

WHY DO UK FIRMS REPURCHASE THEIR OWN SHARES?

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ABSTRACT

We examine the practice of share repurchases in the UK. 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 listed firms. However, unlike in the US, repurchases remain a small proportion of total distributions to shareholders. We test five key hypotheses from prior literature. Our analysis of a large sample of firms from 2000 to 2016 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 the leverage/capital structure hypothesis in the first regime only. In contrast to the US, the dividend substitution hypothesis is not supported. In the UK, the extent of share repurchases remains relatively small, and they appear to be used as a complement to regular dividends, being made regularly, in an amount positively associated with dividends paid.

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 and this is now the dominant form of distribution in that environment (Skinner, 2008). In the UK, however, stricter regulations have historically prevented most firms from buying their own shares, with an outright ban until 1981 (except for redeemable preference shares). 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 (Andriosopolous and Lasfer, 2015).

The subsequent significant increase in share repurchase activity allows us to employ a sample larger than that available to earlier researchers to examine several hypotheses identified in prior research, much of which is US-based, regarding the determinants of stock repurchases in the UK. Payout practices have differed substantially between the UK and US (Renneboog and Trojanowski, 2011), arguably due in part to the onerous rules regarding share repurchases (Rau and Vermaelen, 2002). Whether the 2003 regulatory liberalisation has led to a convergence of UK and US practice in respect of share repurchases is an empirical question, which is addressed in this paper. Using a large sample of listed firms from 2000-2016, we first establish that repurchase activity increases following the reform. The proportion of sample firms which repurchase shares increases, as does the proportion which repurchase in two consecutive years. Share repurchase amounts as a proportion of both retained earnings and net income increase

following the reform, and the fraction of total payout represented by repurchases almost doubles post-2003. All of these increases are both statistically and economically significant.

However, in contrast to the US trend, the magnitude of UK repurchase distributions remains much smaller than that of dividend payouts. Given this divergence in payout choice across the two countries, which are comparable in many other respects, it is not clear that the determinants of repurchases will be the same. We therefore test the motivation for share repurchases in the UK using five key hypotheses from prior US literature (Dixon *et al.*, 2008). These include (H1) the leverage/capital structure hypothesis (Dittmar, 2000; Vermaelen, 1981; Rau and Vermaelen, 2002); (H2) the free cash flow hypothesis (Jensen, 1986); (H3) the investment hypothesis (Brav *et al.*, 2005); (H4) the undervaluation hypothesis (Ikenberry *et al.*, 1995); and (H5) the dividend substitution hypothesis (Dittmar, 2000; Grullon and Michaely, 2002; Skinner, 2008). There is limited related literature using UK data in this area, most of which uses samples from the pre-reform period, when repurchases were restricted and very rare. Examining the issue using a sample which spans both regulatory periods will therefore provide information on both the determinants of repurchases, as well as any changes in the apparent motivation for use of this payout method associated with the reforms.

We find limited support for H1, the leverage hypothesis, with indebtedness being associated with repurchase activity in the pre-reform period only. However, since the regulatory change, there is no strong evidence that UK firms use share repurchases to increase their leverage or change their capital structure. In support of H2, we find strong support across all regulatory time periods for a positive relation between surplus cash and cash flow from operations on one hand, and the likelihood of repurchases on the other hand. Our multivariate tests reveal that firms with greater investment opportunities are less likely to repurchase, which is consistent with H3. According to H4, if firms are buying their own shares because management considers them to be cheap, then we would expect to observe a negative association between share price

performance and repurchases. Our evidence indicates that this was the case prior to the reforms, when repurchased shares had to be cancelled, but it is not the case since the reforms. Similar to H1, we therefore find historical support, but no current support, for H4.

Earnings performance is a positive driver of 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, to distribute current earnings. However, there is a positive association across all time periods between the amounts paid in share repurchase and dividends, suggesting that share repurchases are a complement to dividends in the UK, rather than a substitute, as in the US.

Prior research suggests US managers commit to dividend payout targets and use repurchases more flexibly (Dittmar, 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.

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 more powerful institutional investors, and share repurchase activity. We therefore include these factors in our research design. 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. No significant association is observed between either board or institutional ownership of sample firms and their repurchase activity.

Our study contributes to prior literature in several ways. First, to the best of our knowledge, we are the first to conduct an examination of a broad set of key hypotheses regarding UK share

repurchases and provide evidence as to their validity. Second, we provide evidence on the effect of regulatory reforms on the extent and determinants of share repurchase activity in the UK. Finally, the paper is likely to be of interest to both academics and members of the broader corporate finance community given the paucity of evidence regarding UK firms' motivations for repurchasing their own shares.

The rest of the paper is organised as follows. Section 2 provides more detail on the institutional 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 analyses and then we sum up and make conclusions in Section 6.

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 allowed publicly listed companies

to repurchase their own, fully paid up, qualifying¹ shares out of distributable profits and to hold them as treasury shares. 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 (Andriosopolous and Lasfer, 2015).

Just a month later, in December 2003, the European Commission (EC) passed a regulation which provided safe harbour to EU member firms in relation to share repurchases. The Market Abuse Directive (MAD), introduced in January 2003 for adoption by member states by October 2004, had introduced strict rules on market manipulation, which could have deterred firms from repurchasing their own shares. The new EC Regulation provided a set of safe harbour conditions in relation to share repurchases meeting certain criteria, which enabled firms to protect themselves from potential penalties arising under MAD (Siems and De Cesari, 2012). The introduction of safe harbour provisions has 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, examining time periods from 2000 to 2003 and then from 2004 to 2016. The next section discusses prior literature relevant to our investigation.

3. Prior Literature and Hypotheses

¹ 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.

