The Long-Term Consequences of Short-Term Incentives*

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Abstract

This paper shows that short-term stock price concerns induce CEOs to take value-reducing actions. Vesting equity, our measure of short-term concerns, is positively associated with the probability of a firm repurchasing shares, the amount of shares repurchased, and the probability of the firm announcing a merger and acquisition (M&A). When vesting equity increases, stock returns are more positive in the two quarters surrounding both repurchases and M&A, but more negative in the two years following repurchases and four years following M&A. These results are inconsistent with CEOs buying underpriced stocks or companies to maximize long-run shareholder value, but consistent with these actions being used to boost the short-term stock price and improve the conditions for equity sales. Overall, by identifying actions that carry clear value implications, this paper documents the long-term negative consequences of short-term incentives.

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1. Introduction

The short-termism of executive incentives is a major problem alleged by academics, practitioners, and policymakers. A central concern in Bebchuk and Fried's (2004) influential critique of executive pay is that CEOs are rewarded for short-term increases in the stock price; hence, their main proposal for pay reform is to escrow the CEO's equity until the long-term (Bebchuk and Fried (2010)). The UK Government's response to its Green Paper on Corporate Governance Reform proposes increasing the minimum vesting period of equity from three to five years.

The concern with short-term incentives is that they lead to the CEO taking myopic actions that boost the short-term stock price at the expense of long-run value. However, critics' allegations are rarely backed up by systematic evidence. Gathering such evidence is particularly challenging for two main reasons. First, it is very difficult to demonstrate a causal effect of short-run horizons since the CEO's contract is endogenous. Second, even if one could show that CEO incentives cause particular actions, it is difficult to show that such actions are myopic, i.e., erode long-term value.

Edmans, Fang, and Lewellen (2017, "EFL") address the first challenge by introducing a new measure of CEO incentives: the amount of stock and options scheduled to vest in a given quarter. Vesting equity is highly correlated with same-quarter equity sales, so it leads to short-term stock price concerns, analogous to the relevance criterion for a valid instrument.[1] It also depends on the magnitude and vesting schedule of equity grants made several years ago, and so is unlikely driven by current economic conditions – analogous to the exclusion restriction for a valid instrument. EFL show that vesting equity is significantly correlated with reductions in investment growth. They study investment since it is arguably a firm's most important day-to-day decision. However, since we can only observe the level of investment and not its quality, it is difficult to assess the value implications

[1] Vesting equity is also relevant because the vesting schedule is known to the CEO in advance, and so he is able to take actions to boost the short-term stock price in anticipation. In contrast, while unanticipated liquidity shocks might lead to equity sales, they are unlikely to affect corporate actions as they are unplanned.

of the investment cut and thus address the second challenge of showing that the cut is myopic. If the scrapped investments would have been wasteful, the implication of short-term stock price concerns is very different – far from inducing myopia, they encourage the CEO to rein in empire-building or excess expenditure. While EFL conduct cross-sectional tests that are suggestive of the myopia interpretation, they are unable to use long-run stock returns to study the long-term consequences of investment cuts, for three reasons. First, any association is unlikely to be causal, because long-term stock returns are likely affected by many firm decisions other than investment. Second, there is no announcement date for investment cuts, as firms are only required to report investment at a quarterly frequency. Third, their sample period is relatively short (2006-11).

This paper studies two corporate actions whose long-run consequences can be more accurately measured, enabling us to assess the long-term consequences of short-term incentives. The first is stock repurchases. Like investment cuts, repurchases boost the short-term stock price (Ikenberry, Lakonishok, and Vermaelen (1995)) and so CEOs with short-term concerns might have incentives to undertake them. Also like investment cuts, repurchases can either be myopic (if financed by scrapping valuable projects) or efficient (if financed by free cash which would otherwise have been wasted). Critically, unlike investment cuts, the long-term stock return can be used to diagnose the value implications of the repurchase even if it were not caused by the repurchase. The long-term stock return measures the return that the firm obtains from the repurchased stock.

The second corporate action is M&A, which has different advantages to repurchases. First, M&A has an announcement date, enabling us to cleanly calculate short- and long-term returns. Moreover, the announcement date is relevant – the majority (72%)[2] of announced M&A is eventually completed. In contrast, firms are only required to make an announcement when they first establish a repurchase

[2] This figure is a lower bound since 13% of deals are intended and 11% are pending. These deals could eventually be completed, but just not within our sample period.

program[3], announced repurchases are often not completed (Stephens and Weisbach (1998)), and there are major problems with the standard data source used to approximate repurchase announcements, described later. Second, M&A is a much more significant event than an investment cut (or repurchase) – it is arguably the most transformative corporate decision that a firm can undertake – and so it is likely that at least a significant portion of long-run stock returns is attributable to the M&A. Indeed, prior literature (e.g. Agrawal, Jaffe, and Mandelker (1992)) uses long-run stock returns to assess the long-term value implications of M&A.

As an example of how a firm might use M&A to boost the short-term stock price with negative long-run consequences, Bazaarvoice acquired PowerReviews in June 2012, which led to its stock price soaring above $20. Bazaarvoice's officers and directors then sold $90 million of stock before the U.S. Department of Justice ("DoJ") commenced an antitrust lawsuit in January 2013, since PowerReviews was Bazaarvoice's closest competitor. The DoJ lawsuit forced Bazaarvoice to divest PowerReviews and led to its stock price falling below $7. In internal communications, Bazaarvoice executives stated that their motivation for the acquisition was "[e]limination of our primary competitor" to leave them with "literally, no other competitors." Thus, they likely knew that a DoJ lawsuit would be probable and that the long-term returns would be negative, but the acquisition announcement inflated the stock price in the short-term.

We study the relationship between vesting equity and both actual repurchases and M&A announcements over 2006-2015, a longer sample period than prior literature that allows us to study long-term returns. We find that a one standard deviation increase in vesting equity is associated with

[3] Until 2004, share repurchases are regulated by the Securities Exchange Act of 1934. The 1934 Act requires firms to obtain board approval for establishing repurchase programs, but does not require firms to announce either their establishment or the subsequent actual repurchases. NYSE and NASDAQ require listed companies to disclose when they first establish repurchase programs but not the subsequent actual repurchases. The new Exchange Act of 2004 also requires firms to disclose the total number of shares actually repurchased, the average price paid per share, the number of shares purchased as part of a publicly announced program, and the maximum number of shares (or approximate dollar value) that may yet be repurchased under the program – but not the actual repurchase dates.

a 1.2% increase in a firm's likelihood of conducting a share repurchase in a given quarter (corresponding to an expected increase in shares repurchased of $1.5m for an average firm), controlling for other determinants of repurchase behavior and year-quarter fixed effects. This compares with the unconditional repurchase probability of 37.5%. When focusing on sizable repurchases, i.e. ones that exceed the sample mean, the increase is now 1.04% compared to an unconditional probability of 20%. These results are not driven by repurchases that result from investment cuts – instead, repurchases and investment cuts appear to be independent channels that a CEO may pursue to increase the stock price. We find similar results for M&A: a one standard deviation increase in vesting equity is associated with a 0.6% increase in a firm's likelihood announcing an M&A in a given quarter, compared with the unconditional probability of 15.8%.

Our main results are the short- and long-term returns to repurchases and M&A. Again, we find a consistent picture across both corporate events: vesting equity increases short-term returns but reduces long-term returns, consistent with it inducing the CEO to take myopic actions with negative long-term consequences.[4] A one standard deviation increase in vesting equity is associated with an annualized 0.61% higher return over the two quarters surrounding a repurchase, but a 1.11% (0.75%) lower return during the first (second) year after the repurchase. The results are similar for M&A although the negative association with long-run returns persists for longer. A one standard deviation increase in vesting equity is associated with an annualized 1.47% higher return over the two quarters surrounding an M&A announcement, but a 0.81%, 0.35% (insignificant), 0.72%, and 0.62% lower return in the first, second, and third, and fourth subsequent years.

This paper is related to three literatures. The first is on the effects of short-term equity incentives. In addition to EFL, Edmans et al. (2017) show that CEOs reallocate news toward months in which

[4] These results are consistent with Graham, Harvey, and Rajgopal (2005). Their survey finds that 78% of executives would sacrifice long-term value to meet earnings targets, although they do not study equity incentives.

their equity vests and away from adjacent months, and Gopalan, Huang, and Maharjan (2016) document that vesting equity leads to CEO departures. Ladika and Sautner (2016) find that the adoption of FAS 123R induced some firms to accelerate option vesting, which in turn led to a fall in investment; Jochem, Ladika, and Sautner (2016) show that accelerated vesting prompted CEO turnover. Our main contribution is to identify outcome variables (repurchases and M&A) whose long-run effects can be estimated, thus allowing us to demonstrate that short-term equity incentives may have negative long-term consequences.

While our main contribution is to study the long-term effects of short-term incentives, rather than to show the effect of vesting equity on different outcome variables, the outcome variables chosen are of independent interest as they relate the paper to two separate literatures. One is on the determinants and consequences of stock repurchases. Dittmar (2000) studies the effect of various characteristics on stock repurchases; we show that they are also determined by the CEO's contract horizon. Turning to the consequences, Ikenberry, Lakonishok, and Vermaelen (1995, 2000) show that the long-term returns to stock repurchases are positive, suggesting the average repurchase creates value. In contrast, Almeida, Fos, and Kronlund (2016) show that repurchases that are motivated by the desire to beat earnings per share ("EPS") forecasts lead to reductions in employment and investment, and a fall in cash holdings (which could either be positive or negative for firm value). Whether a firm is motivated to beat EPS forecasts depends ex post on whether earnings would be below the forecast in the absence of the repurchase. We identify a determinant of repurchase activity that is predictable ex ante, and link it to long-run stock returns.

The third literature is on the determinants and consequences of M&A. Firms are more likely to engage in acquisitions if they have overconfident CEOs (Malmendier and Tate (2008)), young CEOs (Yim (2013)), less debt-based CEO compensation (Phan (2014)), and deviate from their target capital structure (Uysal (2013)). Turning to the consequences, the surveys of Jensen and Ruback (1983) and

Andrade, Mitchell, and Stafford (2001) show that acquirers enjoy (modestly) positive short-term returns and negative long-term returns. Moreover, short- and/or long-term returns have been shown to be increasing in recent acquirer performance (Morck, Shleifer, and Vishny (1990)) and corporate governance (Masulis, Wang, and Xie (2007)), and decreasing in CEO overconfidence (Malmendier and Tate (2008)) and CEO debt-based pay (Phan (2014)). We show that CEO short-term incentives affect both the propensity to acquire and the short-and long-run returns to acquisitions.

2. Data and Variable Measurement

2.1 Measuring short-term incentives

Our initial sample contains the entire 48,856 firm-CEO-years for which Equilar collects compensation data from 2006 to 2015. We closely follow the approach of EFL to calculate vesting equity, which is described in more detail in Appendix B. In short, this procedure involves three steps. First, we use annual data from Equilar to infer the number of shares and options that vest, grant-by-grant, in a particular year. Second, we allocate this vesting equity to a particular quarter, since quarterly is the highest frequency available for actual repurchases. This requires the vesting date of equity, which we infer for options using their expiry date and estimate for stock using EFL's algorithm. Third, we calculate the effective value of quarterly vesting equity. Doing so requires the delta of each individual vesting option, which we are able to calculate since the first step yields grant-by-grant vesting data.[5] The resulting measure reflects the dollar change in vesting equity for a 100% change in price, and we label it *VESTING*. We estimate *VESTING* for a sample of 150,914 firm-CEO-quarters, representing 6,122 unique firms and 9,623 unique CEOs.

