

Timing Matters: Further Evidence on Motives for Repurchases and Special Dividends

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Abstract

We compare the importance of opportunities for market timing with incentives to manage EPS, in decisions to repurchase. We distinguish between repurchases which are done to distribute cash (payout-related) and those which are conducted to provide shares for re-issue to staff (pay-related). Firms are more likely to pay out cash via a repurchase when timing opportunities are compelling and will opt for a special dividend otherwise. Incentives to manage EPS, on the other hand, explain less of the choice of repurchase vs. special dividend. Pay-related repurchases are likewise associated with compelling timing opportunities, and thus timing considerations also help explain decisions to repurchase shares for issue to staff.

Keywords: share repurchases, special dividends, market timing, EPS, share-based pay

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1. Introduction

Corporate share repurchases have grown significantly in recent decades. In the US, they have overtaken dividends to become the most important means of payout. There are several possible reasons why a company might choose to pay out via repurchases. One prominent reason is that they enable managers to gain from market timing by repurchasing shares at times of undervaluation. A second prominent reason is that repurchases enable managers to increase earnings per share (EPS), or prevent dilution of EPS, because they reduce the number of shares in issue. There is evidence to suggest that companies can successfully time their repurchases, and also that they use repurchases to manage EPS. However, the comparative importance of timing and management of EPS in decisions to repurchase is uncertain.

In this paper, we assess the comparative importance of these motives. We do so by means of two empirical strategies which are novel in the literature. First, we study the choice between repurchases and special dividends, using data from a country (the UK) in which large listed companies use both methods to make flexible payouts. In doing so, we abstract from generic reasons for making a flexible payout, and focus on reasons specific to the choice of payout method. Second, we classify repurchases as being either pay- or payout-related. We identify the repurchase as being pay-related if its stated purpose in the company's annual report is to provide shares to the company's employee benefit trust (EBT), or a similar entity, for re-issue to staff. The remaining repurchases are classified as payout-related.

Special dividends and payout-related repurchases can be thought of as alternatives—both are means of distributing cash to shareholders in a flexible manner. However, special dividends are not an alternative to conducting a pay-related repurchase because they do not provide shares for subsequent re-issue. Therefore, in studying the determinants of the payout decision, we focus on special dividends and the payout-related repurchase subsample. The pay-related repurchase sample is also of interest in its own right. In conducting an open-market repurchase (OMR) to provide such shares for re-issue, the firm is forgoing an alternative mechanism for provision, namely share issuance. On the face of it, the choice of OMR over issuance might appear driven by dilution concerns. However, the timing aspects are also of interest. Firms are more likely to favour repurchases of existing stock rather than new issuance when management perceive the stock as undervalued. Conversely, they are more likely to favour issuance as opposed to OMRs of existing stock when they perceive the stock as overvalued. Evidence to date on this question is limited to a recent paper by Bonaimé, Moore, Kahle and Nemani (2022) who conclude that repurchases considered to be pay-related are not associated with timing gains.

Our measure of timing ability is similar to that developed by Ben-Rephael, Oded and Wohl (2014) and Dittmar and Field (2015). It measures the repurchase price relative to average prices over various windows around the execution date. In this paper, we benefit from enhanced granularity: we scrape daily repurchase execution data from regulatory announcements on the London Stock Exchange. Most previous studies examine aggregated monthly executions. We also measure a *notional* equivalent of timing ability associated with special dividends. This is notional in the sense that it measures the timing gain that would have occurred had the firm instead chosen to distribute cash via an OMR executed at the date the special dividend was announced. We can thus directly compare the timing ability associated with payout-related repurchases with that of both special dividends and pay-related repurchases. We also compare the frequency of daily pay- and payout-related OMR transactions, controlling for the amounts repurchased. If the primary motive of pay-related OMRs is prevention of dilution, rather than exploiting gains from timing, they should display both less timing ability and greater daily frequency than payout-related repurchases.

Our main results are as follows. Both payout- and pay-related repurchases exhibit positive timing ability, whereas special dividends display negative timing ability. Firms that announce a special dividend would have made a loss from timing, had they made the payment instead by means of a series of OMRs conducted shortly before the announcement. In our regressions to explain the choice between a repurchase and a special dividend, timing gain (actual for repurchases and notional for special dividends) is highly significant. Firms opt for a repurchase when the timing opportunity is compelling, and a special dividend when it is not. In contrast, proxies for incentives to manage EPS have much less explanatory power. We use several measures of EPS and dilution-management incentives. Our main proxy is pay-related shares, that is, shares issued to staff on the exercise of stock options and on the vesting of restricted shares. We also find that the choice of a special dividend over a repurchase is positively related to measures of recent dividend payout. Our interpretation is that variation across firms in firm-specific shareholder demand for dividends is an important factor in the choice of payout method.

Pay-related OMRs display more timing ability than payout-related in a univariate comparison, but there is no significant difference between the types when controlling for repurchase amounts and other factors that might affect timing gains. Hence, pay-related OMRs are not inferior to payout-related, in terms of gains from timing. We also find that pay-related OMRs are made less frequently than payout-related, controlling for repurchase amounts and other factors. We infer that, in choosing whether and when to provide repurchased shares to

their EBT, firms take account of, and successfully exploit, timing opportunities as they do when choosing to conduct payout-related OMRs. They do not repurchase shares for re-issue to staff on a more frequent basis than they make other OMRs, nor with less regard for timing opportunities.

Our evidence on the choice between payout-related repurchases and specials indicates that opportunities for market timing—and their absence—are indeed important in firms' choice between the two methods, whereas there is less sign that management of EPS is an important consideration in this choice. Our identification of pay-related OMRs enables us to study, for the first time, the numerous repurchases which are explicitly made in order to provide shares for re-issue to staff. We are thereby able to provide better evidence than before on the timing ability and frequency of repurchases which are directly linked to share-based pay for the firm's staff. The evidence for pay-related OMRs indicates that exploitation of timing opportunities is important for this type of repurchase, as it is for payout-related OMRs. The evidence does not support the suggestion in Bonaimé et al. (2022) that firms make frequent OMR transactions to offset dilution of EPS due to share issues to staff, with little regard to timing opportunities. The fact that pay-related OMRs display timing ability can explain why firms often choose to provide shares to their EBT via repurchasing rather than issuance of new shares. Similarly, firms that wish to provide shares to their staff or their EBT may choose to issue new shares at times when they believe that repurchasing would produce a timing loss. Both the timing motive for pay-related repurchases, and the dilution-prevention motive, predict a positive relation between repurchase amounts and pay-related share issues, as Bonaimé et al. (2022) report. Our evidence suggests that the timing motive is an important part of the explanation.

2. Background

This section reviews the two motives for repurchases that we examine, namely market timing and management of EPS. We then discuss special dividends, and finally the distinction we make between payout- and pay-related repurchases.

2.1 Market timing of repurchases

The timing hypothesis for repurchases assumes that there is information asymmetry, and that companies can identify when their shares are undervalued in relation to the full-information valuation. If companies carry out OMRs at times of undervaluation it reduces the cost of the payout from the perspective of shareholders who retain their holdings. As such the

OMR can be viewed as a transfer of wealth from selling shareholders to continuing shareholders.

A second and related rationale for OMRs is that managers use the action to signal to outsiders that the shares are undervalued. In the UK, each OMR is publicly reported the day after execution. However, the power of the signal for any one individual OMR transaction is questionable. Announcements of repurchase programmes (of a planned series of OMRs) could be more informative. Yet most programmes are announced along with the company's year-end results rather than separately; a given programme might not be completed; and the timing of the actual OMRs under the programme is uncertain *ex ante*. In addition, many OMRs, including all those that are pay-related, are not carried out under a specific pre-announced programme.¹ Signalling is a more plausible explanation for repurchases conducted via tender offers, in which the company makes an offer with a specific price and a predetermined date to existing shareholders. Tender offers have their own distinct announcement and timetable, and are larger in size than individual OMRs. Moreover, the tender process is costly and willingness to incur the cost improves the credibility of any signal. However, tender offers are a tiny proportion of the repurchases observed. A third rationale for OMRs, which also results in timing-like behaviour, is that they can be used to support the company's share price. The benefit is simply that the OMR might prevent the price from falling further than it would have done otherwise.

Previous studies are divided as to whether firms can successfully time OMRs. Ben-Rephael et al. (2014) and Dittmar and Field (2015) examine monthly data on OMRs by US firms. They find that in months with repurchases, the average repurchase price is below the average closing share price during the month, and below the average share price in months that both precede and follow the repurchase month. The evidence that prices tend to fall before OMRs is consistent with both market timing and price support. The evidence that prices tend to rise following OMRs supports timing ability specifically. Kulchania and Sonika (2023) use daily repurchase data for UK firms, as we do, and find that OMR prices are below the average share price over one week or month beforehand. They do not study post-OMR prices.

Bonaimé, Hankins and Jordan (2016) use a different methodology. They calculate the internal rate of return (IRR) on repurchases by a given company over long periods of several years, as though the company conducted an investment programme in its own shares. They

¹ Most UK listed companies routinely obtain prior authorisation annually, at their annual general meeting, for repurchases of up to a certain proportion of the shares in issue. Often they do not go on to conduct any OMRs during the year. Therefore, an annual authorisation in itself cannot be construed as the announcement of a repurchase programme.

find that the IRR on actual repurchases is less than on alternative notional strategies in which the same sums are paid out but the repurchases are spread evenly over time, without attempting to time the stock price. Their interpretation is that, from a long-term perspective, firms do not succeed in buying their shares at times of undervaluation. They explain firms' observed lumpy patterns of repurchases over time as the result of decisions to make payouts at dates that suit, rather than attempts to time the stock price.²

The extent to which the opportunity to time OMRs is a motive for decisions to repurchase is uncertain. Studies that examine whether OMRs display timing ability do not seek to measure the extent to which timing explains decisions to conduct OMRs. At the same time, studies that examine the determinants of repurchase amounts do not include gains or notional gains from timing in their explanatory variables.³ One reason for this omission might be because it is difficult to measure timing opportunities, as opposed to actual gains from timing, in firm-years with no repurchases.

However, survey evidence from US executives suggests that the value of the firm's stock in relation to its true value (i.e. potential for timing gain) is a very important factor in repurchase decisions (Brav, Graham, Harvey and Michaely, 2005). They also suggest that increasing EPS, and avoiding dilution of EPS, are reasons that are nearly as important as timing.

2.2 Repurchases and EPS

Repurchases can be used to increase EPS or prevent its dilution, because they reduce the number of shares in issue for the purpose of calculating EPS.⁴ Given the perceived salience of EPS, both among investors and as a target in performance-contingent remuneration of staff, it has been suggested that managers have incentives to manipulate EPS. Several authors argue that firms use repurchases to prevent dilution of basic EPS when shares are issued to staff, and also to prevent further dilution of diluted EPS arising from unexercised or unvested awards of share-related pay (Kahle, 2002; Bens et al., 2003; Cheng et al., 2015; Bonaimé et al., 2022). For US firms, it has been noted that the extent to which a firm repurchases stock is positively

² Other studies on the timing of OMRs include Brockman and Chung (2001) who support timing ability, and Cook, Krigman and Leach (2004) and Ginglinger and Hamon (2007) who do not support timing ability.

³ Studies that examine the determinants of repurchase amounts include Bens, Nagar, Skinner and Wong (2003), Bonaimé et al. (2022), Cheng, Harford and Zhang (2015), De Cesari and Oskan (2015), Skinner (2008), and Young and Yang (2011).

⁴ Repurchased shares are either cancelled, held by the company as treasury shares, or held by the EBT. Strictly speaking, both treasury and EBT shares remain in issue.

correlated with various measures of the extent of share-based pay. The contention is thus that repurchase activity is in part driven by a desire to minimise the dilution of EPS caused by pay-related shares.⁵ In addition, Bonaimé et al. (2022) find that the frequency of OMRs is positively related to measures of pay-related shares. The suggested reason for this is simply that pay-related awards and issues of shares are themselves frequent events, and that dilution-preventing repurchases will be made at roughly the same time.⁶ However, Gao and Kronlund (2020) find that firms do not make more repurchases when executive stock options are by chance just in-the-money on expiry and hence likely to be exercised, which dilutes basic EPS.

Another EPS-related motive for repurchases is to meet a specific consensus EPS target that would otherwise be missed (Hribar, Jenkins and Johnson, 2006; Almeida, Fos and Kronlund, 2016). However, data given in Hribar et al. (2006, p. 24) imply that only 2.9% of their sample of firm-quarters with OMRs result in a consensus EPS forecast being met as a result of the OMRs. In view of this small proportion, we do not try to identify OMRs which might be conducted to meet an EPS target.

