

# WHY DO UK FIRMS REPURCHASE THEIR OWN SHARES?

## ABSTRACT

We examine the practice of share repurchases in the UK from 2000 to 2016. We find that an important regulatory reform in 2003, which relaxed previously strict rules about repurchases, was followed by a significant increase in repurchase activity by UK main-market listed firms. We then examine the motivation for repurchases, testing several key hypotheses from prior literature. Our analysis of a sample of 6,119 firm years provides strong support, across both regulatory regimes, for both the free cash flow and the investment hypotheses. We find some support for both the undervaluation and also the leverage/capital structure hypothesis in the pre-reform period only. Post-reform, board independence is associated with share repurchase activity. We document several important differences between the UK and the US. First, most UK firms distribute cash to shareholders, whereas most US firms do not. Second, share repurchases remain relatively small in both proportion and value the UK. Third, we find no evidence that repurchases are substituting for dividends in the UK, and dividends continue to dominate as a mechanism of cash disbursement in the UK.

JEL Codes and Keywords: G35, Payout Policy (Share Repurchases); G38, Regulation.

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## 1. Introduction

In the US, managers have long been able to distribute cash to shareholders *via* share repurchases. For example, Grullon and Michaely (2002) report that 31% of US firms repurchased shares in 1972. Following the adoption of safe harbour provisions contained in Rule 10b-18, instituted in 1982, US repurchase activity increased dramatically, becoming the dominant form of distribution in that environment (Skinner, 2008). By the late 1990s, dividends recovered and regained the same economic significance as share repurchases in the US (Oded, 2020). In the UK, the story is different, with stricter regulations historically preventing most firms from buying their own shares, with an outright ban until 1981. From 1981, the law allowed firms to buy back their own shares but required them to be cancelled. For this reason, share repurchases remained relatively rare in the UK until 2003, when a regulatory reform permitted firms to hold repurchased stock as treasury shares, making them available for use in future transactions, such as takeovers or for use in executive stock option schemes. The significant increase in share repurchase activity subsequent to this reform allows us to examine the practice employing a sample of firms with a higher propensity to repurchase than that available to earlier researchers. We are therefore able to test several hypotheses identified in prior research, much of which is US-based, regarding the determinants of stock repurchases in the UK, in two different regulatory regimes.

Historically, payout practices have differed substantially between the UK and US (Renneboog and Trojanowski, 2011), arguably due, in part, to the previously onerous rules regarding share repurchases (Rau and Vermaelen, 2002). However, there are other institutional differences between the two countries which may affect payout practice. Of note are significant differences in ownership structure, and in the structure of executive compensation, both of which may affect the propensity for firms to repurchase their own shares. Whether the 2003 regulatory liberalisation has led to a convergence of UK and US practice in respect of share repurchases is therefore an empirical question, which is addressed in this paper.

Using a large sample of main-market listed firms from 2000-2016, we first establish that repurchase activity increases substantially following the reform. The proportion of sample firms which repurchase shares increases (from 15.7% to 37.8%), as does the proportion which repurchase in two consecutive years (from 8.1% to 26.6%). Share repurchase amounts as a proportion of both retained earnings and of total payout increase significantly after 2003. However, unlike the situation in the US, share repurchases never approach dividends in their importance as a payout mechanism in the UK; share repurchases amounts as a proportion of net income average 10.9% following the reforms, which is small compared to over 45% of profits distributed *via* dividends, with no significant post-reform change in the average dividend payout ratio.

Another stark dissimilarity between the US and UK environments is in the propensity to make payouts at all. UK firms are much more likely to distribute cash to shareholders, using dividends and/or share repurchases, than US firms. According to the comprehensive sample utilised by Floyd, Li and Skinner (2015), between 2000 and 2012, 64.5% of US industrial firms make no payout to shareholders.<sup>1</sup> In contrast, our sample reveals that the vast majority of UK non-financial firms make some form of distribution to shareholders, with 33% repurchasing shares, over 80% paying dividends, and fewer than 17% making no payout.

It is therefore important that the UK setting is examined, rather than relying on results from the US to apply ‘over the pond’.

The variation in payout practice may be partly due to important institutional differences between the two environments, one of which is the structure of corporate ownership, which could affect the demand for share repurchases and dividends. In both the UK and US, the taxation of share repurchases and dividends varies between categories of investor, with individual investors better off after tax if they receive cash distributions by way of repurchases, whereas institutions are better off receiving dividends. As Black (1976) points out, where dividends are taxed more heavily than capital gains, and capital gains are not taxed until realised, individual investors will prefer to invest in companies which pay no dividends. However, firms may signal

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<sup>1</sup> We calculate this from data provided in Table 2 of Floyd *et al.* (2015).

their quality by paying regular dividends, in the knowledge that this will attract institutional investors, who provide more rigorous oversight of their management (Allen, Bernardo and Welch, 2000). Over our sample period, Franks (2020) reports that US firms have relatively stable and higher levels of domestic institutional ownership, at around 45%, compared to a decline in this category of ownership in the UK, which reduces from 43% in 2000 to 27% in 2014. Further, US firms have much higher levels of individual ownership than UK firms. Given these differences, it is likely that any clientele considerations in corporate payout policy will vary between the two countries.

Another factor which increases demand for repurchases in the US is the relatively high stock option compensation paid to US executives compared to their UK counterparts. Lambert, Lanen and Larcker (1989) argue that, as dividend distributions reduce the value of call options, including executive stock options (ESOs), managers of firms introducing stock options are incentivised to reduce dividend payments. Their evidence supports this conjecture. Fenn and Liang (2001) provide additional evidence that managers with ESOs protect total payout ratios by increasing share repurchases. Thus, marked differences in compensation practice between the US and UK may affect share repurchase propensities. Conyon, Fernandes, Ferreira, Matos and Murphy (2011) document such differences, reporting that 49% of US CEOs receive stock option grants compared to 16% in Europe, a statistic consistent with what we find for our UK sample. In a UK study, Young and Yang (2011) report no significant difference between the proportion of repurchasing and non-repurchasing sample firms which report the existence of stock option based executive compensation plans.

Given the reported divergences in ownership structure, compensation arrangements and payout practice across the two countries, it is not clear that the determinants of repurchases will be the same in the UK as they have been found to be in the US. We therefore test the motivation for share repurchases in the UK using a comprehensive set of hypotheses from prior literature, many originating from the US, as described by Dixon, Palmer, Stradling and Woodhead (2008). These include (*H1*) the leverage/capital structure hypothesis (Dittmar, 2000; Vermaelen, 1981; Rau and Vermaelen, 2002); (*H2*) the free cash flow hypothesis (Allen *et al.*, 2000; Bolton *et al.*, 2011; Chowdry and Nanda, 1994; Décamps *et al.*, 2011; Jensen, 1986; Lambrecht and Myers, 2017; Oded, 2020); (*H3*) the investment hypothesis (Bolton, *et al.*, 2011; Brav, Graham, Harvey and

Michaely, 2005; Oded, 2020); (*H4*) the undervaluation hypothesis (Ben-Rephael *et al.*, 2014; Bonaimé and Ryngaert, 2013; Bond and Zhong, 2015; Brav *et al.*, 2005; Brennan and Thakor, 1990; Comment and Jarrell, 1991; Chowdry and Nanda, 1994; Ikenberry, Lakonishok and Vermaelen, 1995; Oded, 2005; Ofer and Thakor, 1987); and (*H5*) the dividend substitution hypothesis (Dittmar, 2000; Grullon and Michaely, 2002; Skinner, 2008; Andres, Doumet, Fernau and Theissen, 2015). Motivated by Oded (2020) and Sharma (2011), we also examine the association between measures of corporate governance quality and repurchases (*H6*). Finally, in light of Lambert *et al.* (1989) and Fenn and Liang (2001), we test the association between stock options and share repurchases in the UK in our seventh hypothesis (*H7*).

Further, if, as prior literature suggests, firms are making rational decisions regarding their payout practices, considering the costs and benefits of each option, then reducing the costs of one option (i.e. share repurchases following the reform) will potentially change the outcome of these calculations, and thereby the preferences of UK firms in respect of share repurchases. For this reason, we test our hypotheses on the pooled sample and also on regulatory regime sub-samples. We make no predictions about the effect of the reforms on the determinants of share repurchases – we simply acknowledge that there may be some effect and test whether this is the case.

We employ logit regression models, using the likelihood of a repurchase as the dependent variable, and tobit models, using the value of repurchases as a proportion of net income, to test the hypotheses. We run the models on the full sample and also on pre/post-reform sub-samples to test for any change in determinants of repurchases or their amounts following the regulatory change. In additional, untabulated tests, we restrict the post-reform sample to end in 2006, creating a time-balanced panel of observations, with three years either side of the reform, and repeat our multivariate tests.

In respect of *H1*, the leverage hypothesis, we find indebtedness is significantly negatively associated with repurchase activity in the pre-reform period only. The result, though weak, is consistent with earlier UK studies using pre-reform data (Oswald and Young, 2008; Renneboog and Trojanowski, 2011). During this time, firms may have been using share repurchases to increase leverage and move towards an optimal capital

structure. However, since the regulatory change, we find no evidence that UK firms use share repurchases to increase their indebtedness and change their capital structure. This represents one apparent change in the motivation for share repurchases following the 2003 reform.

In support of *H2*, the free cash flow hypothesis, we find a strong positive association, across both regulatory time periods, between excess cash and the likelihood and amount of repurchases. Firms with surplus cash are significantly more likely to buy back their own shares, and spend more on this, all else equal.

Next, our multivariate tests reveal that firms with greater investment opportunities, measured using the market-to-book ratio, have less repurchase activity, which is consistent with *H3*. This result holds for both time periods.

According to *H4*, the undervaluation hypothesis, firms are more likely to buy back their own shares when management considers them to be undervalued. Whether the motivation is to signal undervaluation, or to execute planned repurchases at a time when the price is low, we would expect to observe a negative association between prior share price performance and repurchases. Here we find a second possible change in the drivers of share repurchases in the UK. Whereas our evidence weakly supports the undervaluation hypothesis in the period prior to the reforms, when repurchased shares had to be cancelled, we find no significant association between share price performance and repurchase activity in the post-reform period.

Opposite to our first prediction related to *H5*, there is a positive association, across both time periods, between the amounts paid in share repurchase and dividends, suggesting that share repurchases are paid in addition to dividends in the UK, rather than as a substitute, as has been argued to be the case in the US (Grullon and Michaely, 2002). Earnings performance is positively related to both repurchase incidence and the repurchase payout ratio in both time periods. This is consistent with firms using share repurchases in the same way as they use dividends, *i.e.* to distribute current earnings. Further analysis indicates that the positive association between the amounts distributed by repurchases and dividends is significantly stronger in the later time period. Following Skinner (2008) and Andres *et al.* (2015), we also employ Lintner regressions using both dividends and total payout (dividends plus share repurchases) to execute further tests of the dividend

substitution hypothesis. If, following the reforms, share repurchases are used instead of dividends to pay out earnings, then we would expect to see a reduction in the speed of adjustment of dividends to earnings but no change in the speed of adjustment of total payout to earnings. We would also expect to see a reduction in the target payout ratio in respect of dividends but no change in the target payout ratio for total payouts (dividends plus repurchases). Our results are not in line with these predictions, with speed of adjustment decreasing in both cases (dividends and total payout) and target payout ratios increasing following the reforms. The Lintner regressions therefore do not support dividend substitution in the UK. Prior research suggests US managers commit to dividend payout targets and use repurchases more flexibly (Dittmar, 2000; Guay and Harford, 2000; Jagannathan *et al.*, 2000). Our analysis points to a different situation in the UK, with persistence in the distribution of both repurchases and dividends, consistent with both methods of shareholder payout containing some commitment to repeat the exercise in the following year. In sum, none of our tests provide support for dividend substitution in the UK.

Next, we consider the association between share repurchases and corporate governance (*H6*). If share repurchases offer a solution to agency problems such as free cash flow retention, then we may expect to observe positive associations between corporate governance mechanisms (such as more independent boards and/or board equity ownership) and share repurchase activity. In the US, Sharma (2011) reports a positive association between board independence and the propensity to both pay dividends and repurchase shares. Similarly, we find that more independent boards, measured by the proportion of non-executive directors, are positively associated with both the propensity to repurchase, and the amount distributed by this means. However, our sub-sample tests reveal that this relationship is only significant post-2003, which we suggest may be due to the publication of the Higgs Report (2003) which emphasised the role of non-executive directors and which was then adopted by the UK Code on Corporate Governance. No significant association is observed between board ownership of sample firms and their repurchase activity, though a positive association is predicted according to the theoretical model developed by Oded (2020).

Finally, we find no support for *H7*, with there being no significant association between the awarding of stock option compensation and payout policy in the UK, which is different to findings from the US but

consistent with earlier work from the UK (Young and Yang, 2011). This may be due to the relatively lower importance of stock options in the UK as a component of executive remuneration. If managers are less concerned about the effect of share repurchases on their compensation, then other drivers of the practice are likely to dominate any ESO effect.

Our study contributes to prior literature in several ways. First, we provide evidence of the important effect of liberalising regulatory reforms on the extent of share repurchase activity in the UK, which we find to be associated with a substantial increase in share repurchases. Second, we examine the determinants of repurchases using a more comprehensive set of hypotheses than has previously been employed, and we are able to use a much larger sample than was available to earlier researchers. Third, we identify significant changes to the determinants of repurchases following the regulatory change. Fourth, we observe important differences between UK and US practice in this area. We argue this may be due to institutional differences which remain even after the rules on share repurchases have largely converged. Given the current paucity of post-reform evidence regarding UK firms' motivations for repurchasing their own shares, the paper is likely to be of interest to regulators, academics, and members of the broader corporate finance community,

The rest of the paper is organised as follows. Section 2 provides more detail on the institutional background and the changes which are relevant to this study. Section 3 discusses prior literature and presents the hypotheses to be tested. In Section 4, we document our research methodology. In Section 5 we present our main analyses, with the results of additional tests reported in Section 6. Finally, we sum up and draw conclusions in Section 7.