[5] Prior to 2006, disclosure requirements do not allow us to infer vesting options on a grant-by-grant level.

2.2 Measuring stock returns to corporate actions

As discussed in the introduction, we link equity vesting to share repurchases and M&A, since we can assess their long-term value implications using long-run stock returns.

We first measure a firm's actual repurchases in a given quarter. Historically, this task has been difficult for three reasons. First, firms were not required to disclose actual repurchases in their periodic filings prior to 2004. Second, while Thomson Reuters's Securities Data Company ("SDC") Platinum database collects repurchase announcements, these announcements are voluntary after a repurchase program is first established (which could be several years prior). Even when firms do announce their repurchases, they are not obligated to follow through with these announcements – they can subsequently choose to purchase more shares than announced, fewer shares than announced, or even none at all (Stephens and Weisbach (1998)). Third, although researchers have used several databases to approximate the actual amount of shares repurchased by a firm in a given year, such as SDC Platinum, the Compustat Annual files, and CRSP, each database has its unique challenges and the resulting proxies are often noisy. Banyi, Dyl, and Kahle (2008) find significant estimation errors in all of them.

We measure actual repurchases using Compustat Quarterly. This database takes advantage of the Securities and Exchange Commission's (SEC) enhanced disclosure requirements, which require public companies to report the number of common shares repurchased (CSHOPQ in Compustat Quarterly) as well as the average price paid for the shares repurchased (PRCRAQ) in their 10-Q filings for quarterly reporting for periods ending on or after March 15, 2004. We first define a binary variable *REP* to denote the existence of a share repurchase for a firm, which equals one if the firm reports either CSHOPQ or PRCRAQ in a given quarter, and zero otherwise.[6] We also calculate

[6] In our sample, 1,002 (1.07%) firm-quarters report PRCRAQ but not CSHOPQ because Compustat Quarterly codes CSHOPQ as "Insignificant" if the number of reported shares outstanding is less than 500 shares. Our results are unaffected if we code *REP* as one only if the firm reports both CSHOPQ and PRCRAQ in a quarter.

REP%, the value of the shares repurchased (CSHOPQ × PRCRAQ) as a percentage of market capitalization at the end of the prior quarter.

We collect data for all M&A announced between January 2006 and May 2016 from SDC Platinum. We define *MA*, a binary variable that equals one if a firm announced an M&A as an acquirer in a quarter, and zero otherwise.

To gauge the long-run value implications of share repurchases and M&A, we calculate the buy-and-hold abnormal returns (BHAR) surrounding these events. We calculate BHAR also at the quarterly level, from quarter *q-1* (the quarter prior to the event quarter *q*) to quarter *q+16*. We calculate a firm's quarterly BHAR by first geometrically compounding its three-month raw return and then subtracting the geometrically-compounded return on one of three benchmarks – the CRSP value-weighted index, Fama-French 49 industry portfolio, and Daniel, Grinblatt, Titman, and Wermers's (1997, DGTW) characteristic-based portfolio. The last two benchmarks control for industry- and firm-level factors that might account for a firm's stock returns.

For M&A, 72% of announced deals in our sample are eventually completed, and so an M&A announcement has real consequences. We thus also calculate *CAR*, the cumulative market-adjusted abnormal returns to the announcements of M&A, over [-1, +1], [-2, +2], and [-3, +3] (with day 0 being the announcement date), to capture the initial market reaction. We cannot similarly calculate the returns to share repurchase announcements for several reasons. First, firms are only required to make an announcement when they first establish a repurchase program; subsequent modifications to the program and actual repurchases do not need to be announced. Second, as Banyi, Dyl, and Kahle (2008) show, even for repurchases that are announced, data quality in SDC Platinum is poor. SDC's data coverage is far from comprehensive and systematically misses announced repurchases for low growth firms; on the other hand, it double counts other repurchases. Third, even for repurchase announcements that are accurately recorded, they are often not followed through and so are less

relevant events than M&A announcements. It may take several years for the repurchase to be executed; Stephens and Weisbach (1998) study the three-year period after an announcement and find that the average repurchase is not completed. Nevertheless, we verify robustness to studying repurchase announcements in Section 5.

2.3 Controls

As standard controls, we include the CEO's incentives that might arise from his unvested equity holdings (*UNVESTED*), already-vested equity holdings (*VESTED*), salary (*SALARY*), and bonus (*BONUS*), to isolate the incentives provided by vesting equity rather than other components of a CEO's contract. We also include the CEO's age, tenure, and a new CEO indicator (*AGE*, *TENURE*, and *NEWCEO*). *NEWCEO* is measured for the year to which quarter *q* belongs, while *UNVESTED*, *VESTED*, *SALARY*, *BONUS*, *AGE*, and *TENURE* are measured for the year before.

We follow Huang and Thakor (2013) to construct additional controls used in the repurchase analysis. These controls include the natural logarithm of quarterly sales (*SALES*), market-to-book ratio (*MB*), the long-term debt-to-assets ratio (*BKLEV*), the operating and nonoperating return-on-assets ratio (*ROA* and *NROA*) and recent stock returns (*RET*). These controls measure firm size, leverage, accounting performance (which affects excess capital) and stock performance (which affects undervaluation) – factors previously shown to affect repurchase behavior (e.g., Dittmar (2000), Jagannathan, Stephens, and Weisbach (2000), Guay and Harford (2000)). We measure these controls either over quarter *q-1* or at the end of *q-1*.

The additional controls used in the M&A analysis are mainly taken from Uysal (2011). We first calculate the trailing one-year average market leverage ratio (*MKLEV*) prior to quarter *q-1*, which, as Uysal (2011) shows, is the primary driver of a firm's M&A decision. We also include *SALES*, *MB*, *ROA*, and *RET* to proxy for firm size and performance, *MALIQ*, the sum of M&A values in the firm's

industry over a year to measure its industry M&A liquidity, as well as *HFI*, the Herfindahl index of the firm's industry to measure its product market concentration.

2.4 Sample and summary statistics

The sample that intersects vesting data with repurchase data and controls consists of 93,537 firm-CEO-quarters, and the sample that intersects vesting data with M&A and controls consists of 94,362 firm-CEO-quarters. Table 1 reports summary statistics. Comparable to EFL, vesting equity has a mean of $786,877 in our sample. In a given quarter, 37.5% of firms buy back stock and 15.8% announce at least one M&A. The average percentage of shares repurchased is 0.36% for all firms; this number becomes 0.95% if we limit the sample to firms that conducted repurchases.

3. Share Repurchase

3.1 Equity vesting and share repurchase

We assess whether vesting CEOs are more likely to engage in a share repurchase by running the following panel regression:

$$REP_q\ (REP\%_q) = \alpha + \beta VESTING_q + \gamma CONTROLS1_{q-1} + \varepsilon_q. \qquad (1)$$

The dependent variable is either the repurchase indicator *REP* or the repurchase amount *REP%*. The independent variables include *VESTING* measured for the CEO during quarter *q*, as well as the controls as discussed in Section 2.3. The sample is at the firm-CEO-quarter level, but we omit firm subscripts (and CEO subscripts if there are multiple CEOs for a firm in a quarter) for brevity. In all regressions henceforth, we cluster standard errors at the firm level.[7]

[7] The sample contains 93,537 firm-CEO-quarters, which correspond to 92,873 firm-quarters. Out of the 92,873 firm-quarters, only 652 (0.7%) have multiple CEOs. The results are robust to replacing firm fixed effects with CEO fixed effects and clustering the standard errors at the CEO level throughout.

Column (1) of Table 2 reports the regression results of estimating equation (1) with *REP* as the dependent variable using a probit model, which ensures that the predicted values of *REP* are bounded within [0, 1] and allows for heteroskedasticity. We include year-quarter fixed effects to control for time variation in share repurchases induced by common shocks, such as macroeconomic conditions. Vesting equity is positively associated with a firm's likelihood of conducting a share repurchase in a given quarter at the 1% level. Based on the reported marginal effect, a one standard deviation increase in *VESTING* is associated with 1.2% increase in the firm's likelihood of conducting repurchase in a quarter, which is modest compared to 37.5%, a firm's unconditional probability of repurchasing shares in a quarter in our sample.

The economic significance increases if we only consider sizable repurchases to begin with. If we redefine *REP* to equal one only when the percentage of shares repurchased exceeds the sample average of 0.36%, a one standard deviation increase in *VESTING* is associated with 1.04% increase in the firm's likelihood of such a repurchase. This corresponds to 5.21% of the unconditional probability of 20%.

Column (2) reestimates equation (1) using a linear probability model (LPM): the coefficient on *REP* is similar in magnitude to that reported in column (1) and remains significantly positive at the 1% level. Compared to a probit model, a LPM assumes a non-normal and homoscedastic error term and potentially gives unbounded predicted values of *REP*, but it allows us to estimate coefficients on certain binary covariants that are otherwise non-estimable under probit (Caudill (1987)). We exploit this feature of LPM and include firm fixed effects in column (3) to control for firm-level heterogeneity in the propensity to repurchase. The coefficient on *REP* remains significantly positive at the 1% level, albeit smaller in magnitude.

Columns (4)-(5) of Table 2 report the ordinary least squares (OLS) regression results of estimating equation (1) with *REP%* as the dependent variable. Again, we first include year-quarter fixed effects

in column (4) and then add firm fixed effects in column (5). *VESTING* remains positive and significant at the 1% level. Based on the reported coefficient in column (4), a one standard deviation increase in *VESTING* is associated with a 0.03% increase in the amount of shares repurchased as a fraction of market capitalization, compared to the sample mean of 0.36%. Based on the average market capitalization of $5bn, this translates into $1.54m per quarter, or $6.16m annualized. This is a somewhat larger magnitude to Edmans, Fang, and Lewellen, who find that a one standard deviation increase in *VESTING* is associated with an annualized fall in investment of $1.8m.

Among the controls for the CEO's other equity incentives, *UNVESTED* is significantly positive in all five specifications and *VESTED* is significantly negative in three. The coefficients on these variables is difficult to interpret: the CEO's voluntary holdings of vested equity are endogenous. His holdings of unvested equity are also endogenous since they depend on recently-granted equity; moreover, unvested equity might mitigate or exacerbate myopia depending on when it vests in the short-term or long-term. Turning to other controls for CEO incentives and characteristics, repurchases are positively related to CEO salary and negatively related to CEO age. The coefficients on firm characteristics are generally consistent with prior literature – repurchases are more likely for firms that are large, low-value, less leveraged, more profitable, and recent stock market laggards.