2.3 Special dividends

Both repurchases and special dividends are flexible methods of payout that do not imply a commitment to continue paying in the future. They are used by UK companies to pay out surplus cash that remains after payment of regular dividends (Armitage and Gallagher, 2021). It is uncommon for a company to make a payout-related repurchase and pay a special dividend in the same financial year (see Table 2 below). It is therefore plausible that, if a company intends to make a substantial flexible payout, it chooses between a repurchase and a special dividend. In the US, however, repurchases are overwhelmingly the preferred method of flexible payout. Specials are rarely paid by larger firms, and the amounts paid by smaller firms are small in relation to the firm's size (DeAngelo, DeAngelo and Skinner, 2000; Lie, 2000; Beladi, Chao and Hu, 2016). Therefore, specials are not economically important in the US.⁷

⁵ Not everyone agrees that offsetting dilution of EPS is a credible motive for repurchases. Edmans, Fang & Huang (2022, p. 1015) argue that 'there is no theoretical reason for using repurchases to offset dilution. Whether a repurchase creates value depends on whether the firm's stock is undervalued (and, if capital is constrained, the attractiveness of investment opportunities that must be foregone to engage in the repurchase)—not the number of shares outstanding or whether this number has recently increased due to option exercises.'

⁶ Bonaimé et al. (2022) note that 'if frequent repurchasers react to options and equity grants to avoid dilution, they should distribute repurchases more evenly across time rather than concentrate them in months with low stock prices' (p. 28).

⁷ Both regular and special dividends remain more prevalent in the UK than the US. For many years, a likely explanation was that the tax disadvantage to dividends was smaller or non-existent in the UK. This was clearly the case up to the abolition of the UK imputation-tax system in 1997-99, and the reduction in US personal tax

Lie and Lie (1999) is the only paper that attempts to explain how companies choose between special dividends and repurchases, though specials are compared with tender offers only. They find that payment of specials by US firms is positively related to the dividend yield on the firm's shares, and to previous capital gains. Their suggested explanation is tax-based: firms choose specials because they have a shareholder clientele that faces lower tax rates on dividends, compared to higher rates on capital gains payable in the event that they choose to sell stock to the repurchasing firm.

Other research documents that there is a positive average abnormal return on announcement of special dividends (Brickley, 1983; DeAngelo et al., 2000; Lie, 2000). The positive market reaction to specials is consistent with both a reduction in expected agency costs (due to the paying out of free cash), and with signalling. Gombala and Liu (1999) argue that specials are used to signal improved future operating performance, but this is disputed by Crutchley, Hudson, Jensen and Marshall (2003). DeAngelo et al. (2000) study the gradual decline since the 1950s in the payment of specials by NYSE firms, such that specials had almost disappeared by the late 1980s. They contend that any signalling function was not valuable to the majority of firms, which otherwise would not have ceased to pay them (they are still paid by smaller, non-NYSE firms). Their evidence indicates that firms converted frequent payments of specials into regular dividends, and also that specials were not directly replaced by repurchases. Hanlon and Hoopes (2014) report an uptick in the payment of specials before expected increases in tax rates on dividends. Beladi et al. (2016) find that specials are paid slightly more frequently during bear markets and economic downturns, perhaps because there is more pressure to pay out spare cash at those times.

Evidence from other countries is limited. Armitage and Gallagher (2021) note that specials remain quite important in the UK and that the average scaled size of payout is greater for specials than for repurchases. Andres, Doumet, Fernau and Theissen (2015) briefly compare repurchases and specials paid by German firms. They argue that specials, but not repurchases, are used to pay out transitory earnings (evidence from the US and UK suggests that both methods are used to pay out transitory earnings).

2.4 Pay-related and payout-related repurchases

rates on dividends in 2003. But since 2003, it is uncertain whether the tax disadvantage to dividends is greater in the US. A large proportion of the shares of UK listed companies is now owned by foreign investors (over 60% by 2020), who pay non-UK taxes.

Pay-related repurchases. Many repurchases are made specifically to provide shares for re-issue to the firm's staff. Inspection of annual reports reveals that most small repurchases (scaled by the firm's assets) are made for this purpose. Shares are issued to staff when they exercise stock options and when restricted shares vest. Restricted shares are those which have been awarded under schemes such as long-term incentive plans (LTIPs) for executives and share-ownership plans for other staff. Repurchases can be identified as pay-related because they are explicitly stated in the annual report to have been made to obtain shares for re-issue to staff. The relevant information is disclosed in the note on share capital or in a separate note about the EBT. Pay-related repurchases are usually made by or on behalf of the EBT, with funds provided by the company.⁸ The shares are then owned by the EBT until re-issued, and are distinct from treasury shares. The provision-of-shares motive for repurchases is recognised in the literature (Fama and French 2001; Kahle, 2002; Young and Yang, 2011), but has received little attention to date.

One explanation for pay-related repurchases is that they are made in order to prevent dilution of EPS due to pay-related share issues, as discussed above. Because most pay-related repurchases are small, the difference they make to EPS in the relevant year would be negligible. But Bonaimé et al. (2022) argue that companies are concerned about EPS growth measured over a number of years, and that small annual pay-related repurchases can make a substantial difference to the longer-term growth rate of EPS.

A second motive for pay-related repurchases could be reduction in the cost of providing shares, by means of market timing of OMRs. Pay-related repurchases could be good candidates for exploitation of timing opportunities, because there will usually be no pressure to conduct a given pay-related OMR at a specific time—the EBT could often satisfy a requirement to issue shares from shares it already owns, or instead the company could issue new shares.⁹ Companies conducting pay-related repurchases could therefore be 'patient traders', willing to wait for the best timing opportunities. On the other hand, timing might *not* matter for pay-related OMRs, if the main motive for such OMRs is to prevent dilution of EPS. In addition, if decisions to conduct pay-related OMRs are made by the EBT or its managing agent, and not by the

⁸ An EBT is a discretionary trust, which means that the trustees have discretion regarding provision of benefits from the trust to the beneficiaries (employees). The company is the trustor or settlor. There are external companies which provide an EBT administration service, through becoming a trustee, e.g. the company RM2. EBTs are known by several other names, the most common of which is employee share ownership trust (ESOT).

⁹ New shares can readily be issued to an EBT, provided the shares in issue remain below the number of shares authorised. 'Employees' share schemes are facilitated by several exemptions... The directors... do not require authority from the articles or a resolution to allot shares... and shares can be allotted to be held under a scheme without also being offered to other members... [such shares] are exempt from the rule that at least one quarter of the nominal value must be paid up before allotment...' (French, Mayson & Ryan, 2009, p. 294).

company, timing ability might be less than for OMRs made by the company itself. Hence, it is uncertain *a priori* whether pay-related OMRs will display gains from timing, and if they do, whether such gains will be greater or less than for other, payout-related, OMRs.

If pay-related OMRs exhibit timing ability, this could explain why some of the shares companies provide for issuance to staff are repurchased rather than newly issued. The requirement for shares to issue to staff depends on the extent of the pay-related shares the company has awarded. If, for reasons of timing opportunity, firms obtain a certain proportion of the shares via OMRs, we would expect a positive relation between the number of shares repurchased and the number of pay-related shares issued to staff. Therefore, the timing motive as well as the dilution-prevention motive predict a positive relation between repurchases and pay-related shares. This implies that evidence in existing research of a positive relation between repurchases and pay-related shares does not establish conclusively that companies use repurchases to prevent pay-related dilution of EPS.

Share-based pay gives rise to other possible motives for repurchases. As these motives are less relevant for our study, we relegate their discussion to Appendix 1.

Payout-related repurchases. We designate all repurchases that are not pay-related as payout-related. Such mainstream repurchases feature much more prominently in annual reports. They are itemised in the finance director's report or the directors' report, both of which form sections of the text that precedes the financial statements. They might also be highlighted in the chair of the board's statement to shareholders. The amounts of repurchases as stated in the finance director's report *ignore* any pay-related repurchases that the company funded in the relevant year. In fact, we note widespread instances in which the finance director's report states that the company made no repurchases during the year, whereas both the cash flow statement and the note on share capital show that the company funded (pay-related) repurchases.¹⁰

Shares purchased in payout-related repurchases are either cancelled or added to treasury shares. It is possible for treasury shares to be transferred to the EBT, or re-issued to staff, but both steps are uncommon. It is therefore highly likely that the immediate motive for almost all payout-related repurchases is to pay out cash, not to obtain shares for re-issue.

If a repurchase is pay-related, in the sense explained above, then a special dividend is not a viable alternative, since it would not provide shares for re-issue to staff. Hence, we argue

¹⁰ The annual amount for repurchases in the cash flow statement, and as recorded in Worldscope, is the sum of cash paid out under both types of repurchase. Some cash flow statements itemise pay-related repurchases separately, under a heading such as 'Repurchases by the Employee Benefit Trust'.

that, if a company seeks to make a flexible payout, the choice of method is really between a payout-related repurchase and a special dividend.¹¹ In contrast, if the company intends to provide shares for its staff or EBT, the choice is between a repurchase and an issue of new shares: both methods are commonly used to provide shares for staff. We note that the popularity of issuing new shares for staff does not, on the face of it, sit easily with the view that companies are concerned about dilution of EPS due to issuance of pay-related shares.

3. Reasons for repurchases and special dividends

To examine the choice between a repurchase and a special dividend, we run logit regressions in which the dependent variable is equal to one for a firm-year with a payout-related repurchase, and zero for a special. First, we explain our empirical proxies for reasons for choosing a repurchase, followed by reasons for a special.

3.1 Reasons for repurchases

Market timing

Our measures of the timing gain from OMRs are similar to those in Ben-Rephael et al. (2014) and Dittmar and Field (2015). They involve comparing the execution price with the share price over various windows around the execution date. We choose this approach as it seems to align best with the perspective of a manager (or broker as their agent) who is attempting to time the market—and we are seeking to assess the importance of timing opportunities as perceived by the relevant decision makers. Interview evidence in Brav et al. (2005, p. 514) suggests that managers believe that they can ‘beat the market... over the course of the year’. It is possible that they do not have timing ability over longer horizons of several years, as Bonaimé et al. (2016) contend. Nevertheless, if managers believe themselves to have timing ability, and can point to supporting evidence using price comparisons over horizons measured in months, opportunities for such shorter-term timing gains can help explain decisions to repurchase.

In order to calculate the *relative repurchase price* (RRP), we first compute the average closing price, adjusted for any capital changes such as stock splits, over various windows around specific days in which OMRs were executed. These windows are 30, 90 and 180 days

¹¹ A pay-related repurchase does reduce the firm’s spare cash. Therefore, it could affect the firm’s decision about whether to conduct a payout-related repurchase or special dividend in a given year, and about the amount of such a payout if one is made.

after execution, and 30, 90 and 180 days both before and after execution, similar to those in Dittmar and Field (2015). The average price over the observation window of interest is thus:

$$Average\ price = \frac{\sum_1^n Adjusted\ closing\ price}{n} \quad (1)$$

where n is the number of days in the observation window. We have daily OMR transaction data (rather than aggregate OMRs per month as in Dittmar and Field, 2015) and for any day with an OMR we observe the volume-weighted average execution price. We adjust this price for any capital changes to make it comparable to the average price across the observation window. The RRP for repurchases executed on day τ is thus:

$$RRP_\tau = \frac{Volume\ weighted\ average\ repurchase\ price_\tau - Average\ price}{Average\ price} \quad (2)$$

Timing ability is indicated by a negative value of RRP, i.e. the OMRs on a given day are executed at prices lower than the average across the comparison window. Since most of our analysis is conducted using firm-years, we also calculate the variable *Timing gain* for a given firm-year t by summing the transaction consideration-weighted RRP for each day on which there was an OMR:

$$Timing\ gain\ repurchase_t = -RRP_t = -\sum_{\tau=1}^{\tau=T} \frac{C_\tau}{C_t} RRP_\tau \quad (3)$$

where T = the total number of OMR days during year t , C_τ = the total repurchase consideration on day τ , and C_t = the total repurchase consideration during the fiscal year. The repurchase consideration for a given day is equal to the weighted average execution price multiplied by the total number of shares repurchased that day.

To assess the importance of timing potential in the choice between repurchases and special dividends, we need an estimate of the *notional timing gain* for each firm-year in which a special was paid. This notional timing gain is the one which would have arisen, had the firm paid out by means of a repurchase instead of a special. The construction of the notional timing gain is similar to that used above for OMRs. We compare the closing price of the stock on the day that the special dividend is announced to the average adjusted closing price over various observation windows of interest around the announcement date. The windows are identical to those employed for OMRs: 30, 90 and 180 days after announcement, and 30, 90 and 180 days before and after announcement. By anchoring on the announcement date, we make the implicit

assumption that the decision to pay out via a special rather than via a series of OMRs is likewise made around that time.

$$\text{Notional RRP}_\tau = \frac{\text{Price on day of special div announcement}_\tau - \text{Average price}}{\text{Average price}} \quad (4)$$

Average price is as defined in equation (1). The notional timing gain for a special dividend announced on day τ is thus:

$$\text{Timing gain special dividend}_\tau = -\text{Notional RRP}_\tau \quad (5)$$

The calculation assumes that a notional OMR can be made at the closing price on the day that the special dividend is announced. If a firm has more than one announcement of a special dividend in a given fiscal year we aggregate by weighting each individual notional RRP by the special dividend consideration such that the timing gain for fiscal year t is:

$$\text{Timing gain special dividend}_t = -\text{Notional RRP}_t = -\sum_{\tau=1}^{\tau=T} \frac{C_\tau}{C_t} \text{Notional RRP}_\tau \quad (6)$$

where T = the total number of days with special dividend announcements in year t , C_τ = the total consideration of special dividend announced on day τ , and C_t the total consideration of special dividends announced during the fiscal year.

