchases vis-à-vis dividends is undertaken. Briefly, however, unlike in the case of dividends where the market reacts negatively to news of a reduction in dividends, market expectations/pressures in regard to firms making regular and/or predictable share repurchases are almost non-existent. Indeed, this lack of market expectations provides repurchasing firms with significant financial flexibility via their ability to choose the timing and size of their actual trades, including of course the possibility of ex post not repurchasing at all irrespective of earlier apparent decisions/announcements to the contrary.

The flexibility of share repurchases vis-à-vis dividends as a method of returning apparently "surplus" cash to shareholders is likely to be particularly valuable to firms facing uncertainties regarding future income levels and therefore fearful of raising unrealistic expectations of future dividends. Consequently, it seems plausible to model repurchase decisions as simply one element of a firm's overall payout policy and to focus the empirical analysis upon evaluating the impact of repurchase activities on total payouts, in particular, whether repurchases are primarily substitutes for, or complementary to, dividend payments.

An implication of share repurchases being considered to be an integral part of a firm's payout policy, is that repurchases ought to be taken into account when valuing its shares, or when predicting its future cash distributions. What is evident from the financial literature though, is that dividends are still the only form of payout used in the standard textbook models of share valuation and future payout estimations.

Financial analysts also still use models such as the discounted dividend model (DDM) to estimate the value of a firm without taking into account its repurchase policy. Some researchers, for example Lamdin (2000) and Randall (2000), have already raised this issue and have demonstrated how valuation models can be biased when they do not incorporate share repurchases. For instance, Lamdin (2000) found that when the traditional DDM is used it results in undervaluation errors that are positively related to the extent of the firm's use of share repurchases, meaning that the more a firm repurchases its shares the more undervalued it would look if valued using the DDM. Consequently, both Lamdin (2000) and Randall (2000) have proposed modified versions of the DDM that take into account cash distributions through share repurchases.

Another example of the confusion caused when a narrow definition of dividends is used comes from the stock price volatility literature. Earlier studies such as LeRoy & Porter (1981), Shiller (1981) and West (1988) found evidence against the efficient market hypothesis primarily because they used a narrow definition of dividends. Ackert & Smith (1993) on the other hand, incorporate in their model cash distributions through share repurchases and takeover payments. Their results lend support to the market efficiency hypothesis as they find that stock prices are not too volatile to be explained by the discounted value of total cash flows.

These studies illustrate that regular dividend payments have become only part of the total payouts of many firms; they appear to represent the smooth expectable component of the distribution to shareholders. The other part, which could take the form of special dividends and/or share repurchases, represents the cyclical more

volatile component of the distribution. Hence, analyses that restrict corporate payout policy to dividends are effectively limiting the analysis to just the inherently smoother and less flexible component of total payouts. This means that any results will automatically be biased against finding any relationship between changes in dividends and the uncertain component of current earnings.

The aim of this chapter is to examine the determinants of *total* payout policy as opposed to just dividends. We start off with Lintner's (1956) model of corporate dividend behaviour, apply it to total payouts, and extend it to include other variables that have been suggested or found to be influential in respect of corporate payout policies. We demonstrate that Lintner's model can still function relatively well when total payouts are estimated as opposed to just dividends. We also show that firms that repurchase their shares tend to have a smoother dividend policy, as the most volatile element of their payouts is captured by share repurchases. This implies that using the traditional models of corporate dividend behaviour without taking into account share repurchases will tend to yield results that appear to show that current earnings have virtually no impact upon current dividends and that the latter can be almost wholly explained in terms of lagged dividend payments. In addition, we suggest some modifications to Lintner's partial adjustment model, that reflect changes in fundamentals of corporate dividend policy over the years, and the unique environment in which UK companies operate, which tends to encourage conservatism more than in the US (with regard to dividends).

The remainder of the chapter is organised as follows; firstly, some background literature on dividends is presented, there is no need to do the same for share

repurchases as these have been analysed in depth in the previous chapter. The main motivations for paying dividends are presented followed by what the literature suggests are the determinants of corporate dividend policy. Secondly, motivations for this research are presented with a theoretical framework of how the analysis fits into the current spectrum of literature on dividends. This is followed by a brief description of the methodology and data used. Finally, the results are presented and discussed and conclusions drawn.

5.2 Literature review

Corporate dividends have been at the centre of an ongoing debate for at least the past 50 years. This debate has come to be known as the 'dividend puzzle', and at its heart are questions like "why do firms choose to pay dividends?" and "why should dividends affect the value of the firm?" Many academicians have attempted to answer these and other questions, some advancing strong theories and models to support them, others choosing to draw their answers from the mouths of those who make the decisions i.e. directors and senior managers. In either case, the financial literature has not reached a consensus over the importance and the relevance of corporate dividend policy. At one extreme, some theorists have asserted that in perfect markets dividend policy has no bearing on the value of the firm (Miller and Modigliani's irrelevancy theory, 1961). At the other extreme, other theorists have maintained that markets are not perfect, and therefore dividend policy does affect the value of the firm.

Numerous hypotheses have been developed to explain why firms choose to pay dividends; most are based on some sort of market imperfection. It would be foolish to try to summarise all the literature on the subject, given how large and widespread it is. The following is therefore only a taster of an incredibly rich and "puzzling" literature. Given that this literature is usually divided into that which looks at why firms pay dividends, and that which looks at what determines the firm's dividend policy, we will also divide our preview accordingly.

5.2.1 The Motivations for Dividend Payments

5.2.1.1 The tax clientele hypothesis

It has been argued that due to differential tax liabilities amongst investors, dividend payments create a tax clientele effect. Each clientele is classified according to its tax preferences, for instance, individual investors tend to be taxed on income at a higher rate than capital gains, this makes them less favourable to dividends, contrary to institutional investors like pension funds who ought to be indifferent (at least in the UK) between income gains or capital gains. The result of this is that high-income tax payers would put a smaller value on the shares of high dividend-paying firms, and according to the theory we should expect them to concentrate their investments in stocks characterised by share repurchases or income retention instead of dividend payments. The opposite would be true for the case of low-income tax payers. This is consistent with the model put forward by Masulis & Trueman (1988), where the segregation of investors into clienteles minimises the shareholder tax-differences.

Several authors have come up with models to explain why firms keep paying dividends while a large portion of potential investors would prefer capital gains. Farrar & Selwyn (1967) for example present a model in which investors can choose the level of their debt (personal and corporate) and how to receive their returns (income or capital gains). They show that instead of paying dividends firms should repurchase their shares to distribute their cash flows. Brennan (1970) extends this model from just a partial to a general equilibrium framework, but essentially comes to the same conclusions. Auerbach (1979) argues that firms pay dividends essentially because investors tend to underestimate the value of long-term corporate capital.

Bajaj & Vijh (1990) use the clientele hypothesis to explain the price reactions associated with announcements of changes in dividends. They predict these reactions to be affected by the marginal investor's dividend yield preferences, and find that indeed the market's reaction to a dividend change is greater the higher the pre-announcement dividend yield, which they use as a proxy for anticipated dividend yield. The reasoning behind this is that, since high yield firms attract low-income tax payers, their announcements of dividend-increases or cuts should induce a greater price shock than low-yield firms which mostly attract high-income tax payers. Denis et al. (1994) also provide results supportive of the dividend clientele hypothesis. Using a sample of 6,777 large dividend changes during the period from 1962 to 1988, they document a positive relationship between announcement period excess returns and dividend yield.

5.2.1.2 The signalling hypothesis

The idea that dividends are used as a signalling device originated almost as early as the debate over dividends itself. In fact we can trace this idea back to the seminal paper by Lintner in 1956, where he presented his model of corporate dividend behaviour (and which we will come back to later), explicitly suggesting that corporate dividends reflect the long-term earnings prospects of the firm. He argued that firms are reluctant to cut their dividends since this would be interpreted by the market as a signal of bad things to come, and are generally cautious about large increases in their dividends especially if these may not be sustainable over the long-term. This is reflected in the fact that most firms have a relatively smooth dividend payout policy, and gives impetus to the signalling hypothesis; knowing how reluctant corporations are to cut their dividends, the market usually downgrades any firm that does so,

similarly, knowing how cautious corporations are about large increases in their dividends, the market generally rewards firms that do so. This suggests that dividends are indeed used in the financial markets as a channel of communication between insiders and interested outsiders, whether this channel of communication is used to transmit accurate information is at this point irrelevant.

Numerous studies have empirically tested the signalling hypothesis, though this has generally led to conflicting results. Event studies of the effect of dividend changes on stock returns generally find evidence supporting the signalling hypothesis, as dividend cuts are generally followed by large declines in stock prices and vice versa (Aharony & Sway, 1980; Asquith & Mullins, 1983; Petitt, 1972; Balachandran *et al*, 1996). For instance, using a sample of 6,777 large dividend changes between 1962-1988 Denis et al. (1994) find that two-day abnormal returns associated with dividend change announcements are positively related to the standardised size of the dividend change. They also document significant changes in analysts' earnings forecasts following dividend changes. They interpret these findings as being supportive of the signalling hypothesis.

However, many researchers challenge, not the findings themselves, but the leap from such findings to the suggestion that dividend changes can inform us of the future earnings of the firm. As stated very eloquently by Alli et al. (1993, p.528): "*Despite the significant number of studies showing that dividends convey information, there is still considerable controversy about what dividends actually signal*". In other words, although there is much evidence of the correlation between dividend changes and stock prices, it should not be taken to mean that dividend changes actually inform us of the *future* prospects of the firm. In fact, there is just as much evidence showing that dividend changes can hardly be indicative of future earnings. Watts (1973) examines

the relationship between current dividends and future earnings using a sample of 310 firms between 1946 and 1967. He regresses next year's earnings on current year's dividends and finds a positive relationship that is statistically insignificant. Gonedes (1978) and Penman (1983) find similar results. Benartzi et al. (1997) also reports results that are consistent with those of Watts (1973); namely, there is no significant relationship between dividend changes and future earnings. However, they do find that dividend changes are indicative of lagged and current earnings' changes, which leads them to conclude that all the information that one can draw from dividend changes concerns the permanence or otherwise of current changes in earnings.

Kalay (1980) tests the signalling hypothesis using a theory based on the conflicting interests of shareholders and bondholders, where the dividend decision is not left to the discretion of managers but is rather imposed on them as a result of some constraints. He argues that forced dividend reductions (reductions that result from an existing dividend constraint) cannot convey managers' expectations of future earnings, but finds that only 5% of dividend reductions he studied were forced reductions. This could be interpreted as providing support to the signalling hypothesis.

Brickley (1983) uses a small sample of 35 firms that increased their dividends by more than 20 percent and finds that earnings increase significantly in the year of the dividend increase and year subsequent to it. Aharony & Dotan (1994) find that earning increases continue for a period well over four quarters after the dividend increase.

Healy & Palepu (1988) find somewhat conflicting evidence. They use a sample of 131 firms that initiate dividend payments, and a sample of 172 firms that omitted a dividend payment. Their results show that the sample that initiated dividends experienced earnings increases before and after the dividend initiation, while the sample that omitted paying dividends experienced earning decreases in the year of the omission announcement but then experienced significant earning increases in the next years. These findings both support and dismiss the signalling hypothesis.

DeAngelo et al. (1992) compare dividend decisions of 167 NYSE firms that suffered at least one annual loss during 1980-1985 to those of 440 NYSE firms that did not suffer any loss during the same period. They find that half of the loss-firms reduced dividends in the initial year of the loss, while only 1% of non-loss firms reduced dividends during the sample period. They also find that 25% of loss-firms omit paying dividends during the year of the initial loss, while only one non-loss firm omits to pay dividends during the whole sample period. Nevertheless, the authors argue that a negative net income is not always a predictor of a dividend reduction, since half of loss-firms did not reduce their dividends during the year of the initial loss. They suggest that the use of net income corrected for extraordinary items should give better predictions as to dividend reductions.

Baker & Powel (1999) conduct a survey on dividend policy which they sent to chief executive officers of US firms listed on the NYSE, and based on 198 usable responses they find that most respondents believe that dividend policy affects the firm's value. Moreover, out of four explanations they gave in their survey for the relevance of dividends, most respondents expressed the highest agreement with the signalling

explanations. These results confirm those of Baker, Farelly & Eldelman (1985) and confirm the prediction of Lintner (1956) regarding managers concern for dividends' continuity.

Instead of examining changes in earnings following large changes in dividends, some researchers choose to study changes in dividends in periods surrounding large changes in earnings. Using a sample of 145 firms that experienced large decreases in their earnings after ten consecutive years of earnings' increases, DeAngelo et al. (1996) find that earnings changes precede dividend changes. They suggest that managers do not use dividends to signal any negative information they might have about the future earnings of the firm, which may be due to their over optimism or to other agency considerations. Brook et al. (1998) use the same type of methodology on a sample of firms that experienced four years of flat cash flows followed by a sharp permanent increase in cash flow. They find that these firms tend to increase their dividends more than benchmark firms before the large cash flow jump. They also find that firms that increase their dividends prior to the earnings increase experience much higher abnormal returns in the year preceding the earnings' increase than those that do not increase their dividend prior to the earnings increase. Although both types of firms eventually experience similar levels of abnormal returns, the timing of these returns is different depending on whether the firm increases its dividends prior to the earnings increase, in which case it would experience positive abnormal returns at the announcement of the dividend increase, or if it does not increase its dividends, in which case the abnormal returns would be associated directly with the announcement of earnings increases. In addition, the authors find that firms that experience only short-term earning increases do not tend to increase their dividends in the year prior to

the earnings increase nor decrease them afterwards. This comforts the findings of DeAngelo et al. (1996), but overall Brook et al.'s results lend support to the signalling hypothesis.

Some argue that dividend changes can also signal the volatility of a firm's cash flows. Kale & Noe (1990) develop such a model and illustrate how firms with volatile future cash flows pay less in dividends. However, Alli et al. (1993) test this model but do not find evidence to support it.

5.2.1.3 The agency theory and managements' entrenchment hypothesis

Agency theory suggests that paying dividends can help alleviate the agency costs arising from the conflicting interests of managers and shareholders. It is argued that this can be achieved in two ways: dividend payments can induce managers to be more selective in their investments by limiting the funds at their disposal (Jensen, 1986), and dividend payments also induce managers to raise external capital and hence expose themselves more frequently to the scrutiny of the market (Easterbrook, 1984). Proponents of Jensen's free cash flow hypothesis argue that managers are less likely to invest in value-decreasing projects when they distribute the available free cash flow to shareholders. However, some researchers have argued that FCF should be primarily used for the internal funding of investment projects, and that if it is paid to shareholders instead then it may not be cost-effective if the firm ends up going back to the market to raise the necessary funds for its investments, given all the transaction costs involved in such a process. Yet, supporters of the agency theory have argued that going back to the market to raise funds is not a bad thing in itself; rather, that accessing the public debt markets is beneficial for shareholders since the information

revealed and the attention the firm attracts from market makers tend to result in better monitoring and keener pricing of anticipated risks and returns that benefits all stakeholders and the economy in general. Studies by Baghat (1986), Hansen and Torregrosa (1992) and Jain and Kini (1999) all acknowledge the important monitoring role of investment banks in new equity issues (Farinha, 2003). Fluck (1998) and Myers (2000) also demonstrated through agency-theoretic models of dividend behaviour how managers could use dividends to avoid being disciplined by shareholders (Farinha, 2003).

One of the most popular hypotheses developed from the agency theory paradigm is the management entrenchment hypothesis. This hypothesis stems from work by Jensen and Meckling (1976), who argued that managers (the agents) are more prone to moral hazard when they have relatively small ownership stakes in the companies they run. As these ownership stakes increase, however, managers' behaviour becomes more in line with investors expectations, since they are no longer 'pure' agents, but to an extent are also principles. Nonetheless, it has been argued (Demsetz, 1983; Fama & Jensen, 1983) that managers who own substantial stakes of the firms where they work will no longer operate optimally as they are no longer exposed to takeover threats and other disciplining mechanisms of the market, and are likely to be more risk averse because of their relatively undiversified personal portfolios. For instance, Weston (1979) finds that firms with more than 30% insider ownership have never been acquired in hostile takeovers, and Morck et al. (1988) and McConnel and Servaes (1990) document a bell-shaped relationship between insider ownership and firm performance which suggests that managers become entrenched above a certain level of ownership (Farinha, 2003).

Rozeff (1982) argues that dividends and insider ownership can be used as substitutes in order to reduce agency costs, and considers the optimal dividend policy to be the result of a trade-off between agency costs and transaction costs. He uses a sample of one thousand US firms during the period between 1974 and 1980, and finds that dividend payments are strongly related to the set of variables he uses to proxy for agency and transaction costs. Crutchley & Hansen (1989) find evidence of a substitution effect between dividends, managerial ownership and debt, each one being a means of corporate monitoring, which lends support to the agency theory ideas.

In addition, using a sample of 235 US firms, Schooley & Barney (1994) test the hypothesis that the relationship between dividends and CEO share holdings is non-monotonic. They find that the relationship between dividend yield and CEO ownership is parabolic, i.e., when insider ownership is low they document evidence consistent with the classical agency theory. They find however that the DY is negatively related to CEO holdings once the latter has increased beyond a certain level as the two variables start to increase simultaneously. This led the authors to suggest that beyond a certain point CEO ownership no longer reconciles the interests of managers with those of shareholders. Using a much larger sample (more than 600 firms) for a two five-year periods, Farinha (1993) tests the management entrenchment hypothesis and finds that the coefficient on insider ownership changes from positive to negative after a critical entrenchment level of insider ownership that he estimates to be in the region of 30%. The author also finds that beneficial interests as well as unbeneficial interests that managers have control over (like pension funds, charity

trusts and employee stock option plans) tend to induce them to behave in a manner consistent with the management entrenchment hypothesis.

Moh'd, Perry & Rimbey (1995) use a sample of 341 firms over the period from 1972 to 1989 to test agency theory predictions. They employ a time-series cross-sectional analysis and find that dividend policy is a function of firm size, its growth rate, its operating/financial leverage mix, its intrinsic business risk, and its ownership structure. They also find that managers seem to act to minimise agency costs and that they adjust dividends in conjunction with the transaction costs structure of their firms.

5.2.1.4 The residual theory of dividends

Although the theories discussed so far have attempted to explain the market reaction following announcements of changes in dividend payments, and thus are concerned with explaining the paradox of why dividend policy should affect firm value, the residual dividend theory has a very different outlook on the whole dividend issue. In fact, it is rather inappropriate to consider it as a theory for explaining the dividend puzzle, since at its heart; it does not recognise this puzzle in the first place. However, in order to remain consistent with the literature in previous studies, we shall overlook this matter.

It has been argued by Alli et al. (1993) that the primary objective of firms should be to increase shareholder value, and that this can only be done if managers have an optimal investment strategy where they invest all the necessary funds in positive NPV projects. Therefore, dividends only come into the equation after all the earnings needed to invest in profitable projects have been retained – hence dividends are a

residual outcome of the investment decision. According to Myers & Majluf's (1984) pecking order argument we should expect high growth firms with large investment opportunities to have low payout ratios. Moreover, according to this theory we should also observe a negative relationship between dividend payouts and external financing costs, since these would determine whether the firm would resort to the market to raise capital for its investments, or use its internal funds (Alli et al, 1993, p.527).

This theory also implies that dividend payments would fluctuate with earnings and changes in investment opportunities (Kania & Bacon, 2005). However, given the 'smoothness' of corporate dividends we generally observe in the markets, Higgins (1972, p.1527) argues that "*The term residual does not imply that there is no dividend decision or that dividend policy does not affect the worth of the firm*". He maintains that dividend payments, even though secondary to the investment decision, still need to be forecasted in order to have a stable dividend policy that would predict future dividend payments and secure the necessary funds for these payments. As a consequence, the optimal residual dividend policy is one that minimises the costs related to underestimating (excess liquidity) or overestimating (external equity financing) future dividend payments.

Higgins (1972) develops a model to test this theory, and applies it to a sample of 117, 188 and 123 dividend paying firms during 1961, 1963 and 1965 respectively. He finds that inter-temporal differences in corporate dividends are mainly driven by differences in earnings and investment opportunities, which he takes as offering weak support to the view that dividend policy does not affect firm value. He also finds no support for the view that dividends and investment decisions are interdependent, a finding with which Fama (1974) strongly agrees, the latter concludes that regardless of any

imperfections that might exist in the market these are not enough to cause his data to reject the hypothesis that the dividend decision and the investment decision are completely independent of one another.