The results in Table 2 do not control for investment, because EFL show that vesting equity leads to a reduction in investment. Thus, investment would be a "bad control", as it is affected by the independent variable of interest. However, it remains important to check whether our results are robust to controlling for investment. If repurchases are financed by investment cuts, the negative correlation between *VESTING* and repurchases could be due to repurchases simply proxying for investment cuts. Table 3 thus adds contemporaneous R&D and capital expenditure (both scaled by total assets) as additional controls. While repurchases are indeed strongly negatively correlated with capital expenditure and weakly negatively correlated with R&D, the coefficients on *VESTING* are

almost unchanged compared to those reported in Table 2.[8] These results suggest that investment cuts and share repurchases are independent channels that a CEO may pursue to increase the stock price when his equity is vesting, rather than repurchases simply being financed by investment cuts.

3.2 Equity vesting and BHAR surrounding share repurchase

The prior section showed that vesting equity induces the CEO to increase stock repurchases. These repurchases could be myopic, if they are financed by cuts in value-enhancing investments not included in R&D or capital expenditure (e.g., organizational development, which is included in Selling, General, and Administrative expenses), or if they are of overvalued stock. Alternatively, they could be efficient, if they are financed by free cash that might otherwise be wasted, or if they are of undervalued stock. Under both hypotheses, short-term returns to repurchases should be positive – even if a firm's stock is overvalued, repurchases may still boost the short-term stock price by (falsely) signaling undervaluation to the market. However, the two hypotheses have opposite predictions for long-run returns: if repurchases are myopic (efficient), long-run returns should be negative (positive). As discussed in the introduction, this prediction does not require the assumption that future stock returns are caused by the repurchases.

We regress the BHAR surrounding repurchases on *VESTING*:

$$BHAR_t = \alpha + \beta VESTING_q + \varepsilon_q. \quad (2)$$

This regression approach follows Chen, Harford, and Li (2007). The dependent variable, BHAR, is calculated at the quarterly level from quarter *q-1*, the quarter prior to the event quarter, to quarter *q+16*, 16 quarters after. We require a firm to be traded at least two years following quarter *q* to be included in the sample. We measure short-term returns by compounding BHAR over quarters *q-1* and *q* for two reasons. First, stock returns in these two quarters will have the most direct effect on

[8] The results are also unaffected if we include changes in R&D and capital expenditure from prior quarter (also scaled by total assets) as additional controls.

the CEO's payoff from equity sales induced by equity vesting in quarter *q*. Second, expanding the window into quarter *q-1* helps capture market reaction if an announcement was made ahead of the actual repurchase. We measure long-run returns by annualizing BHAR over quarters *q+1* to *q+4*, *q+5* to *q+8*, *q+9* to *q+12*, and *q+13* to *q+16*, respectively.[9] We continue to include year-quarter fixed effects and firm fixed effects.

Columns (1)-(5) of Table 4 report the OLS regression results of estimating equation (2) with BHAR calculated over the short-term window and four long-run windows, respectively. In Panel A, BHAR is calculated relative to the returns on the CRSP value-weighted index. The coefficient on *VESTING* is positive and significant at the 5% level in column (1), which suggests that repurchases conducted by firms with larger amounts of equity vesting for their CEOs enjoy a higher return in the near term. A one standard deviation increase in *VESTING* is associated with 0.3% increase in BHAR over quarters *q-1* to *q*, and 0.61% if annualized. However, the pattern quickly reverses as the coefficients on *VESTING* turn significantly negative in columns (2) and (3), both at the 1% level. Firms with higher CEO vesting equity experience much lower returns over the two years following repurchases. A one standard deviation increase in *VESTING* is associated with a 1.11% (0.75%) decrease in BHAR during the first (second) year following the repurchase.[10] The coefficients become insignificant in the third and fourth year.

Panels B and C repeat the analyses in Panel A, but instead calculate BHAR relative to the returns on the Fama-French 49 industry portfolios and the returns on the DGTW characteristic-based

[9] We convert quarterly BHARs over the four years following repurchases into four annual BHARs instead of eight semi-annual BHARs for the ease of presentation. The results are consistent if we instead run the long-run stock return analyses using semi-annual BHARs. Separately, the results are also consistent if we include the list of controls from equation (1) when estimating equation (2).

[10] The sample size in the long-run return analysis changes between columns depending on the availability of BHAR. We report economic significance for each column using its reported coefficient on *VESTING* and the standard deviation of *VESTING* in the sample used to estimate the regression.

portfolios, respectively. We observe a similar pattern: *VESTING* is positively related to BHAR over the two quarters surrounding repurchases but negatively related to BHAR over the next two years.

Overall, the results of Table 4 are more consistent with vesting equity inducing CEOs to undertake myopic repurchases that boost short-term returns at the expense of long-term value, rather than efficient repurchases that increase firm value in both the short- and long-run.

4. Mergers and Acquisitions

4.1 Equity vesting and M&A announcement

This section links vesting equity to another corporate action, M&A. Our hypothesis is that, similar to repurchases, vesting equity could induce a CEO to undertake M&A that boosts the short-term stock price at the expense of long-term returns. Unlike repurchases, the vast majority (72%) of announced M&A are completed, and so we test this hypothesis by linking vesting equity to M&A announcements.

We run the following panel regression:

$$MA_q = \alpha + \beta VESTING_q + \gamma CONTROLS2_{q-1} + \varepsilon_q. \qquad (3)$$

The dependent variable is the M&A indicator *MA*, and the independent variables include *VESTING* and the controls discussed in Section 2.3. As in the repurchase analyses, we build the sample at the firm-CEO-quarter level.

Table 5 reports the regression results of estimating equation (3) using a probit model in column (1) and a LPM in columns (2)-(3). We include year-quarter fixed effects in all three columns, and firm fixed effects in the last column. Vesting equity is positively associated with a firm's likelihood of announcing an M&A in a given quarter at the 5% level or lower. Based on the reported marginal effect in column (1), a one standard deviation increase in *VESTING* is associated with a 0.6% increase

in the firm's likelihood of announcing an M&A in a quarter, compared with the unconditional probability of 15.8%.

When firm fixed effects are included in column (3), the controls for other CEO incentives and CEO characteristics are all insignificant except for CEO's incentives from his unvested equity, which is significantly positive at the 10% level, and a new CEO indicator, which is significantly negative also at 10%. Turning to firm controls, market-to-book and the firm's accounting and stock performance are significantly positive. Market leverage is significantly negative, consistent with Uysal (2011).

Given the size of M&A, it is less likely that M&A (as opposed to repurchases) is financed by investment cuts. Nevertheless, we repeat the analysis in Table 5 controlling for contemporaneous R&D-to-assets and capital expenditures-to-assets. The results are reported in Table OA1 and remain robust.

4.2 Equity vesting and BHAR surrounding M&A announcement

We now evaluate the efficiency of vesting-induced M&A. As in the repurchase analyses, we similarly regress the BHAR surrounding M&A announcements on *VESTING*:

$$BHAR_t = \alpha + \beta VESTING_q + \varepsilon_q. \quad (4)$$

Unlike repurchases, we do have the exact announcement dates for M&A so we calculate BHAR in the equation above, from quarter *q-1*, redefined as three months prior to the announcement date, to quarter *q+16*, 16 quarters after the announcement date.[11] Again, we require a firm to continue trading at least two years following quarter *q* and include year-quarter and firm fixed effects.

Table 6 reports the regression results of estimating equation (4) with BHAR calculated relative to the returns on the CRSP value-weighted index, Fama-French 49 industry portfolios, and DGTW

[11] Some firms announce multiple M&A in a given quarter. To avoid artificially inflating sample size, for the long-run BHAR analysis and the announcement return analysis, we retain the deal with the largest absolute market reaction.

characteristic-based portfolios in Panels A, B, and C, respectively. All three panels demonstrate a similar pattern to Table 4: *VESTING* is positively related to short-term returns but negatively related to long-term returns. The one difference is that the negative relationship with long-term returns persists for up to four years, consistent with Agrawal, Jaffe, and Mandelker's (1992) finding of five-year negative long-term returns to M&A. Based on the coefficients reported in Panel A, a one standard deviation increase in *VESTING* is associated with an annualized 1.47% increase in BHAR over quarter *q-1* to *q*. However, it is also associated with a 0.81%, 0.35% (insignificant), 0.72%, and 0.62% decrease in BHAR in the first, second, and third, and fourth years after the M&A, respectively.

4.3 Equity vesting and M&A announcement returns

While Table 6 studies stock returns in the two quarters around the M&A announcement, Table 7 hones in on the [-1, +1], [-2, +2] and [-3, +3] windows, to more precisely measure how M&A boosts the short-term stock price. We hypothesize a positive relationship between *VESTING* and *CAR*, i.e. vesting equity leads CEOs to announce deals that are perceived more positively by the market in the short-term. We run the following regression:

$$CAR_t = \alpha + \beta VESTING_q + + \gamma CONTROLS3_{q-1} + \varepsilon_q. \quad (4)$$

As before, we control for the other components of CEO pay, age, tenure, and a new CEO dummy, as well as size and the market-to-book ratio due to size and value effects in stock returns. Consistent with our hypothesis, a CEO's vesting equity is positively related to his firm's M&A announcement returns. Based on the reported coefficients, a one standard deviation increase in *VESTING* is associated with 0.15% increase in three-day *CAR*, 0.18% increase in five-day *CAR*, and 0.20% increase in seven-day *CAR*. These results suggest that CEOs with high vesting equity undertake acquisitions that the market responds to positively in the short-term.

5. Robustness Checks

This section describes the results of additional robustness tests. The first set of tests verify robustness to alternative definitions of the dependent variables. Table OA2 studies the link between vesting equity and repurchase announcements. We do not use repurchase announcements in the core analyses primarily due to the data quality issues described in Section 2.2. In addition, a repurchase announcement is less meaningful (compared to an M&A announcement) since the repurchase may not eventually be completed. However, since repurchase announcements can increase the short-term stock price even if not eventually executed, a CEO with short-term concerns may have incentives to undertake them. The dependent variable is *REPANN*, an indicator for whether a firm announces a share repurchase program or actual share repurchase in a particular quarter. Under both probit and LPM specifications, *VESTING* is positive and significant at the 1% level. For example, a one standard deviation increase in *VESTING* is associated with 0.4% increase in a firm's likelihood of announcing a repurchase in a given quarter, compared with the unconditional probability of 4.3%. The economic significance is markedly higher than in Table 2, but we put less weight on these results given the data issues.

Table OA3 studies robustness to alternative definitions of the M&A dependent variable. The first alternative is *MANUM*, the number of acquisitions announced in a particular quarter (while Table 5 used *MA*). Column (1) and (2), without and with firm fixed effects respectively, show that *VESTING* is positive and significant at the 5% level or better. The second alternative is *MASUM*, the aggregate value of all acquisitions made in a particular quarter, scaled by the acquirer's market capitalization at the end of the previous quarter. [12] Column (3) shows that *VESTING* is positive and significant at the 1% level without firm fixed effects. The significance level drops to 10% in column (4) with firm fixed

[12] We drop a firm-quarter if a firm announced at least one M&A but all deals have missing transaction size. If the firm announces at least one deal with non-missing transaction size, the firm-quarter is included, with missing transaction sizes set to zero. If the firm did not announce any acquisitions, *MASUM* is zero.

effects, potentially due to the *MASUM* being underestimated because over half of the deals in our sample do not have their size recorded in SDC. Table OA4, Panels A and B, repeats the results of Tables 5 and 6 (respectively) only considering M&A announcements that are subsequently completed. Despite the smaller sample, the results are similar to including all M&A announcements.