Management of EPS

We construct several variables to proxy for an incentive to use repurchases to manage EPS. The first is a dummy, *EPS boost*, which identifies firm-years in which a repurchase or notional repurchase would have increased EPS.¹² The following variable identifies such years (Hribar et al., 2006). For repurchases:

$$\text{EPS boost}_t = 1 \text{ if } \frac{\text{Pre-repurchase EPS}_t}{\text{Repurchase price}_t} > \text{Interest rate on cash}_t, \text{ and } 0 \text{ otherwise} \quad (7)$$

For special dividends:

¹² The calculation of *EPS boost* must account for 'capital events', i.e. a stock split, stock consolidation or rights issue. If there is no capital event during the year, the date of the repurchase does not affect *EPSboost*, as Hribar et al. (2006) note. This means that we can use the number of shares in issue at year-end in calculating *Pre-repurchase EPS*, excluding treasury and EBT shares. But if there is a capital event during the year, it is crucial that *Pre-repurchase EPS* and *Repurchase price* are calculated on a consistent basis. For example, if there is a 10 for 1 stock split during the year with effect from day τ , and a repurchase is conducted before day τ , the price of the repurchase (as recorded in in the Stock Exchange's Regulatory News Service) should be divided by 10. We obtain the dates of capital events from the London Share Price Database.

$$\begin{aligned}
& \text{Notional } EPS \text{ boost}_t = 1 \\
& \text{if } \frac{\text{Pre-repurchase } EPS_t}{\text{Notional repurchase price}_t} > \text{Interest rate on cash}_t, \text{ and zero otherwise}
\end{aligned}
\tag{8}$$

where:

$$\text{Pre-repurchase } EPS_t = \frac{\text{Net income}_t}{\text{Shares outstanding at year end}_t + \text{Total number of shares repurchased}_t}
\tag{9}$$

The interest rate on cash is the average 3-month Treasury-bill rate over the firm-year. For firm-years with a repurchase, the repurchase price is the daily consideration-weighted average price of OMRs during the year. For firm-years with a special, we calculate *Notional EPS boost*, in the same spirit as we calculate *Notional timing gain*. The *Notional repurchase price* equals the share price at the date of announcement of the special dividend. In the event that more than one special dividend was announced, *Notional repurchase price* is the consideration-weighted average price on the dates of announcement. Hence, *Notional EPS boost* estimates whether OMRs would have increased EPS, had that method been chosen and exercised at the closing price as of the announcement date.

The coefficient on *EPS boost* should be positive if firms choose to repurchase in order to increase EPS, and choose to pay out via a special if repurchasing would not increase EPS. Since interest rates were close to zero during much of our sample period, by far the most common reason for *EPS boost* = 0 to arise is that the firm made a loss in the relevant year. Repurchases can be used to offset dilution of EPS due to *pay-related shares*. We calculate three measures of pay-related shares using hand-collected data from annual reports. Appendix 2 discusses the collection process.

(i) Basic EPS for a given year is diluted by shares that are issued or released during the year on exercise of stock options (*OptShares*) or on vesting of restricted shares (*RestShares*). We scale this sum by the number of shares in issue at the start of the year:

$$\text{PayShares}_{1t} = \frac{(\text{OptShares}_t + \text{RestShares}_t)}{\text{Shares}_{t-1}}
\tag{10}$$

(ii) Diluted EPS is diluted during the year by the issue of pay-related shares, as for basic EPS, plus the change in dilutive shares (*DilShares*):

$$\text{PayShares}_{2t} = \frac{(\text{OptShares}_t + \text{RestShares}_t + \Delta \text{DilShares}_t)}{\text{Shares}_{t-1}}
\tag{11}$$

Dilutive shares are shares that would dilute basic EPS in future, on the exercise of stock options or the vesting of restricted shares outstanding.¹³ Their number can fall as well as rise from year to year. Their number increases (decreases) when in-the-money options or restricted shares are granted (lapse or are exercised), and when the average share price for the year is higher (lower) than the year before, in relation to the exercise prices of options and restricted shares outstanding. If $PayShares2 < 0$, we set its value to zero. A firm that follows a policy of using repurchases to exactly offset pay-related dilution of basic (diluted) EPS would repurchase the number of shares in the numerator of $PayShares1$ ($PayShares2$).¹⁴

(iii) Bonaimé et al. (2022) find that a scaled measure of the number of shares repurchased is positively related to each of the number of options outstanding at the start of the year ($Options$), the number of options exercised ($OptShares$), and the number of restricted shares granted ($RestGrant$). For comparability with their paper, we also calculate:

$$PayShares_{3t} = \frac{(Options_t + OptShares_t + RestGrant_t)}{Shares_{t-1}} \quad (12)$$

If firms are concerned about dilution of EPS due to pay-related shares, they should likewise be concerned about dilution due to scrip dividends, which are issues of shares in lieu of cash dividends. EPS is not adjusted retrospectively after a scrip dividend is paid, unlike after a stock split, and so current EPS is diluted in relation to the previous year's EPS. Similarly, conversions into ordinary shares of convertible debt and preference shares are dilutive, and could prompt repurchases.¹⁵ For example, in 2018 Vodafone plc repurchased exactly the same number of shares (729m, value €1.8bn) as were issued on conversion of its convertible bonds. We include the variable $Scrip_t$ which is equal to one if a scrip dividend is paid or a scrip

¹³ Unexercised awards are treated as dilutive to the extent that the issue price is less than the market price. This follows from the treasury stock method of determining the effect of pay-related awards of shares awards on diluted EPS. The method is used by both US and UK companies (under International Accounting Standard 33 for the UK). It assumes that options in-the-money, based on the average share price during the year, are exercised, and the proceeds used to repurchase shares at the average price. Dilutive shares are those that are notionally issued on exercise but not covered by the repurchase – because the exercise price is below the average share price for the year. Only dilutive shares are added to the share count in calculating diluted EPS. Shares to be issued with zero exercise price (i.e. entitlements to restricted stock) are all counted as dilutive.

¹⁴ The fact that dilutive shares can fall avoids double-counting of the repurchases required under a policy of preventing dilution of diluted EPS. For example, suppose that a firm grants 100 restricted shares in year t which vest in $t+1$. Then $DilShares_t$ and the numerator of $PayShares2_t = 100$. In year $t+1$ the 100 restricted shares vest and are issued. $RestShares_{t+1} = 100$, $DilShares_{t+1} - DilShares_t = -100$, and $PayShares2_{t+1} = 0$.

¹⁵ Note that the shares issued in scrip dividends and conversions of securities are not issued to raise funds. We would not expect to observe dilution-preventing repurchases after fund-raising share issues (SEOs), because such repurchases would use up the funds being raised and negate the purpose of the share issue.

alternative to cash dividends is offered in year t , or if shares are issued on conversion of convertible debt or preference shares during year t , and zero otherwise.¹⁶

US ownership

We also include a proxy for high US ownership of the company's shares. US firms repurchase on a much larger scale than UK firms (Armitage and Gallagher, 2021). This could reflect a preference of US investors for repurchases over dividends. PwC (2019) assert that US ownership of UK shares is indeed associated with more repurchases. A simple proxy for high US ownership, and therefore for possible shareholder pressure for payout via repurchases, is whether the company has an American Depository Receipt (ADR) programme:

$$ADR_t = 1 \text{ if the company has ADRs listed in year } t \quad (13)$$

3.2 Reasons for special dividends

Lack of market-timing opportunity

Firms wishing to pay out cash might choose to avoid repurchasing when they perceive the share price to be overvalued. In this case, they could either delay the repurchase and retain the cash, or make the payout via a special dividend if they do not wish to delay. If companies behave in this manner, we expect decisions to pay special dividends to be associated with a negative value for (notional) *Timing gain*.

The annual report of Next plc (2017) provides a rare example of a discussion of the choice of flexible payout method. If it were true that the absence of timing opportunities motivates the choice of a special dividend, this motive would be awkward to convey, as it would be an admission that the company viewed itself to be overvalued. Next's 2017 report (p. 22), defending its decision to pay a series of special dividends, puts the case as follows:

‘With the share price trading at a relatively low multiple of future earnings, some have reasonably questioned whether the Company would be better to use surplus cash to buy back shares... *In hindsight* we were wrong not to buy back shares in 2008 and we hope that hindsight will prove us wrong, on this particular decision [to pay specials], once again! But at this time of significant uncertainty we feel that the decision to buy back shares is best left to shareholders themselves... In the long

¹⁶ Worldscope has items for convertible debt (18282) and preference shares (03451) but not for convertible preference shares specifically. We identify firm-years with a reduction in convertible debt or preference shares, and then check by hand whether the reduction was due to conversion.

term share buybacks remain our preferred route for returning capital to shareholders and we intend to return to them when market and trading conditions make it appropriate.’

Market-wide demand for dividends

A prominent possible reason for choosing a special dividend is to cater to shareholder preferences for returns via dividends. The catering theory, developed by Baker and Wurgler (2004), proposes that investors exhibit a market-wide demand for dividends, which varies over time, to which companies cater. The Baker-Wurgler proxy for market-wide demand is termed the ‘dividend premium’:

$$DivPremium_t = \ln(Av \frac{Mkt}{Book} \text{ of div payers})_t - \ln(Av \frac{Mkt}{Book} \text{ of nonpayers})_t \quad (14)$$

DivPremium is calculated for a given calendar year *T* using the market values for sample firms as at 31 December, and the book values for the financial year-end closest in time to 31 December.¹⁷ In all cases, the firm is classed as a dividend payer if it pays regular or special dividends in the financial year for which its book value is measured. We calculate *DivPremium* using both equal- and value-weighted averages of *Mkt/Book*. If companies cater to investor demand for dividends, a higher dividend premium should make a special dividend more likely, and a repurchase less likely, in which case the coefficient on *DivPremium* should be negative.

Firm-specific demand for dividends

Shareholder demand for dividends could also vary across firms, as suggested by Armitage (2012). Our proxies for firm-specific demand for dividends are measured by observing recent firm-level dividend activity. We calculate three measures of recent dividend payout, as follows.

$$DivYield_t = Av_{t-2 \text{ to } t-1} \frac{DPS_t + Special \text{ per share}_t}{Av(P)_t} \quad (15)$$

where *DPS* = dividend per share, and *Av(P)_t* = average share price during year *t*. The current year is excluded to avoid circularity: payout is inflated if a special is paid. *Payout ratio* is not calculated if EPS is negative in both years.

¹⁷ Thus, for firms with year-end between 1 January and 30 June, the book value used is for the year-end after 31 December of year *T*. For firms with year-end between 1 July and 31 December, the book value used is for the year-end on or before 31 December.

$$Yield\ on\ assets_t = Av_{t-2\ to-1} \frac{DPS_t + Special\ per\ share_t}{Assets\ per\ share_t} \quad (16)$$

$$Payout\ ratio_t = Av_{t-2\ to-1} \frac{DPS_t + Special\ per\ share_t}{EPS_t} \quad (17)$$

Tender offer would be required

The Listing Rules of the UK Financial Conduct Authority specify that a repurchase amount larger than 15% of the shares in issue, or amounts that take cumulative purchases since the last general meeting of the company above 15%, must be by means of a tender offer. This makes the option of a repurchase more expensive, because tender offers have high transaction costs, and they involve offering a premium to the market price of several percentage points (Louis and White, 2007). We therefore expect a special to be more likely for firm-years with a total flexible payout amount large enough to imply that a tender offer would be required. We identify such years by the following variable:

$$Tender\ required_t = 1\ if\ \frac{Flexpayout_t / Av(P)_t}{Av(Shares)_t} \geq 15\%,\ and\ zero\ otherwise \quad (18)$$

where $Av(Shares)_t$ is the average number of shares in issue, adjusted for any capital events during the year.

4. Data and descriptive statistics

4.1 Data

Our initial sample consists of almost all listed UK-registered companies during 2000-20, excluding investment and financial companies. The sample period starts in 2000, because availability of information about OMRs declines for earlier years. Our data sources are LSPD for regular, special and scrip dividends per share, daily share prices, number of shares in issue, and capital events; Worldscope for accounting data including repurchase amounts by firm-year; and the London Stock Exchange Regulatory News Service (RNS) for reports of OMR transactions and tender offers.¹⁸ We start with the companies in LSPD and attempt to find matches in Worldscope. We match both using the Stock Exchange Daily Official List (SEDOL)

¹⁸ RNS is accessed via Lexis Nexis. We run a search for announcements containing ‘Transaction in Own Shares’, ‘Share repurchase’ or ‘Share buyback’ in the title.

code and fuzzy matching on company names. Finally, we attempt to hand-match companies which have incorrect matches or no matches. This process results in a match in Worldscope for over 99% of the firm-years in LSPD.

Obtaining data on OMR transactions. Under UK Listing Rules, companies are required to report details of each OMR transaction on the trading day after it was executed. There is heterogeneity in the language used to report the precise particulars of OMRs. We manually inspect the semantics of 500 RNS announcements, using this to refine a natural language processing script trained to identify repurchase prices and volumes. We employ a variety of filters to ensure that the data we retain are accurate. Our text-reading process results in data on around 48,000 firm-days with OMR transactions.