5.2.2 The Empirical Determinants of Corporate Dividend Policy

There is a large body of empirical studies that has examined corporate dividend behaviour from the perspective of those making the decisions i.e. managers. Most of this literature uses survey and interview methodology, and much of it confirms the hypotheses discussed earlier with the notable exception of the residual theory of dividends. The first behavioural study, which initiated the whole debate over corporate dividends, was undertaken by Lintner in 1956. Using a sample of 28 firms over seven years (from 1947 to 1953), which he selected on the basis of factors that appeared to have an effect on dividend policy, Lintner (1956) conducted field interviews with the managers of these firms. His results indicated a considerable heterogeneity among firms' dividend policies. Nonetheless, some common features were shared by most of these firms. For instance, managers largely favoured a steady dividend policy, and were generally unwilling to change dividends if these changes were likely to be reversed. Changes in dividends were largely determined by changes in permanent earnings, and overall, managers set a target payout ratio which they partially adjusted periodically to reflect permanent changes in earnings. This resulted in a smooth dividend payout policy and a marked reluctance to cutting dividends for most firms. Overall, Lintner's findings suggest that *"...dividends represent the primary and active decision variable in most situations"* (Lintner, 1956, p.97). These findings appear to completely contradict the predictions of models based on "dividends as residual" theory assumptions.

Lintner (1956) formally modelled these findings to produce an empirically testable model of corporate dividend behaviour that he used to predict the dividend behaviour of his sample of firms during 1918 to 1941 (excluding 1936 and 1937). His results indicated that his model could explain a significant portion of dividend changes. Lintner's model was later re-examined and extended by Fama & Babiak (1968) and several other researchers (Petit, 1972; Watts, 1973 and others) who confirmed his findings that managers only partially adjust dividends to levels that would be maintained over the long-term.

A survey of managers' views on dividend policy was carried out by Baker et al. (1985) using a sample of 315 firms, their results indicate a 'striking' resemblance to those of Lintner (1956), and appear to lend unequivocal support for the signalling and clientele dividend hypotheses. Their findings also indicate some differences in management's attitudes to, and perceptions of dividends between regulated and unregulated industries.

Gosh (1993) also carried out a survey of managers' views on dividends using a sample of over two hundred and fifty firms operating in the NYSE. He found that managers would prefer to increase dividends rather than conserve funds for uncertain investments, and that they would be willing to sustain (or be unwilling to cut) future dividend payments even if this implied taking on debt and incurring significantly higher costs and financial risk exposure. These findings, again, appear to confirm the main empirical predictions of Lintner's (1956) behavioural model.

Using 198 useable responses from a survey sent to CFOs of American firms listed on the NYSE in 1997, Baker & Powel (2000) find that the determinants of dividend policy have not materially changed over time; (smoothed) current and future earnings, together with the continuity of (i.e., the reluctance to cut) dividends are still the key factors influencing managers' decisions with respect to dividends.

Furthermore, the more recent Brav et al. (2005) survey of 384 CFOs and treasurers' dividend and share repurchase policies reports similar behaviour to previous studies, i.e., that mangers smooth dividends over time and are very reluctant to cut them. They also find that dividend increases depend primarily upon long-term earnings but to a smaller extent than in the past. Instead of increasing dividends, many firms now choose to repurchase their shares; the authors find that managers are attracted to repurchases because of their flexibility, and tend to use them to signal the undervaluation of their firms or to improve reported EPS. The survey also reveals that managers believe that retail investors prefer dividends to share repurchases, while institutional investors are largely indifferent between the two forms of corporate payout.

5.3 Motivations and theoretical framework

In recent years, there has been growing evidence of the decrease in the number of firms that pay dividends, and some evidence of a substitution of dividends for share repurchases. The leading paper in the debate over dividends' disappearance is by Fama & French (2001). They find that over the period 1978 to 1998, the proportion of dividend paying firms (non-financials and non-utility) decreased from 66.5% to 20.8%, translating into a decline of more than 50%. They argue that this is primarily due to the changing composition of the types of firms listed on the main US Stock Exchanges. For example, currently the main stock indices have a much higher proportion of small growth stocks that by definition can be expected to have a very low propensity to pay dividends. Nevertheless, the authors also find evidence that regardless of their type, currently all firms appear to be marginally less likely to pay dividends than similar firms twenty years ago.

Nonetheless, DeAngelo et al. (2003) find that although the number of dividend paying industrial firms decreased over the past two decades, dividend payments by these long-standing high dividend paying sectors actually increased both in nominal and real terms over the same period. They argue that the decline in dividend payers has been primarily due to small firms that generally had low dividends anyway. They conclude that large dividend payers have tended to increase their dividend payouts, which accounts for the observed increase in aggregate dividends, the increased number of small firms in the population of listed firms has led to a simultaneous decrease in the proportion of dividend paying firms. The authors use their findings to cast doubt on the signalling hypothesis, arguing that if dividends were used to signal

information to the market then these signals ought to be more, rather than increasingly less, prominent among small firms with little media coverage.

Starks & Yoon (2004) study the abnormal returns and operating performance around the announcement of dividend changes over the period 1963-2002 to shed light on any changes in the information content of quarterly dividends. Their results do not indicate any material changes in the market reaction to announcements of dividend increases, though they do document a decreased market reaction to dividend cuts. They also find that the operating performance of dividend-increasing firms significantly increased over the sample period, and that the operating performance of dividend-decreasing firms towards the end of the sample period is significantly less negative than at the start of the sample period. Overall, the authors suggest that managers have become more reluctant to increase dividends and less reluctant to decrease them. These results are consistent with those of Brav et al. (2005).

Grullon & Michaely (2000) report that between 1980 and 2000 expenditure on share repurchases relative to earnings increased from 4.8 percent in 1980 to 41.8 percent in 2000, which represents an average annual rate of increase of 26.1%, while dividends increased by an average annual rate of only 6.8%. This suggests that share repurchases as a percentage of dividends increased from 13.1% in 1980 to 113.1% in 2000. The authors also report that in 1999 and 2000 industrial firms spent more money on repurchases than on dividends, a situation which indicates just how popular and significant share buybacks have recently become in terms of US corporate payout policies.

In order to test the hypothesis that dividends are being substituted for repurchases, Grullon & Michaely (2000) use a very large sample constructed of 15,843 firms over the period of 1972 to 2000, which translates into 134,646 firm-year observations. They find evidence that share repurchases have been largely financed with potential dividend increases. They also find that the total payout ratio over their sample period remained the same despite the decrease in the average dividend payout ratio. Consistent with the findings of Fama & French (2001), Grullon & Michaely (2000) find that currently firms have a lower propensity to pay dividends than they did two decades ago. Nonetheless, their results contradict Fama & French (2001) in the sense that they lend support to the substitution hypothesis. Finally, the authors find that the market reaction to the announcements of dividend cuts is significantly less negative for repurchasing firms than for non-repurchasing firms. In fact, for repurchasing firms the market reaction to dividend reductions is not significantly different from zero, which appears to indicate that the market views share repurchases primarily as substitutes for dividends.

In a recent paper, Ferris, Pen & Hui (2006) examine corporate payout policy in the UK. Using a sample period extending from 1988 to 2002, they investigate whether the decline in the number of dividend payers is purely a US phenomenon or is part of a global trend. They find that the number of dividend paying firms in the UK declines from 75.9% at the beginning of the sample period to 54.5% at the end of the sample period. After controlling for firm size, profitability and investment opportunities, the authors find a declining propensity to pay dividends over the 1998-2002 subperiod, although this decline is neither as sever nor as lengthy as that documented in the US. The authors argue that because share repurchases in their sample seemed scarce, it is

not likely that dividends are being substituted for by share repurchases, and that the most likely explanation for this declining propensity to pay dividends is a shift in catering incentives. However, the authors collect their share repurchase data from the SDC, and as was discussed in the previous chapter, this source greatly under estimates the share repurchase activity in the UK market, which would explain why they did not find it likely that their sample firms were substituting dividends for share repurchases. Moreover, in another recent study of UK payout policy patterns, Renneboog & Trojanowski (2005) find that, contrary to US evidence and the findings of Ferris et al. (2006), firms in the UK do not display a decreasing propensity to pay cash to shareholders; that is, they find that despite the increasing role played by share repurchases, dividends still constitute a vast proportion of total payouts. In addition, most firms that repurchase shares also pay dividends.

Whether or not share repurchases are substitutes for dividends, it is clearly irrefutable that nowadays repurchases form a non-negligible form of payouts. Whilst, it is also true that they have always been far more popular in the US than in the rest of the world, more and more countries have been introducing legislation to facilitate corporate repurchase activities.

In Europe, 80% of share repurchase activity has been concentrated in the UK alone (Lasfer, 2000). Between January 1995 and December 2000, firms in the UK returned the equivalent of £34 billion in share repurchases, with an increase of more than 600 percent on the aggregate value of share repurchases between 1995 and 2000[47].

[47] Pope, P. and S. Young. (2002). "Executive Remuneration: an investor's guide." www.manifest.co.uk/reports

Share repurchases in the UK are set to increase further for two reasons. Firstly, fiscal legislation before 1997 made share repurchases unattractive to institutional investors who were able to receive tax relief on dividends but not on repurchases. But since 1997, tax changes have made institutional investors indifferent between dividends and repurchases, a development that can be expected to encourage more companies to repurchase. Secondly, before December 2003, firms had to cancel any shares they repurchased, but new regulations that came into force in December 2003 make it possible for firms to keep the shares they repurchase in treasury stock to be reissued at a later date or cancelled. This provides UK repurchasing firms much greater flexibility than previously. For example, now firms can use buybacks to fund their employee stock options instead of, as was the situation prior to the change in the law, having to create a separate trust for the sole purpose of providing shares for their benefit plans.

These changes in legislation together with the empirical findings highlighted earlier, suggesting that repurchases are increasing in popularity at the expense of dividends, raise questions as to the appropriateness of using dividends as opposed to total payouts (dividends plus share repurchases) in different valuation and behavioural models.

Bagwell & Shoven (1989) report that while in 1977 dividend payouts amounted to 77 percent of total cash distributions, in 1987 they represented only 47%. Moreover, Randall (2000) reports that in the 1990s the relative importance of dividends continued to decline with the S&P 500 dividend yield decreasing from 3.66% in 1990 to 1.41% in 1998. The author also points out that until the early 1990s the S&P 500 dividend yield was a reasonably good predictor of the strength of the stock exchange,

with 'low' yields signalling poor future performance. However, by the end of the 1990s the market was performing very well despite unprecedented low levels of dividend yield.

For a long time, the dividend discount model has been the most widely used share valuation model. Its prominence has not been limited to the academic world as financial analysts, investors and other financial practitioners also rely on it for many investment-related decisions. However, with repurchases becoming an important part of total payouts, it has become questionable whether the DDM is really appropriate when it neglects a large part of payouts. As Lamdin (2000, p.252) remarks: "*it is a bit of a conundrum that all corporate finance texts discuss repurchases under the rubric of dividend policy-noting that repurchases can be used as a substitute for dividends-however, the impact of repurchases on the DDM is left unexplored*".

Lamdin (2000) demonstrates that when repurchases are not incorporated in the DDM, undervaluation errors automatically occur, with the extent of these errors being positively related to the extent of the use of repurchases. He proposes a modified model where the dollar value of repurchases is added to the dollar value of dividends to get total payouts (not the per share value), the total value obtained must then be divided by the number of current outstanding shares to obtain the per-share value.

Randall (2000) also develops a modified version of the dividend discount model that incorporates the repurchase activity of the firm. He argues that as repurchases increase in popularity and in aggregate value, such modified models will prove very useful in estimating current and future stock prices for companies in the habit of repurchasing their shares.

Another example of the bias that can result from using a narrow definition of dividends is illustrated in the stock price volatility literature. Many of these stock price volatility studies reject the efficient market hypothesis on the premise that prices are too volatile to be determined by the expected discounted value of cash dividends. Ackert & Smith (1993) challenge this finding on account of the narrow definition of dividends they use. The authors argue that dividends should include all cash distributions to shareholders, as discussed by Kleidon (1986) and Marsh & Merton (1986), and argue that dividend smoothing can lead to changes in future residual dividend not reflected in current dividends. Kleidon (1986) also concludes that excess stock price volatility can be explained by the fact that most firms smooth their dividends.

Ackert & Simith (1993) use a variance-bound methodology to test the hypothesis that stock prices are not too volatile. They use data from the Toronto Stock Exchange for the period of January 1950 to February 1991. They find that when they analyse annual and monthly series of cash dividends their results are similar to previous studies in the sense that they reject the null hypothesis; stock prices are too volatile to be explained by the discounted dividend valuation model. However, when they redo the tests but broadening their definition of dividends to include share repurchases and cash mergers and acquisitions, they find that the null hypothesis cannot be rejected; stock prices are not too volatile to be explained by the discounted value of *total* cash distributions. These results appear to reflect the fundamental difference in roles played by dividends and repurchases in firms' total payout policies; namely, dividends being a smooth and predictable payout of sustainable long-term earnings,

whilst actual repurchases being driven by a combination of volatile or unexpected earnings outcomes and their ability to help achieve a variety of short term financial objectives such as reducing the agency costs of FCF, increasing EPS, or the avoidance of employee or managerial share option values. These differences in terms of the respective roles of dividends and repurchases in a firm's total payout policy, coupled with differences across firms in their usage of both dividends and repurchases, means that the use of only dividends instead of total payouts in stock price volatility studies results in ignoring an increasingly important component of firms' total payouts and the loss of all information related to the volatility of total payouts that, in the US, is largely driven by share repurchases.

Unfortunately, repurchases have not been neglected only in the share valuation or the stock price volatility literature, corporate dividend payout models have also traditionally been only applied to dividends. When we consider that repurchases have become an integral part of payouts for many firms we wonder at the usability of such models. Perhaps one reason why share repurchases have not been incorporated with dividends in modelling corporate payout behaviour is to do with their volatility.

It is generally accepted, since Lintner (1956), that firms are reluctant to decrease their dividends. The market reaction to dividend cuts has traditionally been very harsh; Ghosh & Woolridge (1988) and Denis et al. (1994) document average stock price declines of about 6% on the three days surrounding the announcement of a dividend cut (Jagannathan et al., 2000). Share repurchases, on the other hand, do not carry any obligation for the firm to sustain or increase them in the future. In fact, most firms, as we have seen in the previous chapter, obtain the authority to repurchase their shares but do not use it. Many actually announce repurchase programs but are under no

obligation to carry them fully or to carry them at all. Of course, getting into the habit of announcing repurchase programs without carrying them through may eventually damage a company's reputation. The bottom line is that share repurchases contain an element of flexibility which makes them very attractive to managers when they want to signal the undervaluation of their firm to the market or simply when they need to distribute excess cash flow to shareholders. As a result, for managers, increasing dividends carry an element of risk that they may not be sustainable whilst repurchases are free of any such sustainability expectations.

Models that focus on analysing the actual dividend policies of firms are numerous, most of which are just extensions of the original Lintner (1956) model. To date, these behavioural dividend models have all been used and empirically evaluated in terms of dividend payout policies rather than being extended to encompass corporate total (dividends plus repurchases) payout policies.

Lintner (1956) developed his model of corporate dividend behaviour on the basis of his observations from his field investigations, primarily interviews with managers. He subsequently applied this theoretical model to a sample of data and obtained results that were superior to those obtained from the use of a naïve model. In his model, Lintner assumes that a firm's dividend level for any year t (D_t^*), is related to its actual earnings (E_t) by a target payout ratio (r):

$$D_t^* = r\,E_t \quad \ldots\ldots\ldots\ldots \quad (1)$$

He also maintains that because earnings are uncertain, firms will want to "play safe" and only partially adjust to their target dividend level in any one year. This implies

that their dividend payout policy will be a function of their target payout ratio and the speed of adjustment of their current dividends to changes in earnings. Therefore, the change in dividends between year t-1 and year t is given by:

$$D_t - D_{t-1} = a + c\,(D_t^* - D_{t-1}) + u_t \quad \ldots\ldots\ldots\ldots (2)$$

Where a is a positive constant that reflects managers reluctance to cut dividends, r is the target payout ratio, c is the speed of adjustment coefficient that reflects managers' preferred adjustment to the desired dividend level , D_{t-1} are dividends in year t-1, E_t are the current year's earnings after tax and u_t is the error term.

Substituting (1) in (2) we obtain:

$$\Delta D_t = a + c\,r\,E_t - cD_{t-1} + u_t \quad \ldots\ldots\ldots\ldots (3)$$

which can also be written as

$$\Delta D_t = \alpha + \beta_1 E_t + \beta_2 D_{t-1} + u_t \quad \ldots\ldots\ldots\ldots (4)$$

Where $\alpha = a$, $\beta_1 = cr$ and $\beta_2 = -c$

Lintner's model assumes that all changes in earnings are "unexpected" and hence results in a uniform partial adjustment of dividends to total earnings changes. This is perhaps somewhat unrealistic given that the earnings of most firms are highly serially correlated over time and that often the best estimate of next year's earnings is this year's earnings. Fama & Babiak (1968) extend Lintner's partial adjustment model by incorporating the behavioural assumption that there is an "expected earning" component to which there is a full adjustment of dividends and an unexpected earnings component to which, as in the Lintner model, dividends only partially adjust to. They assume that expected earnings (E^*_t) in time t are generated as follows:

$$E^*_t = (1+\lambda)\,E_{t-1} \quad \ldots\ldots\ldots\ldots (5)$$

where λ is an earnings trend factor. Substituting (1) and (5) in (2) we obtain the Fama and Babiak model which includes lagged (i.e., t-1) earnings as a regressor:

$$\Delta D_t = a + c\, r\, E_t + r\, \lambda\, (1- c)E_{t-1} - c\, D_{t-1} + u_t \ldots\ldots\ldots\ldots (6)$$

(6) can also be written as:

$$\Delta D_t = \alpha + \beta_1\, E_t + \beta_2 E_{t-1} + \beta_3\, D_{t-1} + u_t \ldots\ldots\ldots\ldots (7)$$

From the empirical estimates, the following parameters can be deduced:

- *Speed of adjustment coefficient*: $c = - \beta_3$
- *Target payout ratio*: $r = (\beta_1 / c) = \beta_1/(- \beta_3)$
- *Rate of growth of earnings*: $\lambda = [\beta_2 / r(1- c)] = \beta_2 / [\beta_1 (1- \beta_3) /(- \beta_3)]$

Fama & Babiak (1968) also find that Lintner's model performs well relative to other models but that suppressing the intercept and adding lagged earnings slightly improves the predictive power of the model.

The partial-adjustment model in its various forms has enjoyed much support from the literature. However, times have moved on, and as we have seen in the literature review, the nature and shape of firms operating in today's markets is not exactly the same as that of firms that operated in the 1950s and 1960s. Moreover, challenges facing today's corporations and the environment within which they operate have changed dramatically over the past two decades. All this raises questions as to the applicability of Lintner's model.

When Lintner (1956) conducted his field work on the behavioural determinants of dividend policy, dividends were the main form of payouts to shareholders, share

repurchases were not then an issue. Nowadays, however, share repurchases cannot be ignored; they have to be incorporated in any payout policy model.

In a recent survey of managers' opinions and motives regarding their firms' payout policies, Brav et al. (2005) find that managers are still very conservative in their dividend policies, which is mainly due to the market's asymmetric reactions to dividend increases and decreases. However, contrary to Lintner's findings, Brav et al. (2005) find that firms do not place as high an importance on the target payout ratio as they used to, and they consider it to be more flexible than they used to. Moreover, the authors find that managers view share repurchases as an important form of payout that they prefer to dividends mainly for its flexibility. It is also found that repurchase policy is better explained by the framework of Miller and Modigliani (1961) than is dividend policy, in the sense that managers can afford to treat repurchase policy truly as a residual to the investment policy of the firm.

It would seem that despite their success in modelling corporate dividend behaviour to date, the Lintner-type behavioural models may become increasingly irrelevant unless they can be adapted to incorporate the increasing and uncertain component of total payouts represented by share repurchases. In addition, the behavioural assumptions of the Lintner-type models have become questionable as the evidence reviewed earlier indicates that firms today tend not to focus on maintaining a fixed target payout ratio as much as previously and their reduced reluctance to cut dividends, particularly when repurchasing shares are an adequate substitute for the forgone dividend.