Table OA5 conducts the return analyses of Table 4 (for repurchases) and Table 6 (for M&A) studying CAR rather than BHAR. While BHAR geometrically compounds a stock's benchmark-unadjusted return and then subtracts the geometrically-compounded benchmark return, the CAR first calculates a stock's benchmark-adjusted monthly (or daily) returns and then arithmetically compounds them over several months. Conrad and Kaul (1993) argue that the BHAR method is more accurate for statistical reasons, hence using it in the main analyses, but here we verify robustness to CAR. The inferences are unchanged: both repurchases and M&A lead to significantly positive short-term returns, but negative long-term returns over two years for repurchases and four years for M&A.

The final set of tables verifies robustness to alternative ways of calculating *VESTING*. One concern with *VESTING* is that an option's delta is increasing in the current stock price, which may be correlated with unobservable variables (such as growth opportunities) that also drive repurchase and M&A behavior. While this might seem to work against our repurchase results (since higher growth opportunities would encourage investment rather than repurchases), it may explain our M&A results (since a higher stock price may make it easier to stock-finance M&A, or obtain board approval for M&A). Table OA6 recalculates *VESTING* assuming that all options are at-the-money. This still allows option deltas to vary with their maturity date and the volatility of the underlying stock, but removes their dependence on the strike price.

A related concern is that the current stock price may affect *VESTING* through triggering vesting. Our use of vesting equity is motivated by it being determined by equity grants made several years prior. While true for grants with time-based vesting, performance-based vesting is becoming more

common, and Bettis et al. (2010) find that 46% of performance-based vesting provisions are contingent on stock price thresholds, twice as frequent as the next category. Table OA7 recalculates *VESTING* including only time-based vesting grants, and removes post-2006 grants labeled "performance-based," "contingent," or "accelerated;" post-2006 grants with unknown vesting schedule.

Table OA8 addresses the concern that an option's delta depends on its time-to-maturity, but if CEOs exercise their options shortly after they vest, their effective horizons are shorter. We thus recalculate *VESTING* using options' intrinsic values: we assign a delta of one to all in-the-money options and zero to all out-of-the-money options, because only the former would be exercised immediately upon vesting. In Tables OA6-OA8, the inferences regarding both the frequency of and returns to repurchases and M&A are unchanged.

6. Conclusion

This paper shows that the impending vesting of equity may lead CEOs to take myopic actions – actions that boost the short-term stock price at the expense of long-term value. An increase in vesting equity is associated with a greater frequency of stock repurchases and M&A announcements, and higher short-term returns and lower long-term returns surrounding these events. These results provide suggestive evidence of the negative causal effects of short-term CEO incentives on long-term firm value, thus potentially justifying proposals to lengthen the vesting period of equity.

Note that, while we have provided evidence of the potential costs of short-term incentives, there may also be costs of lengthening vesting periods, as proposed by some academics and practitioners. For example, longer vesting periods may subject the CEO to risk outside his control and lead to him demanding a risk premium, or avoiding value-creating risky projects as shown theoretically by Brisley (2006). Relatedly, the model of Laux (2012) shows that, if equity is forfeited upon dismissal,

long vesting periods may encourage the CEO to take short-term actions that reduce the risk of being fired. Future research is needed to identify the costs of long-term incentives to provide further guidance on any reform.

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Appendix A: Definition of variables

This appendix describes the calculation of variables used in the core analysis. Underlined variables refer to variable names within Compustat. *t* indexes the year to which quarter *q* belongs.

Variable	Definition
Outcome variables of interest	
REP_q	An indicator variable that equals one if a firm reports either the number of shares repurchased (*CSHOPQ*) or average repurchase price (*PRCRAQ*) in quarter *q*, and zero otherwise.
$REP\%_q$	The value of shares repurchased in quarter *q* (*CSHOPQ*× *PRCRAQ*) as a percentage of market capitalization (*CSHOQ*× *PRCCQ*)) at the end of quarter *q-1*, and zero if no repurchase is conducted.
MA_q	An indicator variable that equals one if a firm announced an M&A in quarter *q*, and zero otherwise.
$BHAR_{q-1\ to\ q}$	A firm's buy-and-hold abnormal return (BHAR) over quarter *q-1* and *q*, with quarter *q* being either the fiscal quarter in which a share repurchase occurred or the one quarter that follows an M&A announcement (with the first day of the quarter being the M&A announcement date). For repurchase events, BHAR is calculated as the firm's geometrically-compounded monthly raw returns minus a benchmark return geometrically compounded over the same period: either the CRSP value-weighted index, the Fama-French 49 industry portfolio (obtained from Kenneth French's data library), or the DGTW (1997) characteristic-based portfolio (obtained from Russell Wermers' website) BHAR and benchmark returns for M&A events are calculatedly similarly as those for repurchase events, but use daily returns rather than monthly returns. $BHAR_{q+1\ to\ q+4}$, $BHAR_{q+5\ to\ q+8}$, $BHAR_{q+9\ to\ q+12}$, and $BHAR_{q+13\ to\ q+16}$ are analogously calculated as a given firm's BHAR for quarter *q+1* to *q+4*, *q+5* to *q+8*, *q+9* to *q+12*, and *q+13* to *q+16*, respectively.
CAR_q	Cumulative market-adjusted abnormal announcement return surrounding an M&A announcement made by a firm during quarter *q*. It is calculated as the sum of the firm's daily abnormal returns over [*-n*, *n*] with the daily abnormal return being the firm's daily raw return minus the corresponding return on the CRSP value-weighted index, where day 0 is the announcement date and *n* = 1, 2, and 3 trading days.
CEO's stock price sensitivity of his vesting equity	
$VESTING_q$	CEO's stock price sensitivity of his vesting equity in quarter *q*, calculated as the price sensitivity of vesting stock [number of vesting shares in quarter *q* × stock price at the end of quarter *q-1*] plus the price sensitivity of vesting options [aggregated delta of vesting options in quarter *q* × stock price at the end of quarter *q-1*]. Vesting options are assigned to quarter *q* based on expiry dates, and vesting stocks are assigned to quarter *q* based on grant dates. See EFL for details on the algorithm to estimate the vesting date of option and stock grants and details on the calculation of option delta.
Controls	
$UNVESTED_{q-1}$	CEO's stock price sensitivity of his unvested equity at the end of year *t-1*.
$VESTED_{q-1}$	CEO's stock price sensitivity of his already-vested equity at the end of year *t-1*.
$SALARY_{q-1}$	CEO's salary in year *t-1*.
$BONUS_{q-1}$	CEO's cash bonus in year *t-1*.
AGE_{q-1}	CEO's age in year *t-1*.
$TENURE_{q-1}$	CEO's tenure in year *t-1*.
$NEWCEO_q$	An indicator variable to denote new CEO in year *t* to which quarter *q* belongs.
$SALES_{q-1}$	Natural logarithm of total sales of quarter *q-1*.

MB_{q-1}	The ratio of market value of assets to book value of assets, calculated as [market capitalization plus book value of total debt (*DLTTQ*+*DLCQ*)] divided by total assets, both at the end of quarter *q-1*.
$BKLEV_{q-1}$	Long-term debt-to-asset ratio (*DLTTQ*)/*AT* of quarter *q-1*.
ROA_{q-1}	Operating income (*OIBDPQ*) in quarter *q-1* divided by the average of the total assets at the beginning and the end of quarter *q-1*.
$NROA_{q-1}$	Non-operating income (*NIPIQ*) in quarter *q-1* by the average of the total assets at the beginning and the end of quarter *q-1*.
RET_{q-1}	A firm's BHAR relative to the CRSP value-weighted index over quarter *q-1*.
$R\&D_q$	R&D (*XRDQ*) in quarter *q* divided by total assets at the end of quarter *q-1*, and set to zero if missing.
$CAPX_q$	Capital expenditure (inferred from *CAPXY*) in quarter *q* divided by total assets at the end of quarter *q-1*, and set to zero if missing.
$MKLEV_{q-1}$	Average quarterly market leverage over year *t-1*, calculated as book value of total debt divided by market value of total debt, where market value of total debt is the sum of book value of total debt, market capitalization, and preferred stock (*PSTKQ*) minus deferred taxes and investment tax credit (*TXDITCQ*).
$MALIQ_{q-1}$	Industry M&A liquidity is the sum of acquisitions value for the year to which quarter *q-1* belongs within three-digit SIC code divided by the total assets of all Compustat firms in the same three-digit SIC and year.
HFI_{q-1}	Herfindahl index, calculated as the sum of the squares of the market shares of the Compustat firms for the year to which quarter *q-1* belongs in the same three-digit SIC industry. Market share is defined as the sales of a firm divided by the sum of sales in the firm's industry.
MV_{q-1}	Natural logarithm of market capitalization at the end of quarter *q-1*.

Appendix B: Calculation of Vesting Equity

This Appendix describes our calculation of vesting equity, which also follows EFL. First, we retrieve a CEO's number of vesting shares in a given year using Equilar's variable "Shares Acquired on Vesting of Stock," which includes shares vested from restricted stock plans, restricted stock unit plans, and long-term incentive plans. We then infer a CEO's number of vesting options in the year, grant by grant, from his unvested options at the beginning and the end of the year as well as his newly awarded options during the year. Option grants are sorted using their strike price and expiry date.

Second, we convert vesting equity from an annual to quarterly basis by estimating the vesting date of equity. For options, this is simple. Options vest and expire on the anniversary of a grant (as assumed in the literature and as we verify in a random sample). For shares, there is no expiry date, and grant dates are only available for shares awarded after 2006 in Equilar, so we follow EFL's algorithm to assign them to a particular quarter. In the first step, a CEO's vesting shares in a given year are attributed to stock awards post 2006 for which we know the grant dates from Equilar. These include cliff-vesting grants, which vest at the end of the vesting period, and graded-vesting grants, which we assume to vest annually on a straight-line basis following Gopalan et al. (2014). In the second step, the remaining vesting shares are attributed to pre-2006 grants evenly across all the grant dates that we observe from post-2006 awards in Equilar.

For robustness, EFL propose two alternative algorithms to assign vesting shares. The first uses post-2006 cliff and graded[13] stock awards without performance provisions (as opposed to all post-2006 cliff and graded stock awards) in the first step. This addresses the concern that, for performance-vesting equity, the grant date anniversaries may not be a good guide to the vesting date. The second algorithm similarly uses post-2006 non-performance-vesting cliff and graded stock awards in the first step, but the second step uses only grant dates for performance-vesting stock - since non-performance-vesting stock was used in the first step, so the remaining unmatched shares are unlikely from this pool. Our results are unchanged under either alternative algorithm.

[13] Equilar classifies the vesting schedule into "cliff", "graded", "retirement", and "N/A". While "retirement" awards is less than 1% of the total, "N/A" comprises 10%.