Distinguishing payout- and pay-related repurchases. To identify repurchases by type, we first hand-collect data from annual reports for 800 firm-years with repurchases. We record which repurchase years are payout-related and which are pay-related, and for years with both types we record the amount of each type. We then train a boosted logit model on the hand-collected sample to predict the repurchase type of the remainder.¹⁹ The features of this model include repurchase size relative to both firm size ($Repurchase_t/Assets_{t-1}$) and the total payout ($Repurchase_t/TotalPayout_t$), operating cash flow, firm size, market-to-book, asset growth, return on assets, retained equity, systematic risk and idiosyncratic risk. An analysis of feature importance shows that the relative repurchase size variables are dominant, contributing 39% and 15% of the total feature influence, respectively. When repurchases are large in the context of the firm's asset base, or a large proportion of their total payout, they are significantly more likely to be payout- rather than pay-related. The model correctly classifies 85.4% of the test sample of the firm-years which have either a payout- or pay-related repurchase only.

A limitation of our classification model is that it is fit assuming a dichotomous outcome i.e. in any given year, a firm's repurchase activity will be classified as entirely related to payout or entirely related to staff pay. However, repurchase activity can be a combination of both (in the 800 hand-collected years, 10.9% of years exhibit both types). In these cases, the payout-related element tends to dominate by size. Given the importance of relative repurchase size in our classification model, years with both types of repurchase are more likely to be classified as payout- rather than pay-related. Fortunately, this is not a serious problem for our 'repurchase

¹⁹ We also ran regular logit and random forest models for classification, but the boosted logit had consistently better out-of-training-sample accuracy.

vs. special dividend' analysis. In these years, the firm has still made a genuine choice between a (payout-related) repurchase and a special dividend.

Special schemes. Some special dividends are paid by means of either a B-share scheme, or a court-approved capital reduction. Under a B-share scheme, a company issues redeemable shares *pro rata* to its shareholders, with the intention of buying them back shortly afterwards. Under a capital reduction, shareholders receive a cash payment plus shares in a new company that acquires the shares in the existing group. The schemes are means of paying a special dividend, since they are one-off payouts and all shareholders are entitled to the same cash payment per share. Under a B-share scheme, the payout could be taxed as either a dividend or a receipt of capital (as if shares had been sold); a capital reduction was taxed as a receipt of capital. Capital reductions died out by the early 2010s, and B-share schemes have been rarely used after 6 April 2015, when they were made 'capital only'.²⁰

We hand-collect special scheme dividends by means of word searches (B-share; capital reduction; return of capital) of RNS announcements, followed by checks in annual reports for confirmation. We record the amount declared in the announcement of a scheme as a special dividend for the financial year that gives rise to the declaration, as for a normal special dividend, unless the scheme was later cancelled. We identify 108 special scheme dividends made by companies during the sample period. The total amount paid via special schemes is £113bn in 2020 pounds, out of a total of £171bn for special dividends. Hence, special schemes have been an important method for paying special dividends.

A firm's decision to payout via a special scheme is most likely to enable individual shareholders to avoid income tax on dividends.²¹ This is also likely to be an underlying reason for payout via repurchases, and it would help explain why payout-related repurchases are the more important channel for flexible payouts, as shown in Table 1.

4.2 Background evidence

We have complete data for repurchases and special dividends by almost all UK listed companies. To make the descriptive data as informative as possible, we present them for the

²⁰ Two listed companies, Rolls-Royce plc and McBride plc, in effect paid regular dividends via the issue and repurchase of B-shares since the mid-2000s. Since we are concerned with flexible (one-off) payouts, we exclude the Rolls-Royce and McBride payouts from our sample of special dividends.

²¹ As implied, for example, in the circular from Standard Life Aberdeen (SLA) plc about its special payout in 2018: 'The SLA Board... concluded that the B Share Scheme would be the most favourable method for the bulk of the Return of Capital. In reaching this conclusion, the SLA Board considered in particular the position of retail Shareholders and the benefits of completing the Return of Capital to Shareholders within a fixed time frame' (p. 10). SLA had a high proportion of retail shareholders, who had received shares on conversion of Standard Life from a mutual organisation.

complete sample. In the results tables (Section 5), the samples vary from table to table and are described in the table notes. In total there are 4,494 firm-years with a repurchase, of which 1,458 are classified as payout-related and 3,036 as pay-related. There are 678 firm-years with a special dividend.

Table 1 around here

Table 1 shows data by sample year on payout via repurchases and special dividends. The annual average value of repurchases is £24.8bn in 2020 pounds, and this value does not show a clear trend, though there is a notable surge in 2005-08.²² But the proportion of firms that repurchase rises from 12.1% in 2000 to 28.3% in 2020. All of this increase is accounted for by an increasing proportion that conduct pay-related repurchases, rising from 6.2% of firms per year to 23.4%. The reason is no doubt the growing use of share-based pay by listed firms. The proportion of firms making payout-related repurchases varies around an average of 6.0% per year, and does not increase much beyond this over the sample period. As a result of the above trends, pay-related repurchases become substantially more numerous than payout-related during the sample period. By value, however, payout-related repurchases are much larger than pay-related in most years. For the whole period, the average annual value of payout-related repurchases is £21.0bn, compared with £3.7bn for pay-related.

The proportion of firms paying a special dividend increases from 1.5% per year to 3.9%; the average is 2.8%. The annual value of specials averages £8.1bn, and does not show a clear trend. Comparing payout-related repurchases with special dividends, payout-related repurchases are just over twice as common by number, while the total amount paid out is 2.6 times larger.

Table 2 around here

Table 2 shows payouts by type in relation to other types of payout. A significant majority of payout-related repurchases and special dividends are paid by firms which also pay regular dividends, consistent with the evidence in Armitage and Gallagher (2021) that both types of flexible payout are used primarily to augment regular dividends. Most pay-related

²² In comparison, the annual average for regular dividends (not shown) is £56.2bn, and the amounts of regular dividends show an increasing trend over the sample period.

repurchases are also made by dividend-paying firms. Only 13.4% of pay-related repurchases arise in years with zero dividend, compared with 47.2% of all firm-years which show zero dividend. A possible explanation is that firms that do not pay dividends lack free cash to make payouts, and therefore choose to provide shares for staff via issuance of new shares. Another possibility is that the use of share-based pay is more prevalent in dividend-paying firms, though it is not obvious, *a priori*, why this might be so.

Of the special dividends, 64.3% are paid in years with no repurchase, and a further 25.9% are paid in years with a pay-related repurchase only. The remaining 9.7% of specials are paid in years in which the firm also makes a payout-related repurchase. The low proportion of specials in years which also see a payout-related repurchase implies that firms view the two methods of payout as alternatives, and that there are reasons why they tend to choose one over the other method to make a flexible payout in a given year, rather than both together. The higher proportion of specials in years with a pay-related repurchase is not surprising, since pay-related repurchase years are about twice as common as payout-related. However, it is also consistent with our argument that a pay-related repurchase is primarily to obtain shares rather than to pay out cash, and that firms are not making a choice between a pay-related repurchase and a special dividend. In this case, we expect firm-years to be more common which combine a special and a pay-related repurchase than a payout-related repurchase.

Table 3 around here

Table 3 shows the annual frequency of repurchases by firms that make at least one repurchase during the sample period, and the equivalent for specials. Repurchase frequency is quite heterogeneous. Of firms making at least one repurchase, 38.9% do so more than one year in three, and 17.4% more than one year in two. Splitting repurchases by type, pay-related repurchases are made more frequently than payout-related, from which we infer that ‘topping up’ of shares owned by the EBT is done more frequently than repurchasing to pay out cash. Special dividends are paid less frequently than both types of repurchase. Nevertheless, the difference in frequency between specials and payout-related repurchases is moderate. For example, of the firms that pay at least one special, 79.7% do so less than one year in five, and the equivalent figure for payout-related repurchases is 70.6%.

Our evidence on the infrequency of specials contrasts with that of DeAngelo et al. (2000). They find that most US firms which paid specials before the 1980s did so nearly every year, suggesting that payment of specials in most cases was akin to payment of regular

dividends. In our sample there are only two (excluded) firms which pay specials every year for a period of more than a few years (see footnote 20).

Figures 1 to 4 around here

We also present evidence on the size of repurchases and specials by firm-year, scaled by the size of the company measured by $Assets_{t-1}$. Figure 1 shows histograms of all scaled repurchases, and Figures 2 and 3 shows payout- and pay-related repurchases separately. The distributions of the two types are clearly very different. Almost all pay-related repurchases are small; 80.0% are less than 1% of $Assets_{t-1}$, and 14.3% are between 1% and 2%. Payout-related repurchases display a much wider range, with 27.4% less than 1% of $Assets_{t-1}$, and 32.6% larger than 5% of $Assets_{t-1}$, including 7.0% exceeding 15%. The distribution of special dividends in Figure 4 displays a similar wide range of scaled sizes, but is tilted more towards larger amounts, with 56.0% of specials larger than 5% of $Assets_{t-1}$, including 24.0% exceeding 15%. The evidence on the size of specials differs from that in DeAngelo et al. (2000) and others, who find that most specials paid by US firms are small, around 1% of market value, with the exception of the occasional very large payment.

Table 4 around here

Finally, Table 4 shows descriptive statistics for the full sample of firm-years with repurchases and specials in Panel A, and for the sample available for the choice of method in Panel B (used in Table 6). Points that stand out are that *Timing gain* is positive for repurchases and negative for special dividends, and that the proxies for firm-specific demand for dividends (*DivYield*, *Yield on assets* and *Payout ratio*) are much larger for specials than for repurchases.

5. Results

5.1 Timing evidence for repurchases and special dividends

Table 5 around here

We start by presenting results on the timing gain for repurchases and the notional gain for special dividends. This analysis is conducted at the daily level; the statistics presented

summarise the timing gain of daily OMRs and notional timing gain of individual special dividends. There are in the region of 40,000 OMR days and 800 days with an announcement of a special. Table 5, Panel A strongly suggests that on average, OMRs are executed when the timing opportunity is compelling. OMRs are executed at prices 6.08% (median 1.02%) lower than the average price over the following 30 trading days, and 4.69% (3.40%) when benchmarked against the average price in the 180 days after execution. These means and medians are significantly different from zero at the 1% level. The results are similar using symmetric intervals pre- and post-execution. This implies that on average OMRs occur following price declines of approximately the same size as the price increases thereafter. When repurchases are partitioned by type, we find greater timing ability for pay- than payout-related repurchases. For example, the mean (median) timing gain for OMRs, benchmarked against average prices 180 trading days after execution, is 7.4% (4.7%) for pay-related repurchases, and 2.2% (2.0%) for payout-related. The differences across repurchase types are significant at the 1% level. The results for pay-related OMRs show that firms successfully reduce the cost of obtaining shares for their EBTs through their timing of OMRs. This suggests that the compelling nature of the timing opportunity is a probable reason for firms' choice of repurchases (as opposed to share issuance) in order to provide shares linked to staff remuneration.

Our evidence on timing is not readily consistent with the view of Bonaimé et al. (2022) that repurchases to prevent dilution of EPS from pay-based shares do not show timing gains. They do not explicitly study what we call pay-related repurchases. However, such repurchases must make up a large proportion of all the repurchases that are potentially motivated to prevent dilution due to share-based pay.

The results are also clear for the notional *Timing gain* on announcement of special dividends. Special dividends are announced at times when opportunities for a timing gain from a hypothetical equivalent repurchase are absent—there would have been a loss from market timing, had the payout been made via OMRs executed on the date on which the special was announced. On average, the share price on the date of announcement of the special dividend is 8.3% (1.8%) higher than that over the 180 days following the announcement.²³ These figures are significantly different from zero at the 1% level. The timing results for specials, together with those for payout-related repurchases, suggest that, if a firm wishes to pay out cash, the

²³ There is a positive market reaction to the announcement of special dividends. In our sample, the share price increases by 2.34% on average on the announcement day (median 0.67%). Arguably, the positive reaction biases our estimate of the notional loss upwards.

existence of market timing opportunities for potential repurchases, or the lack thereof, affects its choice of payout method. Our evidence for specials is consistent with the finding of Lie and Lie (1999) that announcements of specials are on average preceded by increases in the share price. However, our explanation, which is that specials tend to be chosen because a repurchase would result in a timing loss, differs from theirs, which is that managers cater to shareholders who wish to avoid capital gains tax.

Panel B of Table 5 shows *Timing gain* for repurchases partitioned according to the frequency with which the repurchasing firm executes OMRs during its financial year, à la Dittmar and Field (2015). We show results for three levels of frequency: the firm executes OMRs in up to four months of the year (infrequent repurchaser), in five to eight months (moderate repurchaser), and in nine months or more (frequent repurchaser). We find that there is a marked decline in *Timing gain* as frequency increases; the gain is small or non-existent for frequent repurchasers. For example, mean (median) *Timing gain* is 6.4% (4.7%) for infrequent repurchasers, benchmarked against the average share price 180 days post execution, falling to 0.0% (1.6%) for frequent repurchasers. Panel C shows results for payout- and pay-related repurchases considered separately, with the annual frequency calculated using repurchases of the relevant type only. The decline in gain as frequency of repurchase increases is similar across both types. A striking point, which Table 5 does not fully convey, is that a few large firms transact OMRs on most trading days of the year. The extent to which near-daily repurchasers attempt to time their OMRs during the year must be limited, and so timing is unlikely to be an important explanation for the decisions of such firms to pay out via repurchases.