## **2. Regulatory Background**

Prior to 1981, UK legislation prevented companies from repurchasing their own shares, other than redeemable preference shares. The prohibition was designed to prevent firms from: (a) reducing their capital to the detriment of creditors; (b) privileging certain shareholders in off-market transactions; (c) rigging the market for their shares; and (d) engaging in 'greenmail' transactions to ward off takeover threats. Changes made in the Companies Act of 1981, however, allowed share repurchases as an alternative distribution channel



to UK firms but with some fairly stringent restrictions. These included: requirements for prior permissions, to be granted with a limited life; quantitative restrictions, with payments to be made from distributable profits; public disclosure of any repurchase amount and price paid by noon the following day, with summary figures disclosed in the annual reports; restrictions relating to timing (to avoid insider trading); and the cancellation of all repurchased shares (Bank of England, 1988). The Finance Bill 2003 subsequently amended the regulations to allow companies to retain repurchased shares as treasury stock (Dixon *et al.*, 2008). The Companies Act 2006, Chapter 6 codifies the changed regulation, which allows publicly listed companies to repurchase their own, fully paid up, qualifying shares out of distributable profits and to hold them as treasury shares.<sup>2</sup> As a company is not allowed to own itself, treasury shares receive no dividends, carry no voting rights, and are not included in the calculation of weighted average number of shares for earnings per share (EPS) calculations. The maximum aggregate nominal value of treasury shares allowable to be held was 10% of the nominal value of the issued share capital of the company at that time (s.725 CA2006). The 2003 rule change, which came into force in November of that year, introduced a greater degree of flexibility for firms in the management of their capital. For example, allowing companies to retain repurchased shares made them available for use in future transactions, such as acquisitions (Andriosopoulos and Lasfer, 2015).

Early in 2003, the EU Market Abuse Directive 2003/6/EC (MAD) was adopted by the European Parliament and the Council of the European Unions (Siems and DeCesari, 2012). Replacing the previous regulation on insider dealing, MAD introduced a prohibition on the manipulation of the market value of stock, which could have put managers of share repurchasing firms at risk because share repurchases often affect market prices. MAD was adopted by the UK in July 2005. Prior to this, however, in December 2003, the European Commission (EC) passed regulation 2273/2003, which provided safe harbour to EU member firms in relation to share repurchases meeting certain criteria, enabling firms to protect themselves from potential penalties arising under MAD (Siems and De Cesari, 2012). The introduction of safe harbour provisions has

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<sup>2</sup> Here 'qualifying' refers to a stock being listed on at least one of: (1) the Official List; (2) AIM; (3) an official European Economic Area market; or (4) any other regulated market.

been found to coincide with a significant increase in share repurchase activity in the US (Grullon and Michaely, 2002).

This study examines the motivation for share repurchases by UK firms before and after these important regulatory changes. As the 2003 safe harbour provisions preceded the 2005 adoption of MAD, we predict that share repurchase practice will be most affected by the regulatory changes in 2003. We therefore examine time periods from 2000 to 2003 (pre-reform) and then from 2004 to 2016 (post-reform). The next section discusses prior literature relevant to our investigation.

### **3. Prior Literature and Hypotheses**

Whilst there are many similarities between the US and UK capital markets, the pattern of payouts in the UK has historically differed from that in the US (Renneboog and Trojanowski, 2011). In particular, UK repurchases represent a much smaller proportion of shareholder distributions, and convey a much weaker signal, than in the US stock markets (Andriosopoulos and Lasfer, 2015). Earlier literature argues that the infrequent use of share repurchases in the UK is due to the onerous regulation of the practice relative to the US (Rau and Vermaelen, 2002). Dhanani and Roberts (2009) provide a summary of these restrictions and show that the UK regulation was amongst the most stringent globally. The 2003 reform substantially liberalised the UK environment with respect to repurchases, though differences in ownership and compensation structure, both of which may affect the demand for repurchases, remain. The effects of the reforms on UK practice are not clear, cannot be reasonably predicted using US evidence, and are therefore worthy of investigation.

Before the reform, Dixon *et al.*, (2008) survey finance directors of large UK firms, designing their questionnaire so as to test five key hypotheses from existing literature. The literature in this area is mainly based upon the US, where share repurchases have been permitted and popular for a long time (Grullon and Michaely, 2002; Skinner, 2008). The results in Dixon *et al.* (2008) provide pre-reform support for three of

them in the UK (leverage, investment, and undervaluation). We discuss their five hypotheses below, along with our two additions, and make predictions designed to test each of them using a large sample and archival data.

### *3.1 The gearing or leverage (optimal capital structure) hypothesis (H1)*

Repurchases increase gearing so firms which have capacity for more debt may buy back their own shares in order to move towards a preferred capital structure (Dittmar, 2000; Farre-Mensa, Michaely and Schmalz, 2018). When the repurchase is financed by debt, this can reduce corporate taxes, thereby lowering the company's cost of capital (Vermaelen, 1981; Rau and Vermaelen, 2002). Repurchasing respondents to the survey reported in Dixon *et al.* (2008) rank the pursuit of an optimal capital structure as the primary motivation for share repurchases, while increasing gearing is ranked second. Given that repurchasing shares increases gearing, we expect that firms with relatively low gearing will be more likely to buy back their own shares if the reason for doing so is to improve capital structure. Consistent with this, in the US, Dittmar (2000) finds a negative association between leverage and share repurchases, as does pre-reform research conducted in the UK (Oswald and Young, 2008; Renneboog and Trojanowski, 2011). We therefore propose the following:

***Prediction 1: There will be greater share repurchase activity from firms with relatively low gearing.***

### *3.2 The free cash flow hypothesis (H2)*

Hoarding cash increases agency costs (Bolton, Chen and Wang, 2011; Décamps, Mariotti, Rochet and Villeneuve, 2011). Unchecked, managers are prone to value-reducing empire-building behaviour (Jensen, 1986). Rather than distributing surplus cash to investors, they may overinvest, or waste cash on unnecessary expenses (Décamps *et al.*, 2011; Oded, 2020; Richardson, 2006). They are also averse to increasing dividends because of the implicit commitment to maintain payouts, and the negative stock market response later dividend cuts may elicit (Brav *et al.*, 2005; Lintner, 1956). Share repurchases offer an alternative distribution channel which does not contain the same commitment as dividends (Allen *et al.*, 2000; Skinner, 2008). Evidence from the US suggests managers prefer to use transient cash flow gains to fund share repurchases rather than increase

dividends (Dittmar, 2000; Guay and Harford, 2000; Jagannathan *et al.*, 2000). However, transient excess cash may not be distributed immediately. Lambrecht and Myers (2017) describe how profitable firms over-retain cash and become ‘cash cows’. Chowdry and Nanda (1994: 322) propose that firms ‘*carry cash through time so as to be able to distribute it in the form of repurchases at appropriate times*’, i.e., when the stock price is low, or the accumulation of cash reaches an upper endogenous limit. Bolton *et al.* (2011) also demonstrate that firms pay out cash only when holdings are so large as to incur burdensome costs. Theory therefore suggests a positive association between excess cash and share repurchase activity. Empirical UK research from prior to the regulatory changes of 2003 is supportive of theory, reporting a positive association between surplus cash and share repurchase activity (Oswald and Young, 2008). Dixon *et al.* (2008) report that returning excess cash to shareholders is ranked third in reasons for share repurchases by large UK firms. We test this on our sample with our second prediction:

***Prediction 2: Share repurchase activity will be greater in firms with more excess cash.***

### *3.3 The investment hypothesis (H3)*

The availability of investment opportunities is likely to influence shareholder distribution decisions. Bolton *et al.* (2011) and Oded (2020) demonstrate theoretically that cash retention is higher when the firm anticipates future investment opportunities. Conversely, where a company has limited investment opportunities, they are more likely to repurchase their own shares, *unless* they are over-valued, in which case managers may elect to waste free cash (Oded, 2020). Empirical work is again supportive of theory in this regard. A lack of investment opportunities for available cash was ranked 5<sup>th</sup> as a reason for UK share buybacks by repurchasing firms in the survey by Dixon *et al.* (2008). Using Tobin’s Q (market-to-book ratio) as a proxy for the presence of profitable investment opportunities, both Oswald and Young (2008), and Renneboog and Trojanowski (2011), report that firms with fewer investment opportunities are more likely to repurchase their own shares. Following these studies, we use the market-to-book ratio as our proxy for investment opportunities and predict the following:

**Prediction 3: Share repurchase activity will be greater in firms with lower market-to-book ratios.**

### 3.4 The undervaluation hypothesis (H4)

There are two main reasons why a firm may repurchase shares when they are relatively low in price: one is to signal undervaluation; the other is to take advantage of a low share price to execute planned repurchases. We examine each of these in turn.

#### i. Signalling

According to the argument developed by Akerlof (1970), where there is asymmetry of information between firm managers and capital markets, managers of high-quality firms may wish to signal their quality in order that market participants can differentiate them from poor quality firms (Oded, 2005). In order for any signal to be credible, it must be prohibitively costly for lower quality firms to mimic (Comment and Jarrell, 1991). Firms may signal undervaluation of their firm's shares by making repurchases (Ikenberry *et al.*, 1995). The cost to low value firm in trying to mimic this would be that they would be buying back their own shares at no discount, and possibly at a premium to true value (Oded, 2005). A further cost of signalling *via* repurchases is imposed upon managers personally, who often commit not to trade their own shares during a repurchase period. Following the repurchase, managers therefore own a larger fraction of the firm, increasing their undiversified risk exposure (Ofer and Thakor, 1987). Where insider trading does occur during the repurchase period, repurchases accompanied by net insider buying are followed by significantly positive abnormal stock returns, an effect which is not observed where there is net insider selling, or neutral trading, during the repurchase period (Bonaimé and Ryngaert, 2013).

It may be argued that, if a firm credibly signals its undervaluation by a repurchase, then investors may prefer to hold their shares in anticipation of them reaching their true value in the future (Bond and Zhong, 2015). However, investors may not be aware they are selling their shares back to the company, as in open market transactions, or they may have liquidity constraints (Oded, 2005). The evidence on the amount of repurchases

made by firms suggests enthusiasm for this method of returning cash to shareholders (e.g., Floyd and Skinner, 2015).

ii. Timing

Managers may execute repurchases which have already been announced so as to time the market and benefit from depressed stock prices (Chowdry and Nanda, 1994; Dittmar and Field, 2015). Bond and Zhong (2016) argue that the optimal payout policy is to distribute some cash *via* dividends and to carry forward the rest until the share price is sufficiently undervalued, when all the carried forward excess cash is used to repurchase shares. The question of timing is important because this may result in wealth transfers across investors, who must incur costs in order to decide whether to sell at the price offered (Ben-Rephael, Oded and Wohl, 2014; Brennan and Thakor, 1990). Exploiting an enhanced disclosure regime in the US, Ben-Rephael *et al.* (2014) provide evidence that firms repurchase when the price is lower than average. This supports earlier work by Skinner (2008), who reports a significantly negative association between prior stock returns and the likelihood of repurchases across his sample period of 1980-2005.

Other empirical work from both the US and the UK fails to find an association between prior abnormal share price performance and share repurchases (Dittmar, 2000; Oswald and Young, 2008; Rau and Vermaelen, 2002). In response to the survey by Brav *et al.* (2005), 86.4% of US financial executives of repurchasing firms say they repurchase when the stock is, in their opinion, undervalued. Managers of non-repurchasing firms reveal that undervaluation would be the most likely reason for them to switch to repurchasing. Whilst the undervaluation rationale ranks top amongst US managers, UK finance directors of repurchasing firms rank it only 8<sup>th</sup> out of 14 possible reasons for share repurchase (Dixon, *et al.*, 2008).

If UK managers buy back their stock when it is undervalued, whether to signal undervaluation, or to take advantage of a low market price in order to execute a planned repurchase, then we expect to observe the following:

**Prediction 4:** *Share repurchase activity will be greater following a period of low stock returns.*

### 3.5 The dividend substitution hypothesis

If capital gains are taxed less onerously than income, then firms may prefer to distribute cash *via* repurchases than by way of dividends since this would reduce shareholders' tax liability on shares they sell back to the firm (Dittmar, 2000; Renneboog and Trojanowski, 2011). Renneboog and Trojanowski (2011) calculate the after-tax value of a £100 dividend payment for different time periods and different classes of investor. For our sample period, UK individual shareholders, whether high-, low- or basic-rate tax payers, have a tax-based preference for share repurchases, whilst tax-paying institutional investors have a preference for dividends. Tax exempt institutions are indifferent between the two. This is similar to the case in the US, although the structure of corporate ownership is different, with US firms having greater proportions of their equity owned by small investors. From a tax perspective, we would therefore expect the substitution of dividends with repurchases to be more prevalent in the US than in the UK. However, we control for institutional ownership in our models, predicting a negative association between this variable and share repurchase activity for tax reasons.