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 (Andriosopolous 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. However, the 2003 reform substantially liberalised the UK environment with respect to repurchases and the effects of this are 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 main hypotheses from the 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 (leverage, investment and undervaluation). We discuss the main hypotheses below, and make predictions designed to test each hypothesis 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. 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 (non-repurchasing) respondents to the survey reported in Dixon *et al.* (2008) rank the pursuit of an optimal capital structure as the primary (second) motivation for share repurchases, while increasing gearing is

ranked second (fifth). 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. We therefore propose the following:

<i>Prediction 1:</i>	<i>If the achievement of a change in capital structure is a motivation for share repurchases then there will be more share repurchase activity by firms with relatively low gearing.</i>
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3.2 The free cash flow hypothesis (H2)

Unchecked, managers are prone to value-reducing empire-building behaviour (Jensen, 1986). Rather than distributing surplus cash to investors, they may overinvest (Richardson, 2006). Given managerial reluctance to cut dividends because of the negative market response this action provokes, they are also averse to increasing dividends because of the commitment to maintain payouts (Lintner, 1956; Brav *et al.*, 2005). Share repurchases offer an alternative distribution channel. Evidence from the US suggests managers prefer to use transient cash flow gains to fund share repurchases rather than increase dividends (Dittmar, 2000). UK research from prior to the regulatory changes of 2003 reports 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 the second top reason for share repurchases by large UK firms. We test whether this is still the case with our second prediction:

<i>Prediction 2:</i>	<i>Share repurchase activity will be greater in firms with more excess cash.</i>
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3.3 The investment hypothesis (H3)

Related to the association between excess cash and share repurchases is the availability of investment opportunities. Firms which have positive net present value projects available to them are predicted to be less likely to make shareholder distributions. Where a company has limited investment opportunities, however, they are more likely to repurchase their own shares. This reduces total dividend payments and enables firms to maintain a constant dividend per share ratio, in line with the managerial preferences established by Lintner (1956) and Brav *et al.*, (2005). A lack of investment opportunities for available cash was ranked 4th (5th) as a reason for share buybacks by repurchasers (non-repurchasers) in Dixon *et al.* (2008). Renneboog and Trojanowski (2011) find that firms with fewer investment opportunities are more likely to repurchase their own shares. Following prior research (e.g., Dittmar, 2000), we use the market-to-book ratio as our proxy for investment opportunities and predict the following:

<i>Prediction 3:</i>	<i>Share repurchase activity will be greater in firms with lower market-to-book ratios.</i>
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3.4 The undervaluation (signalling) hypothesis (H4)

Where there is asymmetry of information between firm managers and capital markets, managers may signal undervaluation of their firm's shares by making repurchases (Ikenberry, Lakonishok and Vermaelen, 1995). 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. Most (75.7%) of managers of *non-repurchasing* firms state that undervaluation would be an important factor in a decision to repurchase, ranking this the highest of 14 potential reasons for repurchasing.

In her archival analysis, however, Dittmar (2000) finds no consistent negative association between prior abnormal returns and repurchase activity. Whilst the undervaluation rationale ranks top amongst US managers (Brav *et al.*, 2005), UK finance directors of repurchasing firms rank it only 8th out of 14 possible reasons for share repurchase (Dixon, *et al.*, 2008). Earlier archival work in the UK finds no association between abnormal share price performance and share repurchases (Oswald and Young, 2008). However, this may have changed since the reforms. If managers buy back their stock when it is undervalued, then we expect to observe the following:

<i>Prediction 4:</i>	<i>Share repurchase activity will be greater following a period of low stock returns.</i>
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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 (Dittmar, 2000), since this would reduce shareholders' tax liability on shares they sell back to the firm. Further, if managers wish to distribute cash without the implicit commitment contained in dividends they can repurchase shares (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 US firms are substituting share repurchases for dividends. Using a slightly later sample to investigate a similar question, Skinner (2008) and Floyd *et al.* (2001) report share repurchases have now overtaken dividends as a way to distribute cash to shareholders, consistent with a preference to reduce any dividend commitment.

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 number 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 period² when share repurchases were more strictly regulated in the UK, so it is an open question as to whether firms have changed their payout policy following the reforms.

If, since the liberalising of repurchases in the UK, firms are substituting share repurchases for dividends as a way of distributing earnings, we expect to observe the following:

<i>Prediction 5:</i>	<i>Share repurchase activity will be negatively associated with dividends.</i>
<i>Prediction 6:</i>	<i>Share repurchase activity will be positively associated with earnings.</i>

In addition, we should observe the proportion of total shareholder distribution made by share repurchases increasing after each regulatory change (Skinner, 2008). The next section details our research methodology.

4. Sample, Data and Research Design

4.1 Sample and Data

Our sample period runs from 2000 to 2016 and comprises UK non-financial, listed firms. We collect firm-level data from Worldscope *via* Datastream. After deleting observations with incomplete data, we are left with a sample of 6,228 observations, representing 2,043 repurchase and 4,185 non-repurchase firm years. We winsorise continuous variables at 1% and 99% on

² Reneboog and Trojanowski (2011) have one year (2004) of post-reform data.

an annual basis to mitigate the effects of outlying observations. For variables that are left-truncated at zero (SP/NI, INSTITOWN and BOARDOWN), we only winsorise at 99%.