Given the results above, one reason for the superiority of timing associated with pay-related repurchases could credibly relate to their size by firm-year, relative to payout-related repurchases. Larger repurchases tend to result in more frequent execution in order to manage liquidity. However, the gains for pay-related OMRs compare favourably to those for payout-related at all levels of frequency. Therefore, the smaller size of pay-related OMRs is probably not the only reason for their superior timing gains.

Our timing results for repurchases are broadly consistent with those in Dittmar and Field (2015) for US firms. They likewise report significant timing gains that diminish with intra-year repurchase frequency. However, the timing gains we document are larger. For example, mean (median) *Timing gain* for all repurchases in Dittmar and Field (2015) is 0.7% (0.9%) based on +30 days, and 0.3% (2.3%) based on +180 days. The equivalent figures in our data are 6.1% (1.0%) and 4.7% (3.4%), respectively. A possible explanation for the difference is that Dittmar and Field (2015) only have data on the month in which OMRs are executed,

rather than the day. If timing ability exists, as it seems to, then lack of precision in the data regarding the days on which OMRs are executed would bias downwards estimates of *Timing gain*.

Tender offers. There are only 33 tender offers in our sample. They are excluded from results for OMRs in Table 5, because they differ materially from OMRs in several respects. A key difference is the existence of large tender premiums: the offer price at which shares are repurchased is several percentage points above the share price on announcement of the offer. We find that tender premiums are sufficiently large for *Timing gain* to be negative on average. For example, mean *Timing gain* is -11.4% (median -4.9%) based on 180 days after the announcement (not tabulated). This evidence suggests that cost reduction through market timing is unlikely to be a motive for choosing a tender offer rather than a special dividend.

5.2 The choice between repurchases and special dividends

We now examine the explanatory power of market timing, management of EPS, and other motives that might affect the choice between a payout-related repurchase and a special dividend, conditional on a firm's decision to make a flexible payout. We run the following regression estimated by logit, for firm-years with a repurchase or special dividend only:

$$\begin{aligned}
 \text{Repurchase choice}_{it} &= \text{Timing gain}_{it} + \text{PayShares}_{it} + \text{Scrip}_{it} + \text{ADR}_{it} + \text{DivPremium}_{it} \\
 &+ \text{DivYield}_{it} + \text{Tender required}_{it} + \text{Control variables} + e_{it}
 \end{aligned}
 \tag{19}$$

where *Repurchase choice* = 1 for a year with a payout-related repurchase, and zero for a year with a special dividend. The explanatory variables are discussed in Section 3. We include a number of control variables that might explain decisions to make a flexible payout *per se*. The control variables are measures of cash flow, firm size, return on assets, retained equity and firm risk.²⁴ Our model is novel in that prior studies do not study determinants of the *method* of flexible payout. As a consequence, we do not have prior expectations about how the control variables might explain the choice of flexible payout method, if at all. We do not report results that include *EPS boost*, for reasons explained below.

²⁴ Our selection of controls is guided by evidence in previous studies on determinants of the decision to make payouts (Fama and French, 2001; DeAngelo, DeAngelo and Stulz, 2006; Hoberg and Prabhala, 2009). Chay and Suh (2009) and Hoberg and Prabhala (2009) find a strong negative relation between regular dividends and firm-level measures of risk. However, repurchases and specials are more flexible than regular dividends, and flexible payouts respond to changes in earnings. Therefore, the predicted sign on firm risk is uncertain *a priori*.

In some firm-years the firm carries out both a repurchase and a special dividend (Table 2). We deal with these cases as follows. If the amount of the repurchase (special) exceeds 80% of the total, the whole payout is classed as a repurchase (special). Indeterminate cases are excluded; these are firm-years in which both the repurchase and the special are below the 80% threshold, and therefore neither is treated as dominant.

The sample of firm-years with a payout-related repurchase or special dividend that we can use for the logit regression is smaller than the total of such years in the full sample, shown in Tables 1 to 3. There are various reasons for this, the most important being that our data for *Timing gain* by firm-year are less complete than the data on annual repurchase amounts sourced from cash flow statements, and used in Tables 1 to 3. We require each scraped daily OMR observation to be constructed from the value-weighted average price (if more than one OMR was transacted during the day) and the total number of shares repurchased, which is not always possible. The scraping process is also imperfect given considerable heterogeneity in the semantics of the RNS announcements, which presents challenges to any efforts to machine-read the content. Due to this, we implement strict filters to ensure high fidelity of daily OMR data (see Section 4). In the end, we capture a timing gain measure for around three-quarters of the firm-years with repurchases. To check the robustness of the results reported below, we experiment with various specifications of equation (19) with fewer explanatory variables, resulting in larger sample sizes (not reported). We confirm that the results below are robust to these changes.

Table 6 around here

Table 6 presents a selection of results. Each column shows results using a different measure of *Timing gain*, depending on the number of days over which the benchmark share price is measured. The results are similar regardless of the benchmark window chosen. *Timing gain* is consistently positive and highly significant. The implication is that when timing opportunities are compelling, firms are more likely to return cash to shareholders via repurchases. When timing opportunities are relatively unattractive, special dividends are favoured.²⁵ In contrast, the variables designed to capture incentives to manage EPS lack significance for the most part. If firms use repurchases to offset the dilution that comes from

²⁵ *Timing gain* is slightly negative for tender offers, because of the tender premium. Thus, by including tender offers in the sample, the size and significance of the coefficient on *Timing gain* is slightly biased downwards.

pay-related share issuance, we would expect a positive relation between our variable *PayShares*₁ (= (options exercised + restricted shares issued)/shares in issue), which reduce pre-repurchase basic EPS, and the decisions to repurchase. We note a positive sign for this variable, but significance only at the 5% level, or not at all. Results are similar for the other two measures of *PayShares* (not reported). This evidence provides limited support for the hypothesis that some payout-related repurchases are chosen to counteract dilution arising from pay-related share issuance. *Scrip* has the expected sign (positive) but is not significant. Overall, there is limited evidence that management of EPS is a material determinant of the choice between a repurchase and a special. *ADR*, which proxies for potential demand for repurchases from US shareholders, has the expected sign (positive) but is also not significant.

We turn to the variables intended to capture incentives to pay a special dividend. *DivYield* has the expected sign (negative) and is highly significant, while *DivPremium* has the expected sign (negative) but is not significant. Since *DivYield* proxies for cross-sectional variation in firm-specific demand, and *DivPremium* for variation over time in market-wide shareholder demand for dividends, we infer that cross-sectional variation in demand is more consequential in the choice between a repurchase and a special. The results are similar for alternatives to *DivYield*, i.e. *Yield on assets* and *Payout ratio* (not reported). Our result for *DivYield* is consistent with Lie and Lie (1999), who also find that payment of a special is positively related to dividend yield, but DeAngelo et al. (2000) report a negative relation. The latter result is probably because the sample of DeAngelo et al. stretches back to the 1940s and, historically, some firms paid specials more frequently instead of paying regular dividends. *Tender required* has a negative sign, as expected, but is not significant. This suggests that avoidance of a tender offer is not a motive in the choice of a special dividend.

Three of the control variables turn out to have significant explanatory power. *Retained equity*, *Idiosyncratic risk* and *Asset growth* all have a negative coefficient, meaning that a higher value for the respective variable is associated with the choice of a special. The result for *Retained equity* is perhaps not surprising. A higher value for retained equity as a proportion of assets is intended to proxy for a firm that is at a later stage in its lifecycle, and which is more likely to be a payer of regular dividends (DeAngelo et al. 2006). It seems that such later stage firms are also more likely to choose a special dividend, if they make a flexible payout. The results for *Idiosyncratic risk* and *Asset growth* are more unexpected. We do not have a ready explanation for why either greater fluctuation in share prices (which *Idiosyncratic risk* measures), or faster growth in the firm's assets, should be linked to payment of a special rather than a repurchase.

We conclude this section by discussing *EPS boost*. In unreported results, *EPS boost* has a consistently negative and significant coefficient, across various specifications of equation (19). This runs counter to expectation and implies that when firms could boost EPS using a repurchase, they instead choose to do a special dividend. We believe, however, that the observed negative relation stems from a peculiarity of the sample period under investigation. For most of our sample period, the interest rate environment was highly unusual when set in historical context. The yield on cash was effectively zero, meaning that the primary reason for *EPS boost* to be zero was because the company was loss-making, in which case neither a payout-related repurchase nor a special dividend would be expected. It appears, from our result for *EPS boost*, that a loss has a more negative impact on firms' willingness to pay a special than to repurchase. This is consistent with firms' behaviour regarding regular dividends. Despite the well-known 'stickiness' of regular dividends, loss-making firms will cut or omit their dividend per share. Given this, we would expect most loss-making firms to be unwilling to pay a special dividend, even if they have some spare cash from asset sales. However, some loss-making firms might be more willing to make repurchases, perhaps to take advantage of timing opportunities, and to avoid paying out via a dividend. As a consequence, we would expect special dividends to be less common in loss-making years than repurchases, and this would explain the negative sign for *EPS boost*.

5.3 Are pay-related repurchases different?

Our results above suggest that opportunities to manage EPS have little effect on the decision whether to make a payout-related repurchase or pay a special dividend. Arguably, this is not too surprising if one accepts that, *a priori*, most payout-related repurchases are unlikely to be motivated by counteraction of EPS dilution due to issues of pay-related shares. It could still be that management of EPS is the main motive for pay-related repurchases, and that in this way pay-related shares affect total amounts repurchased (if the repurchase route is chosen). This would result in a positive relation between measures of pay-related shares and repurchase amounts, as Bonaimé et al. (2022) report. However, there is an alternative explanation for a positive relation between pay-related shares and repurchase amounts. If repurchases are used to supply a certain proportion of pay-related shares, in order to exploit market timing opportunities, then a desire to benefit from market timing would also result in a positive relation between pay-related shares and repurchase amounts.

We now test whether payout- and pay-related repurchases differ regarding timing ability, and also regarding the frequency of OMR transactions. Bonaimé et al. (2022) argue

that the reason for many OMRs is to prevent dilution of EPS. Part of their case is their evidence that OMRs by firms that repurchase frequently do not display timing ability (consistent with Dittmar and Field, 2015), and that there is a positive relation between OMR frequency and measures of pay-related shares. They infer that frequent OMRs are likely to be made to prevent pay-related EPS dilution, and that timing is not an important motive.

Determinants of timing gain. Section 5.1 shows that, in a univariate comparison, pay-related repurchases display greater timing ability than payout-related. To compare timing ability across the two types of repurchase in a multivariate setting, we include possible determinants of timing ability examined by Dittmar and Field (2015):

$$\begin{aligned}
 \textit{Timing gain}_{it} = & \textit{Payout}_{it} + \textit{Frequency}_{it} + \textit{Prior mkt rtn}_{it} + \textit{Asset growth}_{it} + \textit{Leverage}_{it} \\
 & + \textit{Cash}_{it} + \textit{Size}_{it} + \textit{Mkt/Book}_{it} + \textit{Retained equity}_{it} + \textit{Volatility}_{it} + \gamma_i + \delta_t \\
 & + e_{it}
 \end{aligned}
 \tag{20}$$

In this regression, *Timing gain* is measured by firm-year, by taking the average of the gain for each OMR during the year, weighted by the number of shares repurchased, as in equations (3) and (6). *Payout* is a dummy variable equal to one if the repurchase in the year is payout-related, and zero if it is pay-related. *Frequency* = 1 (2) (3) if the firm is an infrequent (moderate) (frequent) repurchaser. We use an indicator rather than continuous variable for consistency with the univariate analysis in Table 4. We include firm (γ_i) and year (δ_t) fixed effects.

Table 7 around here

Table 7 shows separate results for *Timing gain* based on a comparison of execution prices to average prices 30, 90 and 180 days after execution.²⁶ The key result is that the coefficient on *Payout* is not significantly different from zero, for any of the three measures of *Timing gain*. This shows that timing ability is as good for pay-related as for payout-related repurchases, after controlling for the greater intra-year frequency of payout-related repurchases and for other factors that affect timing gains. Therefore, the perceived potential for timing gain is likely to be important in choosing between repurchasing and issuing new shares when topping up shares owned by the EBT, and in deciding exactly when to conduct pay-related OMRs. Regarding the other variables, *Frequency* has a negative coefficient as expected, but it is not significant, which is somewhat surprising in view of the univariate results in Table 4.

²⁶ In this section of the analysis we exclude the windows which contain pre-execution price data given that we wish to control for prior market returns, consistent with Dittmar and Field (2015).

One explanation is that *Size* has a negative coefficient, that is significant at the 1% level for *Timing gain* based on windows of +90 and +180 days. Since larger firms tend to be more frequent repurchasers, *Size* can detract from the explanatory power of *Frequency*.