Thus, given the above arguments for a broader definition and understanding of the determinants of total corporate payout policies beyond merely dividends, our analysis

consists of first determining whether either the original Lintner model or its subsequent variations are able to empirically explain UK dividend behaviour and second, whether when applied to total payout policies, the partial-adjustment models are able to adequately explain total payout (repurchases and dividends) behaviour. Our comparative analysis allows the evaluation of several interesting hypotheses regarding the respective roles played by dividends and repurchases in the total payout policies of UK firms. For example, do the original Lintner or Fama & Babiak behavioural assumptions still apply to UK corporate dividend policies or can alternative earnings benchmarks and behavioural assumptions provide a better explanation?; do these types of models applied to total payout policies yield plausible and/or better or worse empirical estimates than when applied to explaining solely dividend payouts?; do firms that pay dividends and repurchase shares adopt a smoother dividend payout policy than firms that only pay dividends and, if so, is there evidence that this is because repurchasing firms tend to restrict share repurchases to the distribution of the volatile element of earnings?

Given the changed composition of the listed company population and the ability of firms to design corporate payouts in terms of both dividends and repurchases, the first step in our analysis is to ascertain whether the specification of the partial-adjustment models are still appropriate or, alternatively, can be modified to reflect the changes in corporate payout behaviour discussed earlier, in a contemporary UK setting.

To answer these questions we use both Lintner (1956) and Fama & Babiak's (1968) models as a starting point to analyse the payout policy of an unbalanced panel of firms that represent the FTSE 350 in April 2004 excluding the financial sector, over a four year window (from 2001 to 2004). We model the change in dividends and then the

change in total payouts, where we just replace dividends by total payouts (dividends and repurchases). We contend that the inclusion of share repurchases in the traditional dividend payout models is legitimate and will enable an evaluation of the relationships between dividends and repurchases components of total payouts and whether either or both forms of payout are, as expected, more strongly related to various measures of firms' expected and unexpected earnings. In the following section of this chapter, we develop a general model of changes in dividend and total payouts that is predicated on the assumption that, though the relative payout ratios and/or sensitivity of dividends and repurchases may differ, there is a full adjustment to this payout ratio of either form of payout to expected changes in earnings and a partial adjustment to unexpected earnings. We show that the original Lintner and the Fama & Babiak dividend models are simply special cases where it is assumed that expected earnings are respectively zero and a linear function of the t-1 reported earnings. Our analysis enables us to evaluate whether firms that repurchase their shares are able to operate a smoother dividend policy in tandem with a share repurchase programme that distributes the volatile element of payouts related to non-sustainable earnings without affecting dividends. We can also evaluate whether managers in the UK operate more conservative dividend policies than their US counterparts. If so, we expect to find that current dividends will depend more on past dividends than has previously been documented, and that lagged rather than current earnings is the primary driver of current dividend changes.

5.3.1 Methodology

As mentioned earlier, this chapter aims to determine what affects the (dividend and total) payout policy of UK firms. We start off by estimating dividend changes using

the traditional corporate dividend models; Lintner's partial adjustment model (equation (4)) and its lagged earnings modification by Fama & Babiak (1968) (equation (7)) detailed in the previous section. These models are then used to estimate the change in total payouts, where we introduce both dividends and repurchases as one variable which we refer to as 'total payouts'. An example using Fama and Babiak's model is illustrated below:

$$\Delta T_t = a + c\, r\, E_t + r\lambda\,(1-c)\, E_{t-1} - c\, T_{t-1} + u_t \quad \ldots\ldots\ldots\ldots (8)$$

Where r is the target payout ratio, c is the speed of adjustment coefficient, T_{t-1} are total payouts in year t-1, E_t and E_{t-1} are respectively the current and last year's earnings after tax and u_t is the error term.

(8) can also be written as:

$$\Delta T_t = \alpha + \beta_1 E_t + \beta_2 E_{t-1} + \beta_3 T_{t-1} + u_t \quad \ldots\ldots\ldots\ldots (9)$$

From each model we can deduce that the hypothesised parameters are related to the empirically estimated coefficients as follows:

- *Speed of adjustment coefficient*: $c = -\beta_3$
- *Target payout ratio*: $r = \beta_1 / c = \beta_1 / (-\beta_3)$
- *Rate of growth of earnings*: $\lambda = \beta_2 / r(1 - c_i) = \beta_2 / [\beta_1 (1 - \beta_3) / (\beta_3)]$

We have already argued that the partial-adjustment model may not be very adequate for explaining the payout policies of corporations today. We are particularly concerned about the assumption that Lintner (1956) makes concerning how a firm's dividend level is related to its actual earnings by a target payout ratio. We have seen that Brav et al. (2005) found that managers do not attach the same importance to a

fixed target payout ratio as they used to. Moreover, it is possible that UK managers have become more cautious now that repurchases are possible. For example, as the current year's actual earnings are still uncertain when they set the current year's dividends, some of which is actually distributed as interim dividend payments prior to the end of the current earnings period, we might expect to find that this year's dividends depend primarily upon last year's reported earnings, since these have less uncertainty attached to them. In addition, we might also expect that current dividends are mostly explained by lagged dividends. Finally, we could expect the estimated constant term to be close to zero, especially in the case of firms that repurchase their shares. Lintner (1956) included an intercept in his model to reflect managers' reluctance to reduce dividends, Fama & Babiak (1968), however, found that deleting the intercept slightly improves the predictive power of the model. If we also consider the findings that some managers are less reluctant to cut their dividends than they once were, we would also expect the estimated constant for the sample as a whole to be close to zero, while the inclusion of firm-specific intercepts (fixed effects) would increase the explanatory power of the empirical estimates.

5.3.2 Alternative Expected and Unexpected Earnings Models

As mentioned in the previous section, both the Lintner and Fama & Babiak models assume particular benchmark earnings. In the case of the Lintner model expected earnings are assumed to be zero and hence the change in dividends is a partial adjustment of dividends to all changes in earnings. As we have suggested, not all earnings will be unexpected and, in the Fama & Babiak model, there is an assumption that there will be a full adjustment to expected earnings changes and a partial adjustment to unexpected earnings changes. The expected earnings for time t in this

model is assumed to be a linear function of the t-1 earnings, which in a cross sectional context is equivalent to assuming and testing a sample wide common growth-in-earnings trend factor. Both these models are in fact simply special cases whereby changes in dividends (total payouts) are related to expected and unexpected earnings components. Moreover, it may be that neither the assumption that all earnings are unexpected nor that there is a common trend in earnings relationship across the sample are the most plausible earnings benchmarks.

To see why, assume that:

E^*_t = expected sustainable earnings in time t

$E^*_t - E_{t-1}$ = expected change in earnings in time t

$E_t - E^*_t$ = unexpected change in earnings in time t

If we assume a target payout ratio r and a reluctance to reduce dividends (total payouts), then changes in dividends (total payouts) are a function of a full adjustment of dividends (total payouts) to expected changes in earnings ($E^*_t - E_{t-1}$) and a partial adjustment to unexpected earnings ($E_t - E^*_t$) as follows:

$$D_t - D_{t-1} = a + r(E^*_t) + c\,r(E_t - E^*_t) - D_{t-1} \quad \ldots\ldots\ldots\ldots (10)$$

Empirically,

$$D_{it} - D_{it-1} = \alpha_{it} + \beta_1 E^*_{it} + \beta_2 (E_{it} - E^*_{it}) + \beta_3 D_{it-1} + u_{it} \quad \ldots\ldots\ldots\ldots (11)$$

Where $\beta_1 = r$; $\beta_2 = cr$; $\beta_3 = -1$.

The Lintner model assumes that $c < 1$ and $E^*_{it} = 0$, which reduces equation (11) to the original Lintner estimating equation. In the case of the Fama & Babiak model, expected time t earnings (E^*_t) are assumed to be $E^*_t = (1+\lambda)\, E_{t-1}$, which reduces

equation (11) to the familiar Fama & Babiak expressions shown as equations (6) and (7) in the previous section.

The main problem with using the Fama & Babiak expected earnings formulation in a cross sectional context is that it is highly unlikely that all the firms in the sample will experience an identical earnings trend and hence this imposes an unrealistic restriction on the empirical estimates. In order to estimate the alternative benchmark earnings assumptions using an expected earnings function that makes use of firm-specific data, we need empirical estimates of expected earnings E^*_t and unexpected earnings (E_{it}- E^*_{it}). We do this by running an OLS regression as follows:

$$E_t = \alpha + \beta_1 E_{t-1} + \beta_2 (E_{t-1} * NE_{t-1}) + \beta_3 Size \ldots\ldots\ldots\ldots (12)$$

Where NE_{it-1} refers to a dummy that takes one for all the values of E_{it-1} that are negative and zero otherwise. Both time and industry effects are controlled for.

We obtain:

E^*_t = the predicted value of E_t from the above model (i.e., we save the predicted values for each firm as a new variable which represents expected earnings given the time period and industry, size and last year's earnings of the firms concerned)

and (E_{it}- E^*_{it}) = the unexpected/unexplained variance from the above model (i.e., we save the residuals as a new variable which represents each firm's unexpected time t earnings).

This estimation method has other statistical benefits as by construction E^*_t and (E_{it}- E^*_{it}) are uncorrelated with each other and so avoids any potential multicollinearity

problems associated with having both the current and lagged earnings variables in the same estimating equations.

This formulation also allows us to test a range of alternative earnings benchmarks, including the special case where $E^*_{it} = E_{t-1}$, i.e., where expected earnings are simply last year's earnings and equation (11) reduces to:

$$D_{it}-D_{it-1} = \alpha_{it} + \beta_1 E_{it-1} + \beta_2(E_{it}- E_{it-1}) + \beta_3 D_{it-1} + u_{it} \ldots\ldots\ldots\ldots (13)$$

5.3.3 Empirical Estimating Methods

Ordinary least squares with fixed effects methodology is used to estimate all the regressions (unless indicated otherwise), controlling for firm size, merger activity and time effects (year dummies). Firm size is controlled for because the dividend as well as the repurchase policy of firms may differ systematically according to their size. Large firms tend to have larger and more stable cash flows, which means that their payouts tend to be larger. According to the free-cash flow hypothesis we should expect share repurchases to occur more frequently within large firms with large cash flows and fewer investment opportunities than within small firms, which tend to be more risky and in need of more not less new capital for financing these growth opportunities. Hence, as small firms tend to be less liquid and to have more growth opportunities i.e. profitable investments, then we should expect them to pay out little or no cash to their shareholders in whatever form. Indeed, as we have seen in the previous section, small firms have even less tendency to pay out dividends now than they did two decades ago. Although our sample is constituted of firms that paid dividends at least once during the sample period, differences in size may still arise

between firms that pay large dividends and those that pay small dividends, and companies that repurchase their shares and those that do not. As a result, it is imperative to control for size if we are not to make the mistake of misinterpreting the results.

In addition, we control for merger activity in order to avoid the effects that such activity might have on the dividends and repurchases of sample firms. It is to be expected that when two firms merge their dividend payments may be drastically changed to reflect the merger, and the same goes for share repurchases.

As discussed in the previous two chapters, our sample consists of non-financial firms that were listed on the FTSE 350 in April 2004 and we collected data for these firms from 2000 to 2004. This resulted in an unbalanced paned of 270 firms from which we had to drop 15 because they never paid a dividend during the sample period, and a further eight because they represented very large outliers in terms of their income or their share repurchases[48]. The final sample of firms used in the current analysis consists of 247 firms (926 observations) that paid dividends at least once during the four year sample period.

The process of data collection was divided into two phases; in the first we collected repurchase information from annual reports, consisting of the fraction and pound value of shares repurchased. In the second phase we collected dividend and other financial information from DataStream, as presented below:

[48] A total of eight observations were excluded from the sample. Two observations, from the same company, were excluded because the company in question suffered exceptionally large losses in one sample year. Data for that year and the year before it (lagged) were thus excluded. Six observations where sample firms repurchased (either in the current or in the previous year) more than 15% of their share capital were also excluded from the sample. Most of these repurchases were tender-offer repurchases.

- *Market value* (data item MV): the share price multiplied by the number of ordinary shares in issue.
- *Total assets* (data item WC02999): the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets.
- *Dividends* (data item WC05376): represent the total cash common dividends paid on the company's common stock during the fiscal year, including extra and special dividends[49].
- *Net income* (data item WC01751): represents the net income the company uses to calculate its earnings per share. It is before extraordinary items.
- *Capital expenditure* (data item WC04601): represent the funds used to acquire fixed assets other than those associated with acquisitions.
- *Earnings before interest, taxes and depreciation*- EBITDA (data item WC18198): represent the earnings of a company before interest expense, income taxes and depreciation. It is calculated by taking the pre-tax income and adding back interest expense on debt and depreciation, depletion and amortization and subtracting interest capitalized.

This financial information was used to measure the following variables:

- D_{it} : total cash dividends (excluding special dividends) paid during the current year normalised by the total assets of the firm at the start of the current financial year.

[49] We obtain information on special dividends from company annual reports and subtract it from the DataStream dividends to obtain the dividend variables that we use in this analysis

- D_{it-1} : total cash dividends (excluding special dividends) paid during the last financial year normalised by the total assets of the firm at the start of the previous financial year.
- $\Delta D_{it} = D_{it} - D_{it-1}$: the change in dividends between this year and last year.
- REP: the value of shares repurchased during the current year normalised by the total assets of the firm at the start of the financial year.
- TP_{it} : total payouts (dividends and repurchases) paid during the current year normalised by the total assets of the firm at the start of the current financial year.
- TP_{it-1} : total payouts (dividends and repurchases) paid during the previous financial year normalised by the total assets of the firm at the start of the previous financial year.
- $\Delta TP_{it} = TP_{it} - TP_{it-1}$: the change in total payouts between this year and last year.
- E_{it-1} : net income at the end of the current year normalised by the total assets of the firm at the start of the current financial year.
- E_{it-1-1} : net income at the end of the previous year normalised by the total assets of the firm at the start of the previous financial year.
- SIZE: the natural logarithm of the firm's total assets at the start of the current financial year.
- MERGER: a dummy variable that takes the value of one in the year of the merger/de-merger and the year following it and zero otherwise[50].

[50] Variations in dividends, total payouts and earnings are easily affected by mergers and acquisitions. A dummy was thus created to control for this phenomenon. However, this dummy does not take into account just any merger or acquisition (as these happen very often). Only mergers that resulted in the creation of an entity that was also listed in the FTSE350 subsequent to the merger, or de-mergers that

To recapitulate, the models that will be empirically estimated are:

Lintner's model:

Estimation of dividend changes: $D_{it}-D_{it-1} = \alpha_{it} + \beta_1 E_{it} + \beta_2 D_{it-1} + u_{it}$

Estimation of total payout changes: $T_{it} -T_{it-1} = \alpha_{it} + \beta_1 E_{it} + \beta_2 T_{it-1} + u_{it}$

Fama and Babiak's model:

Estimation of dividend changes: $D_{it}-D_{it-1} = \alpha_{it} + \beta_1 E_{it} + \beta_2 E_{it-1} + \beta_3 D_{it-1} + u_{it}$

Estimation of total payout changes: $T_{it} -T_{it-1} = \alpha_{it} + \beta_1 E_{it} + \beta_2 E_{it-1} + \beta_3 T_{it-1} + u_{it}$

Special case of the expected and unexpected earnings model:

Estimation of dividend changes: $D_{it}-D_{it-1} = \alpha_{it} + \beta_1 E_{it-1} + \beta_2 (E_{it} - E_{it-1}) + \beta_3 D_{it-1} + u_{it}$

Estimation of total payout changes: $T_{it} -T_{it-1} = \alpha_{it} + \beta_1 E_{it-1} + \beta_2 (E_{it} - E_{it-1}) + \beta_3 T_{it-1} + u_{it}$

Alternative expected and unexpected earnings model:

Estimation of dividend changes: $D_{it} - D_{it-1} = \alpha_{it} + \beta_1 E^*_{it} + \beta_2 (E_{it} - E^*_{it}) + \beta_3 D_{it-1} + u_{it}$

Estimation of total payout changes: $T_{it} -T_{it-1} = \alpha_{it} + \beta_1 E^*_{it} + \beta_2 (E_{it} - E^*_{it}) + \beta_3 T_{it-1} + u_{it}$

E* are the estimated predicted earnings.

In all dividend/payout estimations we control for fixed effects, size, and merger activity (refer to the tables in the appendix for more details).

resulted in the creation of one or two entities that were also listed on the FTSE 350 subsequent to the de-merger, were taken into account.

5.4 Descriptive statistics

Table 5-1 presents descriptive statistics of the total sample, the sub-sample of firms that paid dividends but did not repurchase shares in any of the sample years (div-only sample), and the sub-sample of firms that paid dividends and repurchased their shares at least once during the sample period (div-rep sample).

With a mean market value of £7.151 billion and average total assets of £7.240 billion, repurchasing firms seem to be much larger than non repurchasing firms which have a mean market value of only £1.965 billion and average total assets of £2.491 billion. In addition, firms that repurchase their shares seem to have a higher dividend yield than those that do not, with median dividend yields of 0.0359 and 0.0297 respectively. Descriptive statistics also indicate that the dividend yield of firms that do not repurchase is more volatile than that of firms that repurchase; this is reflected in standard deviations of 0.0204 for the DY of non-repurchasing firms and 0.0183 for the DY of repurchasing firms. However, this changes when we look at total payouts instead of just dividends, as the standard deviation of the total payouts yield for the repurchasing sample is 0.0324, higher than that of the div-only sample. Understandably, this reflects the inclusion of share repurchases which are naturally more volatile than dividends. Finally, looking at descriptive statistics of the change in dividends and the change in total payouts, it would seem that firms that repurchase their shares have a more stable payout policy than those that do not, since the median change in both dividends and total payouts is smaller for repurchasing firms than for non-repurchasing firms.

When these differences between re-purchasers and non re-purchasers are tested using a robust test of equality of means (in order to avoid any bias resulting from the different sizes of the two samples), we find most of them are significant, as is shown below:

Robust Tests of Equality of Means

	Welch Statistic*	df1	df2	Sig.
E_{it-1}	19.977	1	798.613	.000
D_{it}	23.608	1	623.853	.000
TP_{it}	64.741	1	425.631	.000
SIZE	39.440	1	662.296	.000

* Asymptotically F distributed.

Looking at these statistics in light of the means reported in Table 5-1, we can deduce that firms that repurchased their shares at least once during the sample period are significantly larger, earn significantly more, and distribute significantly more dividends than firms that did not. These preliminary statistics confirm the recent findings of Renneboog & Trojanowski (2005), who also find that firms that repurchase their shares in the UK usually pay dividends as well.

5.5 Empirical Results for the Lintner and Fama and Babiak Models applied to Dividend and Total Payout Changes

Moving on to the multivariate analysis, Table 5-2 reports results of models equivalent to Lintner (1956) and Fama & Babiak (1968) applied to our panel data, where we model the change in dividends between year t and year t-1, followed by the change in total payouts. In specifications (1) to (4) we use the total sample, in specifications (5) and (6) we use the sample of dividend payers only, while in specifications (7) to (10) we use the sample of re-purchasers. All variables are scaled by total assets at the start of the corresponding financial year while size is the logarithmic value of lagged total assets. In all models we control for time and fixed effects.

The first model indicates that lagged dividends take full credit for explaining the change in dividends of sample firms, with a coefficient close to unity. Current income, on the other hand, does not seem to have any explanatory power, with a very small and insignificant coefficient. When we add lagged income to the explanatory variables (specification 2) we improve the fit of the model by 0.03 index points, and obtain a coefficient for lagged income equal to 0.029 significant beyond 0.01 confidence levels. Size is significantly negatively related to the change in dividends in all models. This means that larger firms experience smaller proportionate changes in their dividend payments.

The repurchase/no repurchase sub-samples show similar relationships between changes in dividends and the explanatory variables. The results also indicate that firms that do not repurchase their shares tend to increase their dividends subsequent to

mergers/de-mergers, while we do not find a similar relationship for firms that repurchase their shares.

Comparing our equivalents of the Lintner and F&B models of dividend changes across the groups of re-purchasers and non re-purchaser reveals that these models fit the repurchasing sample better than they do the non-repurchasing sample. This is indicated by an adjusted R squared of about 0.61 for the repurchase sample (see specification 8), higher than that of the non-repurchase sample by 0.09 index points. It would therefore seem that our equivalent of the Fama and Babiak's lagged earnings model has greater explanatory power when applied on the sample of firms that repurchase their shares as well as pay dividends. Whether the results of the model would improve further if we only apply it to firms that repurchase frequently is not clear at this stage[51].