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:

$$\begin{aligned}
 \text{Log} \left(\frac{p_{it}}{1-p_{it}} \right) = & \delta_0 + \delta_1 \text{LEVIND}_{i,t-1} + \delta_2 \text{XSCASH}_{i,t-1} + \delta_3 \text{CFO/TA}_{i,t-1} + \delta_4 \text{MTBIND}_{i,t-1} + \delta_5 \text{ABRET}_{i,t-1} \\
 & + \delta_6 \text{DIV/NI}_{i,t} + \delta_7 \text{ROA}_{i,t} + \delta_8 \text{SPDUM}_{i,t-1} + \delta_9 \text{INSTITOWN}_{i,t-1} + \delta_{10} \text{BOARDOWN}_{i,t-1} \\
 & + \delta_{11} \text{PROPNEDED}_{i,t-1} + \sum_{n=1}^N \lambda_n \text{Controls}_{n,i,t-1}
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 \text{SP/NI}_{i,t} = & \beta_0 + \beta_1 \text{LEVIND}_{i,t-1} + \beta_2 \text{XSCASH}_{i,t-1} + \beta_3 \text{CFO/TA}_{i,t-1} + \beta_4 \text{MTBIND}_{i,t-1} + \beta_5 \text{ABRET}_{i,t-1} + \beta_6 \text{DIV/NI}_{i,t} \\
 & + \beta_7 \text{ROA}_{i,t} + \beta_8 \text{SP/NI}_{i,t-1} + \beta_9 \text{INSTITOWN}_{i,t-1} + \beta_{10} \text{BOARDOWN}_{i,t-1} + \beta_{11} \text{PROPNEDED}_{i,t-1} \\
 & + \sum_{n=1}^N \lambda_n \text{Controls}_{n,i,t-1}
 \end{aligned} \tag{2}$$

The dependent variable in Model 1, the logit model, is the probability a firm engages in a stock repurchase, whereas in Model 2 the dependent variable is the nominal value of the stock repurchase (SP) scaled by net income (NI).³ Since the dependent variable in Model 2 is non-negative, we estimate the model using a tobit specification. The two models share the same set of independent variables, with one exception, as we explain below.

Hypothesis 1: Gearing/capital structure

³ We set SP/NI to zero if earnings is negative and repurchase amount is none zero. The intuition is that loss making firm does not make repurchase. Number of observation that affected by this is 241. Results are robust whether we keep or drop the 241 observations.

To test the first hypothesis, we include in our models industry-adjusted leverage (*LEVIND*). 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.

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*), as well as cash flow from operations deflated by total assets (*CFO/TA*), as our measures of cash. 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. 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)

In order to test the undervaluation hypothesis, we include a measure of abnormal stock return (*ABRET*), following Dittmar (2000) and Oswald and Young (2008). 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 hypothesis.

Hypothesis 5: Dividend substitution

We 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 1 we therefore include a dummy variable ($L.SPUM$), coded 1 if the firm repurchased its own shares in the prior year, otherwise zero; in Model 2 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. With the exception of the dividend payout and profitability variables, all independent variables are lagged, consistent with prior research (e.g. Oswald and Young, 2008).

We also include a number of controls identified in prior research. If share repurchases are a way to resolve agency problems such as over-retention of free cash flow, then it may be expected that firms with stronger corporate governance will be more active repurchasers (Richardson, 2006). More independent boards may be more effective at preventing managers from retaining surplus cash, so we include $PROPND$, measured as the proportion of the board made up of non-executive directors, in our models. Powerful institutional shareholders may encourage distributions (Renneboog and Trojanowski, 2011; Oswald and Young, 2008; Richardson, 2006) so we include a measure of institutional ownership to test this effect ($INSTITOWN$). We also incorporate board ownership ($BOARDOWN$) because boards with higher equity stakes have stronger incentives to prevent value-destroying activities such as overinvestment. 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 (Skinner, 2008; Renneboog and Trojanowski, 2011) so we include $MCAP$, which is the natural

log of the firm's market capitalisation, to capture size effects. As both dividends and share repurchases must be funded from distributable profits, we include retained earnings as a proportion of total assets (*RE/TA*) in our models. To capture the time trend identified in earlier papers (Renneboog and Trojanowski, 2011; Oswald and Young, 2008), we construct a time trend variable, coded 1 for the year 1999⁴ up to 18 for the last year of our sample. Again, all these variables are lagged by one year, except the time trend. Finally, 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).

Table 1 outlines the variables we use to test each of the five hypotheses detailed in section 3.

[TABLE 1 HERE]

4.3 Descriptive Statistics

Table 2 presents descriptive statistics relating to our sample. The median firm does not repurchase its shares, and only about 33% do so, on average. The mean of *SPDUM2YR* is 22.5%, indicating less than a quarter of UK firms repurchase in a given year, having also bought back their own shares in the previous year.

The comparative numbers for dividends are 81% and 79%, respectively. This does not necessarily indicate dividends are the preferred form of payout but may simply reflect the regulatory constraints historically imposed on UK firms wishing to buy back their own shares. The average amount of net income distributed by way of share repurchases is 10.5%, whereas the average dividend is about 45.5% of net income. In comparison, Oswald and Young (2008) report an average dividend payout ratio of 52% but, during their sample period of 1995 to 2003,

⁴ We code from 1999 due to our use of lagged independent variables in multivariate tests. Dependent variables start from 2000.

repurchased shares had to be cancelled, making this a less attractive distribution option for firms.

[TABLE 2 HERE]

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

5. Analysis

Table 3 reports descriptive statistics for our sample firms, split into observations from the pre- and post-reform periods: 2000-2003 ($n=1,472$) and 2004-2016 ($n=4,756$). 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, 16% of firms repurchased shares, which is similar to the statistic reported by Renneboog and Trojanowski (2011) in their pre-reform sample. In our post-reform subset, this proportion more than doubles, to 38%. There has also been a marked increase in the propensity of firms to make repurchases on consecutive years. Whilst only 8% of sample firms repurchased shares in two consecutive years in the pre-reform period, this increased to 27% 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 net income (SP/NI), or of total payout ($SP/TOTALPAY$), increases significantly in the period following the 2003 reform. Prior to the reform, around 8% of total distributions were by way of repurchases, but this increased to 14% from 2004 onwards, in line with partial dividend substitution. However, the fraction of net income distributed via dividends remains quite 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, though the increase is only significant at the median level. A little over 80% of sample firms pay a dividend in any one year (*DIVDUM1YR*), with no significant change associated with the share repurchase reform. Slightly fewer pay a dividend in two consecutive years (*DIVDUM2YR*) and this decreases significantly after 2003, from 81% to 78%. 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, most US industrial firms (over 60%) make no payout at all.