Determinants of repurchase frequency. We turn finally to the question of whether pay-related repurchases are executed via more frequent OMRs. We control for the amount repurchased in the year and for other variables that might affect the frequency of OMRs, following Bonaimé et al. (2022).

$$Nrepos_{it} = Payout_{it} + \frac{Repurchase_{it}}{Assets_{it-1}} + Leverage_{it} + Cash_{it} + ROA_{it} + Size_{it} + Mkt/Book_{it} + Capex_{it} + \gamma_i + \delta_t + e_{it} \quad (21)$$

where *Nrepos* is the natural log of the number of days with OMRs during the firm-year. using The sample consists of firm-years with non-zero repurchases. Bonaimé et al. (2022) proxy for pay-related repurchases by including several variables that measure pay-related shares, and their sample includes firm-years with zero repurchases. As we are able to distinguish between payout- and pay-related repurchases, we include the *Payout* dummy as the explanatory variable of interest, rather than any measures of pay-related shares. We also include the scaled amount of repurchases during the year (*Repurchase_{it}/Assets_{it-1}*). Bonaimé et al. (2022) do not include the scaled amount, but *a priori* we would expect the annual number and total amount of OMR transactions to be positively related. Larger amounts are likely to be broken up into smaller transactions over several days, in order to minimise price impact.

Table 8 around here

In Table 8, the coefficient on *Payout* is positive and highly significant. This indicates that repurchases that are explicitly pay-related, are conducted via *less* frequent transactions than other repurchases, controlling for firm-year repurchase amount and the other variables. This evidence, together with the timing gains from pay-related OMRs, suggests that decisions to conduct pay-related OMRs are made with a view to exploiting timing opportunities. The evidence is not consistent with the view that pay-related OMRs are made frequently, when the EBT issues shares to staff, without regard to timing opportunities. When *Payout* is excluded, the coefficient on *Repurchase/Assets* is positive and significant (at the 5% level), as expected, but is not significant when *Payout* is included. *Firm Size* is significant at the 5% level in both

specifications, suggesting that larger firms tend to repurchase more frequently, even after controlling for the scaled repurchase amount.

6. Conclusion

We throw new light on the decision to conduct repurchases versus pay special dividends. We distinguish between payout- and pay-related repurchases, following the nature of reporting of repurchases in which companies make a clear distinction between the two types. We designate repurchases as pay-related if the annual report states explicitly that the purpose of the repurchase was to provide shares for re-issue to its staff, to satisfy obligations under share-based pay awards. We designate other repurchases as payout-related, in which we assume that the primary motive is to pay out cash, and not to obtain shares. We argue that special dividends and payout-related repurchases are alternatives.

Therefore, to make a flexible payout of cash, over and above any regular dividends, the choice is between a payout-related repurchase and a special dividend. We find that payout-related repurchases exhibit *gains* from market timing, based on comparison of the OMR transaction price with share prices around the date of execution. We find further that special dividends exhibit *notional timing losses*, meaning that hypothetical equivalent repurchases made upon the announcement would have produced market timing losses. Our variable *Timing gain* helps explain the choice between the two payout methods. In contrast, several proxies for incentives to use repurchases to manage EPS have limited power in explaining the choice.

To satisfy stock awards associated with employee remuneration, the firm can call upon two key sources of stock: they can issue new stock or they can repurchase existing stock in the open market for subsequent re-allocation. We find that timing is an important consideration in this decision. Pay-related repurchases exhibit timing gains that are at least as large as those for payout-related repurchases, both in a univariate analysis and after controlling for a variety of other factors. We also find that pay-related OMRs are made via less frequent OMR transactions than payout-related repurchases, again after controlling for the repurchase amount. Since pay-related repurchases have been little studied, future research could explore further how they interact with payout-related repurchases and dividends, and how companies and EBTs provide shares to honour share-based pay awards.

Figure 1

Figures 1 to 4 show frequency distributions by types of payout per firm-year, by size of payout scaled by the firm's lagged total assets. The sample consists of all repurchases and special dividends we can identify by UK listed firms during 2000-20. The distinction between payout- and pay-related repurchases is explained in Section 2.3.

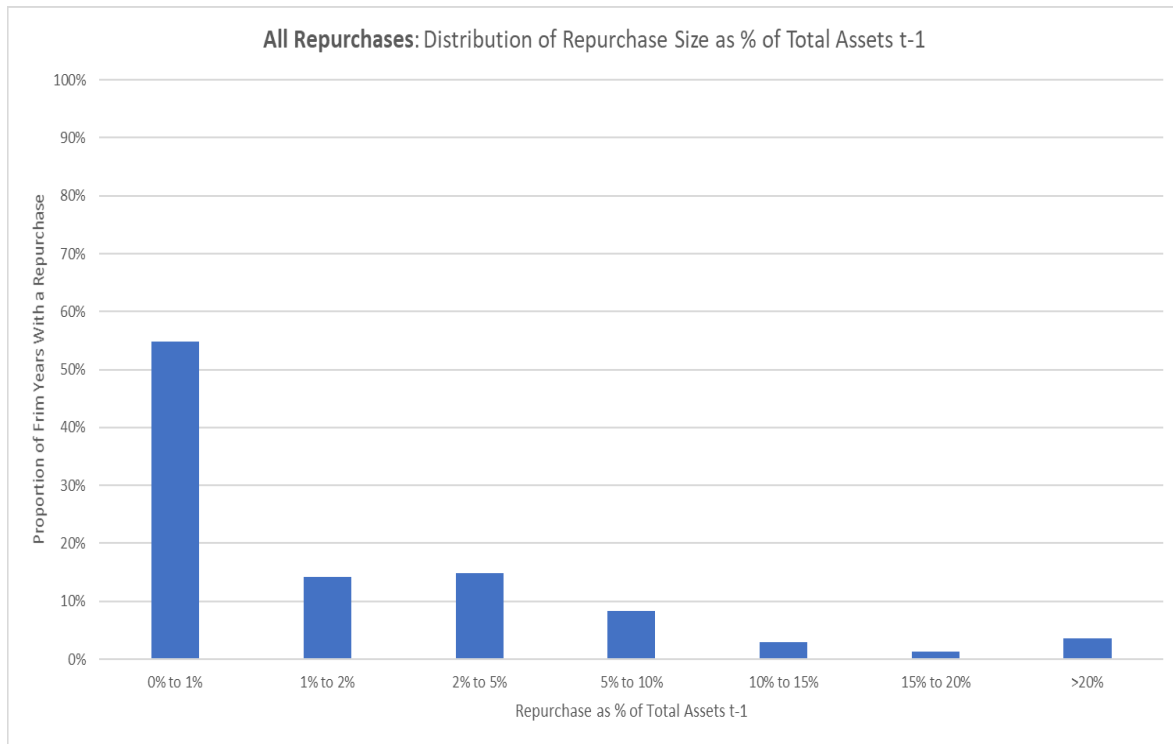


Figure 2

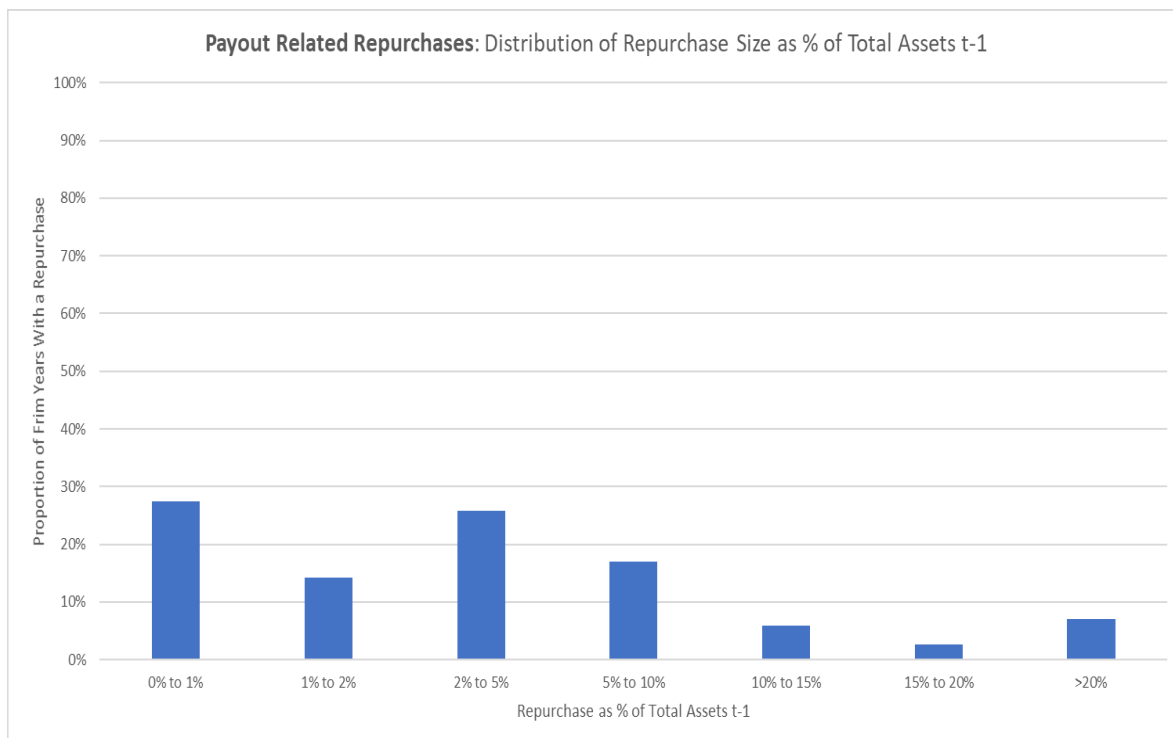


Figure 3

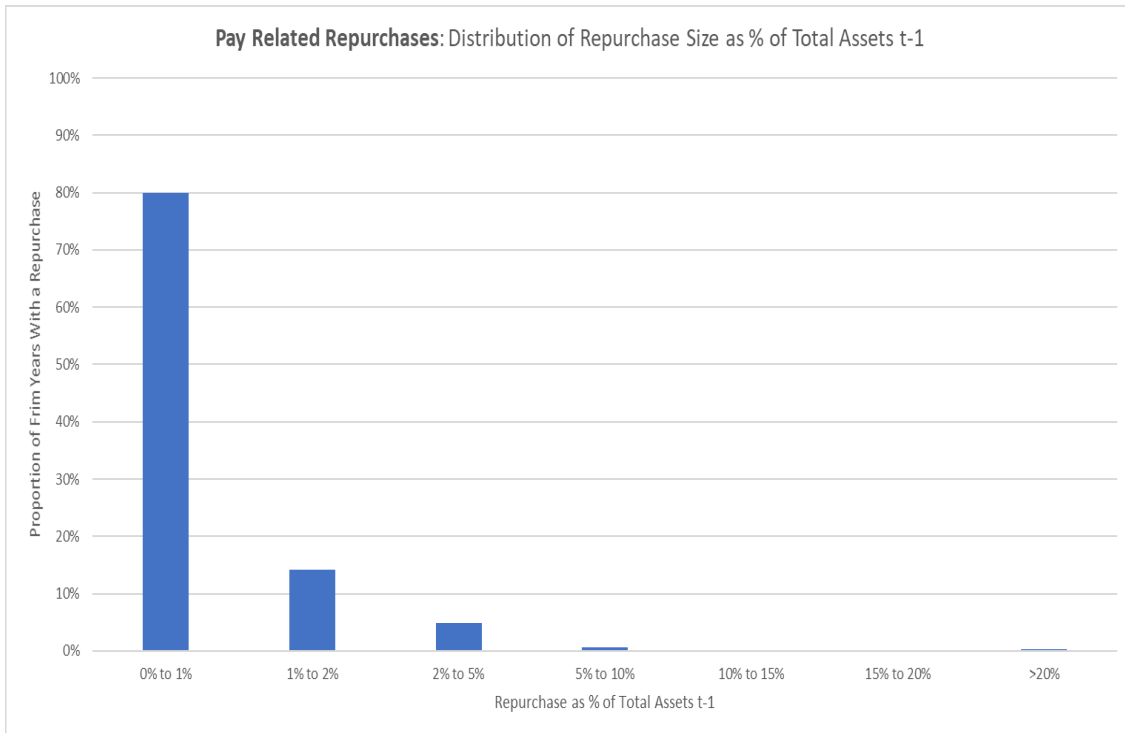


Figure 4

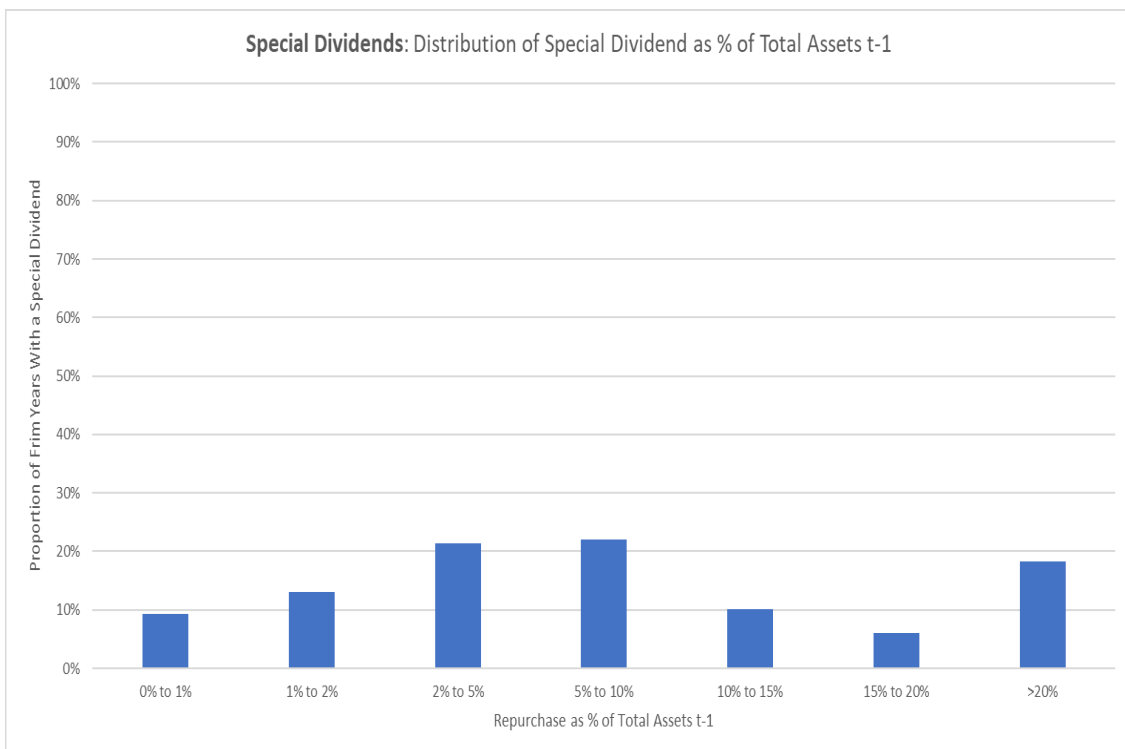


Table 1. Repurchases and special dividends by sample year

The sample consists of all repurchases and special dividends we can identify by UK listed firms during 2000-20, by firm-year. Amounts are in 2020 pounds. The distinction between payout- and pay-related repurchases is explained in Section 2.3. Most firm-years with both types of repurchase are classified as payout-related.