Table 1: Summary statistics

Variable	N	5%	Mean	Median	95%	SD
Main outcome variables of interest						
REP_q	93,537	0	0.375	0	1	0.484
$REP\%_q$	93,537	0	0.356	0	2.226	0.900
MA_q	94,362	0	0.158	0	1	0.365
CEO incentives from vesting equity						
$VESTING_q$	93,537	0	786,877	0	4,479,960	2,625,736
Controls						
$UNVESTED_{q-1}$	93,537	0	4,960,488	1,044,682	24,200,443	10,147,570
$VESTED_{q-1}$	93,537	93,852	59,941,941	8,506,756	248,049,717	192,995,235
$SALARY_{q-1}$	93,537	173,698	614,490	534,449	1,250,000	352,698
$BONUS_{q-1}$	93,537	0	145,428	0	800,000	444,774
AGE_{q-1}	93,537	42	54	54	67	8
$TENURE_{q-1}$	93,537	1	8	6	24	7
$NEWCEO_q$	93,537	0	0.037	0	0	0.189
$SALES_{q-1}$	93,537	1.557	4.836	4.854	8.239	2.075
MB_{q-1}	93,537	0.204	1.493	1.084	4.28	1.384
$BKLEV_{q-1}$	93,537	0	0.174	0.113	0.575	0.196
ROA_{q-1}	93,537	-0.059	0.019	0.024	0.077	0.046
$NROA_{q-1}$	93,537	-0.003	0	0	0.008	0.005
RET_{q-1}	93,537	-0.313	0.007	-0.007	0.376	0.213
$R\&D_q$	93,537	0	0.01	0	0.056	0.025
$CAPX_q$	93,537	0	0.011	0.005	0.042	0.016
$MKLEV_{q-1}$	94,362	0	0.244	0.176	0.727	0.240
$MALIQ_{q-1}$	94,362	0	0.013	0	0.087	0.028
HFI_{q-1}	94,362	0.010	0.042	0.026	0.129	0.040

Summary statistics of our main variables. For variables that are included in both analysis, we calculate and report their summary statistics with the sample used in the repurchase analysis. All continuous variables are winsorized at the 1% and 99% levels. Variable definitions are in Appendix A.

Table 2: Repurchase and vesting equity

	(1)	(2)	(3)	(4)	(5)
	Probit		**LPM**		**OLS**
Dependent Variables		REP_q			$REP\%_q$
$VESTING_q$	**12.263*****	**4.354*****	**2.752*****	**11.888*****	**6.759*****
	(2.681)	(0.875)	(0.529)	(1.776)	(1.458)
	[4.583***]				
$UNVESTED_{q-1}$	12.392***	4.435***	2.047***	5.904***	3.997***
	(1.700)	(0.544)	(0.431)	(0.911)	(0.996)
$VESTED_{q-1}$	-0.214***	-0.071**	0.023	-0.072**	-0.005
	(0.083)	(0.029)	(0.033)	(0.036)	(0.085)
$SALARY_{q-1}$	0.383***	0.150***	0.053**	0.208***	0.094**
	(0.060)	(0.021)	(0.021)	(0.028)	(0.046)
$BONUS_{q-1}$	-0.001	-0.002	0.002	0.008	0.010
	(0.029)	(0.010)	(0.007)	(0.018)	(0.018)
AGE_{q-1}	-0.458**	-0.137**	-0.251***	-0.418***	-0.397**
	(0.203)	(0.067)	(0.095)	(0.087)	(0.170)
$TENURE_{q-1}$	0.443*	0.120	0.220**	0.134	0.297*
	(0.231)	(0.079)	(0.097)	(0.100)	(0.164)
$NEWCEO_q$	0.010	0.009	-0.001	0.040**	0.014
	(0.035)	(0.011)	(0.009)	(0.020)	(0.019)
$SALES_{q-1}$	0.133***	0.044***	0.038***	0.034***	0.030***
	(0.011)	(0.004)	(0.006)	(0.005)	(0.010)
MB_{q-1}	-0.023**	0.001	-0.013***	-0.004	-0.044***
	(0.011)	(0.003)	(0.003)	(0.004)	(0.006)
$BKLEV_{q-1}$	-0.723***	-0.234***	-0.152***	-0.344***	-0.431***
	(0.078)	(0.024)	(0.027)	(0.033)	(0.052)
ROA_{q-1}	4.077***	0.864***	-0.088	1.483***	0.329**
	(0.363)	(0.091)	(0.072)	(0.138)	(0.140)
$NROA_{q-1}$	-1.219	-0.318	0.242	1.624**	0.947**
	(1.669)	(0.450)	(0.232)	(0.715)	(0.463)
RET_{q-1}	-0.129***	-0.035***	-0.039***	-0.042***	-0.054***
	(0.021)	(0.006)	(0.006)	(0.011)	(0.012)
Intercept	-1.045***	0.121***	0.293***	0.313***	0.503***
	(0.113)	(0.037)	(0.054)	(0.051)	(0.096)
Year-Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects			Yes		Yes
Observations	93,537	93,537	93,537	93,537	93,537
Pseudo (Adjusted) R^2	0.113	0.137	0.507	0.0633	0.254

This table presents the regression results on the relationship between share repurchases and the CEO's vesting equity. Variable definitions are in Appendix A. Column (1) estimates a probit model, columns (2)-(3) estimate a linear probability model (LPM), and columns (4)-(5) estimate an ordinary least squares (OLS) model. *VESTING*, *UNVESTED*, *VESTED*, *SALARY*, and *BONUS* are in billions. *AGE* and *TENURE* are in hundreds. Standard errors are in parentheses, clustered by firm. In column (1), the marginal effect for *VESTING* is displayed below the standard errors. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table 3: Repurchase and vesting equity, controlling for investment

	(1)	(2)	(3)	(4)	(5)
	Probit		**LPM**		**OLS**
Dependent Variables		REP_q			$REP\%_q$
$VESTING_q$	**12.507*****	**4.375*****	**2.748*****	**11.787*****	**6.750*****
	(2.704)	(0.878)	(0.529)	(1.770)	(1.459)
	[4.667***]				
$UNVESTED_{q-1}$	12.272***	4.396***	2.047***	5.828***	3.995***
	(1.707)	(0.544)	(0.431)	(0.897)	(0.996)
$VESTED_{q-1}$	-0.206**	-0.068**	0.024	-0.062*	-0.005
	(0.082)	(0.029)	(0.034)	(0.036)	(0.086)
$SALARY_{q-1}$	0.369***	0.146***	0.052**	0.191***	0.093**
	(0.060)	(0.021)	(0.021)	(0.028)	(0.046)
$BONUS_{q-1}$	0.004	0.000	0.002	0.014	0.010
	(0.029)	(0.010)	(0.007)	(0.018)	(0.018)
AGE_{q-1}	-0.500**	-0.143**	-0.252***	-0.405***	-0.399**
	(0.202)	(0.066)	(0.095)	(0.087)	(0.170)
$TENURE_{q-1}$	0.440*	0.118	0.221**	0.126	0.299*
	(0.231)	(0.079)	(0.097)	(0.099)	(0.164)
$NEWCEO_q$	0.003	0.006	-0.001	0.035*	0.013
	(0.035)	(0.011)	(0.009)	(0.020)	(0.019)
$SALES_{q-1}$	0.133***	0.045***	0.038***	0.036***	0.030***
	(0.011)	(0.004)	(0.006)	(0.005)	(0.010)
MB_{q-1}	0.002	0.007**	-0.012***	-0.002	-0.043***
	(0.012)	(0.004)	(0.003)	(0.004)	(0.006)
$BKLEV_{q-1}$	-0.701***	-0.224***	-0.154***	-0.299***	-0.435***
	(0.077)	(0.024)	(0.027)	(0.033)	(0.052)
ROA_{q-1}	3.848***	0.809***	-0.091	1.860***	0.314**
	(0.398)	(0.102)	(0.073)	(0.160)	(0.140)
$NROA_{q-1}$	0.130	0.016	0.250	2.112***	0.964**
	(1.664)	(0.445)	(0.231)	(0.710)	(0.462)
RET_{q-1}	-0.120***	-0.033***	-0.038***	-0.048***	-0.053***
	(0.021)	(0.006)	(0.006)	(0.011)	(0.012)
$R\&D_q$	-2.866***	-0.507***	-0.085	0.646***	-0.251
	(0.766)	(0.177)	(0.184)	(0.247)	(0.349)
$CAPX_q$	-4.878***	-1.433***	-0.245	-3.543***	-0.444
	(0.957)	(0.289)	(0.171)	(0.325)	(0.362)
Intercept	-0.978***	0.138***	0.298***	0.325***	0.511***
	(0.113)	(0.037)	(0.054)	(0.051)	(0.096)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects			Yes		Yes
Observations	93,537	93,537	93,537	93,537	93,537
Pseudo (Adjusted) R^2	0.116	0.140	0.507	0.067	0.254

This table presents the regression results on the relationship between share repurchases and the CEO's vesting equity, controlling for contemporaneous investment. Variable definitions are in Appendix A. Column (1) estimates a probit model, columns (2)-(3) estimate a LPM, and columns (4)-(5) estimate an OLS model. *VESTING*, *UNVESTED*, *VESTED*, *SALARY*, and *BONUS* are in billions. *AGE* and *TENURE* are in hundreds. Standard errors are in parentheses, clustered by firm. In column (1), the marginal effect for *VESTING* is displayed below the standard errors. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table 4: Stock returns surrounding repurchase and vesting equity

Panel A: BHAR over market portfolio

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
VESTING$_q$	**0.897****	**-3.288*****	**-2.214*****	**-0.401**	**-0.476**
	(0.422)	(0.553)	(0.586)	(0.558)	(0.484)
Intercept	0.008	-0.011	0.022*	0.181***	0.048***
	(0.007)	(0.011)	(0.013)	(0.023)	(0.014)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	28,535	28,479	28,360	27,171	23,458
Adjusted R^2	0.088	0.201	0.219	0.241	0.237

Panel B: BHAR over industry portfolio

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over Fama-French 49 industry portfolio return*				
VESTING$_q$	**0.722***	**-3.001*****	**-1.842*****	**-0.278**	**-0.722**
	(0.399)	(0.527)	(0.569)	(0.541)	(0.463)
Intercept	0.010	0.041***	0.042***	0.115***	0.066***
	(0.007)	(0.011)	(0.013)	(0.024)	(0.013)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	28,129	28,073	27,954	26,786	23,136
Adjusted R^2	0.072	0.189	0.200	0.228	0.231

Panel C: BHAR over characteristic-based portfolio

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over DGTW characteristic-based portfolio return*				
VESTING$_q$	**0.925****	**-2.884*****	**-1.913*****	**0.320**	**-0.038**
	(0.419)	(0.519)	(0.528)	(0.529)	(0.446)
Intercept	-0.006	0.066***	0.034***	-0.047**	-0.020
	(0.008)	(0.011)	(0.012)	(0.022)	(0.013)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	25,543	25,525	25,232	24,118	20,717
Adjusted R^2	0.079	0.215	0.234	0.225	0.219