Sample firms pay dividends at around 10% of retained earnings (*DIV/RE*) and over 45% of net income (*DIV/NI*). These figures are comparable to those reported for UK firms in an earlier time period by Renneboog and Trojanowski (2011), and there is little evidence of any change associated with the repurchase reforms.

[TABLE 3 HERE]

5.1 Univariate Analysis

Table 4 reports the results of univariate tests of differences between repurchasing and non-repurchasing firms in respect of the measures we employ to test the predictions generated by the five hypotheses developed earlier. In Panel A, we report tests of simple means and medians; in Panel B, we report similar tests but after adjusting for a limited range of firm characteristics (firm size, age, industry and year) *via* propensity score matching (PSM). We use the full sample in these tests. We find no evidence to support H1 (leverage/capital structure) in our univariate tests with no difference in leverage observed between repurchasing and non-repurchasing firms. H2 (surplus cash) is strongly supported, however; repurchasing firms have more excess

cash and cash flow from operations in the year before repurchasing than do non-repurchasing firms. These results are robust to the PSM controls reported in Panel B. The results on market to book ratios 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. After the PSM controls, the median results are still significant, with repurchasers having higher MTB ratios compared to non-repurchasers. Some limited support is found for H4 (undervaluation); the average prior year abnormal stock return of repurchased shares is lower in Panel A, though not in Panel B, which includes some firm controls. If share repurchases are substituting for dividends, then we would expect the proportion of net income paid out via dividends to be lower for repurchasing firms. However, Table 4 reports the opposite result, which is inconsistent with H5 (dividend substitution). Finally, share repurchase firms report higher prior year profits than firms which do not make this kind of distribution.

[TABLE 4 HERE]

The univariate results provide some support for our second hypothesis but not for the other four. In order to test our predictions more thoroughly, we next move on to the multivariate analysis, where we test Models (1) and (2). Before this, we check for issues of multicollinearity by examining the correlations between our independent variables and report the results of this in Table 5. The Pearson correlation coefficients are small in magnitude and so we proceed to our regression analyses.

[TABLE 5 HERE]

5.2 Regression

Table 6 reports the results of our tests of Models (1) and (2) using the full sample. We find no evidence to support the leverage/capital structure hypothesis (H1) in the pooled sample. If

firms were using share repurchases to alter their capital structure, then we would expect to observe a negative and significant relationship between industry-adjusted leverage (*LEVIND*) and both the incidence of share repurchase as well as its magnitude.

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 the multivariate test, 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. This is broadly supportive of earlier UK work which finds firms use share repurchases to distribute surplus cash, particularly when new positive net present value projects are in short supply (Dixon *et al.*, 2008; Oswald and Young, 2008).

The undervaluation hypothesis, H4, predicts that firms will purchase their own shares when they are cheap. We test this hypothesis using the *ABRET* variable, predicting a negative sign on this coefficient. However, the coefficient is insignificant in the logit models, and only weakly significant in the tobit model, providing only limited support for H4 in the pooled sample.

If the dividend substitution hypothesis (H5) is not to be rejected in the UK environment, 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. In other words, dividends and repurchases are complementary, not substitutive. Consistent with Skinner (2008), 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.

Turning to the control variables, our models control for lagged repurchases (*L.SPNUM*). Finding a positive coefficient for a repurchase event in the prior year is consistent with the presence of a commitment effect, whereby repurchasing firms tend to buyback own shares in multiple years. In the tobit specification we similarly include the lagged repurchase payout ratio (*L.SP/NI*) to assess whether the magnitude of repurchases is auto-correlated. Both coefficients are positive and highly significant, consistent with UK firms committing to 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 (*PROPNET*) are positively associated with both the likelihood and magnitude of share repurchases. However, there is no association between either board or institutional ownership and share repurchase activity, on average. In terms of other control variables, we find that larger firms (*MCAP*) are more likely to repurchase shares, though there is no significant association with firm age (*AGE*). This finding differs from US findings (Skinner, 2008). Finally, the coefficient on the time trend variable is positive and significant in both specifications. This suggests a general increase in the occurrence and magnitude of repurchases over our sample period.

In summary, Table 6 provides no support for the leverage (capital structure) hypothesis in the UK, and very limited support for the undervaluation hypotheses. It provides strong support, however, for the free cash flow and investment hypotheses. The evidence points to the rejection of the dividend substitution hypothesis, instead indicating a complementary relationship between share repurchases and dividends in the UK, in stark contrast to the case documented in the US.

[TABLE 6 HERE]

We next seek to determine whether the 2003 reform, after which share repurchase activity increased substantially, is associated with any change in the motivation of UK firms to repurchase shares. We do this by estimating Models (1) and (2) on the pre- and post-reform observations separately, reporting the results in Table 7. 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. However, our evidence indicates a change in this respect, and that changes to gearing/capital structure no longer represent an important motivation for share repurchase in the UK.

UK research on earlier samples has provided strong support for the hypothesis 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, and is evidence of no change in the importance of surplus cash as a determinant of share repurchase following the 2003 reform.

We find support for the investment opportunities hypothesis across both time periods. A significantly negative association between market-to-book and share repurchases is already documented for the pre-reform period by Oswald and Young (2008) but we are able to confirm that a lack of investment opportunities prevails as a motivation for UK share repurchases after the reforms and when share repurchase activity has substantially increased.