Year	Number of firms	Repurchases (% of firms)	Repurchase amount (£bn)	Payout-related repurchases (% of firms)	Payout-related repurchase amount (£bn)	Pay-related repurchases (% of firms)	Pay-related repurchase amount (£bn)	Firms that pay a special dividend	Special dividend amount (£bn)
2000	1,300	12.2%	12.1	5.9%	11.1	6.2%	0.9	1.5%	2.0
2001	1,416	10.2%	11.3	6.1%	9.2	4.0%	2.0	1.1%	1.2
2002	1,393	9.4%	11.3	5.7%	10.8	3.7%	0.5	1.1%	5.1
2003	1,321	10.7%	11.6	6.3%	9.2	4.5%	2.4	1.6%	1.3
2004	1,347	12.0%	17.0	5.3%	15.5	6.6%	1.5	1.6%	4.8
2005	1,551	13.8%	41.2	6.6%	39.3	7.2%	1.8	2.0%	17.0
2006	1,608	16.6%	74.0	6.7%	66.0	10.0%	8.0	2.4%	12.5
2007	1,495	19.0%	56.3	8.1%	53.5	10.9%	2.8	2.1%	33.2
2008	1,325	22.9%	32.9	9.3%	25.8	13.7%	7.0	1.1%	0.9
2009	1,188	19.2%	5.4	4.5%	2.2	14.7%	3.1	2.1%	1.1
2010	1,088	20.5%	15.1	4.9%	13.6	15.6%	1.4	2.8%	3.5
2011	1,037	23.3%	30.9	5.0%	25.2	18.3%	5.7	2.6%	5.4
2012	984	24.0%	23.4	6.1%	19.0	17.9%	4.4	4.0%	7.3
2013	956	22.7%	23.7	4.9%	18.0	17.8%	5.7	4.9%	3.6
2014	967	24.7%	34.1	5.5%	27.9	19.2%	6.2	4.7%	40.6
2015	926	23.7%	10.5	5.8%	7.2	17.8%	3.3	5.6%	8.1
2016	914	22.9%	10.4	4.8%	7.5	18.1%	2.8	5.6%	3.8
2017	887	24.8%	24.3	5.4%	20.9	19.4%	3.4	4.6%	6.7
2018	860	25.2%	36.9	6.2%	30.2	19.1%	6.7	5.1%	6.1
2019	814	27.6%	26.9	6.5%	23.6	21.1%	3.3	4.5%	4.8
2020	756	28.3%	11.2	4.9%	6.0	23.4%	5.2	3.8%	1.9
Average	1,149	18.6%	24.8	6.0%	21.0	12.6%	3.7	2.8%	8.1

Table 2. Payouts by type in relation to other types of payout

The sample consists of all repurchases and special dividends we can identify by UK listed firms during 2000-20, by firm-year.

Type of payout	Number of firm-years	As % of firm-years for type of payout
Total Payout-related repurchases	1,458	100.0%
with regular dividend	1,077	73.9%
with special dividend	11	0.8%
with regular and special dividend	55	3.8%
with no dividend	315	21.6%
Total Pay-related repurchases	3,036	100.0%
with regular dividend	2,453	80.8%
with special dividend	15	0.5%
with regular and special dividend	161	5.3%
with no dividend	407	13.4%
Total Special dividends	678	100.0%
with regular dividend	352	51.9%
with regular dividend and payout-related repurchase	55	8.1%
with regular dividend and pay-related repurchase	161	23.7%
with payout-related repurchase only	11	1.6%
with pay-related repurchase only	15	2.2%
with no regular dividend or repurchase	84	12.4%

Table 3. Frequency with which firms pay repurchases and special dividends

The sample consists of all repurchases and special dividends we can identify by UK listed firms during 2000-20, by firm-year.

Payout frequency (F)	Repurchases	Payout-related repurchases	Pay-related Repurchases	Special dividends
$F \leq$ One year in five	40.4%	70.6%	49.4%	79.7%
One year in five $< F \leq$ One year in three	20.7%	14.1%	21.2%	11.4%
One year in three $< F \leq$ One year in two	21.5%	10.8%	19.6%	4.6%
One year in two $< F <$ Every year	14.9%	2.8%	8.3%	2.6%
Every year	2.5%	1.6%	1.5%	1.7%
Number of firms	1,046	637	816	350

Table 4. Descriptive statistics

Descriptive statistics for the full sample of firms-years with available data for the given variable are reported in Panel A, and for the sample used in Table 6 (Panel B). The sample in Panel B consists of firm-years with either a payout-related repurchase or a special dividend, for which we have data for all the variables. *Timing gain (T. gain)* and variables used in Panel B are explained in Section 3.1. All other variables are defined in Appendix 3. We do not show statistics for *Prior mkt rtn* as this variable is not measured by firm-year.

Panel A Variable	All repurchases		Payout repurchases		Pay repurchases		Special dividends		Total no. of firm-years
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	
<i>FlexPayout_t/Assets_{t-1}</i>	3.12%	0.80%	8.32%	5.53%	1.84%	0.50%	9.94%	7.29%	5350
<i>T. gain</i> window ±30 days	6.33%	0.75%	4.94%	0.33%	6.97%	1.08%	-3.21%	-1.92%	2357
<i>T. gain</i> window ±90 days	6.84%	1.13%	4.96%	0.60%	7.70%	1.59%	-5.26%	-3.39%	2292
<i>T. gain</i> window ±180 days	7.06%	1.78%	4.63%	0.86%	8.14%	2.44%	-6.35%	-4.55%	2189
<i>T. gain</i> window +30 days	6.06%	0.98%	4.31%	0.21%	6.86%	1.37%	-3.77%	-0.64%	2361
<i>T. gain</i> window +90 days	5.88%	2.07%	3.15%	0.54%	7.12%	3.01%	-7.59%	-1.96%	2333
<i>T. gain</i> window +180 days	4.90%	3.39%	1.16%	0.53%	6.58%	4.44%	-9.83%	-2.51%	2268
<i>OMR days in year</i>	31.61	7	54.72	20	23.82	5	NA	NA	1322
<i>Asset growth</i>	14.80%	5.14%	18.79%	2.51%	13.82%	5.64%	11.95%	4.75%	5350
<i>Capex</i>	4.95%	3.14%	5.32%	3.32%	4.86%	3.06%	4.18%	2.80%	5338
<i>Cash</i>	17.47%	9.83%	22.18%	12.15%	16.32%	9.52%	23.88%	17.29%	5346
<i>Cashflow</i>	11.33%	10.68%	11.07%	10.92%	11.39%	10.61%	15.26%	13.06%	5350
<i>Idiosyncratic risk</i>	33.51%	29.80%	35.45%	31.60%	33.02%	29.50%	35.54%	31.00%	5392
<i>Market/Book</i>	3.30	2.10	2.90	1.55	3.40	2.24	3.82	2.25	5352
<i>Retained equity</i>	18.52%	24.75%	9.91%	25.57%	20.67%	24.49%	23.96%	34.27%	5388
<i>ROA</i>	5.28%	5.66%	5.77%	6.40%	5.15%	5.53%	7.49%	8.84%	5408
<i>Size</i>	12.93	12.90	12.54	12.12	13.04	12.99	12.55	12.64	5408
<i>Stock volatility</i>	36.03%	32.70%	37.59%	34.00%	35.64%	32.40%	37.84%	33.55%	5392
<i>Systematic risk</i>	2.47%	2.10%	2.09%	1.80%	2.56%	2.20%	2.26%	1.80%	5392

Table 4 cont.

Panel B Variable	Payout repurchases			Special dividends		
	Mean	Median	<i>N</i>	Mean	Median	<i>N</i>
<i>PayShares1</i>	0.67%	0.32%	537	0.65%	0.25%	253
<i>Scrip</i>	0.02	0.00	537	0.01	0.00	253
<i>ADR</i>	0.25	0.00	537	0.18	0.00	253
<i>DivPremium</i>	-15.20%	-15.03%	537	-15.13%	-15.03%	253
<i>DivYield</i>	2.61%	2.47%	537	7.25%	4.17%	253
<i>Yield on assets</i>	4.13%	2.99%	535	9.79%	5.91%	252
<i>Payout ratio</i>	45.71%	37.48%	491	87.12%	63.63%	216
<i>Tender required</i>	0.05	0.00	537	0.13	0.00	253

Table 5. Timing gain by payout type and firms' frequency of repurchasing

Panel A reports mean and median for daily values of *Timing gain* for OMRs, measured using share prices for different windows of trading days in relation to the repurchase day (0), e.g. ± 30 days. The data for special dividends are notional timing gains, centred on the announcement day. *Timing gain* and notional gain are explained in Section 3.1. The sample consists of all OMRs and announcements of special dividends for which we could obtain the requisite price data. There are more special dividends than in Table 2 because some firms announce more than one special in a given firm-year. In Panels B and C the values for *Timing gain* for repurchases are partitioned according to whether the repurchasing firm conducts OMRs in up to four months of the relevant year (an infrequent repurchaser), between 5 and 8 months (moderate) and nine months or more (frequent). The sample in this table excludes tender offers.

Panel A	All repurchases			Payout-related repurchases			Pay-related repurchases			Special dividends		
<i>T. gain</i> window	Mean	Median	<i>N</i>	Mean	Median	<i>N</i>	Mean	Median	<i>N</i>	Mean	Median	<i>N</i>
± 30 days	6.41%	0.79%	41,310	4.77%	0.58%	32,038	8.14%	1.25%	9,272	-2.41%	-1.55%	809
± 90 days	6.91%	1.12%	40,157	4.91%	0.74%	31,181	9.06%	2.27%	8,976	-4.46%	-3.28%	788
± 180 days	7.09%	1.77%	38,556	4.56%	0.87%	30,020	9.75%	3.50%	8,536	-5.50%	-4.27%	760
+30 days	6.08%	1.02%	41,388	4.36%	0.65%	32,050	7.91%	1.58%	9,338	-2.22%	0.01%	809
+90 days	5.83%	2.06%	41,079	3.77%	1.46%	31,813	8.05%	3.19%	9,266	-6.01%	-1.39%	806
+180 days	4.69%	3.40%	40,432	2.20%	2.03%	31,372	7.35%	4.70%	9,060	-8.27%	-1.77%	792
Panel B	All repurchases											
	By infrequent repurchaser			By moderate repurchaser			By frequent repurchaser					
<i>T. gain</i> window	Mean	Median		Mean	Median		Mean	Median		Mean	Median	
± 30 days	8.11%	1.38%		5.52%	0.64%		1.73%	0.27%				
± 90 days	8.94%	2.66%		5.85%	0.91%		1.39%	0.14%				
± 180 days	9.49%	3.82%		5.69%	1.17%		0.54%	-0.38%				
+30 days	7.77%	1.76%		5.21%	0.66%		1.33%	0.32%				
+90 days	7.58%	3.47%		5.21%	1.40%		1.03%	1.06%				
+180 days	6.38%	4.68%		4.49%	2.49%		0.04%	1.64%				
Panel C	Payout-related repurchases						Pay-related repurchases					
	Infrequent		Moderate		Frequent		Infrequent		Moderate		Frequent	
<i>T. gain</i> window	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
± 30 days	6.84%	1.14%	5.33%	0.64%	1.13%	0.22%	8.86%	1.52%	5.90%	0.52%	4.37%	0.66%
± 90 days	7.26%	1.60%	5.59%	0.91%	0.79%	-0.03%	9.96%	3.38%	6.36%	0.99%	4.06%	0.65%
± 180 days	7.28%	2.65%	5.26%	1.17%	-0.14%	-0.45%	10.80%	4.51%	6.53%	1.17%	3.61%	0.20%
+30 days	6.35%	1.50%	4.94%	0.66%	0.73%	0.27%	8.62%	2.04%	5.75%	0.70%	3.98%	1.12%
+90 days	5.72%	2.96%	4.57%	0.97%	0.51%	1.06%	8.70%	3.92%	6.47%	2.50%	3.30%	1.46%
+180 days	3.98%	3.68%	3.28%	1.64%	-0.37%	0.77%	7.81%	5.62%	6.91%	3.71%	1.87%	2.63%

Table 6. Choice between repurchases and special dividends

Regression results for eq. (19), estimated by logit. The sample consists of firm-years with either a payout-related repurchase or a special dividend, for which we have data for all the variables. Results are shown including *Timing gain* measured using different numbers of trading days, as shown in the column headings. The first seven explanatory variables, to *Tender required*, are the main variables of interest and are explained in Section 3. The remaining variables are controls, defined in Appendix 3. The first five control variables (*Cashflow* to *ROA*) are as in Fama and French (2001), *Idiosyncratic risk* and *Systematic risk* follow Hoberg and Prabhala (2009), and *Retained equity/Assets* follows DeAngelo et al. (2006). Robust standard errors are in italics. *** (**) (*) = significant at the 1% (5%) (10%) level.