These results suggest that firms that make use of share repurchases tend to have a smoother dividend payout policy. This could be due to the fact that they are much larger and thus, more capable of maintaining stable dividend payouts, or could be due to the fact that they distribute any volatile element of their payouts through share repurchases, and distribute the more constant element of payouts through dividends.

In fact, it is interesting to note that while both re-purchasers and non re-purchasers in our sample have a coefficient of lagged dividends that is close to unity; that of firms that repurchase their shares slightly exceeds one, while that of firms that do not

[51] One is tempted to think that firms that repurchase frequently their shares use their repurchase programmes in much the same way as their dividend policy, except for a higher degree of volatility in the value of the actual repurchases made. However, an analysis of the frequent-repurchasers sample is not feasible with the current dataset, since the sample would be rather small and would not allow for any inferences to be made.

repurchase is slightly less than one. This might reflect the over confidence of re-purchasers in their dividend policy, which may in turn be a reflection of their superior profitability. We have seen in the univariate statistics that re-purchasers have significantly larger earnings than non re-purchasers, and that they pay significantly more in dividends.

Although we use fixed effects OLS regressions in all our estimations, we also report the constant of the equivalent OLS models without fixed effects, in order to verify Lintner's assertion that firms are reluctant to cut their dividends. In all the dividend changes estimations, the constant is positive and highly significant, except the models where the sub-sample of re-purchasers is used (specifications 7 and 8), which show a very small positive constant that is insignificant. Although we have no reason to expect this constant to be significant, this slight difference between re-purchasers and non re-purchasers may be an indication of the latter's greater reluctance to cutting their dividends. One might think that firms in the habit of repurchasing their shares are less worried about how the market would react to small changes in their dividends, contrary to firms that do not repurchase their share. As a matter of fact, in the theoretical framework we discussed several studies that find that firms nowadays are not as reluctant as they used to be about cutting their dividends. Grullon & Michaely (2000) found that for repurchasing firms the market reaction to dividend reductions is not significantly different from zero, while Starks & Yoon (2004) argue that managers have become more reluctant to increase dividends and less reluctant to decrease them.

Throughout all the dividend estimations we find that current income is insignificant while lagged income is highly significant. Although this does not exactly conform to

Lintner's predictions, it does conform to our predictions. It seems very logical that firms would distribute their current dividends out of their realised earnings; hence, lagged earnings which in this case are last year's earnings. One can hardly expect current earnings to be distributed to shareholders in the current year since their value is not certain until the end of the financial year.

We now move on to investigate whether the different dividend models used above can be generalised to include total payouts instead of just dividends. In this case, we use specification (9). Naturally, when we try to model total payouts, which for many companies are partly distributed through share repurchases, we face the issue of their probable volatility. One of the main results obtained by Lintner from his field investigation, and over which much of the theory of his dividend behaviour model is based, is that firms are very reluctant to cut their dividends, and are also very careful about increasing their dividends if these increases cannot be sustained in the future. This means that dividends have traditionally been very stable and in a way predictable. If we just look at our results in Table 5-2 we see that lagged dividends explain most of the 'variation' in dividend payments. This can only benefit corporate dividend models such as Lintner's. Thus one might wonder what would be the use of trying to predict payouts that are naturally unpredictable .i.e. share repurchases. The answer to that question is quite simple. Firstly, although the flexibility of share repurchases has rendered them quite volatile, they still constitute an important form of payout, which, whether we like or not, has to be taken into account when analysing any aspect of firms' payouts. Secondly, share repurchases have become increasingly popular, and with more countries changing their legislations to facilitate this form of payout, they can only continue to increase. The trend in the past has been for repurchases to be one-offs and frequently take the form of tender offers. Nowadays,

most repurchases take place in the open market, and many are not one-offs. In fact, without deviating to the debate of whether dividends are gradually being substituted for share repurchases, we can only expect the latter to form a larger part of payouts to shareholders, particularly in the UK, where legislation has recently been amended to allow companies to keep their repurchased shares in treasury stock. This amendment will surely result in more firms repurchasing their shares, whether to distribute free cash flow, to fund the exercises of their employee options, or for any other motivation. Consequently, it may not be too presumptuous to expect repurchases to gradually become a consistent form of distributing cash to shareholders, and even if they remain volatile as to their value, we should expect them to be more regular, rather than just one-off payments.

Results of models that estimate the change in total payouts are presented in Table 5-2. In models (3) and (4) we use the total sample and in models (9) and (10) we use the repurchase-and-dividend sample.

Firstly, in estimations that are not reported here, when we estimate the change in total payouts using only lagged dividends and current income (i.e., the Lintner model) we obtain a very poor model that does not explain much variation in the dependent variable. This is of course due to the fact that we purposefully omit to control for share repurchases on the right hand side of the equation. When we correct this bias, by replacing lagged dividends with lagged total payouts as an explanatory variable, the results are very much similar to those where we estimated changes in dividends (see specification 3 in Table 5-2). Nonetheless, some slight differences cannot go unnoticed. For instance, while lagged dividends in estimation (1) have a coefficient of 0.9, that of lagged total payouts in estimation (3) is 1. This reflects the fact that firms

in our sample more than fully adjust to their past total payouts. Indeed, firms are usually not expected to sustain their repurchase activities in the same way that they are expected to sustain their dividend payouts.

When we add lagged income to the vector of explanatory variables we improve the fit of the model by about 0.01 index point; lagged earnings are highly significant with a coefficient of 0.04, while current earnings remain insignificant.

Separating the repurchase/no repurchase samples again shows the same patterns as those found previously (when we estimated the change in dividends), except that this time the adjusted R squared of the model applied to the div-rep sample is somewhat lower than it was when we estimated the change in dividends. When we estimate the change in total payouts the adjusted R squared is 0.51 while when we estimated the change in dividends it was 0.61 (see specifications 10 and 8 respectively). This decrease in the explanatory power of the model reflects the increased volatility of total payouts relative to dividends due to the inclusion of share repurchases. Nonetheless, the model applied to the rep-div sample still performs statistically as well as that applied to the div-only sample, which again suggests that firms that pay dividends and do not repurchase shares tend to have a more volatile dividend payout behaviour than firms that both pay dividends and repurchase shares[52]. In addition, lagged income has a slightly bigger coefficient in the case of the repurchase-sample than in the case of the div-only sample. This suggests that share repurchases may also have a direct relationship with lagged income.

[52] It is worth noting here that for the div-only sub-sample we only report one set of results since total payouts in the case of this sample would also be just dividends; hence, the results are identical

5.5.1 Robustness checks

Throughout the analysis we scale both the dependent and the explanatory variables by total assets of the corresponding firm at the start of each financial year. This was done with the objective of normalising the relationships between the dependent variable and the different covariates and also to facilitate the comparison of the latter's respective coefficients. Nevertheless, our results are robust to the choice of the normalising variable. Running the same tests but with the variables being scaled by the market value of equity or the market value of the firm (market value of equity plus long-term debt) yields the same results[53]. Current earnings are not significant in any of these tests. This confirms our prediction that changes in dividends may depend more on lagged earnings than on current earnings. The results also confirm our prediction that lagged dividends constitute the single most powerful determinant of current dividends, which indicates the conservatism of UK corporations with regard to their dividend policies.

Running the same models but without controlling for fixed effects reduces the adjusted R squared of the models, as would be expected if as appears to be the case, individual firms in the sample have significantly differing propensities to cut dividends. The exclusion of the fixed effects also decreases the magnitude of the lagged dividend and total payout coefficients from one to about 0.35 and 0.49 respectively (though they both remain highly significant). In addition, current income becomes significant (in most models) while lagged income loses its significance in the case of dividend estimations, and the intercept is consistently insignificant and close to zero in most models (see Table 5-4). These results do not change much whether we

[53] Refer to Table 5-3 for tests where the variables are scaled by the market value of equity. Results where the market value of the firm is used as a scaling variable are not reported here.

control for industry differences or not, which demonstrates the importance of controlling for firm specific effects in relation to cuts in dividends and/or total payouts.

Our results are also robust to the choice of the earnings variable used. In his original model, Lintner (1956) defined earnings as net income after depreciation and taxes i.e. earnings distributable to shareholders. This definition of earnings was based on his findings in his interviews with managers. However, some may argue that it is actually permanent income which really affects the dividend decision; since dividend increases/decreases should depend on or reflect the long-term prospects of the firm (at least according to the signalling theory and the findings of Lintner (1956)). Brittain (1964) took this on board and hypothesised that dividends tend to follow cash-flow – measured as net income plus depreciation- rather than net earnings. His findings support his hypothesis, but it must be said that the period on which he based his analysis may have encouraged such results[54].

Although our main results are presented using Lintner's definition of income, we also report results where we define income as earnings before interest, tax and depreciation in Table 5-5, they are generally similar to those where we use net income. Although not reported here, our results are also robust to measuring income as earnings before interest, tax and depreciation minus capital expenditure.

The sample of firms we have used so far is made up of firms that paid dividends at least once during the sample period. Although most firms in our sample have paid dividends continuously during the sample period, it is possible that a few observations

[54] Brittain (1964) purposefully estimated his model during the period 1920-1960 (excluding 1936-1938) in order to include the effects of some major changes on the tax law of depreciation that occurred during this period.

where dividends were a one-off payment have influenced the results. Therefore, as a final test of robustness we re-run the analysis using a slightly different definition for our sample; this time are included in the sample only firms that paid dividends in at least two consecutive years of the sample period. This reduces the total sample size from 926 to 856 observations. The results are presented in Table 5-6. They indicate similar patterns in the relationships between payout policy and the rest of the variables. As would be expected, the dividend models fit this dataset better than they did the previous dataset; this can be seen from the adjusted R squared values which are higher than those we obtained previously. The models fit this data better because there is less volatility in dividend payouts. The adjusted R squared of the total payout models, on the other hand, drops slightly from an average of 0.51 to about 0.49.

Interesting to note is the fact that the speed of adjustment coefficient (the coefficient of lagged dividends) is closer to unity than it was previously in the case of dividend estimations, while it is about 1.1 in the case of total payouts, thus reflecting the extra cash payments made in the form of share repurchases.

Another small difference that arises when we use this dataset is that current income is significant in the case of the div-rep sample. For instance, in estimation (8) Table 5-6 (our equivalent of the Fama and Babiak model), the current earnings coefficient is 0.0355, significant beyond the 0.01 level, while the coefficient of last year's earnings is 0.0354, also significant beyond the 0.01 level. The fact that re-purchasers are more profitable (as we found in the univariate statistics) and enjoy greater flexibility in their payout strategies thanks to share repurchases, may give them the possibility of using a

greater fraction of their current earnings to give back to shareholders, contrary to non re-purchasers.

This adds support to our prediction that current dividends are mostly a function of lagged dividends, especially for the case of historically stable dividend payers. Repurchases and dividend initiations and omissions, on the other hand, are more likely to have a direct relationship with income.

To summarise, our findings seem to indicate that traditional corporate dividend models *can* be generalised to include total payouts instead of just dividends. The argument that repurchases are too volatile to be included in such models does not hold since we found that the volatility of repurchases does not greatly affect the power of such models in explaining the variation in total payouts. We also found that dividend payouts of repurchasing firms tend to be smoother than those of non-repurchasing firms, which we interpreted to be an indication that repurchases can be used by dividend-paying firms to "get rid of" the unpredictable element of their payouts, which leaves their dividends more predictable and less volatile.

Moreover, consistent with our predictions, we found that British firms are very conservative in their dividend payout behaviour, as they tend to distribute dividends out of past income, while current income is generally of no significance in predicting current dividends. This also confirms our prediction that dividends are paid out of "expected" earnings. As was mentioned in the theoretical framework, Lintner's model assumes that all changes in earnings are unexpected, which results in firms partially adjusting their dividends to these unexpected earnings. Fama and Babiak, on the other

hand, allow for an element of earnings to be unexpected, but assume that all firms in the sample share the same earnings trend, which is quite unrealistic. This is why in the next section we use the Alternative Earnings Model that we developed in the theoretical framework, to empirically prove that payouts generally, and dividends particularly, are primarily funded out of expected income, where the latter is measured according to the earnings trend of the individual companies making out our sample.

5.6 Empirical Results for the Alternative Benchmarks of Expected and Unexpected Earnings applied to Dividend and Total Payout Changes.

We have seen in the previous section that although the Lintner type models can be used to determine the total payout behaviour of firms quite successfully, a slight modification in their earnings' assumption might result in better predictors that should better reflect the actual relationship between payouts and earnings.

In the methodology section we developed an alternative model that makes an explicit distinction between expected and unexpected income, and unlike Fama and Babiak's model, allows for these two types of income to be determined by the earnings trend of individual companies. In the alternative model we first run an OLS regression to obtain the predicted and unpredicted income of individual companies i.e. predicted values and residuals respectively, as has been illustrated in equation (12). Then we use these estimates to predict changes in dividends and total payouts.

Firstly, however, we will look at a special case of the Alternative Earnings Model, where expected earnings are simply last year's earnings, which means that unexpected earnings are the difference between this year's and last year's earnings (see equation 13).

As in the previous section, we normalise all variables by total assets, we control for year and fixed effects, and apply the models to the total sample followed by the

dividend-only sample and the rep-and-div sample. For each sample we first estimate the yearly change in dividends and then we estimate the yearly change in total payouts.

The results are presented in Table 5-7. They seem very similar to what we found in the previous section. The constant is positive and significant in most of the estimations that use the total sample and the dividend-only sample. Size is significantly negatively related to changes in dividends and total payouts (except changes in total payouts of the re-purchasers sample). This reflects the fact that larger firms tend to experience smaller changes in their dividends, and consequently have smoother dividend policies. Moreover, the coefficient of lagged dividends in all estimations is close to unity, being slightly below one in the dividend estimations and slightly above one in the total payouts estimations, except for the div-and-rep sample where it is slightly above one in all estimations. We have already said that the fact that the constant is closer to zero and less significant when we use the sample of re-purchasers reflects the latter's comparative boldness in their payout behaviour, this is also reflected in their adjusting more than fully to last year's dividend levels.

It is very interesting to note that the coefficients of the earnings variables are also very similar to what we found earlier using the Lintner and the Fama & Babiak models, although slightly larger. Lagged earnings are positive and significant beyond the conventional 0.01 level, with a coefficient ranging from 0.05 using the re-purchasers sample, to 0.03 using the div-only sample. Unexpected earnings, on the other hand, are negative and significant in all estimations apart from that of total payouts using the sample of re-purchasers.

Looking back at Table 5-2, we can see that defining unexpected income as the difference between this year's and last year's earnings allows for a more accurate estimation of the relationship between this variable and changes in dividends and changes in total payouts. Previously, we had found that, estimated individually, the coefficient of unexpected income (i.e. current income) is negative, close to zero and insignificant, while now we find that it is not that close to zero (it is about 0.02), and is negative and significant.

When we use both expected and unexpected income in the same regression, perhaps unsurprisingly, unexpected income loses its significance and becomes positive but highly insignificant, and at any rate close to zero, while expected income has a larger positive coefficient, which in the case of re-purchasers equals 0.11 (see specification 15 in Table 5-7).

It is worth pointing out that these results are also robust to the use of a different scaling variable or income variable, though these robustness checks are not reported here to save space and avoid confusion caused by the reporting of too many tables.

However, we do report the results where we include in the sample only firms that paid dividends in at least two consecutive years of the sample period, and they naturally show relatively larger coefficients (see Table 5-8). However, on the whole they show the same patterns and relationships we identified using the larger sample definition.

Let us now look at how our alternative model, in its more general form, performs. Firstly, we estimate predicted and unpredicted earnings according to specification (12), where current income is mostly a function of last year's income and some control variables. The predicted values and residuals obtained from these estimations are saved and then used in the payout estimations as expected income and unexpected income respectively. Panel data estimation cannot be used to estimate earnings, since its use would produce biased results. This is due to the nature of the model being estimated, as we are regressing current earnings on last year's earnings; the use of a lagged dependent variable as a regressor renders both fixed effects and random effects' estimators biased. A Lagrange Multiplier test reveals a value of 0.37 with one degree of freedom and a probability value of 0.54. Clearly, such a small LM that is quite insignificant favours a classical regression model over the fixed or random effects models. Thus, in the earnings estimation we use the classical OLS model, and we only control for time and industry effects. This estimation produces predicted values and residuals that are more realistic than what would have been obtained if fixed effects were controlled for[55].

Estimations where the total sample is used are reported in Table 5-9, while those where the sub-samples are used are reported in Table 5-10. The earnings estimation indicates that lagged income contributes greatly to the explanatory power of the model, with a coefficient of 0.5 that is highly significant (see specification 1 in Table 5-9). The model explains a lot of the variation in the dependent variable, with an

[55] Fixed effects are not controlled for only in the earnings estimations. However, we do control for them in all the dividend and total payouts estimations, since there is no reason why results from these estimations will be biased. Moreover, the Lagrange Multiplier tests of these models support the use of Fixed Effects.

adjusted R squared of 0.36, which allows us to confidently use the resulting residuals and predicted values in our payout estimations.

When both expected and unexpected income are used to estimate changes in dividends using the total sample (specification 2, Table 5-9), the resulting coefficient of expected income appears to be much larger than what we found in the previous estimation where expected income was simply last year's income; coefficients from both regressions are 0.07 and 0.03 respectively. Unexpected income, on the other hand, is very small and insignificant.

Although not reported here, when unexpected income is used on its own to predict changes in earnings we obtain for it a negative, though insignificant coefficient. This, together with the previous findings where unexpected income (though measured differently) has often had a negative coefficient when used separately from expected income, raises the question of whether this seemingly negative relationship is in fact only capturing the effect of *negative* unexpected earnings on dividend changes. If unexpected earnings are negative, then it is little wonder that they have a negative relationship with dividend increases. In order to control for this possible bias, we introduce a new variable that we refer to as positive unexpected income, which could be viewed as an interaction term between unexpected income and a dummy that takes one for all values of unexpected income that are positive and zero otherwise.

This interaction term seems to have a positive relationship with changes in dividends, as one would expect, but it is not always significant. The fact that this coefficient is significant in specification (5) (Table 5-9) at the 5 percent level may reflect a degree

of multicollinearity between the positive unexpected income and unexpected income variables.

In any case, the relationship of positive unexpected income with changes in dividends fits very well with our predictions, since despite the positive nature of this relationship; it is significantly weaker than the relationship of expected income with changes in dividends, both in terms of the size of the coefficient (or differential coefficient) and its significance.

Similar results are obtained when we use the sub-samples of re-purchasers and non re-purchasers (see Table 5-10). The following is a brief description of the main differences in the results of the two sub-samples:

- The constant is positive in all the dividend estimations, but is relatively 'large' and significant in the group of non re-purchasers while it is close to zero and insignificant in the group of re-purchasers.
- The speed of adjustment coefficient is slightly below one in the group of non re-purchasers and slightly above one in the group of re-purchasers.
- The coefficient of expected income is slightly larger in the case of re-purchasers.
- Unexpected income is not significant in any of the estimations, while positive unexpected income is insignificant in the non re-purchasers sample, and highly significant in the re-purchasers sample, even in the estimation where we exclude unexpected earnings.

These results further validate our predictions and earlier findings that UK firms are quite conservative in their dividend payout behaviour, as lagged dividends constitute the single most important determinant of current dividends, and expected income is a more important source of dividend funding than unexpected income. This explains the insignificant relationship found earlier between current income and changes in dividends using the Lintner model. Indeed, it has become clear that using current income by itself to predict changes in dividends is quite uninformative, since as we have seen, current income contains a large element of unpredictability that renders it unusable for a firm that is inherently conservative in its dividend payout behaviour.

This situation, however, is slightly different for firms that repurchase their shares. Although it could be argued that these firms tend to be more daring in their dividend behaviour because they are more profitable, the fact that they are more inclined to repurchase their shares also provides them with some leeway in their payout policy. They, thus, can afford not only to fully adjust to their previous dividend levels, but they are also able to increase these dividends, and while they still seem reluctant to cut their dividends, this reluctance, reflected in the positive constant, is quite insignificant compared to that of firms that do not repurchase their shares. Moreover, it seems that share re-purchasers, though relying primarily on expected earnings in their dividend payouts, are also very likely to use unexpected *positive* earnings. This suggests that these firms are very confident about their earnings *and* are able to maintain their dividends by cutting back on their share repurchases.

The estimations of total payouts show the same relationships, except that the coefficients are generally slightly larger. For instance, expected earnings in the

repurchase sample estimations of total payouts show a significant coefficient that varies between 0.11 and 0.17, compared to a coefficient that varies between 0.07 and 0.09 in the dividend estimations. Positive unexpected earnings lose their significance in the total payouts estimations, but the size of their coefficient is considerably larger.