In contrast to prior research (Dixon *et al.*, 2008; Oswald and Young, 2008) we find 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 important change in the motivation for UK firms to buy back their own shares.

As in Table 6, in the tobit specification we find an apparently complementary effect between dividends and repurchase payout ratios, which persists across both regulatory regimes. This is different to the US case, as discussed above. Also, in the US, (Skinner, 2008) reports that most firms which distribute cash to shareholders do so *via* a combination of dividends and share repurchases. In our logit tests, we find no association between the dividend payout ratio (*DIV/NI*) and the propensity to repurchase, providing further evidence of important differences in distribution practices between the UK and US. Consistent with share repurchases being used to distribute profits, the positive relation between firm performance and repurchases activity holds in both time periods. In line with this, and further suggesting that repurchases are not used to distribute transient cash gains in the UK, we find evidence of a commitment to repurchase across both regimes, as is seen from the positive coefficients on our lagged share repurchase variables, *L.SPDUM* and *L.SP/NI*.

Interestingly, and 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 (*PROPNE*D) is associated with the propensity of firms to buy back their own shares, and also the amount repurchased.

[TABLE 7 HERE]

6. Summary

Using a comprehensive sample of UK firms over a 17-year time period, we test five key hypotheses relating to share repurchases. These include (1) the leverage (capital structure) hypothesis; (2) the free cash flow hypothesis; (3) the investment hypothesis; (4) the undervaluation hypothesis; and (5) the dividend substitution hypothesis. We also examine whether a regulatory reform in 2003, which relaxed an important restriction relating to UK repurchases, is associated with changes to the extent of, and motivation for, this practice.

We report a significant increase in share repurchase activity in the UK following the 2003 reform, though 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). Examining the motivation, and changes in motivation, for share repurchase in the UK by testing these five key hypotheses from prior literature reveals some changes in the determinants of repurchases. Whereas prior to the reform, adjustments to leverage/capital structure appears to have been an important consideration in the repurchase decision, firm leverage, relative to other firms in the same industry for the year, is no longer significantly associated with repurchase activity. Similarly, whilst pre-reform managers bought back their own shares when they believe them to be undervalued, low share price is no longer a driver of repurchases in the UK.

Consistent with prior literature, we report strong support for both the surplus cash and the investment opportunities hypotheses prior to 2003. We are also able to confirm that the

presence of surplus cash, and the lack of investment opportunities, persist as motivations for share repurchases beyond the regulatory reform.

We present evidence of an important distinction between repurchase practice in the UK compared to the US. Whereas a body of US evidence points to share repurchases replacing regular dividends, in the UK we find a complementary, rather than substitutive, relationship between the two modes of shareholder distribution.

We also report some preliminary evidence on an increase in the effectiveness of independent boards of directors in encouraging companies to distribute cash via repurchases.

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Table 1: Predictions

	Hypothesis	Measure	Variable	Predicted Sign of Association with Share Repurchases
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	Investment opportunities	<i>MTB</i>	-ve
H4	Undervaluation	Abnormal share price return	<i>ABRET</i>	-ve
H5	Dividend Substitution	Dividend payout	<i>DIV/NI</i>	-ve
		Profitability	<i>ROA</i>	+ve

Table 2: Description of Sample

Variable	mean	sd	max	p75	p50	p25	min
<i>SPDUM1YR</i>	0.328	0.470	1.000	1.000	0.000	0.000	0.000
<i>SPDUM2YR</i>	0.225	0.418	1.000	0.000	0.000	0.000	0.000
<i>DIVDUM1YR</i>	0.814	0.389	1.000	1.000	1.000	1.000	0.000
<i>DIVDUM2YR</i>	0.791	0.407	1.000	1.000	1.000	1.000	0.000
<i>SP/NI</i>	0.105	0.396	5.190	0.018	0.000	0.000	0.000
<i>DIV/NI</i>	0.455	1.418	39.295	0.566	0.330	0.000	-6.000
<i>L.LEVIND</i>	0.006	1.815	20.701	0.260	-0.121	-0.437	-21.245
<i>L.XSCASH</i>	-0.005	0.181	3.311	0.036	-0.049	-0.097	-0.323
<i>L.CFO</i>	0.086	0.100	0.391	0.134	0.087	0.047	-0.612
<i>L.MTBIND</i>	0.024	1.088	15.189	0.249	-0.145	-0.493	-5.802
<i>L.ABRET</i>	0.111	0.486	3.742	0.291	0.051	-0.163	-0.995
<i>ROA</i>	0.030	0.142	0.356	0.084	0.048	0.015	-2.041
<i>L.SP/NI</i>	0.674	0.234	1.000	0.845	0.714	0.540	0.000
<i>L.INSTITOWN</i>	0.099	0.191	1.000	0.091	0.012	0.003	0.000
<i>L.BOARDOWN</i>	0.574	0.147	0.929	0.667	0.583	0.500	0.000
<i>L.PROPNED</i>	12.796	1.908	18.293	14.011	12.711	11.502	6.702
<i>L.MCAP</i>	3.282	0.975	4.844	4.143	3.258	2.565	0.000
<i>L.RE/TA</i>	0.074	0.701	1.005	0.355	0.199	0.037	-6.784
<i>L.AGE</i>	0.328	0.470	1.000	1.000	0.000	0.000	0.000

Notes: Statistical description for sample from 2000-2016. For variable definitions, see Appendix 1. Total firm-year observations = 6228. All continuous independent variables are winsorized at 1% and 99% except for *SP/NI*, *INSTITOWN* and *BOARDOWN*.