This table presents the OLS regression results on the relationship between buy-and-hold abnormal return (BHAR) over the period from one quarter prior to the quarter in which a share repurchase occurred to four years after the repurchase quarter and the CEO's vesting equity. BHAR is calculated over the value-weighted market index in Panel A, the Fama-French industry portfolio in Panel B, and the DGTW benchmark portfolio in Panel C. Variable definitions are in Appendix A. *VESTING* is in billions. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table 5: M&A announcement and vesting equity

	(1)	(2)	(3)
	Probit	**LPM**	
Dependent Variables		MA_q	
$VESTING_q$	**10.502*****	**3.597*****	**1.641****
	(2.248)	(0.759)	(0.670)
	[2.352***]		
$UNVESTED_{q-1}$	4.642***	1.993***	0.580*
	(0.980)	(0.330)	(0.304)
$VESTED_{q-1}$	0.101*	0.043**	0.038
	(0.055)	(0.019)	(0.026)
$SALARY_{q-1}$	-0.034	-0.003	0.018
	(0.041)	(0.011)	(0.013)
$BONUS_{q-1}$	0.052***	0.015***	0.003
	(0.018)	(0.006)	(0.005)
AGE_{q-1}	-0.945***	-0.183***	-0.040
	(0.134)	(0.029)	(0.052)
$TENURE_{q-1}$	0.344**	0.053	-0.055
	(0.150)	(0.033)	(0.055)
$NEWCEO_q$	-0.112***	-0.020***	-0.013*
	(0.032)	(0.007)	(0.007)
$MKLEV_{q-1}$	-0.560***	-0.117***	-0.264***
	(0.045)	(0.009)	(0.016)
$SALES_{q-1}$	0.150***	0.032***	-0.001
	(0.008)	(0.002)	(0.003)
MB_{q-1}	-0.022***	-0.003**	0.005**
	(0.007)	(0.001)	(0.002)
ROA_{q-1}	1.380***	0.103**	0.215***
	(0.236)	(0.044)	(0.047)
RET_{q-1}	0.108***	0.021***	0.024***
	(0.025)	(0.005)	(0.005)
$MALIQ_{q-1}$	2.219***	0.510***	0.044
	(0.312)	(0.074)	(0.076)
$HERFINDAHL_{q-1}$	0.478**	0.125**	-0.047
	(0.237)	(0.058)	(0.106)
Intercept	-1.226***	0.106***	0.230***
	(0.081)	(0.018)	(0.032)
Year-Qtr Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects			Yes
Observations	94,362	94,362	94,362
Pseudo (Adjusted) R^2	0.069	0.059	0.159

This table presents the regression results on the relationship between the likelihood of M&A announcement and the CEO's vesting equity. Variable definitions are in Appendix A. Column (1) estimates a probit model and columns (2)-(3) estimate a LPM. *VESTING*, *UNVESTED*, *VESTED*, *SALARY*, and *BONUS* are in billions. *AGE* and *TENURE* are in hundreds. Standard errors are in parentheses, clustered by firm. In column (1), the marginal effect for *VESTING* is displayed below the standard errors. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table 6: Stock returns surrounding M&A announcement and vesting equity

Panel A: BHAR over market portfolio

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
VESTING$_q$	**2.033****	**-2.260*****	**-0.981**	**-2.009****	**-1.715****
	(0.838)	(0.862)	(1.017)	(0.915)	(0.832)
Intercept	0.022	-0.041*	-0.043*	0.261***	0.079***
	(0.016)	(0.021)	(0.023)	(0.034)	(0.020)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	12,294	12,294	12,258	12,207	11,751
Adjusted R^2	0.176	0.210	0.217	0.256	0.246

Panel B: BHAR over industry portfolio

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over Fama-French 49 industry portfolio return*				
VESTING$_q$	**1.768****	**-1.412***	**-1.584***	**-1.995****	**-1.530***
	(0.771)	(0.812)	(0.950)	(0.890)	(0.791)
Intercept	0.022	-0.007	-0.033	0.209***	0.070***
	(0.015)	(0.021)	(0.022)	(0.034)	(0.019)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	12,191	12,192	12,156	12,105	11,651
Adjusted R^2	0.163	0.193	0.205	0.246	0.238

Panel C: BHAR over characteristic-based portfolio

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over DGTW characteristic-based portfolio return*				
VESTING$_q$	**1.835****	**-1.623***	**-0.178**	**-0.667**	**-1.689****
	(0.902)	(0.928)	(1.102)	(1.008)	(0.838)
Intercept	0.016	0.025	-0.064**	0.035	0.027
	(0.017)	(0.022)	(0.027)	(0.038)	(0.022)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	10,280	10,275	10,253	10,211	9,823
Adjusted R^2	0.169	0.216	0.238	0.231	0.231

This table presents the OLS regression results on the relationship between BHAR over the period from one quarter prior to the M&A announcement date to four years after the announcement date and the CEO's vesting equity. BHAR is calculated over the value-weighted market index in Panel A, the Fama-French industry portfolio in Panel B, and the DGTW benchmark portfolio in Panel C. Variable definitions are in Appendix A. *VESTING* is in billions. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table 7: M&A announcement returns and vesting equity

	(1)	(2)	(3)
Period	*[-1, +1]*	*[-2, +2]*	*[-3, +3]*
Dependent Variables		CAR_q	
$VESTING_q$	**0.413***	**0.513***	**0.574***
	(0.240)	(0.273)	(0.294)
$UNVESTED_{q-1}$	0.040	0.068	0.109
	(0.091)	(0.098)	(0.107)
$VESTED_{q-1}$	-0.001	0.002	-0.004
	(0.006)	(0.009)	(0.009)
$SALARY_{q-1}$	-0.006	-0.000	-0.002
	(0.006)	(0.006)	(0.006)
$BONUS_{q-1}$	0.001	0.001	0.003
	(0.002)	(0.002)	(0.002)
AGE_{q-1}	0.016	0.027	0.027
	(0.028)	(0.035)	(0.039)
$TENURE_{q-1}$	-0.014	-0.004	0.006
	(0.030)	(0.036)	(0.043)
$NEWCEO_q$	-0.002	0.001	0.000
	(0.004)	(0.004)	(0.005)
MV_{q-1}	0.001	-0.002	-0.003
	(0.003)	(0.004)	(0.004)
MB_{q-1}	0.004**	0.007***	0.010***
	(0.002)	(0.002)	(0.002)
Intercept	-0.011	0.001	-0.001
	(0.026)	(0.030)	(0.033)
Year-Qtr Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes
Observations	12,718	12,718	12,718
Adjusted R^2	0.110	0.102	0.106

This table presents the OLS regression results on the relationship between M&A announcement return and the CEO's vesting equity. Variable definitions are in Appendix A. *VESTING*, *UNVESTED*, *VESTED*, *SALARY*, and *BONUS* are in billions. *AGE* and *TENURE* are in hundreds. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Online Appendix for "The Long-Term Consequences of Short-Term Incentives"

Table OA1: M&A announcement and vesting equity, controlling for investment

	(1)	(2)	(3)
	Probit	**LPM**	
Dependent Variables		MA_q	
$VESTING_q$	**10.502*****	**3.587*****	**1.644****
	(2.239)	(0.756)	(0.670)
	[2.346***]		
$UNVESTED_{q-1}$	4.469***	1.958***	0.578*
	(0.962)	(0.324)	(0.304)
$VESTED_{q-1}$	0.108**	0.045**	0.037
	(0.054)	(0.019)	(0.026)
$SALARY_{q-1}$	-0.042	-0.005	0.018
	(0.040)	(0.011)	(0.013)
$BONUS_{q-1}$	0.056***	0.016***	0.003
	(0.018)	(0.006)	(0.005)
AGE_{q-1}	-0.961***	-0.186***	-0.040
	(0.133)	(0.029)	(0.052)
$TENURE_{q-1}$	0.336**	0.051	-0.055
	(0.149)	(0.033)	(0.055)
$NEWCEO_q$	-0.116***	-0.021***	-0.012*
	(0.032)	(0.007)	(0.007)
$MKLEV_{q-1}$	-0.579***	-0.120***	-0.261***
	(0.046)	(0.009)	(0.016)
$SALES_{q-1}$	0.151***	0.032***	-0.001
	(0.008)	(0.002)	(0.003)
MB_{q-1}	-0.009	-0.000	0.004**
	(0.008)	(0.002)	(0.002)
ROA_{q-1}	1.336***	0.106**	0.204***
	(0.260)	(0.048)	(0.049)
RET_{q-1}	0.114***	0.021***	0.024***
	(0.026)	(0.005)	(0.005)
$MALIQ_{q-1}$	2.011***	0.450***	0.046
	(0.312)	(0.074)	(0.076)
$HERFINDAHL_{q-1}$	0.276	0.086	-0.046
	(0.237)	(0.058)	(0.106)
$R\&D_q$	-1.373***	-0.156*	-0.083
	(0.487)	(0.084)	(0.112)
$CAPX_q$	-3.913***	-0.890***	0.277**
	(0.588)	(0.116)	(0.129)
Intercept	-1.164***	0.119***	0.226***
	(0.081)	(0.018)	(0.032)
Year-Qtr Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects			Yes
Observations	94,362	94,362	94,362
Pseudo (Adjusted) R^2	0.071	0.061	0.159

This table presents the regression results on the relationship between the likelihood of M&A announcement and the CEO's vesting equity, controlling for contemporaneous investment. Variable definitions are in Appendix A. Column (1) estimates a probit model and columns (2)-(3) estimate a LPM. *VESTING*, *UNVESTED*, *VESTED*, *SALARY*, and *BONUS* are in billions. *AGE* and *TENURE* are in hundreds. Standard errors are in parentheses, clustered by firm. In column (1), the marginal effect for *VESTING* is displayed below the standard errors. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table OA2: Repurchase announcement and vesting equity

	(1)	(2)	(3)
	Probit	**LPM**	
Dependent Variables		$REPANN_q$	
$VESTING_q$	**16.353*****	**2.181*****	**1.625*****
	(3.012)	(0.449)	(0.466)
	[1.342***]		
$UNVESTED_{q-1}$	3.037***	0.380***	0.175
	(0.994)	(0.124)	(0.149)
$VESTED_{q-1}$	-0.098*	-0.009*	-0.000
	(0.055)	(0.005)	(0.011)
$SALARY_{q-1}$	0.098**	0.011***	0.010*
	(0.040)	(0.004)	(0.006)
$BONUS_{q-1}$	0.006	0.001	0.004
	(0.020)	(0.002)	(0.003)
AGE_{q-1}	-0.439***	-0.033***	-0.056**
	(0.152)	(0.013)	(0.027)
$TENURE_{q-1}$	0.168	0.009	0.013
	(0.165)	(0.014)	(0.028)
$NEWCEO_q$	0.035	0.004	0.002
	(0.041)	(0.004)	(0.004)
$SALES_{q-1}$	0.028***	0.002***	0.005***
	(0.009)	(0.001)	(0.002)
MB_{q-1}	-0.052***	-0.002***	-0.004***
	(0.009)	(0.001)	(0.001)
$BKLEV_{q-1}$	-0.578***	-0.044***	-0.064***
	(0.058)	(0.004)	(0.009)
ROA_{q-1}	3.662***	0.179***	0.055**
	(0.289)	(0.018)	(0.027)
$NROA_{q-1}$	0.339	-0.015	0.122
	(1.504)	(0.100)	(0.097)
RET_{q-1}	-0.090**	-0.006**	-0.007**
	(0.038)	(0.003)	(0.003)
Intercept	-1.602***	0.052***	0.062***
	(0.090)	(0.008)	(0.015)
Year-Qtr Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects			Yes
Observations	93,537	93,537	93,537
Pseudo (Adjusted) R^2	0.035	0.011	0.046