5.6.1 Robustness checks

When we drop the fixed effects, unexpected income becomes significant in most regressions (see Table 5-11), except those where the sample of non re-purchasers is used, but expected income remains larger in terms of its size. Furthermore, the results are generally robust to the use of the market value of equity or the market value of the firm as a scaling variable[56]. They are also robust to the use of earnings before interest, tax and depreciation instead of net income distributable to shareholders (Table 5-13). Finally, when the sample of firms that paid dividends in at least two consecutive years is used, the results show the same relationships we identified previously, with slightly larger coefficients (see Table 5-14 and Table 5-15).

[56] See Table 5-12 for the results where the market value of equity is used as the scaling variable. Those where the market value of the firm is used are not reported here.

5.7 Summary and conclusions

The objective of this chapter was to develop a model of corporate payout policy that takes into account changes that occurred over the years in corporate payout trends, and allows for a broader definition of payouts to include dividends as well as repurchases, in the conservative UK setting.

We have argued that share repurchases have become part of the payout strategy of many firms that are usually the largest and most profitable in the market. Ignoring this form of payout, because empirical models would look better without it, is simply a very poor excuse. Thus, we have demonstrated, firstly; that traditional dividend models such as Lintner (1956) and Fama & Babiak (1968) can still produce good estimates when applied to total payouts as opposed to just dividends. Secondly, we have shown that these models could be sharpened to reflect changes that occurred over recent years in corporate payout policy, such as the fact that firms nowadays are not as reluctant to reduce dividends as they used to, especially those that repurchase, or that firms no longer have a target payout ratio. We developed an Alternative Expected and Unexpected Earnings model where the individual earnings trends of firms are used to estimate their expected and unexpected earnings, which in turn are used alongside lagged dividends and total payouts to estimate changes in dividends and changes in total payouts respectively.

Our results show that lagged dividends (total payouts) are the most important determinant of dividend (total payout) changes. Consistent with our predictions, we find that expected earnings, not unexpected earnings as assumed in Lintner's model.

are the main source of dividend increases, and share repurchases (although arguably to a lesser extent).

Finally, we find that firms that repurchase their shares tend to be more daring in their payout behaviour; although they generally have smoother dividends than firms that do not repurchase (at least according to our data), they are more likely to fund a part of their dividends or share repurchases out of unexpected earnings than non re-purchasers. They generally show the type of behaviour that has been documented in previous studies, and which we referred to in the literature review. In fact, the results appear to offer support for the contention that corporate dividend/payout behaviour is changing, with the clear implication that the models that attempt to specify and empirically estimate corporate payout behaviour ought also to reflect such changes.

5.8 Appendix

Table 5-1: Descriptive statistics

This table summarises descriptive statistics of sample firms in relation to the following variables: MV0-the market value at the start of the financial year, TA-the book value of total assets at the start of the financial year, DY-total dividends scaled by market value at the start of the year, TPY- total payouts scaled by market value at the start of the year, E_{it-1}-net income at the start of the financial year scaled by total assets, D_{it} -dividends paid during the year scaled by total assets at the start of the year, REP1-the pound value of shares repurchased during the year scaled by market value at the start of the year, TP_{it} -total payouts made during the year (that is dividends and share repurchases) scaled by total assets at the start of the year. ΔD_{it} -this year's dividends minus last year's dividends both scaled by total assets at the start of the corresponding year, ΔTP_{it} -this year's total payouts minus last year's total payouts both scaled by total assets at the start of the corresponding year. Firstly, descriptive statistics of the total sample are presented, followed by statistics of the sample of firms that paid dividends at least once during the sample period but never repurchased their shares and the sample of firms that paid dividends and repurchased their shares at least once during the sample period. The total sample consists of a panel of non-financial firms that were part of the FTSE 350 in 2004 and that paid dividends at least once during the sample period, which spans from 2001 to 2004 (with the year 2000 also being an estimation period for some variables). For a more detailed description of the variables refer back to the empirical estimating methods section in the main text.

Total sample N = 926

	Mean	Std.Dev.	Minimum	Med.	Maximum
MV0 (£m)	3978	12430	44	903	124639
TA (£m)	4,332	13,172	52	1,229	171,699
DY	0.0329	0.0197	-	0.0320	0.1171
TPY	0.0383	0.0272	-	0.0354	0.26111
E_{it-1}	0.0522	0.0860	- 0.5623	0.0505	0.6448
D_{it}	0.0291	0.0237	0.00E+00	0.0243	0.1643
ΔD_{it}	-1.80E-04	0.0120	- 0.1118	8.34E-05	0.0731
TP_{it}	0.0353	0.0392	0.00E+00	0.0260	0.5046
ΔTP_{it}	3.56E-04	0.0270	- 0.1945	0.00E+00	0.3420

Dividend-only sample N = 567

	Mean	Std.Dev.	Minimum	Med.	Maximum
MV0 (£m)	1,965	3,252	44	713	23,592
TA (£m)	2,491	4,103	52	1,058	34,952
DY	0.0310	0.0204	-	0.0297	0.1171
E_{it-1}	0.0424	0.0873	- 0.5623	0.0412	0.5597
D_{it}	0.0260	0.0208	0.00E+00	0.0224	0.1321
ΔD_{it}	-2.34E-04	0.0131	- 0.1118	2.28E-07	0.0731

Dividend and repurchase sample N = 359

	Mean	Std.Dev.	Minimum	Med.	Maximum
MV0 (£m)	7,157	19,130	120	1,446	124,639
TA (£m)	7,240	20,194	72	1,658	171,699
DY	0.0359	0.0183	-	0.0359	0.1089
TPY	0.0497	0.0324	-	0.0451	0.2611
E_{it-1}	0.0677	0.0817	- 0.4036	0.0597	0.6448
D_{it}	0.0341	0.0269	0.00E+00	0.0270	0.1643
ΔD_{it}	-9.52E-05	0.0102	- 0.0571	1.30E-04	0.0592
TP_{it}	0.0500	0.0542	0.00E+00	0.0348	0.5046
ΔTP_{it}	0.0013	0.0402	- 0.1945	0.00E+00	0.3420
REP1	0.0160	0.0371	0.00E+00	0.00E+00	0.4117

Table 5-2: Lintner and Fama and Babiak's models

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by total assets. The same models are estimated using first, the total sample, then the sample of firms that never repurchased their shares during the sample period, and finally the sample of firms that repurchased their shares at least once during the sample period. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic. Variables are defined as follows: D_{it}- total cash dividends (excluding special dividends) paid during the current year normalised by the value of the firm's total assets at the start of the current year. D_{it-1}- total cash dividends (excluding special dividends) paid during the previous financial year normalised by the value of the firm's total assets at the start of the previous financial year. $\Delta D_{it} = D_{it} - D_{it-1}$: the change in dividends between this year and last year. TP_{it}- total payouts (dividends and repurchases) paid during the current year normalised by total assets at the start of the current year. TP_{it-1}- total payouts (dividends and repurchases) paid during the previous financial year normalised by total assets at the start of the previous financial year. $\Delta TP_{it} = TP_{it} - TP_{it-1}$: the change in total payouts between this year and last year. E_{it} - net income at the end of the current year normalised by total assets at the start of the current financial year. E_{it-1}- net income at the end of the previous year normalised by total assets at the start of the previous financial year. SIZE- the natural logarithm of the firm's total assets at the start of the current financial year. MERGER- a dummy that takes the value of one in the year of the merger/de-merger and the year following it and zero otherwise. This definition of variables applies throughout the rest of the tables, except where indicated otherwise (in the robustness checks). Fixed effects are controlled for throughout the rest of the results except where indicated otherwise. Time effects are controlled for throughout all the tests without exception.

		Total sample				*Div only sample*		*Div-and-Rep sample*			
		ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Constant	Coeff.	**0.0211****	**0.0207****	0.0131	0.0093	**0.0366****	**0.0359****	0.0030	0.0028	-0.0066	-0.0178
	Std.Err.	0.0059	0.0060	0.0132	0.0132	0.0088	0.0089	0.0078	0.0078	0.0293	0.0292
	t-ratio	3.5633	3.4711	0.9910	0.7058	4.1478	4.0383	0.3843	0.3600	-0.2239	-0.6102
SIZE	Coeff.	**-0.0098****	**-0.0096****	**-0.0060***	**-0.0059***	**-0.0100****	**-0.0092****	**-0.0096****	**-0.0109****	0.0013	-0.0012
	Std.Err.	0.0023	0.0023	0.0030	0.0029	0.0029	0.0028	0.0029	0.0028	0.0079	0.0079
	t-ratio	-4.2423	-4.2357	-1.9644	-2.0017	-3.4728	-3.2851	-3.3188	-3.8629	0.1625	-0.1527
D_{it-1}	Coeff.	**-0.9278****	**-0.9674****			**-0.8872****	**-0.9210****	**-1.0217****	**-1.0815****		
	Std.Err.	0.0585	0.0578			0.0792	0.0792	0.0842	0.0829		
	t-ratio	-15.8730	-16.7449			-11.1986	-11.6291	-12.1341	-13.0491		
TP_{it-1}	Coeff.			**-1.0572****	**-1.0663****					**-1.0785****	**-1.0839****
	Std.Err.			0.1378	0.1379					0.1661	0.1658
	t-ratio			-7.6738	-7.7309					-6.4927	-6.5366
E_{it}	Coeff.	-0.0018	0.0008	0.0089	0.0115	-0.0079	-0.0050	0.0177	0.0195	0.0581	0.0606
	Std.Err.	0.0091	0.0086	0.0135	0.0130	0.0105	0.0100	0.0111	0.0105	0.0427	0.0418

	t-ratio	-0.1946	0.0907	0.6597	0.8870	-0.7524	-0.4988	1.5909	1.8510	1.3600	1.4500
E_{it-1}	Coeff.		**0.0295****		**0.0401****		**0.0283****		**0.0333****		**0.0524****
	Std.Err.		0.0073		0.0108		0.0109		0.0060		0.0210
	t-ratio		4.0180		3.7034		2.5977		5.5658		2.4897
Merger	Coeff.	**0.0141***	**0.0154****	**0.0162****	**0.0175****	**0.0273****	**0.0281****	-0.0012	0.0008	0.0029	0.0055
dummy	Std.Err.	0.0062	0.0058	0.0063	0.0060	0.0087	0.0081	0.0056	0.0053	0.0076	0.0074
	t-ratio	2.2972	2.6311	2.5802	2.9429	3.1308	3.4720	-0.2156	0.1484	0.3843	0.7421
Adjusted R squared		0.50	0.53	0.50	0.51	0.51	0.52	0.58	0.61	0.51	0.51
F statistic		4.70	5.03	4.63	4.73	4.71	4.95	5.79	6.51	4.60	4.63
Number of obs		926	926	926	926	567	567	359	359	359	359

** indicates a significance level of 1% or below, * indicates a significance level between 1 and 5%
The constant in the case of the fixed effects OLS models is the actual constant of the equivalent model but without fixed effect controls.

Table 5-3: Lintner and Fama and Babiak's models – Robustness checks- using market value as the scaling variable

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by the market value of equity. The same models are estimated using first, the total sample, then the sample of firms that never repurchased their shares during the sample period, and finally the sample of firms that repurchased their shares at least once during the sample period. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic. Variables are defined as follows: D_{it}- total cash dividends (excluding special dividends) paid during the current year normalised by the market value of equity at the start of the current year. D_{it-1}- total cash dividends (excluding special dividends) paid during the previous financial year normalised by the market value of equity at the start of the previous financial year. $\Delta D_{it} = D_{it} - D_{it-1}$: the change in dividends between this year and last year. TP_{it}- total payouts (dividends and repurchases) paid during the current year normalised by the market value of equity at the start of the current year. TP_{it-1}- total payouts (dividends and repurchases) paid during the previous financial year normalised by the market value of equity at the start of the previous financial year. $\Delta TP_{it} = TP_{it} - TP_{it-1}$: the change in total payouts between this year and last year. E_{it} - net income at the end of the current year normalised by the market value of equity at the start of the current financial year. E_{it-1}- net income at the end of the previous year normalised by the market value of equity at the start of the previous financial year. SIZE- the natural logarithm of the firm's market value of equity at the start of the current financial year. MERGER- a dummy that takes the value of one in the year of the merger/de-merger and the year following it and zero otherwise.

		Total sample				*Div only sample*		*Div-and-Rep sample*			
		ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Constant	Coeff.	0.0060	0.0060	-0.0019	-0.0023	-0.0012	-0.0010	0.0146	0.0146	0.0413	0.0372
	Std.Err.	0.0072	0.0072	0.0114	0.0113	0.0110	0.0110	0.0099	0.0099	0.0230	0.0228
	t-ratio	0.8283	0.8281	-0.1629	-0.2006	-0.1049	-0.0924	1.4819	1.4795	1.7986	1.6316
SIZE	Coeff.	**-0.0102****	**-0.0125****	**-0.0116****	**-0.0153****	**-0.0067****	**-0.0088****	**-0.0207****	**-0.0240****	**-0.0264****	**-0.0350****
	Std.Err.	0.0018	0.0017	0.0029	0.0029	0.0020	0.0020	0.0029	0.0022	0.0095	0.0084
	t-ratio	-5.6151	-7.1847	-3.9456	-5.3614	-3.2947	-4.4738	-7.0358	-10.8380	-2.7965	-4.1550
D_{it-1}	Coeff.	**-0.9698****	**-0.9993****			**-0.9811****	**-1.0132****	**-1.0352****	**-1.0632****		
	Std.Err.	0.0491	0.0468			0.0635	0.0598	0.0524	0.0537		
	t-ratio	-19.7584	-21.3640			-15.4434	-16.9408	-19.7611	-19.8066		
TP_{it-1}	Coeff.			**-0.9856****	**-0.9991****					**-1.0178****	**-1.0239****
	Std.Err.			0.0542	0.0527					0.0721	0.0695
	t-ratio			-18.1678	-18.9490					-14.1166	-14.7231
E_{it}	Coeff.	0.0067	0.0097	0.0104	0.0154	0.0076	0.0102	-0.0011	0.0028	0.0077	0.0193
	Std.Err.	0.0085	0.0085	0.0101	0.0098	0.0108	0.0107	0.0094	0.0099	0.0187	0.0206
	t-ratio	0.7926	1.1430	1.0359	1.5728	0.7061	0.9500	-0.1172	0.2838	0.4124	0.9381
E_{it-1}	Coeff.		**0.0313****		**0.0507****		**0.0323****		**0.0328****		**0.0895****

	Std.Err.		0.0076		0.0111		0.0097		0.0122		0.0246
	t-ratio		4.1054		4.5468		3.3252		2.6876		3.6320
Merger	Coeff.	**0.0105**	**0.0124***	**0.0120***	**0.0152****	**0.0299****	**0.0309****	**-0.0115**	-0.0082	-0.0070	0.0027
dummy	Std.Err.	0.0061	0.0058	0.0061	0.0056	0.0070	0.0063	0.0063	0.0062	0.0065	0.0068
	t-ratio	1.7148	2.1468	1.9697	2.7298	4.2682	4.9112	-1.8062	-1.3073	-1.0763	0.3918
Adj R squared		0.53	0.55	0.51	0.53	0.52	0.54	0.67	0.70	0.53	0.56
F statistic		5.12	5.49	4.81	5.15	4.88	5.20	8.02	8.95	4.93	5.47
N		927	927	927	927	568	568	359	359	359	359

** indicates a significance level of 1% or below, * indicates a significance level between 1 and 5%
The constant in the case of the fixed effects OLS models is the actual constant of the equivalent model but without fixed effect controls.
Fixed and time effects are controlled for in all regressions.

Table 5-4: Lintner and Fama and Babiak's models – Robustness checks- using market value as the scaling variable and not controlling for fixed effects
This table presents coefficient estimates and model descriptive statistics for OLS regressions without fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by the market value of equity. The same models are estimated using first, the total sample, then the sample of firms that never repurchased their shares during the sample period, and finally the sample of firms that repurchased their shares at least once during the sample period. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic. Variables are defined as follows: D_{it}- total cash dividends (excluding special dividends) paid during the current year normalised by the market value of equity at the start of the current year. D_{it-1}- total cash dividends (excluding special dividends) paid during the previous financial year normalised by the market value of equity at the start of the previous financial year. $\Delta D_{it} = D_{it} - D_{it-1}$: the change in dividends between this year and last year. TP_{it}- total payouts (dividends and repurchases) paid during the current year normalised by the market value of equity at the start of the current year. TP_{it-1}- total payouts (dividends and repurchases) paid during the previous financial year normalised by the market value of equity at the start of the previous financial year. $\Delta TP_{it} = TP_{it} - TP_{it-1}$: the change in total payouts between this year and last year. E_{it} - net income at the end of the current year normalised by the market value of equity at the start of the current financial year. E_{it-1}- net income at the end of the previous year normalised by the market value of equity at the start of the previous financial year. SIZE- the natural logarithm of the firm's market value of equity at the start of the current financial year. MERGER- a dummy that takes the value of one in the year of the merger/de-merger and the year following it and zero otherwise.

		Total sample				*Div only sample*		*Div-and-Rep sample*			
		ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Constant	Coeff.	0.0060	0.0060	-0.0019	-0.0023	-0.0012	-0.0010	0.0146	0.0146	**0.0413**	0.0372
	Std.Err.	0.0072	0.0072	0.0114	0.0113	0.0110	0.0110	0.0099	0.0099	0.0230	0.0228
	t-ratio	0.8283	0.8281	-0.1629	-0.2006	-0.1049	-0.0924	1.4819	1.4795	1.7986	1.6316
SIZE	Coeff.	0.0000	0.0001	0.0008	0.0008	0.0004	0.0004	-0.0003	-0.0003	-0.0006	-0.0005
	Std.Err.	0.0003	0.0003	0.0005	0.0005	0.0005	0.0005	0.0004	0.0004	0.0010	0.0010
	t-ratio	0.1475	0.1529	1.4883	1.5243	0.7393	0.7337	-0.7696	-0.7686	-0.6177	-0.4840
D_{it-1}	Coeff.	**-0.3511****	**-0.3558****			**-0.3678****	**-0.3736****	**-0.3378****	**-0.3376****		
	Std.Err.	0.0226	0.0230			0.0301	0.0305	0.0344	0.0355		
	t-ratio	-15.5674	-15.4565			-12.2132	-12.2325	-9.8113	-9.5165		
TP_{it-1}	Coeff.			**-0.4891****	**-0.5022****					**-0.6225****	**-0.6404****
	Std.Err.			0.0243	0.0246					0.0414	0.0416
	t-ratio			-20.1141	-20.4378					-15.0353	-15.4090
E_{it}	Coeff.	**0.0191****	**0.0169****	**0.0305****	**0.0200****	**0.0186****	**0.0151***	**0.0198****	**0.0199****	**0.0440****	0.0268
	Std.Err.	0.0042	0.0047	0.0067	0.0075	0.0055	0.0063	0.0068	0.0073	0.0159	0.0170
	t-ratio	4.5037	3.5628	4.5542	2.6690	3.3972	2.4037	2.9020	2.7213	2.7642	1.5779
E_{it-1}	Coeff.		0.0050		**0.0235****		0.0074		-0.0001		**0.0440****

	Std.Err.		0.0049		0.0076		0.0066		0.0071		0.0162
	t-ratio		1.0209		3.0910		1.1329		-0.0195		2.7120
Merger	Coeff.	**0.0128****	**0.0129****	**0.0156****	**0.0160****	**0.0187****	**0.0188****	**0.0074**	**0.0074**	0.0091	0.0102
dummy	Std.Err.	0.0035	0.0035	0.0055	0.0055	0.0053	0.0053	0.0044	0.0044	0.0103	0.0103
	t-ratio	3.6679	3.7029	2.8249	2.9206	3.5623	3.5849	1.6755	1.6699	0.8822	0.9918
Adj R squared		0.29	0.29	0.33	0.33	0.28	0.28	0.31	0.31	0.40	0.41
F statistic		54.57	47.88	65.53	59.07	32.33	28.46	23.80	20.76	34.69	31.82
N		927	927	927	927	568	568	359	359	359	359

** indicates a significance level of 1% or below, * indicates a significance level between 1 and 5%
Fixed effects are not controlled for in any of the regressions while time effects are.
The constant in the case of the fixed effects OLS models is the actual constant of the equivalent model but without fixed effect controls.