Further, if managers wish to distribute cash without the implicit commitment contained in dividends, then they can repurchase shares (Guay and Harford, 2000; Jagannathan *et al.*, 2000; Skinner, 2008). Grullon and Michaely (2002) examine the dividend substitution hypothesis and report that, in the US between 1972 and 2000, share repurchases grew at the same time as dividends declined, whilst the overall payout ratio remained fairly constant. This is consistent with the hypothesis that US firms are substituting share repurchases for dividends. Using a slightly later sample to investigate a similar question, Skinner (2008) and Floyd *et al.*, (2015) report share repurchases overtook dividends as a way to distribute cash to shareholders, in line with a preference to reduce the dividend commitment. Oded (2020) reports that, since the late 1990s, however, dividends and share repurchases have had similar economic significance as payout channels in US markets.

Renneboog and Trojanowski (2011) examine dividend and share repurchase behaviour for a sample of UK firms from 1992-2004, observing a drop from 84% to 78% in the proportion of firms paying dividends in this time, but a marked increase in the proportion of firms repurchasing shares, from 5% in 1992 to 16% in 2004. Oswald and Young (2008) report a fivefold increase (from 13 to 65) in the number of companies making share repurchases across their sample, which is drawn from the period 1995-2002. Both of these papers study samples drawn mostly from the pre-reform period<sup>3</sup> when share repurchases were more strictly regulated in the UK, so it is an open question as to whether firms have changed their payout mix following the reforms.

Following Dittmar (2000), if UK firms are substituting share repurchases for dividends as a way of distributing earnings, we expect to observe the following:

***Prediction 5a: Share repurchase activity will be negatively associated with current dividends.***

Another way of examining the extent of dividend substitution is to apply Lintner (1956) regressions to dividends, and then to total payout. This method has been applied by Skinner (2008) and Andres *et al.* (2015) to examine this issue in the US and Germany, respectively. Following interviews with managers, Lintner realised that the commitment inherent in dividend payments discouraged managers from fully recognising increases in earnings in dividends; rather they adopted a partial adjustment. He expressed this as follows:

$$\Delta D_{i,t} = a_i + c_i (D_{i,t}^* - D_{i,t-1}) + \mu_{i,t} \quad (1)$$

Where  $D_{i,t}^* = r_i P_{i,t}$  and  $r$  is the target payout ratio, with  $P_t$  being current year profits and  $D$  representing dividends. The parameter,  $c_i$ , is the 'fraction of the difference between this "target" dividend  $D_{i,t}^*$  and the actual payment made in the preceding year' [p.107]. This parameter has come to be known as the speed of adjustment (Skinner, 2008). Rearranging (1), Lintner provides a model which is more easily applicable empirically because  $r$  does not need to be known:

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<sup>3</sup> Renneboog and Trojanowski (2011) have one year (2004) of post-reform data.



$$\Delta D_{i,t} = a_{i,t} + bP_{i,t} + dD_{i,t-1} \quad (2)$$

Where  $b = cr$  and  $d = (-c)$  and  $c$  is the speed of adjustment of dividends to earnings. The target ratio,  $r$ , can therefore be computed as  $b/(-d)$ . Prior research assumes that the target payout ratio and speed of adjustment coefficient are constant across firms (Andres *et al.*, 2015; Skinner, 2008).

Applying this method to the German case, where share repurchases were allowed post-1998, Andres *et al.* (2015) argue that, if dividends and share repurchases are perfect substitutes, then the parameters of a Lintner model using total payouts will be unaffected by the reforms allowing share repurchases.

Following Skinner (2008), we adapt the Lintner model (equation (2)) to incorporate total payout (dividends plus repurchases) and test the two models below:

$$\Delta DIV_t = \alpha_0 + \alpha_1 NI_t + \alpha_2 DIV_{t-1} + \mu_t \quad (3)$$

$$\Delta TOTALPAY_t = \alpha_0 + \alpha_1 NI_t + \alpha_2 TOTALPAY_{t-1} + \mu_t \quad (4)$$

If share repurchases substitute for dividends in the UK, then we would expect that, once it becomes easier to repurchase shares, managers will choose to distribute a greater proportion of profits in this way because it mitigates any risk of the market penalising them for cutting dividends. This will reduce the target payout ratio in relation to dividends, as well as the sensitivity of dividends to earnings (the speed of adjustment) while having no effect on the sensitivity of total payout to earnings. We therefore predict that:

***Prediction 5b: If share repurchases are substitutes for dividends in the UK, then the reform which allows share repurchases will be associated with a reduction in both the speed of adjustment of dividends to earnings and the target payout ratio in a Lintner model of dividends alone (Eq.3).***

Following Andres *et al.* (2015) we also predict the following:

***Prediction 5c: If share repurchases are substitutes for dividends in the UK, then the reform which allows share repurchases will not be associated with any change in the parameters of a Lintner model of total payout (Eq. 4).***

#### *6. Corporate governance (H6)*

If share repurchases offer a solution to the agency problem of free cash flow, then it may be that better governed firms are more likely to repurchase. For example, a more independent board may be better able to discourage over-retention of cash than one which is dominated by insiders (Fama and Jensen, 1983; Sharma, 2011). Consistent with this, Sharma (2011) provides US evidence that more independent boards are positively associated with both dividend payouts and share repurchases. We therefore test an additional hypothesis (*H6*), which is that share repurchases are more likely when a firm has stronger corporate governance mechanisms in place.

In the UK, the role of independent directors was addressed in a reform to the Code of Corporate Governance based upon the Higgs Review of the Role and Effectiveness of Non-Executive Directors (2003). The review provided the first formal outline of the role of UK non-executives, as well as increasing disclosure requirements relating to board activity and decision-making. We therefore examine whether the proportion of non-executives on the board is associated with share repurchase activity, and whether any such relationship is stronger post-2003, predicting the following:

***Prediction 6a: Share repurchase activity will be higher in firms with more independent boards.***

Unchecked, managers are prone to waste free cash (Jensen, 1986). Where board members have equity stakes in the company, they will enjoy a share of the benefits of a reduction in value-reducing activities, such as over-consumption of perquisites or investment in negative net present value projects. They are therefore likely to be supportive of share repurchase programmes which reduce the agency costs of free cash flow (Oded, 2020). Further, if repurchases are made for undervaluation reasons, then stock-owning board members will benefit from any increase in share price due to the repurchase (Chowdry and Nanda, 1994). Any decrease

in outstanding shares due to major repurchase programmes further increases the value of their equity stake.

We therefore predict the following:

***Prediction 6b: Share repurchase activity will be positively associated with board ownership.***

#### *7. Executive stock options (H7)*

Lambert *et al.* (1989) suggest that, as future dividend payments reduce the current value of stock options, managers in receipt of ESOs will be motivated to reduce dividend payments. Their empirical results support this hypothesis, showing that firms pay lower than expected dividends following the introduction of a stock option scheme for senior executives. They conclude that changes to the structure of managerial compensation may therefore affect dividend policy at the firm. Fenn and Liang (2001) develop this further by considering the effect of ESOs on both dividends and repurchases. Using a later sample, they confirm the results of Lambert *et al.* (1989), reporting a significant negative association between dividends and ESOs, as well as a significant positive association between ESOs and share repurchases. US evidence on the association between stock option-based compensation for senior managers and payout policies at the firm is therefore compelling. However, the relative importance of ESOs as a component of top executive pay in the UK is quite small (Conyon *et al.*, 2011) and so it is not clear that the existence of an option plan will provide sufficiently strong incentives for managers to adjust payout policy to maximise the value of their stock options. BEIS (2019) identifies the lack of empirical evidence on the association between ESOs and repurchases in the UK as a gap in the literature. Young and Yang (2011), in a UK sample from 1998-2006, compare the compensation practices of a sample of repurchasing firms with a matched sample of non-repurchasers. They find no difference between the two sets of firms in respect of their propensity to use ESO plans. We test whether the association between ESO use and repurchases in UK firms is consistent with US findings with our final prediction:

***Prediction 7: Share repurchase activity will be positively associated with the use of executive stock options.***

## 4. Sample, Data and Research Design

### 4.1 Sample and Data

We examine actual repurchase activity as opposed to the announcement of repurchase programmes. This is because firms which announce repurchases may do so in order to signal undervaluation and/or manipulate their stock price and may not actually make any repurchases (Andriosopoulos and Hoque, 2013; Chan, Ikenberry, Lee and Wang, 2010; De Cesari, Espenlaub, Khurshed and Simkovic, 2012;). In such cases, the motivation for share repurchase announcements is undervaluation and potentially different from the motivation for actual repurchases, which is our event of interest.

Our sample period runs from 1999 to 2016 and comprises UK non-financial, main-market listed firms. Due to our use of lagged independent variables, we use dependent variables from 2000 only. We collect firm-level financial data from Worldscope *via* Datastream. After deleting observations with incomplete data, we are left with a sample of 6,119 observations, representing 2,018 repurchase and 4,181 non-repurchase firm years. Our corporate governance data, including board ownership, non-executive directors, and executive compensation, are collected from BoardEx. Institutional ownership data is from Eikon<sup>4</sup>.

### 4.2 Models of the determinants of share repurchases

We adapt two models from prior research (Oswald and Young, 2008) in order to examine the determinants of the probability of stock repurchases, and of the payout ratio for repurchases, as follows:

$$\begin{aligned} \text{Log}\left(\frac{p_{it}}{1-p_{it}}\right) = & \delta_0 + \delta_1 LEVIND_{i,t-1} + \delta_2 XSCASH_{i,t-1} + \delta_3 CFO/TA_{i,t-1} + \delta_4 MTBIND_{i,t-1} + \delta_5 ABRET_{i,t-1} \\ & + \delta_6 DIV/NI_{i,t} + \delta_7 ROA_{i,t} + \delta_8 SPDUM_{i,t-1} + \delta_9 BOARDOWN_{i,t-1} + \delta_{10} PROPRED_{i,t-1} \\ & + \delta_{11} ESO_{i,t-1} + \sum_{n=1}^N \lambda_n Controls_{n,i,t-1} \end{aligned} \quad (5)$$

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<sup>4</sup> To be categorised as institutional investors, the investor will be one of the following type, Bank and Trust, Endowment Fund, Foundation, Hedge Fund, Investment Advisor, Insurance Company, Pension Fund, Private Equity, Venture Capital, Sovereign Wealth Fund, Brokerage Firms, Research Firm, Independent Research Firm, Mutual Fund, Hedge Fund Portfolio, Pension Fund Portfolio or Institution.

$$\begin{aligned}
SP/NI_{i,t} = & \beta_0 + \beta_1 LEVIND_{i,t-1} + \beta_2 XSCASH_{i,t-1} + \beta_3 CFO/TA_{i,t-1} + \beta_4 MTBIND_{i,t-1} + \beta_5 ABRET_{i,t-1} \\
& + \beta_6 DIV/NI_{i,t} + \beta_7 ROA_{i,t} + \beta_8 SP/NI_{i,t-1} + \beta_9 BOARDOWN_{i,t-1} + \beta_{10} PROPNEDE_{i,t-1} \\
& + \beta_{11} ESO_{i,t-1} + \sum_{n=1}^N \lambda_n Controls_{n,i,t-1}
\end{aligned} \tag{6}$$

The dependent variable in Model (5), the logit model, measures the probability that a firm engages in a stock repurchase, whereas in Model (6) the dependent variable is the value of the stock repurchase ( $SP$ ) scaled by net income ( $NI$ ). For firms making losses, we set the value of  $SP/NI$  to zero.<sup>5</sup> Since the dependent variable in Model (6) is non-negative, we estimate the model using a tobit specification with left-censoring. The two models share the same set of independent variables, with one exception, as we explain below.

#### *Hypothesis 1: Gearing/capital structure*

To test the first hypothesis, we include industry-adjusted leverage ( $LEVIND$ ) in our models. Assuming that average industry leverage for the year is the target ratio, a negative sign on the coefficient for  $LEVIND$  would support the hypothesis that firms repurchase shares with the objective of increasing gearing. Leverage is measured by total debt (Worldscope item WC03255), divided by total shareholders' equity (Worldscope item WC03995). To adjust for the industry standard, we subtract the average leverage for firms in the same industry in the same year from each firm's reported leverage.

#### *Hypothesis 2: Free cash flow*

If the availability of share repurchases provides a distribution channel for excess cash, then we would expect to see a positive association between measures of surplus cash (or cash flow from operations) and share repurchase activity. Following Oswald and Young (2008) we test the free cash flow hypothesis by including the residual from the optimal cash regression in Dittmar and Mahrt-Smith (2007) ( $XSCASH$ ). We also include cash flow from operations deflated by total assets ( $CFO/TA$ ), as an alternative measure of cash available for

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<sup>5</sup> We repeat our main tests after excluding loss-making firm years as part of our additional analyses in S.6.

distribution (Jagannathan *et al.*, 2000). A positive sign on the cash coefficients will provide support for the free cash flow hypothesis.

### *Hypothesis 3: Investment*

For the investment hypothesis, we follow Renneboog and Trojanowski (2011) and include the industry-adjusted market-to-book (*MTBIND*) as a measure of firms' investment opportunities. The industry adjustment is made by subtracting the average *MTB* for all firms in the same year and industry from each firm's *MTB*. A negative sign on the coefficient of *MTBIND* would support the investment hypothesis as it is consistent with firms with fewer investment opportunities distributing surplus cash to shareholders.

### *Hypothesis 4: Undervaluation (signalling or timing)*

In order to test the undervaluation hypothesis, we include a measure of abnormal stock return (*ABRET*), following Dittmar (2000), Skinner (2008) and Oswald and Young (2008). We compute this by taking the annual return for the firm and then subtracting from it the return on the FTSE All Share Index for the same period. A negative coefficient on *ABRET* would be consistent with managers buying back their own stock when they believe it to be cheap and would therefore support the undervaluation (signalling or timing) hypothesis.