This table presents the regression results on the relationship between the likelihood of repurchase announcement and the CEO's vesting equity. Variable definitions are in Appendix A and Table OA9. Column (1) estimates a probit model and columns (2)-(3) estimate a LPM. *VESTING*, *UNVESTED*, *VESTED*, *SALARY*, and *BONUS* are in billions. *AGE* and *TENURE* are in hundreds. Standard errors are in parentheses, clustered by firm. In column (1), the marginal effect for *VESTING* is displayed below the standard errors. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table OA3: Number and size of M&A and vesting equity

	(1)	(2)	(3)	(4)
Dependent Variables	$MANUM_q$		$MASUM_q$	
$VESTING_q$	**4.372*****	**2.872****	**0.305*****	**0.161***
	(1.505)	(1.186)	(0.088)	(0.093)
$UNVESTED_{q-1}$	3.640***	1.754*	0.055*	0.021
	(0.805)	(0.966)	(0.028)	(0.041)
$VESTED_{q-1}$	0.149**	-0.103	-0.002	-0.010**
	(0.064)	(0.208)	(0.001)	(0.005)
$SALARY_{q-1}$	-0.051	0.037	-0.001	0.001
	(0.038)	(0.029)	(0.001)	(0.002)
$BONUS_{q-1}$	0.032**	0.023*	0.001**	-0.001
	(0.013)	(0.012)	(0.000)	(0.001)
AGE_{q-1}	-0.230***	0.025	-0.013***	0.004
	(0.062)	(0.146)	(0.003)	(0.008)
$TENURE_{q-1}$	0.177	0.026	-0.004	-0.008
	(0.108)	(0.147)	(0.003)	(0.008)
$NEWCEO_q$	-0.021	-0.008	-0.002**	-0.001
	(0.013)	(0.011)	(0.001)	(0.001)
$MKLEV_{q-1}$	-0.153***	-0.355***	-0.005***	-0.038***
	(0.024)	(0.029)	(0.001)	(0.002)
$SALES_{q-1}$	0.7061***	0.003	0.001***	-0.003***
	(0.007)	(0.007)	(0.000)	(0.001)
MB_{q-1}	-0.003	0.011***	-0.001***	-0.000**
	(0.003)	(0.003)	(0.000)	(0.000)
ROA_{q-1}	-0.171	0.303***	0.022***	0.042***
	(0.113)	(0.075)	(0.005)	(0.008)
RET_{q-1}	0.035***	0.042***	0.008***	0.008***
	(0.008)	(0.008)	(0.001)	(0.001)
$MALIQ_{q-1}$	0.884***	-0.046	0.020***	0.013
	(0.168)	(0.119)	(0.007)	(0.011)
$HERFINDAHL_{q-1}$	0.242*	-0.369	0.003	-0.007
	(0.129)	(0.227)	(0.005)	(0.015)
Intercept	0.051	0.251***	0.017***	0.036***
	(0.042)	(0.073)	(0.002)	(0.005)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes
Firm Fixed Effects		Yes		Yes
Observations	94,362	94,362	89,657	89,657
Adjusted R^2	0.058	0.292	0.009	0.045

This table presents the OLS regression results on the relationship between the number of M&A announcements (as well as the total size of the M&A deals announced) and the CEO's vesting equity. Variable definitions are in Appendix A and Table OA9. *VESTING*, *UNVESTED*, *VESTED*, *SALARY*, and *BONUS* are in billions. *AGE* and *TENURE* are in hundreds. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table OA4: M&A analyses restricting to the deals that are subsequently completed

Panel A: M&A announcement and vesting equity

	(1)	(2)	(3)
	Probit	**LPM**	
Dependent Variables		MA_q	
$VESTING_q$	**6.233****	**1.807*****	**0.330**
	(2.436)	(0.699)	(0.586)
	[1.085]		
Controls	Yes	Yes	Yes
Year-Qtr Fixed Effects	Yes	Yes	Yes
Firm Fixed Effects			Yes
Observations	94,362	94,362	94,362
Pseudo (Adjusted) R^2	0.066	0.047	0.165

Panel B: Stock returns surrounding M&A announcement and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
$VESTING_q$	**2.098****	**-2.424****	**-2.759****	**-2.277****	**-2.308****
	(0.977)	(1.152)	(1.269)	(1.078)	(1.065)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	8,884	8,885	8,860	8,826	8,519
Adjusted R^2	0.193	0.224	0.237	0.304	0.267

Panel A presents the regression results on the relationship between the likelihood of M&A announcement and the CEO's vesting equity, and Panel B presents the regression results on the relationship between BHAR over the period from one quarter prior to the M&A announcement date to four years after the announcement date and the CEO's vesting equity. Both include only the announcements for the M&A that is subsequently completed within our sample period. Variable definitions are in Appendix A. Column (1) of Panel A estimates a probit model and columns (2)-(3) of Panel A estimate a LPM. All three columns of Panel B estimate an OLS model. *VESTING* is in billions. BHAR is calculated over the value-weighted market index. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table OA5: Stock returns surrounding repurchase (and M&A) and vesting equity using long-term CAR

Panel A: Long-term CAR surrounding repurchases and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*CAR over value-weighted market index return*				
VESTING$_q$	**0.915****	**-2.549*****	**-1.674*****	**-0.433**	**-0.360**
	(0.398)	(0.502)	(0.489)	(0.439)	(0.436)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	28,535	28,479	28,360	27,171	23,458
Adjusted R^2	0.095	0.227	0.254	0.254	0.252

Panel B: Long-term CAR surrounding M&A and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*CAR over value-weighted market index return*				
VESTING$_q$	**1.900*****	**-2.018****	**-0.643**	**-1.443***	**-1.312***
	(0.732)	(0.820)	(0.798)	(0.755)	(0.735)
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	12,294	12,294	12,258	12,207	11,751
Adjusted R^2	0.188	0.247	0.257	0.270	0.259

Panel A presents the OLS regression results on the relationship between long-term cumulative market-adjusted abnormal return (CAR) over the period from one quarter prior to the quarter in which a share repurchase occurred to four years after the repurchase quarter and the CEO's vesting equity. Panel B presents the OLS regression results on the relationship between long-term CAR over the period from one quarter prior to the M&A announcement date to four years after the announcement date and the CEO's vesting equity. CAR is calculated over the value-weighted market index in both panels. Variable definitions are in Appendix A and Table OA9. *VESTING* is in billions. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table OA6: Repurchase and M&A analyses replacing *VESTING* with *VESTING_ATM*

Panel A: Repurchase and vesting equity

	(1)	(2)	(3)	(4)	(5)
	Probit	**LPM**		**OLS**	
Dependent Variables		REP_q		$REP\%_q$	
$VESTING\_ATM_q$	**14.011*****	**4.983*****	**2.982*****	**13.310*****	**7.206*****
	(2.952)	(0.966)	(0.576)	(1.953)	(1.600)
Controls	Yes	Yes	Yes	Yes	Yes
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects (FE)			Yes		Yes
Observations	93,537	93,537	93,537	93,537	93,537
Pseudo (Adjusted) R^2	0.113	0.137	0.507	0.0633	0.254

Panel B: Stock returns surrounding repurchases and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
$VESTING\_ATM_q$	**0.930****	**-3.426*****	**-2.342*****	**-0.427**	**-0.481**
	(0.466)	(0.602)	(0.642)	(0.609)	(0.521)
Year-Qtr & Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	28,535	28,479	28,360	27,171	23,458
Adjusted R^2	0.088	0.201	0.218	0.241	0.237

Panel C: M&A announcement and vesting equity

	(1)	(2)	(3)
	Probit		**LPM**
Dependent Variables		MA_q	
$VESTING\_ATM_q$	**11.676*****	**3.968*****	**1.749****
	(2.480)	(0.833)	(0.737)
Controls	Yes	Yes	Yes
Year-Qtr FE	Yes	Yes	Yes
Firm FE			Yes
Observations	94,362	94,362	94,362
Pseudo (Adjusted) R^2	0.069	0.059	0.159

Panel D: Stock returns surrounding M&A announcement and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
$VESTING\_ATM_q$	**1.991****	**-2.215****	**-0.999**	**-2.261****	**-1.713***
	(0.919)	(0.966)	(1.124)	(1.011)	(0.923)
Year-Qtr & Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	12,294	12,294	12,258	12,207	11,751
Adjusted R^2	0.176	0.210	0.217	0.256	0.245

Panel A (C) presents the regression results on the relationship between share repurchases (M&A announcements) and the CEO's vesting equity. Panel B (D) presents the regression results on the relationship between BHAR over the period from one quarter prior to the quarter in which a share repurchase occurred to four years after the repurchase quarter (from one quarter prior to the M&A announcement date to four years after the announcement date) and the CEO's vesting equity. Variable definitions are in Appendix A and Table OA9. All are estimated using an OLS model unless otherwise specified. *VESTING* is in billions. BHAR is calculated over the value-weighted market index. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table OA7: Repurchase and M&A analyses replacing *VESTING* with *VESTING_TB*

Panel A: Repurchase and vesting equity

	(1)	(2)	(3)	(4)	(5)
	Probit	**LPM**		**OLS**	
Dependent Variables		REP_q		$REP\%_q$	
$VESTING\_TB_q$	**26.069*****	**8.961*****	**4.152*****	**15.425*****	**8.039*****
	(3.505)	(1.117)	(0.677)	(2.201)	(1.825)
Controls	Yes	Yes	Yes	Yes	Yes
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects (FE)			Yes		Yes
Observations	93,537	93,537	93,537	93,537	93,537
Pseudo (Adjusted) R^2	0.114	0.138	0.507	0.063	0.254

Panel B: Stock returns surrounding repurchases and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
$VESTING\_TB_q$	**1.294***	**-4.543*****	**-2.798*****	**-0.504**	**-0.944**
	(0.774)	(0.706)	(0.734)	(0.715)	(0.617)
Year-Qtr & Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	28,535	28,479	28,360	27,171	23,458
Adjusted R^2	0.088	0.201	0.218	0.241	0.237

Panel C: M&A announcement and vesting equity

	(1)	(2)	(3)
	Probit		**LPM**
Dependent Variables		MA_q	
$VESTING\_TB_q$	**10.649*****	**3.457*****	**1.880****
	(2.968)	(0.977)	(0.859)
Controls	Yes	Yes	Yes
Year-Qtr FE	Yes	Yes	Yes
Firm FE			Yes
Observations	94,362	94,362	94,362
Pseudo (Adjusted) R^2	0.069	0.059	0.159