	<i>Timing gain</i> window = ±30 days	<i>T. gain</i> window = ±180 days	<i>Timing gain</i> window = +30 days	<i>T. gain</i> window = +180 days
<i>Timing gain</i>	12.630*** <i>2.395</i>	9.014*** <i>1.616</i>	5.327*** <i>0.942</i>	1.190*** <i>0.409</i>
<i>PayShares1</i>	23.840** <i>11.340</i>	25.410** <i>11.320</i>	24.290** <i>11.440</i>	17.030 <i>11.000</i>
<i>Scrip</i>	0.212 <i>0.999</i>	0.358 <i>1.085</i>	0.193 <i>1.231</i>	0.344 <i>0.930</i>
<i>ADR</i>	0.111 <i>0.242</i>	0.151 <i>0.238</i>	0.135 <i>0.240</i>	0.092 <i>0.239</i>
<i>DivPremium</i>	-1.032 <i>0.683</i>	-1.077 <i>0.695</i>	-0.820 <i>0.688</i>	-0.335 <i>0.649</i>
<i>DivYield</i>	-34.830*** <i>5.019</i>	-35.640*** <i>5.208</i>	-35.060*** <i>5.925</i>	-33.880*** <i>5.096</i>
<i>Tender required</i>	-0.098 <i>0.438</i>	-0.057 <i>0.437</i>	-0.137 <i>0.412</i>	-0.199 <i>0.403</i>
<i>Cashflow</i>	0.762 <i>0.684</i>	1.183 <i>0.919</i>	0.732 <i>0.688</i>	0.709 <i>0.602</i>
<i>Size</i>	0.054 <i>0.045</i>	0.035 <i>0.045</i>	0.053 <i>0.045</i>	0.066 <i>0.043</i>
<i>Mkt/Book</i>	-0.036 <i>0.026</i>	-0.038 <i>0.027</i>	-0.038 <i>0.027</i>	-0.035 <i>0.024</i>
<i>Asset growth</i>	-0.309** <i>0.132</i>	-0.363*** <i>0.129</i>	-0.313** <i>0.125</i>	-0.361*** <i>0.117</i>
<i>ROA</i>	-2.480* <i>1.503</i>	-2.817* <i>1.677</i>	-2.290 <i>1.411</i>	-2.439* <i>1.420</i>
<i>Idiosyncratic risk</i>	-2.464*** <i>0.786</i>	-2.916*** <i>0.804</i>	-2.787*** <i>0.783</i>	-2.605*** <i>0.753</i>
<i>Systematic risk</i>	-7.565 <i>6.042</i>	-6.533 <i>6.185</i>	-6.349 <i>6.270</i>	-7.759 <i>6.187</i>
<i>Retained equity</i>	-1.659*** <i>0.444</i>	-1.738*** <i>0.485</i>	-1.760*** <i>0.565</i>	-1.678*** <i>0.482</i>
Constant	-34.830*** <i>5.019</i>	-35.640*** <i>5.208</i>	-35.060*** <i>5.925</i>	-33.880*** <i>5.096</i>
Firm-years	790	763	789	777
<i>Pseudo R-squared</i>	0.243	0.237	0.202	0.199

Table 7. Determinants of timing gain

Regression results for eq. (20). The dependent variable is *Timing gain* by firm-year (Section 3.1), measured using different windows of trading days. The sample is the total number of OMR days for which we have price information for the OMR and accounting data for the repurchasing firm. Tender offers are excluded. *Payout* = 1 if the relevant firm-year is a payout-related repurchase year, and 0 if pay-related. The other variables follow Dittmar and Field (2015). *Frequency* = 1 (2) (3) for an infrequent (moderate) (frequent) repurchaser (see Table 5). The remaining control variables are defined in Appendix 3. Standard errors clustered by firm are in italics. *** (**) (*) = significant at the 1% (5%) (10%) level.

	<i>Timing gain</i> window = +30 days	<i>Timing gain</i> window = +90 days	<i>Timing gain</i> window = +180 days
<i>Payout</i>	-0.009 <i>0.010</i>	-0.010 <i>0.011</i>	-0.020 <i>0.015</i>
<i>Frequency</i>	-0.011 <i>0.008</i>	-0.009 <i>0.009</i>	-0.003 <i>0.012</i>
<i>Prior mkt rtn</i>	0.008 <i>0.040</i>	-0.066 <i>0.048</i>	-0.158*** <i>0.056</i>
<i>Asset growth</i>	0.010 <i>0.012</i>	-0.007 <i>0.012</i>	-0.014 <i>0.015</i>
<i>Leverage</i>	-0.164** <i>0.083</i>	-0.170* <i>0.095</i>	-0.204* <i>0.115</i>
<i>Cash</i>	-0.058 <i>0.090</i>	-0.110 <i>0.108</i>	-0.151 <i>0.133</i>
<i>ROA</i>	-0.103 <i>0.080</i>	-0.102 <i>0.102</i>	-0.214* <i>0.122</i>
<i>Size</i>	-0.028 <i>0.017</i>	-0.038*** <i>0.013</i>	-0.080*** <i>0.001</i>
<i>Mkt/Book</i>	0.000 <i>-0.001</i>	0.000 <i>-0.001</i>	-0.001 <i>-0.001</i>
<i>Retained equity</i>	0.017 <i>0.021</i>	0.007 <i>0.027</i>	-0.014 <i>0.038</i>
<i>Stock volatility</i>	0.039 <i>0.079</i>	0.098 <i>0.086</i>	0.152 <i>0.101</i>
Firm fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
<i>N</i> repurchase days	47,655	46,583	45,359
<i>N</i> firms	531	519	506
<i>Adj. R-squared</i>	0.031	0.045	0.097

Table 8. Determinants of repurchase frequency

Regression results for eq. (21). The dependent variable is $\ln(\text{number of days in firm-year with OMRs})$. The sample is the total number of firm-years with at least one OMR, for which we have price information for the OMRs and accounting data for the repurchasing firm. $Payout = 1$ if the relevant firm-year is a payout-related repurchase year, and 0 if pay-related; $Repurchase = \text{Value of repurchases}_t / \text{Assets}_{t-1}$. The other variables follow Bonaimé et al. (2022), and are defined in Appendix 3. Standard errors clustered by firm are in italics. *** (**) (*) = significant at the 1% (5%) (10%) level.

	Ln(<i>N</i> days with OMR)	Ln(<i>N</i> days with OMR)
<i>Payout</i>	1.344*** <i>0.106</i>	
<i>Repurchase</i>	0.207 <i>1.006</i>	3.204** <i>1.500</i>
<i>Leverage</i>	-0.258 <i>0.500</i>	-1.021* <i>0.537</i>
<i>Cash</i>	-0.034 <i>0.440</i>	0.737 <i>0.472</i>
<i>ROA</i>	-0.280 <i>0.445</i>	-1.000** <i>0.506</i>
<i>Size</i>	0.245** <i>0.117</i>	0.240** <i>0.119</i>
<i>Mkt/Book</i>	-0.006 <i>0.001</i>	-0.003 <i>0.014</i>
<i>Capex</i>	-0.658 <i>0.644</i>	-0.790 <i>0.783</i>
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
<i>N</i> firm-years	1,717	1,739
<i>N</i> firms	529	534
<i>Adj. R-squared</i>	0.299	0.136

Appendix 1. Other motives for repurchases

Protecting pay received via stock options or restricted shares (Fenn & Liang, 2001; Kahle, 2002). Executives and other staff commonly receive pay awards in the form of stock options or restricted shares, under which they will receive shares in the future at a fixed or zero exercise price. The executive gains from a higher share price at the time they receive shares under their award. Such awards create incentives to authorise repurchases during the period between receipt of the award and receipt of the shares, because the share price will be higher if payouts are made via repurchases instead of dividends. This is the pay-protection motive for repurchases. It constitutes a further reason, beyond management of EPS, for why share-based pay might give rise to repurchases.

Bonaimé et al. (2022) highlight that in the US (i) awards of executive stock options have declined since 2005, when their cost was first required to be shown in the income statement, and (ii) awards of dividend-protected restricted stock have increased, for which the pay-protection motive does not apply. Since 2005 they find no relation between repurchase amounts and executive options outstanding, and they conclude that protection of pay is no longer an important motive for repurchases. In the UK awards of restricted shares have also become more common, as has dividend protection of such awards. As part of our hand-collection of data, we record for 1,430 firm-years whether awards of options and restricted shares are dividend-protected. The proportion of protected awards is zero up to 2006, rising to more than half by 2020. De Cesari and Ozkan (2015) find no support for the pay-protection motive in a UK sample from 2001-08. Overall, the pay-protection motive has become a less important over time in the UK, as in the US.

Boost to share price when executive stock options vest. When their options vest, executives tend to exercise them and sell the shares on the market, locking in a profit. They therefore benefit from a higher share price at the specific time of vesting, and have an incentive to authorise OMRs just beforehand (assuming that OMRs boost the share price). Edmans et al. (2022) using US data find a positive relation between OMR amounts and the quarters when CEO stock options vest. Such repurchases are followed by negative long-run abnormal returns, suggesting that the shares repurchased were overvalued and that these particular repurchases were driven by CEO self-interest rather than market timing. However, PwC (2019) for the UK find no evidence of vesting-related repurchases. Given this evidence of an absence vesting-related repurchases in the UK, we do not include a variable for the vesting of stock options.

EPS targets in pay schemes. Executives with an EPS or share price target that is set in their pay scheme have an incentive to authorise repurchases that will help to ensure the target

is met, thereby boosting their pay. For the UK, Young and Yang (2011) report statistically weak evidence from regressions that firms' repurchases are linked to the presence of an EPS target in their executives' pay schemes. But PwC (2019) do not identify a single case in which repurchases by a UK firm are used to meet a pay-related EPS target.

Appendix 2. Collection of data on pay-related shares

Four of the annual data items that we collect are found in the note on share-based pay: options outstanding (in terms of the number of shares), options exercised, restricted shares granted, and restricted shares vested or exercised. If there is no separate note, the information might be found in the note on share capital. We collect data relating to share-based pay for all employees, not only executives. Reporting varies greatly across companies in its level of detail and its style of presentation. Recording is awkward because the relevant amounts often have to be obtained by summing across more than one table, or from numbers in sections of text. We classify as options awards in which the recipient pays a non-zero exercise price to obtain the shares. We classify as restricted shares awards in which the recipient pays a zero exercise price. UK companies use a variety of terms for restricted shares as defined, including options, deferred shares, performance shares, incentive shares and free shares.

The fifth annual data item is the number of dilutive shares. This is stated in the note on earnings per share. Sometimes, if the company has made a loss, no number is shown for dilutive shares. If no number is shown for either year $t-1$ or year t , or both, we assume that the change in dilutive shares from year $t-1$ to t is zero.

Appendix 3. Definitions of control variables

The sources are Worldscope for accounting data and LSPD for market data (share prices; shares in issue; market returns; idiosyncratic and systematic risk).

Variable	Definition
<i>Asset growth</i>	$(Assets_t - Assets_{t-1})/Assets_{t-1}$
<i>Capex</i>	Capital expenditure _t /Assets _t
<i>Cash</i>	Cash holdings _t /Assets _t
<i>Cashflow</i>	Cash flow from operations _t /Assets _t
<i>Idiosyncratic risk</i>	Standard deviation of non-market-related returns using the log of monthly returns over the 60 months before firm-year <i>t</i>
<i>Market/Book</i>	$(Assets - Shareholders' funds + Market value)_t/Assets_t$
<i>Prior mkt rtn</i>	Return on stock market over six months preceding start of year <i>t</i>
<i>Retained equity</i>	Retained profit _t /Assets _t
<i>Return on assets</i>	Earnings before interest and tax _t /Assets _t
<i>Size</i>	Ln(Assets _t)
<i>Stock volatility</i>	Standard deviation of daily returns on the share over six months preceding start of year <i>t</i>
<i>Systematic risk</i>	As for <i>Idiosyncratic risk</i> but using market-related returns

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