### *Hypothesis 5: Dividend substitution*

We first test the dividend substitution hypothesis by including dividends as a proportion of net income (*DIV/NI*) as a right-hand side variable in our models. If share repurchases are replacing dividends, then we would expect a negative coefficient on *DIV/NI* (Dittmar, 2000). We also expect that, if managers commit to share repurchases in a manner similar to dividends, firms which repurchase in one year will also tend to repurchase in the next and spend similar amounts (Lee and Suh, 2011). In Model (5) we therefore include a dummy variable, (*SPDUM<sub>t-1</sub>*) coded 1 if the firm repurchased its own shares in the prior year, otherwise zero; in Model (6) we include the lagged measure of *SP/NI*. Finally, to test the association between performance and stock repurchases (Skinner, 2008), we include *ROA*. We expect the coefficient on *ROA* to be positive.

We also examine the question of dividend substitution by applying adapted Lintner models as discussed in Section 3.5.

#### *Hypothesis 6: Corporate governance*

We investigate the association between corporate governance and share repurchases by including variables relating to board structure and board and ownership. *PROPNEED* is measured as the proportion of the board made up of non-executive directors and *BOARDOWN* is the value of ordinary shares held by directors and their immediate family divided by the total value of ordinary shares outstanding.

#### *Hypothesis 7: Executive stock options (ESOs)*

If a sufficient proportion of managerial wealth is tied to the value of stock options in their firm, then this may affect payout policy. Such managers will be motivated to reduce dividends, which reduce the value of their options, and distribute cash to shareholders *via* repurchases. We therefore include a dummy variable, *ESO*, which is coded one if the firm's balance sheet records a positive value for stock options at the year end, otherwise *ESO* is coded zero. Thus, our variable captures the existence of a current stock option scheme.

#### *Additional control variables*

We then incorporate several control variables identified as important to payout decisions in prior literature. Bond and Zhong (2016) argue that equity offerings should be considered alongside share repurchase activity. We therefore construct two types of variable: first, dummy variables, which are set to one if the company issues equity in the current period (*CCDUM1*), or the current *and* prior period (*CCDUM2*); second, the monetary amount raised by equity issuance as a proportion of profits (*CC/NI*). Von Eije and Megginson (2008) find an association between firm age and dividend distributions in Europe, so we include the log of firm age (*AGE*) as a measure of maturity. Larger firms are much more likely to repurchase shares in both the US and UK (Renneboog and Trojanowski, 2011; Skinner, 2008) so we include *MCAP*, which is the natural log of the firm's market capitalisation, to capture size effects. Retained earnings provide a payout 'reservoir', enabling managers to smooth payouts (Lambrecht and Myers, 2017). Further, both dividends and share repurchases must be funded from distributable profits; we therefore include retained earnings as a proportion of total assets in our models (*RE/TA*). Large shareholders are able to force managers to distribute excess cash (Lambrecht

and Myers, 2017; Oded, 2020). As institutional investors are likely to have a tax-related preference for dividends, they may encourage firms to distribute funds in this way rather than by repurchasing shares. We therefore include *INSTOWN*, which is the total number of shares owned by institutional blockholders (>3%), divided by the number of shares in issue.

We include year dummies, and we control for industry effects by categorising our firms into one of 33 industries and incorporating 32 industry dummy variables in our multivariate analyses (after excluding all firms from financial industries).

With the exception of the dividend payout, capital contribution, and profitability variables, all independent variables are lagged, consistent with prior research (e.g., Oswald and Young, 2008). For our multivariate analyses we winsorise non-bounded continuous variables at 1% and 99% on an annual basis to mitigate the effects of outlying observations.<sup>6</sup> For variables that are left-truncated at zero (*SP/NI*, *INSTOWN* and *BOARDOWN*), we only winsorise at 99%. Table 1 outlines the variables we use in our regression analysis to test each of the hypotheses detailed in Section 3.

[TABLE 1 HERE]

#### 4.3 Descriptive Statistics

Table 2 presents descriptive statistics relating to our sample. In an average year, 32.6% of sample firms repurchase shares. This is much higher than the averages reported for a mixed European sample from 1989-2005 by von Eije and Megginson (2008) and is consistent with their description of UK firms as repurchasing more shares by value than any other European country. The mean of *SPDUM2YR* is 22.2%, indicating that just under a quarter of UK firms repurchase in a given sample year, having also bought back their own shares in the previous year. The dummy variables *CCDUM1* and *CCDUM2* indicate that 70.4% of firms issue equity in one year, and 61.8% of firms issue new shares in two consecutive years, respectively. The comparative numbers for dividends are 81.3% and 79%. The next row shows how many firms neither pay dividends nor

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<sup>6</sup> We do not winsorise bounded variables such as *PROPNEED*.



repurchase shares (*NOPAY*). This is only 16.7% of sample firms, compared to over 60% reported in the US by Floyd *et al.* (2015). The average amount of net income distributed by way of share repurchases (*SP/NI*) is 10.4%, close to the figures reported for a sample from 2007-2017 by BEIS (2019). The average dividend payment represents a much larger 45.4% of net income (*DIV/NI*). Sample firms raise, on average, monies to the value of 22.1% of net income in equity sales each year (*CC/NI*). On average, 30% of sample firm equity is held by institutional investors, compared to US findings of 13% reported by Dittmar and Mahrt-Smith (2007), 25% reported by Jagannathan *et al.* (2000) and 45% reported by Franks (2020). Only 16.1% of UK firms have active ESOs, compared to 49% reported as the US peak by Conyon *et al.*, 2011. The structure of both firm ownership and executive compensation, both of which have been found to be associated with share repurchase activity in the US, is therefore different in the UK. These factors may therefore not carry the same weight in the UK.

[TABLE 2 HERE]

The next section presents the results of our analyses of the data.

## 5. Analysis

Figure One reports the trend in share repurchases in our sample compared to the (predominantly) pre-reform sample of Renneboog and Trojanowski (2011) and the US sample employed by Floyd *et al.* (2015). A steep rise in the proportion of firms buying back their own shares can be seen from 2003, consistent with the regulatory reform encouraging share repurchase activity. There is then a reduction in the proportion of firms repurchasing during the financial crisis; the shape of the trend around this time is similar to that in the US, with the lower line derived from Floyd *et al.* (2015) explained by the higher propensity of US companies to make no distribution to shareholders.

Table 3 reports descriptive statistics for our sample firms, split into observations from the pre- and post-reform periods: 2000-2003 (Regime1; n=1467) and 2004-2016 (Regime 2; n=4732). The first row shows a statistically and economically significant increase in the propensity of UK firms to repurchase their own shares. Prior to the reforms, 15.7% of firms repurchased shares, which is similar to the statistic reported by

Renneboog and Trojanowski (2011) in their pre-reform sample. In our later subset, this proportion more than doubles, to 37.8%. There has also been a marked increase in the propensity of firms to make repurchases in consecutive years. Whilst only 8.1% of sample firms repurchased shares in two consecutive years in the pre-reform period, this increased to 26.6% after the reforms. Both mean and median tests show that these changes are all statistically significant at the 1% level.

Prior research (e.g. Renneboog and Tronjanowski, 2011; Skinner, 2008) argues that observing an increasing magnitude of repurchases supports the dividend substitution hypothesis. Table 3 shows that the amount distributed *via* share repurchases, either as a proportion of retained earnings ( $SP/RE$ ), of profit ( $SP/NI$ ), or of total payout ( $SP/TOTALPAY$ ), increases significantly in the period following the 2003 reform. Prior to the reform, 8.1% of total distributions were by way of repurchases, but this increased to 14.2% from 2004 onwards. However, the fraction of net income distributed *via* dividends ( $DIV/NI$ ) remains stable at around 46%. This suggests the increase in repurchases was not offset by a reduction in dividends, rather that total payout has increased over time, a trend which has also been observed in the US by Floyd *et al.*, (2015). Indeed, Table 3 shows total payout as a proportion of net income ( $TOTALPAY/NI$ ) is higher in the later time period, consistent with the change in regulation encouraging firms to pay out more of their profits. Over 80% of sample firms pay a dividend in any one year ( $DIVDUM1YR$ ), with no significant change in this practice associated with the share repurchase reform. Slightly fewer pay a dividend in two consecutive years ( $DIVDUM2YR$ ) and this decreases significantly after 2003, from 81.2% to 78.3%. In comparison, Floyd *et al.* (2015) report that 16% of US industrial firms pay dividends between 2000 and 2003, increasing to 23% in their 2004-2012 sample. Over these time periods, the proportion of share repurchasing firms exceeds that of dividend paying firms. In an important contrast to UK practice, Floyd *et al.* (2015) report that most US industrial firms (over 60%) make no payout at all, whereas the proportion of UK firms in our sample which neither pay dividends nor repurchase shares ( $NOPAY$ ) is less than 17% across our sample period.

Pre-reform sample firms pay dividends at 11.1% of retained earnings ( $DIV/RE$ ) and 46.4% of net income ( $DIV/NI$ ). These figures are comparable to those reported for UK firms in an earlier time period (Renneboog

and Trojanowski, 2011; Oswald and Young, 2008), and there is little evidence of any substantial change associated with the repurchase reforms.

[TABLE 3 HERE]

Table 4 reports the results of univariate tests of mean and median differences between repurchasing and non-repurchasing firms in respect of the measures we employ to test the predictions generated by the seven hypotheses developed earlier. In the univariate tests on the full sample, no difference in prior year leverage (*LEVIND*) is observed between repurchasing and non-repurchasing firms, providing no support for *H1*. However, *H2* (surplus cash) is supported; repurchasing firms have more excess cash (*XSCASH*) and cash flow from operations (*CFO/TA*) in the year before repurchasing than do non-repurchasing firms. The results for market-to-book ratios (*MTBIND*) are opposite to the predictions relating to *H3* (investment opportunities) in the univariate tests. Before controlling for other factors, investment opportunities appear higher for repurchasing firms. No support is found for *H4* (undervaluation); the average prior year abnormal stock return (*ABRET*) is no different for repurchasing firms compared to non-repurchasers, and the median value is significantly higher in repurchase firms. Next, if share repurchases are substituting for dividends, then we would expect the proportion of net income paid out *via* dividends (*DIV/NI*) to be lower for repurchasing firms. However, Table 4 reports the opposite result, which is not consistent with *H5* (dividend substitution). Interestingly, at the median, repurchasing firms raise more money from equity issuances than non-repurchase firms. Less surprisingly, share repurchase firms report higher prior year profits (*ROA*) than firms which do not make this kind of distribution. There are differences in corporate governance between the two types of firm. As predicted by *H6*, repurchasing firms have more independent boards (*PROPVED*). However, board ownership is lower for repurchasing firms, which is opposite to our second prediction relating to *H6*. Executive stock option schemes are hypothesised to deter managers from paying cash dividends and encourage them to switch to repurchases as a method of distributing surplus cash (*H7*). However, our comparison shows that non-repurchasing firms tend to have more ESOs than repurchasing firms, which does not support this hypothesis. In summary, the simple univariate results provide some support for our hypotheses related to excess cash and corporate governance but not for our hypotheses related to capital structure, investment

opportunities, undervaluation, dividend substitution or executive stock options. Before any conclusions can be drawn, however, more sophisticated, multivariate tests are necessary.

[TABLE 4 HERE]

Prior to this, we report the correlations between our variables in Table 5, which shows that the current share repurchase dummy ( $SPDUM_t$ ) is significantly *positively* correlated with current year equity issuances ( $CCDUM_t$ ), as well as one-year lags of the following: cash flow ( $CFO/TA$ ); market to book ( $MTBIND$ ); profitability ( $ROA$ ); share repurchases ( $SPDUM$  and  $SP/NI$ ); institutional ownership ( $INSTOWN$ ); board independence ( $PROPND$ ); firm size ( $MCAP$ ); firm age ( $AGE$ ); retained earnings ( $RE/TA$ ); and the dividend dummy ( $DIVDUM$ ). The likelihood a firm makes a repurchase in a given year is significantly *negatively* correlated with lagged board ownership ( $BOARDOWN$ ). Repurchases as a proportion of net income ( $SP/NI$ ) are significantly positively correlated with lags of: excess cash ( $XSCASH$ ), cash flow ( $CFO/TA$ ), the payment of, and the amount of income paid in dividends ( $DIVDUM$  and  $DIV/NI$ ), profitability ( $ROA$ ), retained earnings ( $RE/TA$ ) and both the payment of ( $SPDUM$ ), and the amount of profit paid out in, share repurchases ( $SP/NI$ ).

The Pearson correlation coefficients between independent variables are small in magnitude so we proceed to our multivariate regression analyses, where we test Models (5) and (6).

[TABLE 5 HERE]

Table 6 reports the results of these regressions using all sample years from 2000-2016. Our first hypothesis ( $H1$ ) tests whether desired changes to leverage/capital structure act as a motivation for repurchases in the UK. If firms use share repurchases to alter their capital structure towards the average in their industry in that year, then we would expect to observe a negative and significant relationship between industry-adjusted leverage ( $LEVIND$ ) and the incidence of share repurchase, as well as its magnitude. However, the coefficient on  $LEVIND$  is not significantly different from zero in either model so we find no support for  $H1$  in the pooled sample tests.

In support of  $H2$ , however, we find significant positive relationships between our excess cash and operating cash flow measures ( $XSCASH$ ,  $CFO/TA$ ) and both the likelihood and magnitude of repurchases. This is consistent with firms reducing high levels of cash *via* repurchases.

In these multivariate tests, we also find support for the investment opportunities hypothesis, (*H3*), in that *MTBIND* is negatively and significantly related to both the likelihood of repurchases and their magnitude, as predicted by theory (Bolton *et al.*, 2011; Oded, 2020). This is supportive of earlier UK work which finds firms use share repurchases to distribute surplus cash when they have limited alternative uses for it (Dixon *et al.*, 2008; Oswald and Young, 2008).