Panel D: Stock returns surrounding M&A announcement and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
$VESTING\_TB_q$	**2.057***	**-2.736****	**-0.865**	**-1.603**	**-2.988*****
	(1.166)	(1.141)	(1.360)	(1.291)	(1.124)
Year-Qtr & Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	12,294	12,294	12,258	12,207	11,751
Adjusted R^2	0.176	0.210	0.217	0.256	0.246

Panel A (C) presents the regression results on the relationship between share repurchases (M&A announcements) and the CEO's vesting equity. Panel B (D) presents the regression results on the relationship between BHAR over the period from one quarter prior to the quarter in which a share repurchase occurred to four years after the repurchase quarter (from one quarter prior to the M&A announcement date to four years after the announcement date) and the CEO's vesting equity. Variable definitions are in Appendix A and Table OA9. All are estimated using an OLS model unless otherwise specified. *VESTING* is in billions. BHAR is calculated over the value-weighted market index. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table OA8: Repurchase and M&A analyses replacing *VESTING* with *VESTING_INT*

Panel A: Repurchase and vesting equity

	(1)	(2)	(3)	(4)	(5)
	Probit	**LPM**		**OLS**	
Dependent Variables		REP_q		$REP\%_q$	
$VESTING\_INT_q$	**12.366*****	**4.338*****	**2.709*****	**11.016*****	**6.953*****
	(2.484)	(0.802)	(0.495)	(1.644)	(1.363)
Controls	Yes	Yes	Yes	Yes	Yes
Year-Qtr Fixed Effects	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects (FE)			Yes		Yes
Observations	93,537	93,537	93,537	93,537	93,537
Pseudo (Adjusted) R^2	0.113	0.138	0.507	0.0632	0.254

Panel B: Stock returns surrounding repurchases and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
$VESTING\_INT_q$	**0.830****	**-3.046*****	**-2.435*****	**-0.431**	**-0.531**
	(0.390)	(0.515)	(0.551)	(0.541)	(0.467)
Year-Qtr & Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	28,535	28,479	28,360	27,171	23,458
Adjusted R^2	0.088	0.201	0.219	0.241	0.237

Panel C: M&A announcement and vesting equity

	(1)	(2)	(3)
	Probit		**LPM**
Dependent Variables		MA_q	
$VESTING\_INT_q$	**9.152*****	**3.175*****	**1.613****
	(2.094)	(0.709)	(0.635)
Controls	Yes	Yes	Yes
Year-Qtr FE	Yes	Yes	Yes
Firm FE			Yes
Observations	94,362	94,362	94,362
Pseudo (Adjusted) R^2	0.069	0.059	0.159

Panel D: Stock returns surrounding M&A announcement and vesting equity

	(1)	(2)	(3)	(4)	(5)
Period	*[q-1, q]*	*[q+1, q+4]*	*[q+5, q+8]*	*[q+9, q+12]*	*[q+13, q+16]*
Dependent Variables	*BHAR over value-weighted market index return*				
$VESTING\_INT_q$	**2.353*****	**-1.995****	**-1.289**	**-2.182*****	**-1.569****
	(0.769)	(0.784)	(0.909)	(0.845)	(0.749)
Year-Qtr & Firm FE	Yes	Yes	Yes	Yes	Yes
Observations	12,294	12,294	12,258	12,207	11,751
Adjusted R^2	0.177	0.210	0.217	0.256	0.246

Panel A (C) presents the regression results on the relationship between share repurchases (M&A announcements) and the CEO's vesting equity. Panel B (D) presents the regression results on the relationship between BHAR over the period from one quarter prior to the quarter in which a share repurchase occurred to four years after the repurchase quarter (from one quarter prior to the M&A announcement date to four years after the announcement date) and the CEO's vesting equity. Variable definitions are in Appendix A and Table OA9. All are estimated using an OLS model unless otherwise specified. *VESTING* is in billions. BHAR is calculated over the value-weighted market index. Standard errors are in parentheses, clustered by firm. *** (**) (*) indicates significance at the 1% (5%) (10%) two-tailed level, respectively.

Table OA9: Definition of variables used in the Online Appendix

This table describes the calculation of variables used only in this online appendix. The variables used also in the core analysis are described in Appendix A of the paper.

Variable	Definition
$REPANN_q$	An indicator variable that equals one if a firm announced either the establishment of a new share repurchase program or actual repurchase(s) under an existing repurchase program in quarter *q* as captured by the SDC Platinum, and zero otherwise.
$MANUM_q$	The number of M&A that a firm announced in quarter *q*, and zero if none was announced.
$MASUM_q$	The sum of deal size for all M&A that a firm announced in quarter *q*, as a percentage of market capitalization at the end of quarter *q-1*, and zero if none was announced. We delete a firm-quarter if a firm announces at least one M&A in a quarter but none of the M&A has transaction size recorded in the SDC Platinum.
$CAR_{q-1\ to\ q}$	A firm's cumulative market-adjusted abnormal return over quarter *q-1* and *q*, with quarter *q* being either the fiscal quarter in which a share repurchase occurred or one-quarter time that follows an M&A announcement (with the first day of the quarter being the M&A announcement date). For repurchase events, it is calculated as the sum of the firm's monthly abnormal returns over the two quarters with the monthly abnormal return being the firm's monthly raw return minus the corresponding return on the CRSP value-weighted index. For M&A events, it is calculated as the sum of the firm's daily abnormal returns over the two quarters with the daily abnormal return being the firm's daily raw return minus the corresponding return on the CRSP value-weighted index. $CAR_{q+1\ to\ q+4}$, $CAR_{q+5\ to\ q+8}$, $CAR_{q+9\ to\ q+12}$, and $CAR_{q+13\ to\ q+16}$ are analogously calculated as a given firm's CAR for quarter *q+1* to *q+4*, *q+5* to *q+8*, *q+9* to *q+12*, and *q+13* to *q+16*, respectively.
$VESTING\_ATM_q$	Similar to $VESTING_q$, except that all options are assumed to be at the money.
$VESTING\_TB_q$	Similar to $VESTING_q$, except that it includes only post-2006 time-based vesting grants without performance provisions (i.e., we remove post-2006 grants labeled "retirement," "performance-based," "contingent," or "accelerated," and post-2006 grants with unknown vesting schedule).
$VESTING\_INT_q$	Similar to $VESTING_q$, except that options' deltas are replaced with their intrinsic values, i.e., delta is set to one for all in-the-money options and is set to zero for all out-of-the-money options.

Discarded Text

This measure has three attractive features. The first two are analogous to the relevance criterion for a valid instrument. First, vesting equity is highly correlated with same-quarter equity sales, so it leads to short-term stock price concerns. Second, the vesting schedule is known to the CEO in advance, and so he is able to take actions to boost the short-term stock price in anticipation.[14] The third is analogous to the exclusion restriction: vesting equity depends on the magnitude and vesting schedule of equity grants made several years ago, and so is unlikely driven by current economic conditions.

While prior literature proposes various motivations for why firms might buy back their own shares (see Dittmar (2000) for a summary), managers often cite undervaluation as the primary reason for share repurchase. If the less informed market interprets share repurchase as a signal for undervaluation (regardless of the repurchasing firm's actual motivation), the firm enjoys a positive return, at least initially (Ikenberry, Lakonishok, and Vermaelen (1995)). This increase in stock price, even if short-lived, could benefit the CEO by improving his equity vesting conditions and increasing his payoff from equity sales.

Do Brav Graham Harvey Michaely find that managers cite undervaluation as a motive for repurchases

VF: Yes, their Table 10 Panel A reports that 75.7% managers cite "market undervaluation of our stock" as an important or very important reason to repurchase. The next ranked reason is "Our company having extra cash/marketable securities," which stands at 60%.

Uysal (2011) finds that Leverage deficit decreases both the likelihood of making an acquisition and the size of that acquisition. However, the effect of leverage deficit on the likelihood of a firm making an acquisition is not symmetric for underleveraged and overleveraged firms. While the effect of

[14] In contrast, while unanticipated liquidity shocks might lead to equity sales, they are unlikely to affect corporate actions as they are unplanned.

overleverage is negative and significant, underleverage has an insignificant effect on the acquisition probability. There are also significant effects of leverage deficit, which are driven by overleveraged firms, in payment choices and premiums paid to targets: overleveraged acquirers pay lower premiums and are less likely to use cash in their offers. Collectively, these findings are consistent with the view that overleverage constrains the ability to acquire and the terms of acquisitions.

In addition to studying quite different outcome variables (repurchases and M&A), our main contribution is to show that short-term equity incentives may have negative long-term consequences, by identifying corporate actions whose long-run effects can be estimated.

Finally, the paper is tangentially related to the literature on post-event drift. This literature typically finds that short- and long-term returns are in the same direction, e.g. to equity issuance (Loughran and Ritter (1995); Spiess and Affleck-Graves (1995)), dividend changes (Michaely, Thaler, and Womack (1995)), stock splits (Ikenberry, Rankin, and Stice (1996)), and repurchases in general (Ikenberry, Lakonishok, and Vermaelen (1995)). In contrast, here we find that CEOs with short-term concerns undertake acquisitions and repurchases with positive short-term but negative long-term consequences, which is suggestive of myopia.

Luofu: please check these papers and ensure that they indeed find that the short-term and long-term reaction are in the same direction. Please summarize the relevant results of each paper in the covering email (or a document). Thanks.

I still have some concerns about whether we can conclude this. If we just take BHARs post repurchases and M&As and test whether they are significantly greater than zero starting quarter q, most likely they are going to be. It's just that if we condition BHARs on VESTING, we see that they go up and down but it doesn't mean, in an absolute sense, the returns are positive and then negative.

I don't have an answer myself but I wanted you to bear in mind this distinction between our results and prior results.

Please discuss the reweighting. From my JFE 2011 paper,

The second is buy-and-hold returns(BHAR).This involves calculating a stock's benchmark-unadjusted return from month s to month t by geometrically compounding its monthly returns. The benchmark returns over that period are calculated separately, and then subtracted from the return on each stock. The months s and t are typically chosen to coincide with years(e.g.,1–12,13–24)which effectively assumes rebalancing to equal-weight at the start of each year.

Are we reweighting at the start of each quarter? If so please specify this.

VF: I will let Allen answer this question, but I think CRSP value-weighted index portfolios are rebalanced at whatever frequency the data are at (I am not 100% sure so Allen, could you please double check?). So for repurchase events, since we used monthly inputs, the portfolios are rebalanced at monthly frequency. For M&A events, since we used daily inputs, the portfolios are rebalanced at daily frequency. This is the description "The Value-Weighted Index is a Value-Weighted Portfolio built each calendar period using all issues listed on the selected exchanges with available shares outstanding and valid prices in the current and previous periods, excluding American Depositary Receipts. Issues are weighted by their Market Capitalization at the end of the previous period," which is available at http://www.crsp.com/products/documentation/stock-file-indexes-0.

Fama-French 49 industry portfolios are rebalanced quarterly. FF describe their rebalancing strategy as "The Fama/French benchmark portfolios are rebalanced quarterly using independent sorts on size (market equity) and the ratio of book equity to market equity," available at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html.

DGTW characteristic-based portfolios are rebalanced annually at the end of June.

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