Table 5-5: Lintner and Fama and Babiak's models- Robustness checks- using EBITD instead of net income

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by total assets. The same models are estimated using first, the total sample, then the sample of firms that never repurchased their shares during the sample period, and finally the sample of firms that repurchased their shares at least once during the sample period. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic. Variables are defined as follows: D_{it}- total cash dividends (excluding special dividends) paid during the current year normalised by the value of the firm's total assets at the start of the current year. D_{it-1}- total cash dividends (excluding special dividends) paid during the previous financial year normalised by the value of the firm's total assets at the start of the previous financial year. $\Delta D_{it} = D_{it} - D_{it-1}$: the change in dividends between this year and last year. TP_{it}- total payouts (dividends and repurchases) paid during the current year normalised by total assets at the start of the current year. TP_{it-1}- total payouts (dividends and repurchases) paid during the previous financial year normalised by total assets at the start of the previous financial year. $\Delta TP_{it} = TP_{it} - TP_{it-1}$: the change in total payouts between this year and last year. $EBITD_{it}$ – earnings before interest, tax and depreciation at the end of the current year normalised by total assets at the start of the current financial year. $EBITD_{it-1}$- earnings before interest, tax and depreciation at the end of the previous year normalised by total assets at the start of the previous financial year. SIZE- the natural logarithm of the firm's total assets at the start of the current financial year. MERGER- a dummy that takes the value of one in the year of the merger/de-merger and the year following it and zero otherwise.

		Total sample				*Div only sample*		*Div-and-Rep sample*			
		ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Constant	Coeff.	**0.0136***	**0.0148****	0.0040	0.0030	**0.0261****	**0.0279****	0.0036	0.0043	0.0045	0.0022
	Std.Err.	0.0059	0.0058	0.0133	0.0134	0.0089	0.0089	0.0075	0.0074	0.0290	0.0290
	t-ratio	2.3090	2.5409	0.2998	0.2212	2.9221	3.1242	0.4855	0.5901	0.1537	0.0754
SIZE	Coeff.	**-0.0065****	**-0.0075****	-0.0040	**-0.0057**	**-0.0073****	**-0.0077****	**-0.0065****	**-0.0088****	0.0000	-0.0035
	Std.Err.	0.0021	0.0022	0.0030	0.0030	0.0027	0.0027	0.0024	0.0023	0.0080	0.0080
	t-ratio	-3.0221	-3.4202	-1.3472	-1.9207	-2.6597	-2.8114	-2.6987	-3.8046	0.0015	-0.4420
D_{it-1}	Coeff.	**-0.9388****	**-0.9960****			**-0.9019****	**-0.9514****	**-1.0139****	**-1.0955****		
	Std.Err.	0.0591	0.0616			0.0817	0.0862	0.0791	0.0821		
	t-ratio	-15.8801	-16.1636			-11.0405	-11.0411	-12.8221	-13.3385		
TP_{it-1}	Coeff.			**-1.0571****	**-1.0715****					**-1.0827****	**-1.0895****
	Std.Err.			0.1379	0.1398					0.1661	0.1667
	t-ratio			-7.6634	-7.6643					-6.5173	-6.5365
$EBITD_{it}$	Coeff.	**0.0224****	**0.0204****	**0.0209**	0.0172	0.0128	0.0119	**0.0370****	**0.0327****	0.0335	0.0282
	Std.Err.	0.0073	0.0071	0.0123	0.0121	0.0087	0.0084	0.0108	0.0108	0.0385	0.0382
	t-ratio	3.0475	2.8614	1.6994	1.4168	1.4757	1.4214	3.4218	3.0315	0.8690	0.7374
$EBITD_{it-1}$	Coeff.		**0.0223****		**0.0294****		**0.0213****		**0.0246****		0.0327

	Std.Err.		0.0064		0.0109		0.0087		0.0061		0.0219
	t-ratio		3.5013		2.7069		2.4400		4.0551		1.4937
Merger	Coeff.	**0.0140***	**0.0147****	**0.0155****	**0.0160****	**0.0275****	**0.0277****	-0.0014	-0.0001	0.0016	0.0028
dummy	Std.Err.	0.0062	0.0059	0.0062	0.0060	0.0091	0.0086	0.0049	0.0049	0.0069	0.0072
	t-ratio	2.2732	2.4724	2.5039	2.6580	3.0192	3.2396	-0.2792	-0.0117	0.2361	0.3847
Adj R squared		0.51	0.53	0.50	0.51	0.51	0.52	0.60	0.63	0.50	0.51
F statistic		4.85	5.09	4.65	4.72	4.74	4.90	6.34	6.86	4.58	4.56
N		926	926	926	926	567	567	359	359	359	359

** indicates a significance level of 1% or below, * indicates a significance level between 1 and 5%
Fixed and time effects are controlled for in all regressions.
The constant in the case of the fixed effects OLS models is the actual constant of the equivalent model but without fixed effect controls.

Table 5-6: Lintner and Fama and Babiak's models- Robustness checks- Using the restricted sample of firms that paid dividends in at least two consecutive years
This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by total assets. The same models are estimated using first, the total sample, then the sample of firms that never repurchased their shares during the sample period, and finally the sample of firms that repurchased their shares at least once during the sample period. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic. Variables are defined as follows: D_{it}- total cash dividends (excluding special dividends) paid during the current year normalised by the value of the firm's total assets at the start of the current year. D_{it-1}- total cash dividends (excluding special dividends) paid during the previous financial year normalised by the value of the firm's total assets at the start of the previous financial year. $\Delta D_{it} = D_{it} - D_{it-1}$: the change in dividends between this year and last year. TP_{it}- total payouts (dividends and repurchases) paid during the current year normalised by total assets at the start of the current year. TP_{it-1}- total payouts (dividends and repurchases) paid during the previous financial year normalised by total assets at the start of the previous financial year. $\Delta TP_{it} = TP_{it} - TP_{it-1}$: the change in total payouts between this year and last year. E_{it} - net income at the end of the current year normalised by total assets at the start of the current financial year. E_{it-1}- net income at the end of the previous year normalised by total assets at the start of the previous financial year. SIZE- the natural logarithm of the firm's total assets at the start of the current financial year. MERGER- a dummy that takes the value of one in the year of the merger/de-merger and the year following it and zero otherwise.

		Total sample				*Div only sample*		*Div-and-Rep sample*			
		ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
Constant*	Coeff.	**0.0217****	**0.0217****	0.0134	0.0112	**0.0414****	**0.0413****	0.0020	0.0024	-0.0108	-0.0209
	Std.Err.	0.0060	0.0060	0.0138	0.0138	0.0091	0.0091	0.0077	0.0077	0.0295	0.0295
	t-ratio	3.6274	3.6198	0.9725	0.8074	4.5530	4.5282	0.2554	0.3122	-0.3646	-0.7068
SIZE	Coeff.	**-0.0151****	**-0.0157****	**-0.0117****	**-0.0125****	**-0.0177****	**-0.0172****	**-0.0114****	**-0.0137****	-0.0002	-0.0039
	Std.Err.	0.0026	0.0025	0.0034	0.0033	0.0035	0.0032	0.0032	0.0031	0.0079	0.0085
	t-ratio	-5.7615	-6.2212	-3.4788	-3.7893	-5.0985	-5.3444	-3.5714	-4.4336	-0.0305	-0.4583
D_{it-1}	Coeff.	**-0.9846****	**-1.0403****			**-0.9621****	**-1.0117****	**-1.0341****	**-1.1061****		
	Std.Err.	0.0605	0.0588			0.0802	0.0786	0.0895	0.0866		
	t-ratio	-16.2690	-17.6807			-11.9900	-12.8777	-11.5522	-12.7661		
TP_{it-1}	Coeff.			**-1.0862****	**-1.0989****					**-1.0981****	**-1.1066****
	Std.Err.			0.1544	0.1550					0.1835	0.1839
	t-ratio			-7.0356	-7.0879					-5.9853	-6.0186
E_{it}	Coeff.	0.0083	0.0111	0.0250	0.0268	-0.0022	0.0012	**0.0336****	**0.0355****	0.0868	**0.0890***
	Std.Err.	0.0110	0.0099	0.0184	0.0173	0.0128	0.0119	0.0131	0.0099	0.0480	0.0458
	t-ratio	0.7536	1.1214	1.3633	1.5477	-0.1754	0.0984	2.5756	3.5988	1.8088	1.9433
E_{it-1}	Coeff.		**0.0386****		**0.0485****		**0.0419****		**0.0354****		**0.0527***

	Std.Err.		0.0082		0.0139		0.0136		0.0056		0.0247
	t-ratio		4.6931		3.5013		3.0818		6.3217		2.1313
Merger	Coeff.	**0.0189****	**0.0205****	**0.0230****	**0.0243****	**0.0322****	**0.0342****	0.0038	0.0046	0.0127	0.0129
dummy	Std.Err.	0.0074	0.0069	0.0074	0.0069	0.0103	0.0091	0.0065	0.0061	0.0079	0.0078
	t-ratio	2.5517	2.9470	3.1307	3.5146	3.1384	3.7433	0.5885	0.7561	1.6011	1.6593
Adj R squared		0.54	0.57	0.48	0.49	0.56	0.59	0.58	0.61	0.49	0.49
F statistic		5.12	5.66	4.28	4.39	5.26	5.77	5.72	6.44	4.29	4.30
Number of obs		856	856	856	856	513	513	343	343	343	343

** indicates a significance level of 1% or below, * indicates a significance level between 1 and 5%
Fixed and time effects are controlled for in all regressions.
The constant in the case of the fixed effects OLS models is the actual constant of the equivalent model but without fixed effect controls.

Table 5-7: Alternative Expected and Unexpected Earnings models- the special case of expected earnings being last year's earnings

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by total assets. In these models we assume a special case of the alternative earnings model where expected earnings are last year's earnings, which means that unexpected earnings are the difference between this year and last year's earnings. The same models are estimated using first, the total sample, then the sample of firms that never repurchased their shares during the sample period, and finally the sample of firms that repurchased their shares at least once during the sample period. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic. For a full definition of variables refer back to table 2.

		Total sample						*Div only sample*			*Div-and-Rep sample*					
		ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
Constant	Coeff.	**0.0248****	**0.0279****	**0.0207****	0.0187	**0.0328****	0.0093	**0.0383****	**0.0417****	**0.0359****	0.0131	0.0144	0.0028	0.0171	0.0516	-0.0178
	Std.Err.	0.0059	0.0059	0.0060	0.0131	0.0130	0.0132	0.0087	0.0086	0.0089	0.0080	0.0078	0.0078	0.0294	0.0294	0.0292
	t-ratio	4.1873	4.7534	3.4711	1.4281	2.5257	0.7058	4.3754	4.8743	4.0383	1.6270	1.8395	0.3600	0.5825	1.7555	-0.6102
SIZE	Coeff.	**-0.0096****	**-0.0115****	**-0.0096****	**-0.0071****	**-0.0091****	**-0.0059***	**-0.0086****	**-0.0108****	**-0.0092****	**-0.0128****	**-0.0136****	**-0.0109****	-0.0071	-0.0071	-0.0012
	Std.Err.	0.0020	0.0022	0.0023	0.0024	0.0027	0.0029	0.0024	0.0026	0.0028	0.0028	0.0030	0.0028	0.0058	0.0069	0.0079
	t-ratio	-4.9463	-5.2994	-4.2357	-2.9599	-3.4237	-2.0017	-3.6048	-4.0926	-3.2851	-4.4871	-4.5137	-3.8629	-1.2292	-1.0386	-0.1527
D_{it-1}	Coeff.	**-0.9671****	**-0.9443****	**-0.9674****				**-0.9245****	**-0.9014****	**-0.9210****	**-1.0817****	**-1.0529****	**-1.0815****			
	Std.Err.	0.0585	0.0575	0.0578				0.0811	0.0779	0.0792	0.0831	0.0847	0.0829			
	t-ratio	-16.5440	-16.4205	-16.7449				-11.4051	-11.5750	-11.6291	-13.0215	-12.4254	-13.0491			
TP_{it-1}	Coeff.				**-1.0667****	**-1.0631****	**-1.0663****							**-1.0939****	**-1.0932****	**-1.0839****
	Std.Err.				0.1378	0.1379	0.1379							0.1620	0.1643	0.1658
	t-ratio				-7.7434	-7.7078	-7.7309							-6.7530	-6.6530	-6.5366
E_{it-1}	Coeff.	**0.0295****		**0.0303****	**0.0396****		**0.0516****	**0.0287****		0.0233	**0.0328****		**0.0528****	**0.0511***		**0.1130****
	Std.Err.	0.0075		0.0101	0.0110		0.0157	0.0110		0.0135	0.0059		0.0137	0.0216		0.0450
	t-ratio	3.9514		2.9865	3.6004		3.2882	2.6098		1.7319	5.5780		3.8544	2.3670		2.5103
Eit - E_{it-1}	Coeff.		**-0.0174****	0.0008		**-0.0200***	0.0115		**-0.0181***	-0.0050		**-0.0163****	0.0195		-0.0179	0.0606
	Std.Err.		0.0060	0.0086		0.0087	0.0130		0.0079	0.0100		0.0054	0.0105		0.0210	0.0418
	t-ratio		-2.9261	0.0907		-2.2889	0.8870		-2.2792	-0.4988		-3.0350	1.8510		-0.8523	1.4500
Merger	Coeff.	**0.0154****	**0.0141***	**0.0154****	**0.0170****	**0.0156****	**0.0175****	**0.0284****	**0.0271****	**0.0281****	0.0002	-0.0012	0.0008	0.0038	0.0017	0.0055
dummy	Std.Err.	0.0060	0.0059	0.0058	0.0059	0.0058	0.0060	0.0084	0.0081	0.0081	0.0052	0.0054	0.0053	0.0071	0.0072	0.0074
	t-ratio	2.5667	2.4000	2.6311	2.8662	2.6857	2.9429	3.3896	3.3343	3.4720	0.0399	-0.2235	0.1484	0.5288	0.2352	0.7421
Adj R squared		0.53	0.52	0.53	0.51	0.50	0.51	0.52	0.52	0.52	0.61	0.59	0.61	0.51	0.50	0.51
F statistic		5.05	4.91	5.03	4.75	4.68	4.73	4.98	4.91	4.95	6.46	5.97	6.51	4.64	4.57	4.63
N		926	926	926	926	926	926	567	567	567	359	359	359	359	359	359

Table 5-8: Alternative Expected and Unexpected Earnings models- the special case of expected earnings being last year's earnings- Robustness checks- using the restricted sample of firms that paid dividends in at least two consecutive years of the sample period.

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by total assets. In these models we assume a special case of the alternative earnings model where expected earnings are last year's earnings, which means that unexpected earnings are the difference between this year and last year's earnings. The same models are estimated using first, the total sample, then the sample of firms that never repurchased their shares during the sample period, and finally the sample of firms that repurchased their shares at least once during the sample period. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic. For a full definition of variables refer back to table 2.

		Total sample						*Div only sample*			*Div-and-Rep sample*					
		ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
Constant	Coeff.	**0.0248****	**0.0255****	**0.0217****	0.0193	**0.0294***	0.0112	**0.0420****	**0.0429****	**0.0413****	0.0121	0.0118	0.0024	0.0127	0.0435	-0.0209
	Std.Err.	0.0060	0.0059	0.0060	0.0138	0.0137	0.0138	0.0090	0.0089	0.0091	0.0079	0.0076	0.0077	0.0296	0.0296	0.0295
	t-ratio	4.1376	4.2851	3.6198	1.4029	2.1364	0.8074	4.6594	4.7912	4.5282	1.5361	1.5410	0.3122	0.4280	1.4691	-0.7068
SIZE	Coeff.	**-0.0164****	**-0.0174****	**-0.0157****	**-0.0143****	**-0.0152****	**-0.0125****	**-0.0173****	**-0.0190****	**-0.0172****	**-0.0160****	**-0.0153****	**-0.0137****	-0.0098	-0.0074	-0.0039
	Std.Err.	0.0023	0.0026	0.0025	0.0030	0.0034	0.0033	0.0029	0.0033	0.0032	0.0034	0.0036	0.0031	0.0076	0.0084	0.0085
	t-ratio	-7.0839	-6.6764	-6.2212	-4.8164	-4.5097	-3.7893	-5.9076	-5.7401	-5.3444	-4.7443	-4.3004	-4.4336	-1.2915	-0.8840	-0.4583
D_{it-1}	Coeff.	**-1.0334****	**-0.9962****	**-1.0403****				**-1.0106****	**-0.9708****	**-1.0117****	**-1.1032****	**-1.0576****	**-1.1061****			
	Std.Err.	0.0591	0.0585	0.0588				0.0797	0.0754	0.0786	0.0889	0.0916	0.0866			
	t-ratio	-17.4984	-17.0408	-17.6807				-12.6837	-12.8782	-12.8777	-12.4134	-11.5409	-12.7661			
TP_{it-1}	Coeff.				**-1.0977****	**-1.0897****	**-1.0989****							**-1.1146****	**-1.1086****	**-1.1066****
	Std.Err.				0.1549	0.1547	0.1550							0.1819	0.1840	0.1839
	t-ratio				-7.0845	-7.0438	-7.0879							-6.1276	-6.0257	-6.0186
E_{it-1}	Coeff.	**0.0381****		**0.0497****	**0.0479****		**0.0753****	**0.0418****		**0.0431****	**0.0345****		**0.0709****	**0.0511***		**0.1417****
	Std.Err.	0.0083		0.0113	0.0140		0.0214	0.0137		0.0166	0.0055		0.0121	0.0258		0.0505
	t-ratio	4.5846		4.4012	3.4318		3.5190	3.0483		2.5946	6.2534		5.8773	1.9810		2.8087
Eit - E_{it-1}	Coeff.		**-0.0193****	0.0111		-0.0200	0.0268		**-0.0233***	0.0012		-0.0123	**0.0355****		-0.0092	**0.0890***
	Std.Err.		0.0070	0.0099		0.0110	0.0173		0.0097	0.0119		0.0068	0.0099		0.0242	0.0458
	t-ratio		-2.7655	1.1214		-1.8156	1.5477		-2.3892	0.0984		-1.8107	3.5988		-0.3809	1.9433
Merger	Coeff.	**0.0198****	**0.0178****	**0.0205****	**0.0227****	**0.0209****	**0.0243****	**0.0341****	**0.0313****	**0.0342****	0.0032	0.0023	0.0046	0.0096	0.0091	0.0129
dummy	Std.Err.	0.0070	0.0069	0.0069	0.0067	0.0066	0.0069	0.0093	0.0091	0.0091	0.0061	0.0064	0.0061	0.0079	0.0081	0.0078
	t-ratio	2.8094	2.5693	2.9470	3.3732	3.1637	3.5146	3.6619	3.4397	3.7433	0.5276	0.3617	0.7561	1.2237	1.1290	1.6593
Adj R squared		0.57	0.55	0.57	0.49	0.49	0.49	0.59	0.58	0.59	0.60	0.57	0.61	0.49	0.48	0.49
F statistic		5.66	5.34	5.66	4.39	4.30	4.39	5.82	5.58	5.77	6.13	5.55	6.44	4.27	4.20	4.30
N		856	856	856	856	856	856	513	513	513	343	343	343	343	343	343

Table 5-9: Alternative Earnings Expected and Unexpected Models

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by total assets. In these models we assume that changes in dividends and total payouts are a function of lagged dividends and a measure of expected earnings, which we estimate according to the following mechanism: $E_t = a + SIZE + E_{t-1} + E_{it-1} * NE_{it-1}$ + industry dummies + annual dummies, where NE_{it-1} refers to a dummy that takes one for all the values of E_{it-1} that are negative and zero otherwise.

The predicted values and residuals obtained from this estimation are used in the dividend and total payout estimations as expected income (Expec E_{it}) and unexpected income (Unexp E_{it}) respectively. Positive Unexp E_{it} is an interaction term between Unexp E_{it} and a dummy that takes one for all values of Unexp E_{it} that are positive. All the remaining variables are as defined before (refer back to table 5-2). For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic.