The undervaluation hypothesis, *H4*, predicts that firms will purchase their own shares when they are cheap, either as a signal to the market, or to take advantage of a low price in executing a planned repurchase programme. We test this hypothesis using the *ABRET* variable, predicting a negative sign on this coefficient. The coefficient is of the predicted sign in both models, but is only significant in the tobit test; firms spend relatively more on share repurchases when the stock has underperformed the market.

If the dividend substitution hypothesis (*H5*) is to be supported in the UK environment, then we would expect to observe a negative association between dividends paid and share repurchases (Dittmar, 2000). In the logit model the coefficient on *DIV/NI* is not significantly different from zero. Moreover, it is *positive* and highly significant in the tobit model, implying a higher dividend payout ratio drives a higher repurchase payout ratio. This is consistent with the observation made by Lee and Suh (2011) in examining an earlier UK sample, who report that dividends and repurchases appear to be complementary, not substitutive, in this environment.

In line with Skinner (2008) in the US, and Lee and Suh (2011) for the UK, we find there is a statistically strong positive relationship between profitability (*ROA*) and share repurchases, indicating repurchases are more likely, and are greater in magnitude, when profitability is higher.

Our models control for lagged repurchases (*SPDUM<sub>t-1</sub>* in Model (5) and *SP/NI<sub>t-1</sub>* in Model (6)). Finding a positive coefficient for a repurchase event in the prior year suggests the presence of a commitment effect, whereby repurchasing firms tend to buyback own shares in multiple years (Lee and Suh, 2011). Both lagged share repurchase coefficients are positive and highly significant, consistent with UK firms using share repurchases as a regular means of cash distribution, not simply a way to pay out irregular cash gains.

In terms of the effect of corporate governance, we find that more independent boards (*PROPNEED*) are positively associated with both the likelihood and magnitude of share repurchases, akin to US results reported

by Sharma (2011). However, there is no association between board ownership (*BOARDOWN*) and share repurchase activity, on average, in the UK (Oded, 2020).

Our final hypothesis tests whether executive share option schemes are associated with payout policy in the UK. We find no evidence that this is the case, with our variable, *ESO*, being insignificantly related to the likelihood of share repurchases, or their amounts. We contend that this may be due to the relative unimportance of this type of compensation to UK executives compared to their US counterparts (Conyon *et al.*, 2011).

Turning to the control variables, there is a significant positive association between the amount raised by equity issuances and the amount paid out *via* share repurchases in the tobit model. In spite of their tax-based preference for dividends rather than repurchases, we find no association between institutional ownership and share repurchase activity in the UK. We find that larger firms (*MCAP*) are more likely to repurchase shares, though there is no significant association with firm age (*AGE*) and own share buy backs. This finding differs from US findings, where more mature firms are more likely to make any type of distribution (Skinner, 2008). Finally, as expected, firms with higher retained earnings (*RE/TA*) are more likely to make share and in a greater amount, relative to their current profits.

In summary, Table 6 provides no support for the leverage (capital structure) hypothesis (*H1*) in the UK, but it provides strong support for the free cash flow and investment hypotheses (*H2* and *H3*). Some support is found for the undervaluation hypotheses (*H4*). The evidence points to the rejection of the dividend substitution hypothesis (*H5*), in contrast to the case documented in the US. (The dividend substitution hypothesis is further examined in Table 8.) In terms of corporate governance (*H6*) board independence is found to be significantly associated with share repurchase activity, but board ownership is not, while no association is found between the presence of executive stock options and share repurchases (*H7*).

[TABLE 6 HERE]

We next seek to determine whether the 2003 reform, after which share repurchase activity increases substantially, is associated with any *change* in the motivation of UK firms to repurchase shares. We have no prior expectations but the extent of the increase in share repurchase practice following the reforms makes us believe it is worthy of testing. We do this by estimating Models (5) and (6) on the pre- and post-reform

observations separately, reporting the results in Table 7. To test for significant differences, we also run regressions on the full sample, including a regime dummy and a full set of interaction terms. The reported  $p$ -values for differences in coefficients across regimes are taken from these otherwise untabulated tests. Although there was no support for  $H1$  in the pooled sample tests in Table 6, when we now separate observations by regulatory regime, it can be seen that, prior to the reform, there is a significantly negative association between industry-adjusted leverage and the likelihood a firm buys back its own shares. The coefficient on the pre-reform tobit test is also negative, though not significant when we use two-tailed  $p$ -values. This result is consistent with the pre-reform survey results in Dixon *et al.* (2008), where managers of repurchasing firms gave the achievement of an optimal capital structure, and to increase their firm's gearing, as the top two reasons for share repurchase at that time. They are also in line with the pre-reform results reported by Oswald and Young (2008), whose analysis revealed a significantly negatively association between net leverage and both the likelihood and magnitude of share repurchases. Similarly, Renneboog and Trojanowski (2011) report a negative association between leverage and the probability of either dividend or share repurchase in their early sample. However, our evidence indicates a change in this respect, and that changes to gearing/capital structure no longer represent a dominant motivation for share repurchase in the UK.

As outlined in S.3, theory predicts a positive association between excess cash and share repurchase activity. UK research on earlier samples has provided strong empirical evidence that share repurchases are a vehicle for the distribution of excess cash (Oswald and Young, 2008). This is the third most important reason for repurchases given by survey respondents in Dixon *et al.*, (2008) The evidence in Table 7 supports the excess cash hypothesis,  $H2$ , in both regulatory regimes. In each time period, both  $XSCASH$  and  $CFO/TA$  are significantly positively associated with the likelihood a firm repurchases shares. Both coefficients are also positive in both regimes in the tobit models, though  $CFO/TA$  is significant only in Regime 2. There is therefore no evidence of a change in the importance of surplus cash as a determinant of share repurchase following the 2003 reform.

We also find strong support for the investment opportunities hypothesis across both time periods. Industry-adjusted market-to-book ( $MTBIND$ ) is significantly negatively associated with both the likelihood

and amount of repurchases in our sample. We therefore corroborate results documented for the pre-reform period by Oswald and Young (2008) and confirm that a lack of investment opportunities prevails as a powerful motivation for UK share repurchases after the reforms, when share repurchase activity has substantially increased.

In line with prior research (Dixon *et al.*, 2008; Oswald and Young, 2008) we find some support for the undervaluation hypothesis in the *pre*-reform period, documenting a significantly negative relationship between prior year abnormal stock return (*ABRET*) and both the likelihood and magnitude of share repurchases. However, undervaluation is no longer a significant determinant of share repurchase in the post-reform period, suggesting another potential change in the motivation for UK firms to buy back their own shares. Across regulatory time periods, the difference in the association between stock market performance and the propensity to repurchase is statistically significant.

As in Table 6, we find that the amount distributed by share repurchases is positively related to the amount distributed by dividends, that is the coefficient on *DIV/NI* is significant and positive in the tobit models. Interestingly, this relationship is significantly stronger in the post-reform period. Consistent with share repurchases being used to distribute profits, a strong positive association between firm performance (*ROA*) and repurchases activity holds in both time periods. We find further evidence of the use of repurchases as a regular distribution mechanism across both regimes, with positive coefficients on our lagged share repurchase variables, *SPDUM<sub>t-1</sub>* and *SP/NI<sub>t-1</sub>*. Firms which repurchased shares last year are more likely to do so this year, and those which repurchased in greater amounts last year will also repurchase in greater amounts this year, on average.

No association is found, in either time period, between board equity ownership (*BOARDOWN*) and share repurchase activity. However, in line with the effectiveness of independent boards being enhanced following the issue of a new code of best practice in corporate governance in 2003, which focused on the role of the board (Higgs Report, 2003), Table 7 reveals that it is only in the post-reform time period that board independence (*PROPNEED*) is associated with the propensity of firms to buy back their own shares. *H6* is therefore supported in this respect in the post-reform period.



We find no significant association between the use of executive stock option plans and repurchase activity in either of our sub-periods and so no support is provided for *H7*.

In the post-reform period, there is a positive association between the amount raised by capital contributions (*CC/NI*) and the amount distributed in share repurchases, which is opposite to what we would expect. Larger firms have greater repurchase activity, on average (*MCAP*) and firms, and older firms distribute higher proportions of profits by repurchases in the pre-reform period only. Firms with higher levels of retained earnings (*RE/TA*) expend larger amounts on share repurchases in both time periods. The amount of equity owned by institutional blockholders, *INSTOWN*, is not significantly associated with the payout decision in either time period.

[TABLE 7 HERE]

Table 8 contains the results of Lintner regressions which provide an additional test of the dividend substitution hypothesis (Skinner, 2008). Panel A reports the results from Model (3), the Lintner model for dividends alone. Current earnings ( $NI_t$ ) are positively and significantly associated with change in current year dividends in both time periods, with no significant change in the coefficients across regimes. The speed of adjustment coefficient, ( $-\alpha_2$ ) is significantly smaller in the second period, reducing from 0.198 to 0.111, indicating that the rate at which changes in profits are paid out in dividends has slowed post-2003.<sup>7</sup> A positive constant in this model can be interpreted as reflecting a general managerial preference to increase, rather than reduce, dividends (Lintner, 1956: 107). The results on  $\alpha_0$  in Panel A therefore suggest that this managerial preference is no longer significant in the UK, that is, that managers are just as likely to cut as to increase dividends in our later sample period. This change in attitude may account in part for the steep increase in target payout ratios between our time periods. The target ratio,  $r$ , is calculated as  $\alpha_1/-\alpha_2$  and reported in the table. It can be seen that the average target ratio has increased from 39.9% pre-reform to 75.7% post-reform. Thus, firms aim to pay out more of their earnings in dividends since the reform but are doing so more slowly. In Section 3 we developed the prediction that, if share repurchases are used as substitutes for dividends in the

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<sup>7</sup> For comparison, Skinner (2008) reports the speed of adjustment coefficient in the same model as being 0.18 (time period: 1980-1994) or 0.29 (time period: 1995-2005) in the US. In Germany, Andres *et al.* (2015) report a speed of adjustment of 0.198 in their OLS model of dividends only.

UK since the reforms, then we would expect to observe a reduction in both the speed of adjustment of dividends to earnings, and the target dividend payout ratio. Whilst we observe the first, the latter is emphatically contradicted, so we are unable to make any unambiguous conclusion regarding *H5* from Panel A.

[TABLE 8 HERE]

Panel B reports the results of Model (4) which incorporates total payout in place of dividends. Again, earnings are significantly positively associated with the change in amounts disbursed to shareholders by dividends plus repurchases, and there is no change in the coefficient across time. Our prediction here is that, if repurchases substitute for dividends, there should be no change in the parameters of Model (4) across time periods. However, this is not the case. The speed of adjustment measure ( $-\alpha_2$ ) for total payouts reduces significantly in the second period, from 0.357 to 0.229.<sup>8</sup> Further, the positive significant constant in the first period becomes insignificantly different from zero following the reforms. The explanatory power of both models is smaller post-2003, dropping from 24.7% to 18.3% for Model (3), and from 26% to 18.8% for Model (4). The model therefore has much lower explanatory power in the UK than in the US, where Skinner (2008) reports  $R^2$  values of over 30% for his Lintner tests both of dividends and total payouts when using annual data.

Although the Lintner tests reveal some interesting changes in payout attitudes and practices in UK firms across our two time periods, they fail to provide strong evidence of dividend substitution in this environment.

## 6. Additional Analyses

Our sample period spans the global financial crisis. Figure 1 shows a marked decrease in share repurchase activity during the UK recession years of 2008 and 2009. We therefore repeat the tests reported in Tables 6 to 8 after the exclusion of these two years. The exclusion makes no discernible difference to the results in any of the tables; the sizes of the coefficients and their  $p$ -values are very similar and there is no change in their signs. We also repeat these tests after excluding loss-making firm years and our results again remain similar.

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<sup>8</sup> For comparison, Skinner (2008) reports speed of adjustment coefficients for total payouts of 0.4 (1980-1994) and 0.55 (1995-2005). For German data, Andres *et al.*, (2015) report a coefficient of 0.453.

We then repeat our tests using a sample which is balanced in time around the year of reforms, 2000-2006. There is no change to the sign of any of the coefficients, and significance levels remain similar, except for the following: in the restricted sample,  $MTBIND_{t-1}$  is not significantly associated with the propensity of firms to make repurchases in the post-reform sample (2004-2006);  $ABRET_{t-1}$  is significantly negatively associated with the amount of profits distributed by way of share repurchases post-reform; and the coefficient on  $PROPNE_{t-1}$  is not significantly associated with the propensity to repurchase post-reform, in these earlier years.

We substitute a measure of capital expenditure ( $CAPEX$ ) as used by Lee and Suh (2011) for  $MTBIND$  and re-run the tests from Table 6 and 7.  $CAPEX$  is not significantly associated with share repurchase activity, except for in the amount of repurchase in the pre-reform period, i.e. the tobit model for Regime 1. Here, it obtains a coefficient of -4.383 and a  $p$ -value of 0.098. All other variable coefficients are unaffected by the substitution.

If the determinants of dividends overlap with those for repurchases, so both types of payout are simultaneously determined, then the inclusion of current year dividends (included to test H5) on the right-hand side of Equations 5 and 6 may introduce endogeneity. We address this by testing a model of the determinants of share repurchases as a proportion of total payout, as per Fenn and Liang (2001), noting that this introduces a potential bias due to the exclusion of 1,152 zero payout observations.