Table 3: Trends by Regulatory Regime

		Pre-2003 <i>n = 1,472</i>	Post-2003 <i>n = 4,756</i>	Post – Pre	<i>p</i>-value
<i>SPDUM1YR</i>	mean	0.159	0.380	0.221	0.000
	median	0.000	0.000	0.000 ⁺	0.000
<i>SPDUM2YR</i>	mean	0.083	0.269	0.186	0.000
	median	0.000	0.000	0.000 ⁺	0.000
<i>SP/RE</i>	mean	0.018	0.026	0.008	0.065
	median	0.000	0.000	0.000 ⁺	0.000
<i>SP/NI</i>	mean	0.090	0.110	0.020	0.102
	median	0.000	0.000	0.000	0.000
<i>SP/TOTALPAY</i>	mean	0.082	0.142	0.060	0.000
	median	0.000	0.000	0.000 ⁺	0.000
<i>DIVDUM1YR</i>	mean	0.824	0.811	-0.013	0.238
	median	1.000	1.000	0.000 ⁺	0.245
<i>DIVDUM2YR</i>	mean	0.813	0.784	-0.028	0.017
	median	1.000	1.000	0.000 ⁻	0.020
<i>DIV/RE</i>	mean	0.111	0.100	-0.011	0.361
	median	0.078	0.063	-0.014	0.003
<i>DIV/NI</i>	mean	0.464	0.452	-0.012	0.826
	median	0.318	0.332	0.014	0.197
<i>TOTALPAY/NI</i>	mean	0.554	0.562	0.007	0.900
	median	0.343	0.392	0.049	0.003

Notes: univariate test for sample from 2000-2016, mean and median are reported for the two regimes, respectively. 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. For variable definitions, see Appendix 1. A superscript with the plus/minus sign indicates the sign of difference in medians which are smaller than 0.000.

Table 4: Differences by Repurchase Choice

Panel A <i>UNIVARIATE</i>		NON REPURCHASER	REPURCHASER	Diff Rep - NR	p-value
<i>LEVIND</i>	mean	0.001	0.009	0.008	0.882
	median	-0.129	-0.106	0.023	0.130
<i>XSCASH</i>	mean	-0.014	-0.003	0.011	0.006
	median	-0.058	-0.036	0.022	0.000
<i>CFO/TA</i>	mean	0.074	0.110	0.035	0.000
	median	0.078	0.100	0.022	0.000
<i>MTBIND</i>	mean	-0.059	0.078	0.137	0.000
	median	-0.197	-0.081	0.116	0.000
<i>AbnReturn</i>	mean	0.093	0.070	-0.023	0.037
	median	0.035	0.036	0.002	0.656
<i>DIV/NI</i>	mean	0.426	0.515	0.089	0.019
	median	0.271	0.404	0.133	0.000
<i>ROA</i>	mean	0.013	0.067	0.054	0.000
	median	0.040	0.061	0.021	0.000
Panel B <i>PSM</i>					
<i>LEVIND</i>	Unmatched	0.059	0.008	-0.051	0.513
	Matched	0.006	0.008	0.002	0.962
<i>XSCASH</i>	Unmatched	-0.013	0.003	0.017	0.011
	Matched	-0.009	0.003	0.012	0.014
<i>CFO/TA</i>	Unmatched	0.091	0.113	0.023	0.000
	Matched	0.073	0.113	0.040	0.000
<i>MTBIND</i>	Unmatched	0.057	0.104	0.047	0.260
	Matched	-0.015	0.104	0.119	0.000
<i>AbnReturn</i>	Unmatched	0.096	0.101	0.005	0.774
	Matched	0.116	0.101	-0.015	0.243
<i>DIV/NI</i>	Unmatched	0.589	0.515	-0.074	0.168
	Matched	0.426	0.515	0.089	0.020
<i>ROA</i>	Unmatched	0.030	0.067	0.037	0.000
	Matched	0.013	0.067	0.054	0.000

Notes: Panel A conducts univariate test for sample from 2000-2016, mean and median are reported for the non-repurchaser and repurchaser, respectively. 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. For variable definitions, see appendix 1. Total number of observations is 6228, in which 4,185 are non repurchaser, and 2,043 are repurchaser.

Panel B conducts propensity score matching. The propensity score is estimated within industry-year status, and with firm size and age included. We reported the estimation of the treatment effect on the population (Unmatched) and on the treated (Matched). In the untabulated results, we also control for corporate governance characteristics, such as institutional ownership, board ownership, and non-executive proportion.

Table 5: Correlations

	<i>L.LEVIND</i>	<i>L.XSCASH</i>	<i>L.CFO/TA</i>	<i>L.MTBIND</i>	<i>L.ABRET</i>	<i>DIV/NI</i>	<i>ROA</i>	<i>L.SPDUM</i>	<i>L.SP/NI</i>	<i>L.INSTITOWN</i>	<i>L.BOARDOWN</i>	<i>L.PROPNED</i>	<i>L.MCAP</i>	<i>L.AGE</i>
<i>L.XSCASH</i>	-0.05	1.00												
<i>L.CFO</i>	-0.01	0.10	1.00											
<i>L.MTBIND</i>	-0.05	0.14	0.19	1.00										
<i>L.ABRET</i>	-0.01	0.09	0.11	0.18	1.00									
<i>DIV/NI</i>	0.00	-0.01	0.07	0.01	-0.02	1.00								
<i>ROA</i>	-0.02	0.02	0.48	0.14	0.19	0.07	1.00							
<i>L.SPDUM</i>	0.00	0.01	0.17	0.04	-0.05	0.04	0.13	1.00						
<i>L.SP/NI</i>	0.01	0.00	0.03	0.01	0.00	0.02	0.04	0.25	1.00					
<i>L.INSTITOWN</i>	0.03	0.04	0.05	0.01	-0.05	0.01	0.01	0.07	0.02	1.00				
<i>L.BOARDOWN</i>	-0.01	0.05	0.04	0.02	0.04	0.00	0.02	-0.10	-0.01	-0.41	1.00			
<i>L.PROPNED</i>	0.03	-0.01	0.05	-0.03	-0.05	-0.01	0.03	0.21	0.03	0.25	-0.24	1.00		
<i>L.MCAP</i>	0.04	0.04	0.26	0.20	0.02	0.06	0.22	0.33	0.05	0.23	-0.26	0.38	1.00	
<i>L.AGE</i>	-0.02	-0.19	0.02	-0.12	-0.04	0.02	0.07	0.08	0.01	-0.02	-0.14	-0.02	0.01	1.00
<i>L.RE/TA</i>	-0.01	-0.01	0.42	-0.15	0.01	0.07	0.35	0.14	0.03	0.04	0.04	0.04	0.24	0.09