		Total sample N = 926								
		E_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Constant*	Coeff.	**0.2162****	**0.0191****	**0.0192****	**0.0161****	**0.0161****	0.0008	0.0016	-0.0069	-0.0071
	Std.Err.	0.0647	0.0064	0.0064	0.0063	0.0063	0.0142	0.0143	0.0141	0.0141
	t-ratio	3.3439	3.0066	2.9936	2.5501	2.5407	0.0570	0.1096	-0.4916	-0.5068
E_{it-1}	Coeff.	**0.5056****								
	Std.Err.	0.1399								
	t-ratio	3.6129								
SIZE	Coeff.	**-0.0109****	**-0.0088****	**-0.0089****	**-0.0079****	**-0.0090****	-0.0049	**-0.0061****	-0.0039	-0.0051
	Std.Err.	0.0026	0.0022	0.0019	0.0020	0.0022	0.0029	0.0024	0.0028	0.0029
	t-ratio	-4.2005	-3.9914	-4.6652	-4.0003	-4.0184	-1.6797	-2.5640	-1.4156	-1.7552
E_{it-1} * N E_{it-1}	Coeff.	-0.1385								
	Std.Err.	0.2061								
	t-ratio	-0.6721								
	P-value	0.5015								
D_{it-1}	Coeff.		**-0.9718****	**-0.9714****	**-0.9744****	**-0.9684****				
	Std.Err.		0.0581	0.0588	0.0594	0.0582				
	t-ratio		-16.7157	-16.5078	-16.4015	-16.6262				
TP_{it-1}	Coeff.						**-1.0674****	**-1.0678****	**-1.0660****	**-1.0660****
	Std.Err.						0.1381	0.1379	0.1388	0.1388
	t-ratio						-7.7287	-7.7409	-7.6814	-7.6776
Expec E_{it}	Coeff.		**0.0675****	**0.0666****	**0.0750****	**0.0624****	**0.1012****	**0.0887****	**0.1068****	**0.0925****
	Std.Err.		0.0173	0.0171	0.0172	0.0181	0.0270	0.0261	0.0262	0.0286
	t-ratio		3.9132	3.8898	4.3616	3.4550	3.7411	3.3988	4.0816	3.2394
Unexp E_{it}	Coeff.		0.0008			-0.0169	0.0114			-0.0198
	Std.Err.		0.0086			0.0117	0.0130			0.0158
	t-ratio		0.0953			-1.4453	0.8806			-1.2550
Positive	Coeff.				0.0292	**0.0514***			0.0649	0.0911
Unexp E_{it}	Std.Err.				0.0171	0.0232			0.0392	0.0500
	t-ratio				1.7037	2.2201			1.6578	1.8235
Merger	Coeff.		**0.0154****	**0.0153****	**0.0152****	**0.0143****	**0.0174****	**0.0170****	**0.0166****	**0.0157****
dummy	Std.Err.		0.0058	0.0060	0.0060	0.0056	0.0059	0.0059	0.0060	0.0056
	t-ratio		2.6370	2.5729	2.5424	2.5611	2.9363	2.8610	2.7697	2.7742
Industry dummies		Yes	No	No	No	No	No	No	No	No
Fixed effects		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R squared		0.36	0.53	0.53	0.53	0.53	0.51	0.51	0.51	0.51
F statistic		34.98	5.03	5.06	5.09	5.11	4.73	4.75	4.78	4.76

The constant in the case of the fixed effects models refers to the intercept resulting from the equivalent model without the use of fixed effects (and without intercept).

** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.

Table 5-10: Alternative Earnings Expected and Unexpected Models- using the sub-samples

Refer to table 5-9 for a brief presentation of the models and a definition of the variables.

		Dividend-only sample N = 567				Dividend-and-Repurchase N = 359							
		ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}
		[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]
Constant	Coeff.	**0.0336****	**0.0339****	**0.0296****	**0.0291****	0.0028	0.0087	0.0091	0.0070	-0.0369	-0.0207	-0.0173	-0.0214
	Std.Err.	0.0094	0.0094	0.0096	0.0097	0.0086	0.0089	0.0083	0.0084	0.0320	0.0329	0.0310	0.0313
	t-ratio	3.5670	3.5914	3.0997	3.0179	0.3304	0.9731	1.0971	0.8305	-1.1530	-0.6270	-0.5586	-0.6821
SIZE	Coeff.	**-0.0083****	**-0.0078****	**-0.0073****	**-0.0083****	**-0.0102****	**-0.0121****	**-0.0105****	**-0.0109****	-0.0001	-0.0060	-0.0014	-0.0017
	Std.Err.	0.0027	0.0024	0.0025	0.0028	0.0028	0.0028	0.0025	0.0027	0.0079	0.0058	0.0067	0.0072
	t-ratio	-3.0374	-3.3048	-2.9193	-2.9965	-3.6744	-4.3328	-4.1906	-3.9859	-0.0161	-1.0435	-0.2096	-0.2395
D_{it-1}	Coeff.	**-0.9251****	**-0.9285****	**-0.9310****	**-0.9249****	**-1.0876****	**-1.0878****	**-1.0769****	**-1.0757****				
	Std.Err.	0.0800	0.0818	0.0814	0.0804	0.0829	0.0831	0.0809	0.0805				
	t-ratio	-11.5692	-11.3447	-11.4411	-11.5031	-13.1138	-13.0899	-13.3173	-13.3705				
TP_{it-1}	Coeff.									**-1.0844****	**-1.0944****	**-1.0834****	**-1.0838****
	Std.Err.									0.1659	0.1621	0.1667	0.1673
	t-ratio									-6.5351	-6.7510	-6.4974	-6.4789
Expec E_{it}	Coeff.	**0.0604***	**0.0661****	**0.0701****	**0.0595***	**0.0923****	**0.0722****	**0.0827****	**0.0779****	**0.1701****	**0.1078***	**0.1391****	**0.1350***
	Std.Err.	0.0261	0.0262	0.0256	0.0265	0.0186	0.0130	0.0146	0.0178	0.0598	0.0492	0.0500	0.0628
	t-ratio	2.3119	2.5291	2.7414	2.2434	4.9609	5.5573	5.6469	4.3861	2.8451	2.1902	2.7821	2.1514
Unexp E_{it}	Coeff.	-0.0048			-0.0156	0.0193			-0.0057	0.0601			-0.0050
	Std.Err.	0.0100			0.0137	0.0104			0.0122	0.0418			0.0368
	t-ratio	-0.4787			-1.1435	1.8610			-0.4685	1.4394			-0.1363
Positive	Coeff.			0.0111	0.0332			**0.0567****	**0.0631****			0.1591	0.1646
Unexp E_{it}	Std.Err.			0.0204	0.0282			0.0196	0.0256			0.0992	0.1140
	t-ratio			0.5446	1.1754			2.8909	2.4672			1.6033	1.4443
Merger	Coeff.	**0.0280****	**0.0283****	**0.0282****	**0.0270****	0.0008	0.0003	0.0003	0.0002	0.0054	0.0037	0.0040	0.0039
dummy	Std.Err.	0.0081	0.0084	0.0084	0.0079	0.0053	0.0052	0.0052	0.0051	0.0074	0.0071	0.0070	0.0070
	t-ratio	3.4723	3.3918	3.3464	3.4231	0.1614	0.0546	0.0655	0.0348	0.7308	0.5212	0.5759	0.5552
Adj R squared		0.52	0.52	0.52	0.53	0.61	0.61	0.63	0.62	0.51	0.51	0.52	0.51
F statistic		4.95	4.98	4.95	4.94	6.53	6.49	6.81	6.73	4.62	4.63	4.70	4.64

Table 5-11: Alternative Earnings Expected and Unexpected Models- Comparison of models with and without fixed effects

Refer to table 5-9 for a brief presentation of the models and a definition of the variables. Time effects are controlled for in all the regressions.

		Total sample N = 926				Div-only N = 567		Div-and-Rep N = 359				Difference	
		ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔTP_{it}
		[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[7] - [9]	[7] - [11]
Constant*	Coeff.	**0.0191****	**0.0191****	0.0008	0.0008	**0.0336****	**0.0336****	0.0028	0.0028	-0.0369	-0.0369	**0.0308**	**0.0705**
	Std.Err.	0.0064	0.0073	0.0142	0.0158	0.0094	0.0092	0.0086	0.0094	0.0320	0.0324	0.0132	0.0337
	t-ratio	3.0066	2.6085	0.0570	0.0512	3.5670	3.6542	0.3304	0.3013	-1.1530	-1.1362	2.3392	2.0903
SIZE	Coeff.	**-0.0088****	-0.0005	-0.0049	0.0014	**-0.0083****	**-0.0011***	**-0.0102****	0.0000	-0.0001	**0.0034***	-0.0012	**-0.0045**
	Std.Err.	0.0022	0.0004	0.0029	0.0009	0.0027	0.0006	0.0028	0.0005	0.0079	0.0018	0.0008	0.0019
	t-ratio	-3.9914	-1.1938	-1.6797	1.6281	-3.0374	-1.9719	-3.6744	0.0716	-0.0161	1.9349	-1.5075	-2.4475
D_{it-1}	Coeff.	**-0.9718****	**-0.1976****			**-0.9251****	**-0.2547****	**-1.0876****	**-0.1998****			-0.0548	
	Std.Err.	0.0581	0.0418			0.0800	0.0691	0.0829	0.0448			0.0823	
	t-ratio	-16.7157	-4.7255			-11.5692	-3.6874	-13.1138	-4.4615			-0.6662	
TP_{it-1}	Coeff.			**-1.0674****	**-0.3192****					**-1.0844****	**-0.4775****		**0.2229**
	Std.Err.			0.1381	0.0557					0.1659	0.0545		0.0880
	t-ratio			-7.7287	-5.7331					-6.5351	-8.7574		2.5327
Expected E_{it}	Coeff.	**0.0675****	**0.0393***	**0.1012****	**0.1352****	**0.0604***	0.0298	**0.0923****	**0.0623****	**0.1701****	**0.3631****	-0.0325	**-0.3333**
	Std.Err.	0.0173	0.0155	0.0270	0.0305	0.0261	0.0197	0.0186	0.0207	0.0598	0.0776	0.0286	0.0801
	t-ratio	3.9132	2.5309	3.7411	4.4331	2.3119	1.5126	4.9609	3.0122	2.8451	4.6786	-1.1391	-4.1631
Unexpec E_{it}	Coeff.	0.0008	**0.0252****	0.0114	**0.0545****	-0.0048	0.0107	0.0193	**0.0563****	0.0601	**0.1779****	**-0.0456**	**-0.1672**
	Std.Err.	0.0086	0.0098	0.0130	0.0185	0.0100	0.0116	0.0104	0.0126	0.0418	0.0478	0.0171	0.0492
	t-ratio	0.0953	2.5687	0.8806	2.9460	-0.4787	0.9191	1.8610	4.4647	1.4394	3.7190	-2.6617	-3.3973
Merger	Coeff.	**0.0154****	0.0075	**0.0174****	0.0108	**0.0280****	0.0158	0.0008	-0.0028	0.0054	-0.0010	0.0186	0.0167
Dummy	Std.Err.	0.0058	0.0095	0.0059	0.0093	0.0081	0.0145	0.0053	0.0101	0.0074	0.0108	0.0177	0.0181
	t-ratio	2.6370	0.7962	2.9363	1.1603	3.4723	1.0881	0.1614	-0.2764	0.7308	-0.0890	1.0502	0.9252
Year dummies		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Industry dummies		No	Yes	No	Yes	No	Yes	No	Yes	No	Yes		
Fixed effects		Yes	No	Yes	No	Yes	No	Yes	No	Yes	No		
Adjusted R squared		0.53	0.146	0.51	0.171	0.52	0.189	0.61	0.147	0.51	0.256		
F statistic		5.03	10.300	4.73	12.190	4.95	8.780	6.53	4.640	4.62	8.230		

Table 5-12: Alternative Earnings Expected and Unexpected Models- Robustness checks, using MV as the scaling variable

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by the market value of equity. In these models we assume that changes in dividends and total payouts are a function of lagged dividends and a measure of expected earnings, which we estimate according to the following mechanism: $E_t = a + SIZE + E_{t-1} + E_{t-1} * NE_{it-1}$ + industry dummies + annual dummies, where NE_{it-1} refers to a dummy that takes one for all the values of E_{it-1} that are negative and zero otherwise.

The predicted values and residuals obtained from this estimation are used in the dividend and total payout estimations as expected income (Expec E_{it}) and unexpected income (Unexp E_{it}) respectively. Positive Unexp E_{it} is an interaction term between Unexp E_{it} and a dummy that takes one for all values of Unexp E_{it} that are positive. All the variables are scaled by the market value of equity, and are defined as in table 5-3. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic.

		Total sample					Div only		Div&Rep			
		E_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Constant*	Coeff.	**0.1522****	0.0044	-0.0012	-0.0095	-0.0158	-0.0036	-0.0088	0.0144	0.0070	0.0232	0.0125
	Std.Err.	0.0589	0.0073	0.0075	0.0116	0.0118	0.0112	0.0115	0.0101	0.0101	0.0235	0.0239
	t-ratio	2.5836	0.5977	-0.1568	-0.8223	-1.3450	-0.3196	-0.7651	1.4162	0.6850	0.9859	0.5237
E_{it-1}	Coeff.	**0.4773****										
	Std.Err.	0.1041										
	t-ratio	4.5847										
SIZE	Coeff.	**-0.0081****	**-0.0117****	**-0.0110****	**-0.0141****	**-0.0133****	**-0.0079****	**-0.0073****	**-0.0233****	**-0.0227****	**-0.0335****	**-0.0330****
	Std.Err.	0.0026	0.0017	0.0018	0.0028	0.0031	0.0019	0.0021	0.0022	0.0022	0.0084	0.0085
	t-ratio	-3.0936	-6.8025	-6.2083	-5.0100	-4.2810	-4.1262	-3.5256	-10.5850	-10.5278	-3.9914	-3.8684
$E_{it-1} * N E_{it-1}$	Coeff.	-0.1320										
	Std.Err.	0.1681										
	t-ratio	-0.7852										
D_{it-1}	Coeff.		**-0.9984****	**-0.9974****			**-1.0107****	**-1.0101****	**-1.0672****	**-1.0612****		
	Std.Err.		0.0470	0.0467			0.0597	0.0595	0.0547	0.0526		
	t-ratio		-21.2368	-21.3573			-16.9235	-16.9697	-19.5218	-20.1822		
TP_{it-1}	Coeff.				**-0.9985****	**-0.9979****					**-1.0248****	**-1.0204****
	Std.Err.				0.0526	0.0531					0.0692	0.0694
	t-ratio				-18.9859	-18.7998					-14.8154	-14.7062
Expec E_{it}	Coeff.		**0.0847****	**0.0874****	**0.1412****	**0.1404****	**0.0889****	**0.0880****	**0.0821****	**0.1048****	**0.2483****	**0.2686****
	Std.Err.		0.0228	0.0213	0.0311	0.0293	0.0294	0.0275	0.0319	0.0321	0.0693	0.0624
	t-ratio		3.7199	4.1074	4.5460	4.7871	3.0217	3.2009	2.5743	3.2637	3.5844	4.3078

Unexp E_{it}	Coeff.		0.0095		0.0153		0.0101		0.0022		0.0185				
	Std.Err.		0.0085		0.0098		0.0107		0.0096		0.0196				
	t-ratio		1.1187		1.5640		0.9448		0.2324		0.9431				
Positive	Coeff.			**0.0294**		0.0369		0.0233		**0.0486***		0.0841			
Unexp Eit	Std.Err.			0.0154		0.0233		0.0182		0.0216		0.0535			
	t-ratio			1.9034		1.5853		1.2797		2.2465		1.5736			
Merger	Coeff.		**0.0125***	**0.0123***	**0.0154****	**0.0151****	**0.0308****	**0.0302****	-0.0080	-0.0062	0.0039	0.0059			
dummy	Std.Err.		0.0058	0.0057	0.0056	0.0055	0.0063	0.0063	0.0062	0.0062	0.0070	0.0066			
	t-ratio		2.1529	2.1639	2.7607	2.7595	4.8991	4.8105	-1.2750	-0.9888	0.5525	0.8872			
Industry dummies		Yes	No	No	No	No	No	No	No	No	No	No			
Fixed effects		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Adj R squared		0.27	0.55	0.55	0.53	0.53	0.54	0.54	0.69	0.70	0.56	0.57			
F statistic		24.33	5.44	5.46	5.13	5.13	5.16	5.15	8.82	9.17	5.47	5.52			
N		927	927	927	927	927	568	568	359	359	359	359			

The constant in the case of the fixed effects models refers to the intercept resulting from the equivalent model without the use of fixed effects (and without intercept).
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.
Time effects are controlled for in all the regressions.

Table 5-13: Alternative Earnings Expected and Unexpected Models- Robustness checks, using EBITD instead of net income

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by total assets. In these models we assume that changes in dividends and total payouts are a function of lagged dividends and a measure of expected earnings, which we estimate according to the following mechanism: $EBITD_t$ = a + SIZE + $EBITD_{t-1}$ + $EBITD_{it-1}$ * $NEBITD_{it-1}$ + industry dummies + annual dummies, where $NEBITD_{it-1}$ refers to a dummy that takes one for all the values of $EBITD_{it-1}$ that are negative and zero otherwise.

The predicted values and residuals obtained from this estimation are used in the dividend and total payout estimations as expected income (Expec E_{it}) and unexpected income (Unexp E_{it}) respectively. Positive Unexp E_{it} is an interaction term between Unexp E_{it} and a dummy that takes one for all values of Unexp E_{it} that are positive. All the variables are scaled by total assets, and are defined as in table 2. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic.

		Total sample					Div only		Div&Rep			
		E_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
Constant*	Coeff.	**0.3466****	**0.0211****	**0.0212****	0.0022	0.0023	**0.0337****	**0.0321****	0.0116	0.0117	-0.0029	-0.0029
	Std.Err.	0.0741	0.0062	0.0062	0.0141	0.0141	0.0094	0.0096	0.0077	0.0077	0.0304	0.0304
	t-ratio	4.6785	3.4195	3.4541	0.1553	0.1619	3.5766	3.3272	1.5016	1.5122	-0.0941	-0.0958
$EBITD_{it-1}$	Coeff.	**0.5788****										
	Std.Err.	0.0691										
	t-ratio	8.3764										
SIZE	Coeff.	**-0.0163****	**-0.0068****	**-0.0068****	**-0.0048**	**-0.0048**	**-0.0070****	**-0.0069****	**-0.0081****	**-0.0081****	-0.0023	-0.0026
	Std.Err.	0.0032	0.0021	0.0021	0.0029	0.0029	0.0027	0.0027	0.0023	0.0023	0.0080	0.0078
	t-ratio	-5.0265	-3.1857	-3.1874	-1.6400	-1.6446	-2.5976	-2.5904	-3.5279	-3.5581	-0.2927	-0.3412
$EBITD_{it-1}$ * NEBITD	Coeff.	-0.3173										
	Std.Err.	0.1949										
	t-ratio	-1.6281										
D_{it-1}	Coeff.		**-1.0020****	**-1.0003****			**-0.9592****	**-0.9609****		**-1.0910****		
	Std.Err.		0.0621	0.0623			0.0873	0.0883		0.0824		
	t-ratio		-16.1320	-16.0480			-10.9857	-10.8857		-13.2355		
TP_{it-1}	Coeff.				**-1.0723****	**-1.0728****			**-1.0982****		**-1.0889****	**-1.0891****
	Std.Err.				0.1401	0.1402			0.0822		0.1668	0.1668
	t-ratio				-7.6510	-7.6516			-13.3526		-6.5289	-6.5312
Expec E_{it}	Coeff.		**0.0635****	**0.0613****	**0.0719****	**0.0690****	**0.0551****	**0.0567****	**0.0768****	**0.0728****	0.0825	0.0683
	Std.Err.		0.0136	0.0140	0.0236	0.0243	0.0197	0.0216	0.0145	0.0150	0.0562	0.0592

	t-ratio		4.6733	4.3853	3.0479	2.8364	2.7956	2.6212	5.2874	4.8394	1.4677	1.1541
Unexp E_{it}	Coeff.		**0.0203****	0.0121	0.0171	0.0053	0.0118	0.0118	**0.0328****	**0.0328****	0.0287	0.0283
	Std.Err.		0.0072	0.0092	0.0121	0.0136	0.0084	0.0084	0.0108	0.0108	0.0382	0.0382
	t-ratio		2.8321	1.3217	1.4044	0.3879	1.4051	1.3999	3.0366	3.0319	0.7521	0.7415
Positive	Coeff.			0.0195		0.0281		-0.0049		0.0234		**0.0943**
Unexp Eit	Std.Err.			0.0166		0.0306		0.0154		0.0260		0.0518
	t-ratio			1.1747		0.9159		-0.3189		0.8993		1.8206
Merger	Coeff.		**0.0147****	**0.0143***	**0.0160****	**0.0154****	**0.027**7**	**0.0277****	0.0000	-0.0001	0.0027	0.0025
dummy	Std.Err.		0.0059	0.0059	0.0060	0.0061	0.0085	0.0084	0.0049	0.0049	0.0072	0.0071
	t-ratio		2.4902	2.4027	2.6637	2.5310	3.2752	3.2834	-0.0048	-0.0252	0.3753	0.3546
Industry dummies		Yes	No	No	No	No	No	No	No	No	No	No
Fixed effects		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R squared		0.50	0.53	0.53	0.50	0.50	0.52	0.52	0.63	0.63	0.51	0.51
F statistic		63.17	5.10	5.10	4.71	4.70	4.92	4.88	6.82	6.78	4.55	4.52
N		926	926	926	926	926	567	567	359	359	359	359

The constant in the case of the fixed effects models refers to the intercept resulting from the equivalent model without the use of fixed effects (and without intercept).
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.
Time effects are controlled for in all the regressions.