We use a two-sided tobit regression, with the dependent variable, share repurchase ratio ( $SP/TP$ ), censored at both zero and one. We also include lagged repurchase ratio as an independent variable, below:

$$\begin{aligned}
 SP/TP_{i,t} = & \beta_0 + \beta_1 LEVIND_{i,t-1} + \beta_2 XSCASH_{i,t-1} + \beta_3 CFO/TA_{i,t-1} + \beta_4 MTBIND_{i,t-1} + \beta_5 ABRET_{i,t-1} \\
 & + \beta_6 ROA_{i,t} + \beta_7 SP/TP_{i,t-1} + \beta_8 BOARDOWN_{i,t-1} + \beta_9 PROPNE_{i,t-1} + \beta_{10} ESO_{i,t-1} \\
 & + \sum_{n=1}^N \lambda_n Controls_{n,i,t-1}
 \end{aligned} \tag{7}$$

The results, reported in Table 9, are consistent with those reported in our main tests and our conclusions are therefore unaffected.

[TABLE 9 HERE]

## 7. Summary and Conclusions

Using a comprehensive sample of UK firms over a 17-year time period, we first examine the effects of a 2003 reform, which substantially liberalised share repurchases for UK companies, on their share repurchase activity, reporting a substantial increase in share repurchases following the change in regulation. However, the proportion of income distributed *via* this method remains much smaller than in the US, according to the statistics reported in Floyd *et al.*, (2015).

We then test seven key hypotheses from prior literature, which has established, largely in the US, the following as potential determinants of repurchases: leverage (capital structure) (*H1*); surplus cash (*H2*); investment opportunities (*H3*); company undervaluation (*H4*); dividend substitution (*H5*); corporate governance (*H6*); and executive stock options (*H7*). Consistent with Hypotheses 2, 3 and 6, we find evidence that repurchase activity is positively associated with surplus cash, a lack of investment opportunities, and board independence. We also find that companies spend more on repurchases following a period of poor stock market performance, in line with the undervaluation hypothesis (*H4*). However, we find little support for Hypotheses 1, 4, 5 and 7. That is, there is no strong association between share repurchase activity and leverage, or executive stock options, and there is no indication that share repurchases are substituting for dividends as a mechanism for returning cash to shareholders in the UK.

Given the extent of the increase in share repurchase activity following the reform, we go on to test whether there has been any change in the determinants of repurchases afterwards. Our analyses reveal that, whereas leverage was a factor in the share repurchase decision prior to the reform, with companies with low industry-adjusted gearing being more likely to buy back their own shares, this is no longer a significant factor in determining payout policy at the firm level. We also find that poor prior stock market performance was significantly associated with share repurchases pre-2003, consistent with firms buying back their shares when they were undervalued but, again, this is no longer an important cause of repurchasing. Finally, board independence is only a significant determinant of repurchases post-2003, which is the year when corporate governance codes in the UK focused on the role and effectiveness of non-executive directors. All other determinants are unchanged by the reforms.

We present evidence of an important distinction between repurchase practice in the UK compared to the US. Whereas a compelling body of US evidence points to share repurchases replacing regular dividends, we find more evidence of a complementary, rather than substitutive, relationship between the two modes of shareholder distribution in the UK. Share repurchases are paid in addition to cash dividends, with cash dividends remaining relatively stable. In contrast, in the US, a substantial increase in share repurchase activity was accompanied by a decrease in dividend payouts, providing clear evidence of substitution in that environment.

The contribution of this paper is to provide recent large-sample evidence of the determinants of share repurchases in the UK, examining a more comprehensive set of hypotheses than prior individual papers in the literature, and using a sample where repurchases are more prevalent than in earlier work. We document that, even though changes to regulation make the share repurchase environment in the UK more similar to that in the US, this has not led to a convergence in payout practice. We attribute this to environmental differences which affect share repurchases, including a high dividend payout tradition, ownership structure, and the structure of executive remuneration.

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**Table 1:****Variables used to test hypotheses in regression models of determinants of share repurchases**

<b>Hypothesis</b>		<b>Measure</b>	<b>Variable Name</b>	<b>Predicted Sign of Association with Share Repurchases</b>
H1	Leverage/Capital Structure	Industry-adjusted leverage	<i>LEVIND</i>	-ve
H2	Free Cash Flow	Surplus cash, cash flow from operations	<i>XSCASH, CFO/TA</i>	+ve
H3	Investment	Industry-adjusted market to book	<i>MTBIND</i>	-ve
H4	Undervaluation	Abnormal share price return	<i>ABRET</i>	-ve
H5	Dividend Substitution	Dividend payout	<i>DIV/NI</i>	-ve
H6	Corporate Governance	Board independence	<i>PROPND</i>	+ve
H6	Corporate Governance	Board ownership	<i>BOARDOWN</i>	+ve
H7	Executive Stock Options	Positive value of exercisable options present at annual report date	<i>ESO</i>	+ve

*LEVIND* is leverage minus industry-year mean value where leverage is measured by total debt (WC03255), divided by total shareholders' equity (WC03995). *XSCASH* is surplus cash, measured as the residual from the optimal cash equation. *CFO/TA* is measured as net operating cash flow (WC04860) divided by total assets (WC02999). *MTBIND* is market-to-book minus year and industry mean value, where market-to-book is measured by the sum of total debt (WC03255) and market capitalisation (WC08001), divided by total assets (WC02999). *ABRET* is the firm's annual return minus the return on the FTSE All Share Index over the same period. *DIV/NI* is measured by aggregate value of total cash common dividends (WC05376), divided by net income before extraordinary items and preference dividends (WC01551). *PROPND* is the number of non-executive directors (BoardEx 'numofned'), divided by the total number of directors. *BOARDOWN* is the value of ordinary shares held by directors and their immediate family (BoardEx 'valtoteqheld'), divided by total market value of the year. *ESO* = 1 if there is a positive value for exercisable options reported in the accounts at balance sheet date, otherwise zero.

**Table 2: Description of Sample**

Variable	mean	sd	max	p75	p50	p25	min
<i>SPDUM1YR<sub>t</sub></i>	0.326	0.469	1.000	1.000	0.000	0.000	0.000
<i>SPDUM2YR<sub>t</sub></i>	0.222	0.416	1.000	0.000	0.000	0.000	0.000
<i>CCDUM1YR<sub>t</sub></i>	0.704	0.456	1.000	1.000	1.000	0.000	0.000
<i>CCDUM2YR<sub>t</sub></i>	0.618	0.486	1.000	1.000	1.000	0.000	0.000
<i>DIVDUM1YR<sub>t</sub></i>	0.813	0.390	1.000	1.000	1.000	1.000	0.000
<i>DIVDUM2YR<sub>t</sub></i>	0.790	0.407	1.000	1.000	1.000	1.000	0.000
<i>NOPAY<sub>t</sub></i>	0.167	0.373	1.000	0.000	0.000	0.000	0.000
<i>SP/NI<sub>t</sub></i>	0.104	0.395	5.190	0.017	0.000	0.000	0.000
<i>CC/NI<sub>t</sub></i>	0.221	2.151	34.611	0.045	0.007	0.000	-18.639
<i>DIV/NI<sub>t</sub></i>	0.454	1.418	39.295	0.566	0.330	0.000	-6.000
<i>LEVIND<sub>t-1</sub></i>	0.007	1.781	20.701	0.260	-0.122	-0.437	-21.245
<i>XSCASH<sub>t-1</sub></i>	-0.005	0.181	3.311	0.036	-0.049	-0.097	-0.323
<i>CFO/TA<sub>t-1</sub></i>	0.086	0.100	0.391	0.133	0.086	0.047	-0.612
<i>MTBIND<sub>t-1</sub></i>	0.021	1.088	15.189	0.245	-0.147	-0.494	-5.802
<i>ABRET<sub>t-1</sub></i>	0.111	0.487	3.742	0.290	0.050	-0.164	-0.995
<i>ROA<sub>t</sub></i>	0.030	0.142	0.356	0.084	0.048	0.015	-2.041
<i>SP/NI<sub>t-1</sub></i>	0.099	0.379	5.190	0.011	0.000	0.000	0.000
<i>CC/NI<sub>t-1</sub></i>	0.228	2.222	34.611	0.047	0.007	0.000	-18.639
<i>BOARDOWN<sub>t-1</sub></i>	0.100	0.192	1.000	0.092	0.012	0.003	0.000
<i>PROPNEDED<sub>t-1</sub></i>	0.574	0.147	0.929	0.667	0.583	0.500	0.000
<i>ESO<sub>t-1</sub></i>	0.162	0.368	1.000	0.000	0.000	0.000	0.000
<i>MCAP<sub>t-1</sub></i>	12.783	1.898	18.293	14.000	12.701	11.495	6.702
<i>INSTOWN<sub>t-1</sub></i>	0.300	0.159	0.905	0.398	0.300	0.186	0.000
<i>RE/TA<sub>t-1</sub></i>	0.072	0.702	1.005	0.353	0.197	0.037	-6.784
<i>AGE<sub>t-1</sub></i>	3.282	0.976	4.844	4.143	3.258	2.565	0.000

*SPDUM1YR* is a dummy variable, coded 1 if the firm repurchases share in the year, otherwise 0. *SPDUM2YR* is a dummy variable, coded 1 if the firm repurchase share in the year and year before, otherwise 0. *CCDUM1YR* is a dummy variable, coded 1 if the firm receives an amount from the sale of common and/or preferred share in the year, otherwise 0. *CCDUM2YR* is a dummy variable, coded 1 if the firm receives an amount from the sale of common and/or preferred share in the year and year before, otherwise 0. *DIVDUM1YR* is a dummy variable, coded 1 if the firm pays a dividend in the year, otherwise 0. *DIVDUM2YR* is a dummy variable, coded 1 if the firm pays a dividend in the year and year before, otherwise 0. *NOPAY* = 1 if *SPDUM1YR* and *DIVDUM1YR* are both zero. *SP/NI* is measured by aggregate value of shares repurchased (WC04751), divided by net income before extraordinary items

and preference dividends (WC01551). *CC/NI* is measured by aggregate value of the amount a firm received from the sale of common and/or preferred shares (WC04251) divided by net income before extraordinary items and preference dividends (WC01551). *DIV/NI* is measured by aggregate value of total cash common dividends (WC05376), divided by net income before extraordinary items and preference dividends (WC01551). *LEVIND* is leverage minus industry-year mean value where leverage is measured by total debt (WC03255), divided by total shareholders' equity (WC03995). *XSCASH* is surplus cash, measured as the residual from the optimal cash equation from Oswald and Young (2008). *CFO/TA* is measured as net operating cash flow (WC04860) divided by total assets (WC02999). *MTBIND* is market-to-book minus year and industry mean value, where market-to-book is measured by the sum of total debt (WC03255) and market capitalisation (WC08001), divided by total assets (WC02999). *ABRET* is the firm's annual return minus the return on the FTSE All Share Index over the same period. *ROA* is net income before extraordinary items and preference dividends (WC01551), divided by total assets (WC02999). *BOARDOWN* is the value of ordinary shares held by directors and their immediate family (BoardEx 'valtoteqheld'), divided by total market value of the year. *PROPNE* is the number of non-executive directors (BoardEx 'numofned'), divided by the total number of directors. *ESO* = 1 if there is a positive value for exercisable options reported in the accounts at balance sheet date, otherwise zero (BoardEx 'exestvalue'). *MCAP* is the natural logarithm of market value of equity (WC08001). *INSTOWN* is the percentage of shares owned by institutional investors. *RE/TA* is retained earnings (WC03495), divided by total assets (WC02999). *AGE* is natural log of (1+) years since incorporation (WC05350 minus WC18273). Total firm-year observations = 6199. All continuous independent variables are winsorised at 1% and 99% except for *SP/NI*, *INSTOWN* and *BOARDOWN*, which are winsorised at 99% only, and *PROPNE*, which is bounded between 0 and 1.

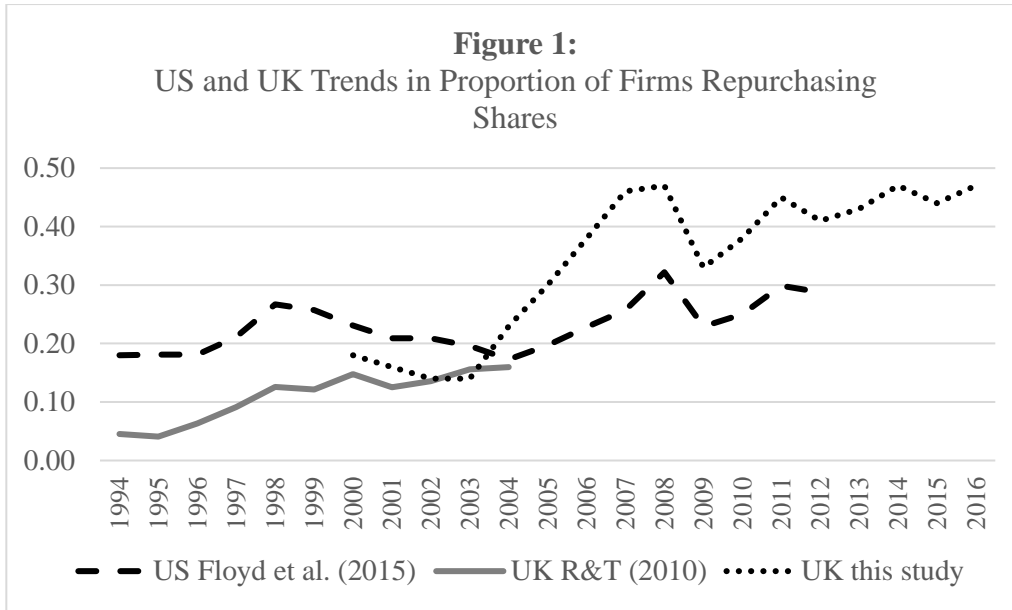


Figure 1 reports the number of sample firms which repurchase shares in each year, divided by the sample size for each year.