Notes: Correlation between all variable for sample from 2000-2016, for variable definitions, see Appendix 1. Total firm-year observations: 6228.

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

	Predicted Sign	Logit All	Tobit All
<i>L.LEVIND</i>	-	0.002	-0.008
		0.919	0.674
<i>L.XSCASH</i>	+	0.623***	2.945*
		0.003	0.069
<i>L.CFO/TA</i>	+	2.607***	3.050***
		0.000	0.008
<i>L.MTBIND</i>	-	-0.224***	-0.545***
		0.000	0.002
<i>L.AB_RET</i>	-	-0.077	-0.276*
		0.333	0.059
<i>DIV/NI</i>	-	-0.025	0.370***
		0.498	0.000
<i>ROA</i>	+	4.032***	13.843***
		0.000	0.000
<i>L.SPDUM</i>		2.317***	
		0.000	
<i>L.SP/NI</i>			0.354***
			0.002
<i>L.INSTITUOWN</i>		-0.195	-0.268
		0.302	0.447
<i>L.BOARDOWN</i>		-0.012	0.222
		0.962	0.720
<i>L.PROPNED</i>		0.880***	1.731*
		0.006	0.055
<i>L.MCAP</i>		0.259***	0.396***
		0.000	0.001
<i>L.AGE</i>		0.024	0.168
		0.594	0.190
<i>L.RETAIN/TA</i>		0.204*	0.467
		0.066	0.224
<i>TIMETREND</i>		0.041***	0.081**
		0.000	0.034
Constant		-6.232***	-11.487***
		0.000	0.002
N		6209	6228
Pseudo R ²		0.324	0.073
INDUSTRY CONTROLS		YES	YES

Notes: This table presents the results for Models (1) and (2) for the entire sample period. 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	Tobit Regime 1	Logit Regime 2	Tobit Regime 2
<i>L.LEVIND</i>	-	-0.178*	-0.153	0.012	0.003
		0.089	0.188	0.523	0.870
<i>L.XSCASH</i>	+	0.568*	1.371*	0.874***	4.392
		0.088	0.066	0.008	0.107
<i>L.CFO/TA</i>	+	2.974**	3.705	2.433***	2.157*
		0.031	0.147	0.000	0.062
<i>L.MTB</i>	-	-0.328***	-0.506***	-0.198***	-0.555***
		0.001	0.006	0.001	0.004
<i>L.AB_RET</i>	-	-0.377*	-0.540*	-0.002	-0.175
		0.067	0.098	0.981	0.274
<i>DIV/NI</i>	-	0.001	0.239**	-0.033	0.518***
		0.982	0.017	0.314	0.000
<i>ROA</i>	+	3.914**	14.199***	3.675***	13.105***
		0.014	0.000	0.000	0.000
<i>L.SP/NI</i>		2.073***		2.319***	
		0.000		0.000	
<i>L.SP/NI</i>			0.270***		0.342***
			0.003		0.007
<i>L.INSTITUOWN</i>		-0.196	-0.603	-0.364*	-0.500
		0.613	0.306	0.094	0.246
<i>L.BOARDOWN</i>		-0.495	-0.748	-0.006	0.378
		0.425	0.465	0.984	0.586
<i>L.PROPNED</i>		0.886	1.099	0.806**	1.736*
		0.200	0.300	0.034	0.092
<i>L.MCAP</i>		0.212***	0.350***	0.295***	0.422***
		0.001	0.001	0.000	0.001
<i>L.AGE</i>		0.150	0.361**	-0.003	0.119
		0.145	0.045	0.946	0.397
<i>L.RETAIN/TA</i>		-0.031	0.247	0.227**	0.470
		0.921	0.623	0.049	0.245
<i>TIMETREND</i>		0.023	0.102	0.000	0.024
		0.773	0.360	0.982	0.440
Constant		-6.824***	-11.077***	-5.786***	-10.453***
		0.000	0.000	0.000	0.004
N		1407	1472	4739	4756
Pseudo R ²		0.249	0.126	0.325	0.066
INDUSTRY CONTROLS		YES	YES	YES	YES

Notes: This table presents the results for Models (1) and (2) by regime period 2000-2016. Coefficient estimates that are statistically significant at 10%, 5% or 1% indicated by *, ** and *** (two-tailed).