Table 5-14: Alternative Earnings Expected and Unexpected Models- Robustness checks, using the restricted sample of firms that paid dividends in at least two consecutive years of the sample period

This table presents coefficient estimates and model descriptive statistics for OLS regressions with fixed effects of the change in dividends and change in total payouts, from year t-1 to year t, normalised by total assets. In these models we assume that changes in dividends and total payouts are a function of lagged dividends and a measure of expected earnings, which we estimate according to the following mechanism: $E_t = a + SIZE + E_{t-1} + E_{it-1} * NE_{it-1}$ + industry dummies + annual dummies, where NE_{it-1} refers to a dummy that takes one for all the values of E_{it-1} that are negative and zero otherwise.
The predicted values and residuals obtained from this estimation are used in the dividend and total payout estimations as expected income (Expec E_{it}) and unexpected income (Unexp E_{it}) respectively. Positive Unexp E_{it} is an interaction term between Unexp E_{it} and a dummy that takes one for all values of Unexp E_{it} that are positive. All the variables are scaled by total assets, and are defined as in table 5-2. For more details on our sampling methodology refer back to the methodology section. The table reports the coefficient estimate for each covariate followed by its standard deviation and the p-value of the t-statistic.

		Total sample N = 856								
		E_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Constant*	Coeff.	**0.1605***	**0.0217****	**0.0216****	**0.0192****	**0.0188****	0.0064	0.0068	-0.0021	-0.0031
	Std.Err.	0.0687	0.0063	0.0063	0.0062	0.0062	0.0145	0.0146	0.0142	0.0142
	t-ratio	2.3365	3.4573	3.4223	3.1085	3.0516	0.4395	0.4631	-0.1451	-0.2185
E_{it-1}	Coeff.	**0.5561****								
	Std.Err.	0.1515								
	t-ratio	3.6700								
SIZE	Coeff.	**-0.0096****	**-0.0149****	**-0.0156****	**-0.0145****	**-0.0148****	**-0.0116****	**-0.0134****	**-0.0108****	**-0.0114****
	Std.Err.	0.0028	0.0025	0.0023	0.0023	0.0025	0.0032	0.0029	0.0033	0.0032
	t-ratio	-3.3728	-6.0774	-6.9321	-6.3229	-6.0377	-3.6152	-4.6606	-3.3181	-3.5135
$E_{it-1} * N E_{it-1}$	Coeff.	-0.2056								
	Std.Err.	0.2407								
	t-ratio	-0.8545								
D_{it-1}	Coeff.		**-1.0513****	**-1.0446****	**-1.0544****	**-1.0511****				
	Std.Err.		0.0592	0.0594	0.0602	0.0593				
	t-ratio		-17.7506	-17.5884	-17.5120	-17.7366				
TP_{it-1}	Coeff.						**-1.1015****	**-1.1004****	**-1.1019****	**-1.1015****
	Std.Err.						0.1555	0.1554	0.1561	0.1562
	t-ratio						-7.0831	-7.0804	-7.0596	-7.0495
Expec E_{it}	Coeff.		**0.0967****	**0.0850****	**0.1011****	**0.0952****	**0.1312****	**0.1044****	**0.1375****	**0.1281****
	Std.Err.		0.0171	0.0171	0.0177	0.0178	0.0346	0.0318	0.0326	0.0361
	t-ratio		5.6406	4.9670	5.7185	5.3468	3.7883	3.2770	4.2134	3.5501
Unexp E_{it}	Coeff.		0.0109			-0.0086	0.0261			-0.0146
	Std.Err.		0.0097			0.0118	0.0172			0.0193
	t-ratio		1.1160			-0.7253	1.5169			-0.7547
Positive	Coeff.				**0.0517****	**0.0626****			**0.1123***	**0.1310***
Unexp Eit	Std.Err.				0.0177	0.0221			0.0529	0.0655
	t-ratio				2.9207	2.8380			2.1223	2.0011
Merger	Coeff.		**0.0205****	**0.0198****	**0.0198****	**0.0193****	**0.0241****	**0.0226****	**0.0225****	**0.0216****
dummy	Std.Err.		0.0069	0.0070	0.0070	0.0066	0.0069	0.0067	0.0067	0.0064
	t-ratio		2.9776	2.8418	2.8525	2.9393	3.5132	3.3764	3.3554	3.3777
Industry dummies		Yes	No	No	No	No	No	No	No	No
Fixed effects		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R squared		0.39	0.58	0.58	0.58	0.58	0.49	0.49	0.50	0.50
F statistic		36.84	5.73	5.73	5.87	5.85	4.40	4.40	4.48	4.46

The constant in the case of the fixed effects models refers to the intercept resulting from the equivalent model without the use of fixed effects (and without intercept).
** indicates a significance level of 1% or below, * indicates a significance level between 5 and 1%.
Time effects are controlled for in all the regressions.

Table 5-15: Alternative Earnings Expected and Unexpected Models- Robustness checks, using the restricted sample of firms that paid dividends in at least two consecutive years of the sample period- Using the sub-samples
Refer to table 5-14 for a brief presentation of the models and a definition of the variables.

		Dividend-only sample N = 513				Dividend-and-Repurchase sample N = 343							
		ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔD_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}	ΔTP_{it}
		[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]
Constant*	Coeff.	**0.0399****	**0.0399****	**0.0366****	**0.0343****	0.0037	0.0100	0.0078	0.0056	-0.0294	-0.0097	-0.0171	-0.0209
	Std.Err.	0.0095	0.0095	0.0095	0.0096	0.0082	0.0085	0.0080	0.0081	0.0314	0.0322	0.0303	0.0306
	t-ratio	4.2162	4.2155	3.8441	3.5721	0.4481	1.1797	0.9767	0.6994	-0.9357	-0.3020	-0.5626	-0.6832
SIZE	Coeff.	**-0.0161****	**-0.0161****	**-0.0152****	**-0.0156****	**-0.0132****	**-0.0155****	**-0.0139****	**-0.0133****	-0.0030	-0.0089	-0.0040	-0.0034
	Std.Err.	0.0031	0.0028	0.0030	0.0032	0.0030	0.0033	0.0030	0.0030	0.0084	0.0074	0.0082	0.0080
	t-ratio	-5.1454	-5.6823	-5.1256	-4.9522	-4.3285	-4.6700	-4.7106	-4.4396	-0.3617	-1.2021	-0.4962	-0.4323
D_{it-1}	Coeff.	**-1.0258****	**-1.0252****	**-1.0381****	**-1.0331****	**-1.1142****	**-1.1110****	**-1.1020****	**-1.1062****				
	Std.Err.	0.0795	0.0806	0.0805	0.0795	0.0868	0.0890	0.0862	0.0854				
	t-ratio	-12.9101	-12.7246	-12.8959	-12.9926	-12.8427	-12.4880	-12.7802	-12.9512				
TP_{it-1}	Coeff.									**-1.1077****	**-1.1156****	**-1.1080****	**-1.1073****
	Std.Err.									0.1842	0.1823	0.1857	0.1857
	t-ratio									-6.0122	-6.1201	-5.9660	-5.9639
Expected E_{it}	Coeff.	**0.1027****	**0.1019****	**0.1182****	**0.1120****	**0.1076****	**0.0700****	**0.0810****	**0.0957****	**0.1911****	**0.0987**	**0.1340****	**0.1469***
	Std.Err.	0.0304	0.0303	0.0307	0.0304	0.0156	0.0112	0.0123	0.0148	0.0669	0.0539	0.0513	0.0761
	t-ratio	3.3836	3.3604	3.8476	3.6784	6.8923	6.2203	6.5950	6.4801	2.8558	1.8314	2.6121	1.9303
Unexpec E_{it}	Coeff.	0.0008			-0.0145	**0.0357****			0.0171	**0.0891***			0.0153
	Std.Err.	0.0117			0.0138	0.0096			0.0098	0.0459			0.0470
	t-ratio	0.0651			-1.0515	3.7066			1.7498	1.9434			0.3257
Positive	Coeff.			0.0364	0.0586			**0.0633****	**0.0447***			0.1937	0.1771
Unexpec Eit	Std.Err.			0.0295	0.0346			0.0195	0.0225			0.1036	0.1263
	t-ratio			1.2336	1.6942			3.2491	1.9848			1.8696	1.4023
Merger	Coeff.	**0.0340****	**0.0339****	**0.0337****	**0.0323****	0.0047	0.0033	0.0041	0.0045	0.0130	0.0097	0.0121	0.0124
dummy	Std.Err.	0.0089	0.0091	0.0092	0.0087	0.0060	0.0061	0.0060	0.0059	0.0078	0.0079	0.0069	0.0070
	t-ratio	3.8196	3.7390	3.6559	3.7316	0.7801	0.5479	0.6772	0.7563	1.6656	1.2303	1.7499	1.7713
Adjusted R squared		0.59	0.59	0.60	0.60	0.62	0.60	0.62	0.62	0.49	0.49	0.50	0.49
F statistic		5.87	5.92	5.93	5.91	6.50	6.18	6.58	6.55	4.30	4.27	4.37	4.31

6 CONCLUSIONS AND SUGGESTIONS FOR FUTURE RESEARCH

6.1 Summary and conclusions

This thesis has examined corporate payout policy in the UK. Its objective has been twofold, firstly, to determine what motivates firms in the UK to repurchase their shares, and then to establish whether total payouts, and the role played by share buybacks, can be explained using variations on the traditional corporate dividend behaviour models, such as Lintner (1951) and Fama & Babiak (1968).

This thesis contributes not only to improving our understanding of the share repurchase activity in the UK, but it also offers a viable framework for estimating total payouts rather than just dividends, and it provides empirical support for the contention that share repurchases must be taken into consideration alongside dividends in any corporate payout model.

We have seen in the literature review that most empirical work on share repurchases has been undertaken using only US data. We have also seen that, given its relatively tighter regulations and its shareholder-led corporate governance, the UK provides a very interesting alternative research setting for the testing of the hypotheses that have received most empirical support in the US. For instance, the signalling hypothesis, which has received considerable support in the US, is unlikely to generate the same level of support in the UK, given that UK managers are less able than their US counterparts to exploit their firms' undervaluation and the fact that very large open-market repurchases, which are the most effective signals of undervaluation, are very rare in the UK.

Similarly, we have seen that the corporate governance system in the UK, which provides greater powers and incentives for shareholders to monitor and control managers' actions, makes it difficult for share repurchases to be used as a takeover defence mechanism. Shareholders' active involvement in setting up remuneration packages for executive directors also affects the argument of the stock option hypothesis, whereby managers have an incentive to repurchase shares instead of paying dividends in order to avoid the devaluation of their stock options.

Given these differences in the corporate governance systems of the US and UK, and given that most repurchase studies have been undertaken using US data, we identified a gap in the literature, both in terms of what drives firms in the UK to repurchase, but also in terms of how much corporate governance plays a role in disciplining managers' 'motivations' to repurchase.

The analyses contained in this thesis use the FTSE 350 excluding the financial sector to construct an unbalanced panel of 267 firms, for the period 2001-2004. A preliminary analysis of this sample enabled us to identify some significant differences between firms that repurchase and those that do not. For instance, we found that re-purchasers are significantly larger and earn significantly more than non re-purchasers. Re-purchasers also seem to pay significantly more in dividends than non re-purchasers, which is consistent with the recent finding of Hsieh & Wang (2006) that high earners are also high payers, both in terms of dividends and repurchases. Contrary to findings of previous studies such as Jolls (1998) and Fenn & Liang (1999), we find that re-purchasers grant significantly less options to their executives than non re-purchasers. Moreover, when we decompose the sample of re-purchasers

into those that repurchased only once and those that repurchased more than once, we find that frequent re-purchasers are significantly larger and pay significantly larger dividends.

In addition, using information in their annual reports, we find that most firms in the UK say they repurchase to distribute cash to their shareholders, while a few mention repurchasing to enhance their earnings-per-share.

In chapter four, we empirically test these findings; we start by examining the sample of re-purchasers, which is made up of 330 observations. Using OLS estimation, and while controlling for fixed and time effects, we regress the value of shares repurchased on a vector of variables that each controls for a specific factor that has been found in the literature to affect share buybacks. Thus, we control for size, debt, institutional shareholdings, director shareholdings etc. Given the importance of the differences in corporate governance between the US and UK to our analysis, we pay special attention to the stock option hypothesis, and test both the EPS dilution argument and the substitution argument.

The regression results indicate that operating income is the main driver of share repurchases in the UK, with none of the option variables having any significant effect on neither the value nor the fraction of shares repurchased. We also find that expected income is significantly positively related to share repurchases, contrary to the argument of the FCF hypothesis, which contends that repurchases are used to distribute excess cash-flow, hence unexpected income.

When we use binomial and multinomial logit regressions to estimate the effect of our independent variables on the decision to repurchase, to pay dividends, or to retain earnings, we find that the more options a firm has, the less likely it is to repurchase, and the more income it earns, the more likely it is to repurchase. Moreover, we find that the probability of retaining earnings increases with options, director and institutional holdings and debt, while it decreases with size, operating income and return. Consistent with the OLS findings, the relationship between the likelihood of repurchasing and income is driven mainly by expected income.

These results provide confirmation of our main predictions that corporate governance in the UK has a significant influence upon corporate payout motives. This is particularly obvious when we consider that the stock option hypothesis, and in particular, the argument that managers repurchase in order to avoid the devaluation of their options, is not supported by the UK evidence. Moreover, the fact that firms that retain their earnings seem to grant significantly more options to their executives could be simply an indication that these are smaller growth firms that use options to attract high calibre employees, in which case these employee options are arguably being awarded and used exactly as recommended by every UK corporate governance code from Cadbury (1992) to the current "Combined Code" (2004).

It appears from our findings that the most likely motive for firms in the UK to repurchase their shares is to distribute cash to shareholders. Given our finding that these repurchases are funded out of expected income, it is unlikely that repurchases in the UK are used to distribute only *excess* cash. It is very possible that the inherent

flexibility of share repurchases renders them useful even for distributing expected increases in cash flows, which allows firms to further stabilise their dividend payouts.

On that issue, in chapter five we investigate the effect of using total payouts, instead of just dividends, on the predictive power of traditional corporate dividend behaviour models. If share repurchases are being progressively used as substitutes for increases in dividends, then we should expect these models to provide good estimates of changes in total payouts. Our analysis in chapter 5 largely confirms these expectations.

In fact, not only do we find that traditional dividend models such as Lintner (1956) and Fama & Babiak (1968) can still produce good estimates when applied to total payouts, but we also show that by slightly modifying these models to reflect the changes that have occurred over recent years in corporate payout policy, we are able to obtain results that better reflect the reality of UK corporate payout behaviour today.

Thus, in chapter five we develop an alternative total payout policy model that distinguishes between "Expected" and "Unexpected" earnings, which we estimate in separate regressions so that they are reflective of the individual earnings trends of the sample firms. Unlike the Lintner (1956) model, our alternative model assumes that dividends or total payout changes are the result of a full adjustment to expected earnings and a partial adjustment to unexpected earnings.

Our results show that lagged dividends (total payouts) are the single most important determinant of current dividends (total payouts), followed by expected earnings. This

confirms that firms (UK firms in particular) are still very conservative in their dividend payout behaviour, which is reflected in their full adjustment to past dividends and *expected* rather than unexpected earnings. Our findings also show that firms that repurchase their shares have smoother dividends, but are more daring in their total payout behaviour, as they seem to base payouts on their unexpected earnings significantly more than do firms that do not repurchase. This result is partly explained by their superior profitability, but also by the added flexibility associated with share buybacks.

Thus, our results provide further evidence that share repurchases are being used by some firms as substitutes for dividend increases. This allows them to have a smoother dividend policy. It is therefore imperative that, as the popularity of share repurchases is expected to increase (for reasons already mentioned in the text), finance academicians and practitioners need to rethink traditional corporate payout models such as the Lintner (1956) and Fama & Babiak (1968) formulations, and to develop new models that incorporate repurchases within a total corporate payout framework.

6.2 Suggestions for future research

This thesis deals with a very interesting, up-to-date and perhaps controversial topic that encompasses several areas in corporate finance. Considering the time constraints and difficulties relating to collecting data which, unfortunately, is not available in a machine readable format, there are several issues which we touched upon but were not able to analyse in more depth.

For instance, our conclusions about firms' motivations to repurchase their shares in the UK reflect our sample firms, large to medium firms, and the time period which we focused on. Given the relative lack of research on share buybacks in the UK, using a longer time period may enable us to see their trend. It would also be interesting to see if firms' motivations would be any different from what we found if the sample is extended to include small cap firms. One assumption that can be taken from our results in order to reduce the burden of data collection for future researchers is that executive options do not lead to a substitution of dividends for repurchases. Thus, the tedious task of collecting information about executive options can be avoided. According to the theory and to our results, we should expect smaller firms to repurchase for different reasons, and these reasons are unlikely to be related to the FCF hypothesis, since they are unlikely to have much free-cash flow. Moreover, given that in our sample, share repurchases are more popular with larger firms, it would be interesting to confirm whether small cap firms do repurchase at all.

In addition, in chapter four we found that although in the past firms in the UK did not repurchase to fund their employee stock options (before they were exercised), this

might be changing. Thus, it would be interesting to see whether this is the case. Three years have already passed since the change in the law that made it possible for firms in the UK to keep the shares they repurchase in treasury stock, within these three years, a new pattern of share repurchases may have already emerged.

In addition, our sample was designed to give a fair reflection of firms operating in the UK market (excluding the financial sector); it thus, encompasses both firms that repurchased and those that did not. It is possible to look at the repurchase issue from a different angle, by focusing only on firms that repurchased their shares, and investigating the link between the value of these repurchases and a set of control variables, which our results have helped to identify.

In chapter three, where we provide some descriptive statistics of our sample firms, we briefly analysed firms' motives behind their buyback programs, according to the reasons that these firms provided in their annual reports. However, we argued that using these reasons in a multivariate context would not be very informative since categorising re-purchasers according to these motives would result in very small sub-samples that would not allow any statistical inferences to be made. An area for future research would, thus, be to compile firms' motives for repurchasing their shares according to the information reported in their annual reports, and to use this information empirically to determine how truthful or reliable UK firms are in terms of the reporting of their 'real' reasons for undertaking share repurchases.

Furthermore, from our sample of re-purchasers we were able to distinguish between firms that routinely repurchased their shares and those that only made one-off buybacks. A larger sample of share buybacks can, thus, allow a more detailed analysis of the differences between the motives behind these two types of buyback.

We have seen in chapter five that repurchases are not only marginalised as a cash distribution method in the existing payout behaviour models, as we have seen throughout the thesis other areas where dividends are used to represent total payouts also need to be rethought to encompass both dividends and buybacks, including, for instance, the dividend discount model.

This could be an interesting area for future research. Some authors such as Randall (2000) have already proposed modifications to the dividend discount model to enable the estimation of current and future stock prices of firms that repurchase their shares. However, it does not appear that the academic world is showing enough interest for developments in this area, as we can see that most finance text books still advocate the use of the DDM without consideration for the possible bias that would result from its use to value firms that repurchase their shares. This thesis can serve to renew interest in this area which would give it a new breadth and encourage even more work in the direction of giving share repurchases more importance in different corporate payout models.

Finally, an interesting extension of our analyses would be to investigate whether 'cash-cows' in the UK have witnessed a significant change in their payout policies since the mid nineties, when repurchases first started to grow in popularity. The focus

on cash cows would probably involve looking at cash generative industries. Such an investigation would help determine further how share repurchases are being used to smooth dividends, and would also contribute to the current substitution debate. More specifically, it would be very useful to analyse dividend 'increases' in a panel data framework and in conjunction with share repurchases.

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