**Table 3: Trends by Regulatory Regime**  
(Regime 1 = 2000-2003; Regime 2 = 2004-2016)

		Regime 1 <i>n</i> = 1467	Regime 2 <i>n</i> = 4732	Post – Pre	<i>p</i> -value
<i>SPDUM1YR</i>	mean	0.157	0.378	0.221	<b>0.000</b>
	median	0.000	0.000	0.000+	<b>0.000</b>
<i>SPDUM2YR</i>	mean	0.081	0.266	0.185	<b>0.000</b>
	median	0.000	0.000	0.000+	<b>0.000</b>
<i>SP/RE</i>	mean	0.018	0.026	0.008	<b>0.061</b>
	median	0.000	0.000	0.000+	<b>0.000</b>
<i>SP/NI</i>	mean	0.089	0.109	0.020	<b>0.093</b>
	median	0.000	0.000	0.000+	<b>0.000</b>
<i>SP/TOTALPAY</i>	mean	0.081	0.142	0.060	<b>0.000</b>
	median	0.000	0.000	0.000+	<b>0.000</b>
<i>DIVDUM1YR</i>	mean	0.823	0.810	-0.014	0.235
	median	1.000	1.000	0.000+	0.242
<i>DIVDUM2YR</i>	mean	0.812	0.783	-0.028	<b>0.016</b>
	median	1.000	1.000	0.000-	<b>0.019</b>
<i>DIV/RE</i>	mean	0.111	0.101	-0.011	0.387
	median	0.077	0.063	-0.014	0.797
<i>DIV/NI</i>	mean	0.464	0.450	-0.014	0.922
	median	0.317	0.332	0.014	0.884
<i>TOTALPAY/NI</i>	mean	0.553	0.559	0.006	<b>0.000</b>
	median	0.342	0.391	0.049	<b>0.002</b>
<i>NOPAY</i>	mean	0.168	0.167	-0.002	0.461

*Notes:* T-test (for mean) and Wilcoxon rank-sum test (for median) are conducted based on the difference between regime two and regime one. Probability values are reported in the final column, for two-tailed tests. The first column shows the independent variables. *SPDUM1YR* is a dummy variable, coded 1 if the firm repurchases shares in the year, otherwise 0. *SPDUM2YR* is a dummy variable, coded 1 if the firm repurchases shares in the year *and* the year before, otherwise 0. *SP/RE* is measured by aggregate value of shares repurchased (WC04751), divided by retained earnings (WC03495). *SP/NI* is measured by aggregate value of shares repurchased, divided by net income before extraordinary items and preference dividends (WC01551). *SP/TOTALPAY* is measured by aggregate value of shares repurchased, divided by the value of shares repurchased plus total cash common dividend paid (WC04751 + WC05376). *DIVDUM1YR* is a dummy variable, coded 1 if the firm pays a dividend in the year, otherwise 0. *DIVDUM2YR* is a dummy variable, coded 1 if the firm pays a dividend in the year *and* the year before, otherwise 0. *SP/RE* is measured by aggregate value of total cash common dividends (WC05376), divided by retained earnings (WC03495). *DIV/NI* is measured by aggregate value of total cash common dividends, divided by net income before extraordinary items and preference dividends (WC01551). *DIV/TOTALPAY* is measured by aggregate value of total cash common dividends (WC05376), divided by total payout (WC04751 + WC05376). A superscript with a plus/minus sign indicates the sign of difference in medians which are smaller than 0.000.

**Table 4: Differences by Repurchase Choice**

<i>UNIVARIATE</i>		<b>NON- REPURCHASE FIRMS (NR)</b>	<b>REPURCHASE FIRMS (R)</b>	<b>Diff: R - NR</b>	<b><i>p</i>- value</b>
<i>LEVIND<sub>t-1</sub></i>	mean	0.006	0.010	0.005	0.923
	median	-0.128	-0.106	0.022	0.730
<i>XSCASH<sub>t-1</sub></i>	mean	-0.008	0.004	<b>0.012</b>	<b>0.005</b>
	median	-0.058	-0.034	<b>0.024</b>	<b>0.000</b>
<i>CFO/TA<sub>t-1</sub></i>	mean	0.073	0.113	<b>0.039</b>	<b>0.000</b>
	median	0.078	0.103	<b>0.025</b>	<b>0.000</b>
<i>MTBIND<sub>t-1</sub></i>	mean	-0.015	0.095	<b>0.110</b>	<b>0.000</b>
	median	-0.193	-0.075	<b>0.119</b>	<b>0.000</b>
<i>ABRET<sub>t-1</sub></i>	mean	0.116	0.100	-0.016	0.172
	median	0.044	0.061	<b>0.017</b>	<b>0.022</b>
<i>DIV/NI<sub>t-1</sub></i>	mean	0.426	0.510	<b>0.083</b>	<b>0.029</b>
	median	0.271	0.404	<b>0.133</b>	<b>0.000</b>
<i>CC/NI<sub>t-1</sub></i>	mean	0.223	0.218	-0.005	0.921
	median	0.003	0.012	<b>0.008</b>	<b>0.000</b>
<i>ROA<sub>t</sub></i>	mean	0.013	0.066	<b>0.054</b>	<b>0.000</b>
	median	0.040	0.061	<b>0.021</b>	<b>0.000</b>
<i>PROPNE<sub>D</sub><sub>t-1</sub></i>	mean	0.553	0.616	<b>0.063</b>	<b>0.000</b>
	median	0.571	0.625	<b>0.054</b>	<b>0.000</b>
<i>BOARDOWN<sub>t-1</sub></i>	mean	0.111	0.076	<b>-0.036</b>	<b>0.000</b>
	median	0.016	0.007	<b>-0.010</b>	<b>0.000</b>
<i>ESO<sub>t-1</sub></i>	mean	0.171	0.142	<b>-0.029</b>	<b>0.003</b>
	median	0.000	0.000	<b>0.000</b>	<b>0.003</b>

Tests for differences between non-repurchasers (R) and repurchasers (NR). T-tests (for mean) and Wilcoxon rank-sum tests (for median) are conducted. Probability values are reported in the final column, for two-tailed tests. All variables are defined in Table 2. Total number of observations is 6199, of which 4181 are non-repurchasers, and 2018 are repurchasers.



**Table 5: Correlations**

	<i>SPDUM<sub>t</sub></i>	<i>CCDUM<sub>t</sub></i>	<i>SP/NI<sub>t</sub></i>	<i>LEVIND<sub>t-1</sub></i>	<i>XSCASH<sub>t-1</sub></i>	<i>CFO/TA<sub>t-1</sub></i>	<i>MTBIND<sub>t-1</sub></i>	<i>ABRET<sub>t-1</sub></i>	<i>DIV/NI<sub>t</sub></i>	<i>ROA<sub>t</sub></i>	<i>SPDUM<sub>t-1</sub></i>	<i>CCDUM<sub>t-1</sub></i>	<i>SP/NI<sub>t-1</sub></i>	<i>CC/NI<sub>t-1</sub></i>	<i>INST OWN<sub>t-1</sub></i>	<i>BOARD OWN<sub>t-1</sub></i>	<i>PROP NED<sub>t-1</sub></i>	<i>ESO<sub>t-1</sub></i>	<i>MCAP<sub>t-1</sub></i>	<i>AGE<sub>t-1</sub></i>	<i>RE/TA<sub>t-1</sub></i>	<i>DIV DUM<sub>t-1</sub></i>	
<i>SPDUM<sub>t</sub></i>	1																						
<i>CCDUM<sub>t</sub></i>	<b>0.07</b>	1																					
<i>SP/NI<sub>t</sub></i>	<b>0.38</b>	0.04	1																				
<i>LEVIND<sub>t-1</sub></i>	0.00	-0.02	-0.01	1																			
<i>XSCASH<sub>t-1</sub></i>	0.03	0.04	<b>0.05</b>	<b>-0.05</b>	1																		
<i>CFO/TA<sub>t-1</sub></i>	<b>0.19</b>	0.04	<b>0.09</b>	-0.01	<b>0.10</b>	1																	
<i>MTBIND<sub>t-1</sub></i>	<b>0.05</b>	<b>0.13</b>	0.03	<b>-0.05</b>	<b>0.15</b>	<b>0.19</b>	1																
<i>ABRET<sub>t-1</sub></i>	-0.02	<b>0.10</b>	-0.02	-0.01	<b>0.09</b>	<b>0.11</b>	<b>0.18</b>	1															
<i>DIV/NI<sub>t</sub></i>	0.03	0.01	<b>0.18</b>	0.00	-0.01	<b>0.06</b>	0.01	-0.02	1														
<i>ROA<sub>t</sub></i>	<b>0.18</b>	<b>0.07</b>	<b>0.08</b>	-0.02	0.02	<b>0.48</b>	<b>0.14</b>	<b>0.19</b>	<b>0.07</b>	1													
<i>SPDUM<sub>t-1</sub></i>	<b>0.57</b>	<b>0.05</b>	<b>0.20</b>	0.00	0.01	<b>0.16</b>	0.04	<b>-0.05</b>	0.04	<b>0.13</b>	1												
<i>CCDUM<sub>t-1</sub></i>	0.08	<b>0.57</b>	0.03	-0.02	<b>0.07</b>	0.02	<b>0.12</b>	0.00	0.01	0.04	<b>0.07</b>	1											
<i>SP/NI<sub>t-1</sub></i>	<b>0.21</b>	0.03	<b>0.19</b>	0.02	0.01	<b>0.08</b>	0.03	-0.01	0.02	<b>0.07</b>	<b>0.39</b>	0.04	1										
<i>CC/NI<sub>t-1</sub></i>	0.00	<b>0.07</b>	<b>0.06</b>	0.01	-0.03	0.02	-0.01	0.01	<b>0.17</b>	0.03	0.00	0.02	0.00	1									
<i>INSTOWN<sub>t-1</sub></i>	<b>0.09</b>	<b>0.12</b>	0.04	<b>0.05</b>	0.00	0.03	0.04	-0.04	0.04	0.03	<b>0.09</b>	<b>0.14</b>	0.04	0.01	1								
<i>BOARDOWN<sub>t-1</sub></i>	<b>-0.09</b>	<b>-0.08</b>	-0.01	-0.01	<b>0.05</b>	<b>0.05</b>	0.02	0.04	0.00	0.02	<b>-0.10</b>	<b>-0.10</b>	-0.02	0.01	<b>-0.28</b>	1							
<i>PROPNED<sub>t-1</sub></i>	<b>0.20</b>	0.03	0.03	0.03	-0.01	0.05	-0.03	<b>-0.05</b>	-0.01	0.03	<b>0.21</b>	0.04	0.05	-0.01	<b>0.14</b>	<b>-0.24</b>	1						
<i>ESO<sub>t-1</sub></i>	-0.04	<b>0.11</b>	0.02	-0.01	0.04	<b>-0.05</b>	0.01	0.03	-0.01	<b>-0.07</b>	<b>-0.05</b>	<b>0.10</b>	0.01	0.01	<b>0.06</b>	-0.03	<b>-0.07</b>	1					
<i>MCAP<sub>t-1</sub></i>	<b>0.33</b>	<b>0.25</b>	<b>0.10</b>	0.04	0.04	<b>0.25</b>	0.20	0.02	<b>0.06</b>	<b>0.22</b>	<b>0.32</b>	<b>0.27</b>	<b>0.10</b>	0.01	<b>0.26</b>	<b>-0.26</b>	<b>0.37</b>	0.00	1				
<i>AGE<sub>t-1</sub></i>	<b>0.07</b>	-0.02	0.00	-0.02	<b>-0.19</b>	0.01	<b>-0.12</b>	-0.04	0.02	<b>0.06</b>	<b>0.08</b>	-0.02	0.02	-0.01	-0.03	<b>-0.14</b>	-0.01	-0.04	0.01	1			
<i>RE/TA<sub>t-1</sub></i>	<b>0.13</b>	0.01	<b>0.05</b>	-0.01	-0.01	<b>0.42</b>	<b>-0.15</b>	0.01	<b>0.07</b>	<b>0.35</b>	<b>0.13</b>	0.01	<b>0.05</b>	0.03	<b>0.06</b>	0.04	0.04	<b>-0.07</b>	<b>0.24</b>	<b>0.09</b>	1		
<i>DIVDUM<sub>t-1</sub></i>	<b>0.18</b>	<b>0.07</b>	<b>0.06</b>	-0.01	<b>-0.08</b>	<b>0.37</b>	-0.02	0.03	<b>0.15</b>	<b>0.34</b>	<b>0.16</b>	<b>0.07</b>	<b>0.07</b>	0.02	<b>0.06</b>	-0.02	-0.02	<b>-0.05</b>	<b>0.29</b>	<b>0.18</b>	<b>0.42</b>	1	

Notes: Correlation between all variable for sample from 2000-2016. The first column shows the independent variables. Variables are defined in Table 2. Total firm-year observations = 6199.