APPENDIX 1: Description of Variables

<i>Pay-out Variables</i>	
<i>REGIME</i>	A set of 3 dummy variables which indicate the regulatory period during which an observation occurs: <i>REGIME1</i> represents observations from 1999 to 2003; <i>REGIME2</i> indicates an observation is from 2004 to 2009; and <i>REGIME3</i> denotes observations from 2010 to 2016.
<i>DIVDUM1YR</i>	A dummy variable, coded 1 if the firm pays a dividend in the year, otherwise 0.
<i>DIVDUM2YR</i>	A dummy variable, coded 1 if the firm pays a dividend in the year and year before, otherwise 0.
<i>SPDUM1YR</i>	A dummy variable, coded 1 if the firm repurchase share in the year, otherwise 0.
<i>SPDUM2YR</i>	A dummy variable, coded 1 if the firm repurchase share in the year and year before, otherwise 0.
<i>L.SPDUM</i>	One year lag of <i>SPDUM1YR</i> .
<i>SP</i>	Share repurchases for the year is funds used to decrease the outstanding shares of common stock (Worldscope item WC04751 - Common/Preferred Redeemed, Retired, Converted etc). (It is assumed that the buying back of preference shares is negligible.)
<i>DIV</i>	The total cash common dividends paid on the company's common stock during the fiscal year, including extra and special dividends. (Worldscope item WC05376 – Common Dividends Cash).
<i>TOTALPAY</i>	$SP+DIV$
<i>SP/NI</i>	Aggregate value of shares repurchased by firm <i>i</i> in year <i>t</i> , scaled by Net Income (<i>NI</i>). See definition of <i>NI</i> below.
<i>SP/RE</i>	Aggregate value of shares repurchased by firm <i>i</i> in year <i>t</i> , scaled by Retained Earnings (<i>RE</i>). See definition of <i>RE</i> below.
<i>DIV/NI</i>	DIV/NI . See definition of <i>NI</i> below.
<i>DIV/RE</i>	DIV/RE . See definition of <i>RE</i> below.
<i>SP/TOTALPAY</i>	$SP/TOTALPAY$.
<i>TOTALPAY/NI</i>	$TOTALPAY/NI$. See definition of <i>NI</i> below.
<i>POST2003</i>	An indicator set equal to one for denotes observations from 2004 to 2016, zero otherwise.
<i>POST2009</i>	An indicator set equal to one for denotes observations from 2010 to 2016, zero otherwise.

Cash Flow Variables

<i>XSCASH</i>	Surplus cash measured as the residual from the optimal cash equation: $\frac{Cash\ Holdings_{it}}{Assets_{it-1}} = \gamma_0 + \gamma_1 \frac{Market_{it}}{Book_{it-1}} + \gamma_2 \frac{Net\ Working\ Capital_{it}}{Assets_{it-1}} + \gamma_3 \frac{Operating\ Cash_{it}}{Assets_{it-1}} + \gamma_4 \frac{Net\ Debt_{it}}{Net\ Assets_{it}} + \gamma_5 \frac{R\&D_{it}}{Sales_{it}} + \gamma_6 \log(Market\ Cap_{it}) + \gamma_7 Dividend\ Dummy_{it} + \varepsilon_{it}$
<i>CFO/TA</i>	Operating Cash Flow (CFO, Worldscope data item WC04860 Net Cash Flow Operating), divided by Total Assets (Worldscope item WC02999)

Corporate Governance Variables

<i>BOARDOWN</i>	The value of ordinary shares held by directors and their immediate family divided by the total value of ordinary shares outstanding; BoardEx data item 'valtoteqheld' divided by total market value of the year.
<i>INSTITOWN</i>	The percentage of shares owned by institutional investors, which include Bank and Trust, Endowment Fund, Foundation, Hedge Fund, Investment Advisor, Insurance Company, Pension Fund, Private Equity, Venture Capital, Investment Advisor/Hedge Fund, Sovereign Wealth Fund, Brokerage Firms, Research Firm, Independent Research Firm, Corporation, Holding Company, Mutual Fund, Hedge Fund Portfolio, Pension Fund Portfolio, Institution. Eikon data item Category Ownership Percentage.
<i>PROPNEED</i>	Proportion of non-executive director. BoardEx data item numofned divided by the number directors.

Other Accounting / Market Variables

<i>MCAP</i>	Logarithm of market value of equity (MV). Market value represents the market capitalisation at the closing price of the firm's share at their fiscal year end (Worldscope item WC08001)
<i>TA</i>	Total assets is represented by the sum of total current assets, long term receivables, investment in unconsolidated subsidiaries, other investments, net property plant and equipment and other assets (Worldscope item WC02999 - Total Assets).
<i>RE</i>	Retained earnings represents the accumulated after tax earnings of the firm which have not been distributed as dividends to shareholders and allocated to a reserve account for the financial year ending in year t (Worldscope item WC03495 – Retained Earnings).
<i>NI</i>	Our measure of earnings is net income before extraordinary items and preference dividends (Worldscope item WC01551 - Income before extraordinary items and preferred and common dividends, but after operating and non-operating income and expense, reserves, income taxes, minority interest and equity in earnings).
<i>AGE</i>	Natural log of 1 plus the number of years since the incorporation of the firm, which is calculated as the firm's financial year-end (Worldscope item WC05350– Date of Fiscal Year End) minus its incorporation date (Worldscope item WC18273– Date of Incorporation).

<i>CASH</i>	Cash is measured by cash and cash equivalents (Worldscope item WC02005 -Cash & Equivalent).
<i>ABRET</i>	An indicator variable that the 12-month firm return over the market return measured over the corresponding period
<i>MTB</i>	The sum of total debt (WC03255) and market capitalisation (WC08001) deflated by total assets (WC02999).
<i>MTBIND</i>	MTB demeaned by industry-year mean value.
<i>LEVERAGE (LEV)</i>	Leverage is measured by total debt (Worldscope item WC03255), divided by Total Shareholders Equity (Worldscope item WC03995).
<i>LEVIND</i>	Leverage demeaned by industry-year mean value.
<i>RETAIN/TA</i>	Retain Earnings deflated by Total Assets.
<i>ROA</i>	Return On Assets, defined as Net Income deflated by Total Assets.
<i>TIMETREND</i>	Time trend is set equal to 1 for 1999 and increases by 1 in each subsequent year.
<i>Industry dum.</i>	Industry dummy variables according to the ICB classification model (DataStream item INDM4).