**Table 6: Determinants of UK Share Repurchases (Pooled Sample)**

	Predicted Sign	Logit Full Sample	Tobit Full Sample
<i>LEVIND</i> <sub><i>t-1</i></sub>	-	0.007	-0.001
<i>XSCASH</i> <sub><i>t-1</i></sub>	+	0.722 <b>0.633***</b> <b>0.003</b>	0.864 <b>0.386***</b> <b>0.003</b>
<i>CFO/TA</i> <sub><i>t-1</i></sub>	+	<b>2.561***</b> <b>0.000</b>	<b>0.955***</b> <b>0.002</b>
<i>MTBIND</i> <sub><i>t-1</i></sub>	-	<b>-0.214***</b> <b>0.000</b>	<b>-0.134***</b> <b>0.000</b>
<i>ABRET</i> <sub><i>t-1</i></sub>	-	-0.038 0.652	<b>-0.073**</b> <b>0.046</b>
<i>DIV/NI</i> <sub><i>t</i></sub>	-	-0.019 0.605	<b>0.099***</b> <b>0.000</b>
<i>ROA</i> <sub><i>t</i></sub>	+	<b>3.670***</b> <b>0.000</b>	<b>3.603***</b> <b>0.000</b>
<i>SPDUM</i> <sub><i>t-1</i></sub>		<b>2.334***</b> <b>0.000</b>	
<i>SP/NI</i> <sub><i>t-1</i></sub>			<b>0.375***</b> <b>0.000</b>
<i>BOARDOWN</i> <sub><i>t-1</i></sub>	+	0.034 0.891	-0.022 0.862
<i>PROPNED</i> <sub><i>t-1</i></sub>	+	<b>0.802**</b> <b>0.016</b>	<b>0.280*</b> <b>0.075</b>
<i>ESO</i> <sub><i>t-1</i></sub>	+	0.092 0.413	0.046 0.388
<i>INSTOWN</i> <sub><i>t-1</i></sub>		-0.061 0.825	0.043 0.741
<i>CCDUM</i> <sub><i>t</i></sub>		0.147 0.143	
<i>CC/NI</i> <sub><i>t</i></sub>			<b>0.025**</b> <b>0.023</b>
<i>MCAP</i> <sub><i>t-1</i></sub>		<b>0.241***</b> <b>0.000</b>	<b>0.104***</b> <b>0.000</b>
<i>AGE</i> <sub><i>t-1</i></sub>		0.033 0.469	0.030 0.159
<i>RE/TA</i> <sub><i>t-1</i></sub>		<b>0.231**</b> <b>0.042</b>	<b>0.128**</b> <b>0.023</b>
<i>Constant</i>		<b>-5.608***</b> <b>0.000</b>	<b>-2.612***</b> <b>0.000</b>
N		6180	6199
Pseudo R <sup>2</sup>		0.333	0.165
YEAR CONTROLS		YES	YES
INDUSTRY CONTROLS		YES	YES

*Notes:* This table presents the results for Models (5) and (6) for the entire sample period. All other variables are defined in Table 2. Coefficient estimates that are statistically significant at 10%, 5% or 1% indicated by \*, \*\* and \*\*\* (two-tailed).

**Table 7: Determinants of UK Share Repurchases by Regulatory Regime**

	Predicted Sign	Logit Regime 1	Logit Regime 2	<i>p</i> -values for diff.s	Tobit Regime 1	Tobit Regime 2	<i>p</i> -values for diff.s
<i>LEVIND</i> <sub><i>t-1</i></sub>	-	<b>-0.191*</b>	0.017		-0.086	0.002	
		<b>0.075</b>	0.380	<b>0.071</b>	0.173	0.758	0.283
<i>XSCASH</i> <sub><i>t-1</i></sub>	+	<b>0.581*</b>	<b>0.807**</b>		<b>0.647*</b>	<b>0.386**</b>	
		<b>0.079</b>	<b>0.017</b>	0.565	<b>0.092</b>	<b>0.015</b>	0.773
<i>CFO/TA</i> <sub><i>t-1</i></sub>	+	<b>3.069**</b>	<b>2.397***</b>		1.807	<b>0.794***</b>	
		<b>0.026</b>	<b>0.000</b>	0.656	0.169	<b>0.007</b>	0.787
<i>MTBIND</i> <sub><i>t-1</i></sub>	-	<b>-0.323***</b>	<b>-0.191***</b>		<b>-0.278***</b>	<b>-0.119***</b>	
		<b>0.001</b>	<b>0.001</b>	0.370	<b>0.002</b>	<b>0.000</b>	0.900
<i>ABRET</i> <sub><i>t-1</i></sub>	-	<b>-0.397*</b>	0.042		-0.242	-0.048	
		<b>0.059</b>	0.661	<b>0.045</b>	0.142	0.171	0.363
<i>DIV/NI</i> <sub><i>t</i></sub>	-	0.005	-0.023		<b>0.076***</b>	<b>0.140***</b>	
		0.932	0.492	0.788	<b>0.003</b>	<b>0.000</b>	<b>0.012</b>
<i>ROA</i> <sub><i>t</i></sub>	+	<b>3.688**</b>	<b>3.529***</b>		<b>7.917***</b>	<b>3.116***</b>	
		<b>0.017</b>	<b>0.000</b>	0.660	<b>0.000</b>	<b>0.000</b>	0.243
<i>SPDUM</i> <sub><i>t-1</i></sub>		<b>2.085***</b>	<b>2.346***</b>				
		<b>0.000</b>	<b>0.000</b>	0.794			
<i>SP/NI</i> <sub><i>t-1</i></sub>					<b>0.519***</b>	<b>0.332***</b>	
					<b>0.000</b>	<b>0.000</b>	0.613
<i>BOARDOWN</i> <sub><i>t-1</i></sub>	+	-0.372	0.115		-0.346	0.038	
		0.541	0.665	0.317	0.479	0.750	0.222
<i>PROPNEDE</i> <sub><i>t-1</i></sub>	+	0.780	<b>0.771**</b>		0.467	0.192	
		0.256	<b>0.046</b>	0.773	0.363	0.223	0.432
<i>ESO</i> <sub><i>t-1</i></sub>	+	0.241	0.037		0.114	0.028	
		0.286	0.765	0.473	0.496	0.590	0.860
<i>INSTOWN</i> <sub><i>t-1</i></sub>		-0.137	-0.194		-0.128	0.031	
		0.796	0.545	0.905	0.770	0.820	0.431
<i>CCDUM</i> <sub><i>t-1</i></sub>		0.337	0.141				
		0.195	0.196	0.954			
<i>CC/NI</i> <sub><i>t-1</i></sub>					-0.022	<b>0.025**</b>	
					0.357	<b>0.029</b>	<b>0.003</b>
<i>MCAP</i> <sub><i>t-1</i></sub>		<b>0.180***</b>	<b>0.266***</b>		<b>0.158***</b>	<b>0.101***</b>	
		<b>0.006</b>	<b>0.000</b>	0.124	<b>0.001</b>	<b>0.000</b>	0.350
<i>AGE</i> <sub><i>t-1</i></sub>		0.155	0.006		<b>0.150*</b>	0.012	
		0.141	0.916	0.288	<b>0.063</b>	0.542	<b>0.082</b>
<i>RE/TA</i> <sub><i>t-1</i></sub>		-0.026	<b>0.238**</b>		0.106	<b>0.117**</b>	
		0.936	<b>0.046</b>	0.766	0.694	<b>0.024</b>	0.557
<i>Constant</i>		<b>-6.645***</b>	<b>-5.685***</b>		<b>-5.006***</b>	<b>-2.330***</b>	
		<b>0.000</b>	<b>0.000</b>		<b>0.000</b>	<b>0.000</b>	
N		1402	4715		1467	4732	
Pseudo R <sup>2</sup>		0.250	0.330		0.153	0.176	
YEAR CONTROLS		YES	YES		YES	YES	
INDUSTRY CONTROLS		YES	YES		YES	YES	

*Notes:* This table presents the results for Models (5) and (6) by regime. *REGIME1* represents observations from 2000-2003; and *REGIME2* indicates an observation is from 2004-2016. All other variables are defined in Table 2. Coefficient estimates that are statistically significant at 10%, 5% or 1% indicated by \*, \*\* and \*\*\* (two-tailed). *p*-values show the significance of the coefficients between the two regimes. *p*-values are based on the interaction terms of a pooled regression. Interactions are calculated between the regime dummy and each of the tested variables.

**Table 8: Lintner Regressions of Dividend and Total Payout by Regulatory Regime**

<b>Panel A: <math>\Delta DIV_t = \alpha_0 + \alpha_1 NI_t + \alpha_2 DIV_{t-1} + \mu_t</math></b>			
	Regime 1	Regime 2	<i>p</i> -value for difference
<i>NI<sub>t</sub></i>	<b>0.079***</b> <b>8.479</b>	<b>0.084***</b> <b>13.256</b>	0.631
<i>DIV<sub>t-1</sub></i>	<b>-0.198***</b> <b>-7.133</b>	<b>-0.111***</b> <b>-6.506</b>	<b>0.002</b>
<i>Constant</i>	<b>0.008***</b> <b>4.417</b>	0.001 0.457	<b>0.000</b>
n	1467	4732	
Adjusted R <sup>2</sup>	0.247	0.183	
Speed of adjustment	<b>0.198</b>	<b>0.111</b>	
Target payout ratio	<b>0.399</b>	<b>0.757</b>	
<b>Panel B: <math>\Delta TOTALPAY_t = \alpha_0 + \alpha_1 NI_t + \alpha_2 TOTALPAY_{t-1} + \mu_t</math></b>			
	Regime 1	Regime 2	<i>p</i> -value for difference
<i>NI<sub>t</sub></i>	<b>0.153***</b> <b>8.290</b>	<b>0.179***</b> <b>13.230</b>	0.249
<i>TOTALPAY<sub>t-1</sub></i>	<b>-0.357***</b> <b>-12.765</b>	<b>-0.229***</b> -8.489	<b>0.002</b>
<i>Constant</i>	<b>0.025***</b> <b>7.923</b>	0.003 0.912	<b>0.000</b>
n	1467	4732	
Adjusted R <sup>2</sup>	0.260	0.188	
Speed of adjustment	<b>0.357</b>	<b>0.229</b>	
Target payout ratio	<b>0.429</b>	<b>0.782</b>	

*Notes:* This table presents the results for Models (3) and (4) by regime. *REGIME1* represents observations from 2000-2003; and *REGIME2* indicates an observation is from 2004-2016. Panel A reports results of Lintner regressions using dividends; whereas Panel B reports results of amended Lintner regressions using total payout. All other variables are defined in Table 2. Coefficient estimates that are statistically significant at 10%, 5% or 1% indicated by \*, \*\* and \*\*\* (two-tailed).

**Table 9: Share Repurchase Amount as a Proportion of Total Payout**

	Repurchase Ratio Full	Repurchase Ratio Regime 1	Repurchase Ratio Regime 2	<i>p</i> - values
<i>LEVIND</i> <sub><i>t-1</i></sub>	0.000	-0.054	0.001	
	0.887	0.105	0.697	<b>0.078</b>
<i>XSCASH</i> <sub><i>t-1</i></sub>	<b>0.259***</b>	<b>0.657***</b>	<b>0.204***</b>	
	<b>0.001</b>	<b>0.007</b>	<b>0.009</b>	0.348
<i>CFO/TA</i> <sub><i>t-1</i></sub>	0.188	0.605	0.086	
	0.208	0.206	0.591	0.360
<i>MTBIND</i> <sub><i>t-1</i></sub>	<b>-0.027**</b>	<b>-0.084**</b>	-0.016	
	<b>0.016</b>	<b>0.017</b>	0.190	0.144
<i>ABRET</i> <sub><i>t-1</i></sub>	<b>-0.042**</b>	-0.110	-0.030	
	<b>0.044</b>	0.131	0.188	0.373
<i>ROA</i> <sub><i>t</i></sub>	<b>0.532***</b>	0.735	<b>0.495***</b>	
	<b>0.000</b>	0.156	<b>0.000</b>	0.888
<i>SP/TOTALPAY</i> <sub><i>t-1</i></sub>	<b>0.940***</b>	<b>1.209***</b>	<b>0.884***</b>	
	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	0.688
<i>BOARDOWN</i> <sub><i>t-1</i></sub>	-0.034	-0.155	-0.011	
	0.517	0.450	0.828	0.272
<i>PROPNED</i> <sub><i>t-1</i></sub>	<b>0.185***</b>	<b>0.446*</b>	0.123	
	<b>0.009</b>	<b>0.053</b>	0.104	0.252
<i>ESO</i> <sub><i>t-1</i></sub>	0.003	0.048	-0.006	
	0.909	0.529	0.781	0.509
<i>INSTOWN</i> <sub><i>t-1</i></sub>	0.027	-0.073	0.021	
	0.651	0.689	0.746	0.413
<i>MCAP</i> <sub><i>t-1</i></sub>	<b>0.033***</b>	<b>0.044**</b>	<b>0.034***</b>	
	<b>0.000</b>	<b>0.047</b>	<b>0.000</b>	0.401
<i>AGE</i> <sub><i>t-1</i></sub>	0.002	0.036	-0.004	
	0.802	0.332	0.681	0.348
<i>RE/TA</i> <sub><i>t-1</i></sub>	0.046	-0.028	0.043	
	0.167	0.851	0.164	0.679
<i>CC/NI</i> <sub><i>t</i></sub>	-0.001	-0.020	0.003	
	0.746	0.266	0.514	<b>0.041</b>
<i>Constant</i>	<b>-0.797***</b>	<b>-1.891***</b>	<b>-0.691***</b>	
	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
N	5045	1206	3839	
Pseudo R <sup>2</sup>	0.293	0.199	0.318	
YEAR CONTROLS	YES	YES	YES	
INDUSTRY CONTROLS	YES	YES	YES	

*Notes:* a two-sided tobit model for repurchases as a share of payouts, which is censored at zero and one. The dependent variable, *SP/TOTALPAY*<sub>*t*</sub>, is defined as in table 3. All other variables are as defined for the main tests.