Bonus incentives and losses from early debt extinguishment

Abstract
An increasing number of firms repurchase debt and recognize associated accounting losses (rather than gains). However, few studies to date have examined the effect of reporting incentives on debt repurchase decisions. We examine the relation between managers' bonus incentives and the recognition of gains or losses from early debt extinguishment (EDE). Our findings indicate that managers tend to recognize disproportionately more losses from EDE when earnings before gains or losses from EDE (i.e., as-if earnings) exceed the maximum performance level set in annual bonus contracts. These results are consistent with the notion that managers' income-decreasing reporting incentives affect debt repurchases. Further analyses indicate that bonus-driven debt repurchases are associated with increases in future bonus awards, but do not significantly affect shareholder value. Overall, our results suggest that managers' bonus incentives are an important determinant of debt repurchases and the recognition of losses.

KEYWORDS
Early debt extinguishment, loss recognition, bonus contracts, managerial incentives, income-reporting incentives, non-recurring losses.

JEL Classification: G32, M41, M52

1. INTRODUCTION

In recent years, there has been a significant increase in the number of firms repurchasing their debt before maturity. For example, between 1996 and 2016, the aggregate amount of bonds repurchased by U.S. firms increased from $6 billion to $85 billion. While prior studies identify several liability-related motives for debt repurchases, such as interest savings (Johnson and Klein 1974), mitigating the debt overhang problem (Julio 2013), and maturity management (Xu 2017), they often overlook the effect of managers' income-reporting incentives. Firms are required to recognize the difference between the net carrying amount and the repurchase price of debt as gains or losses from early debt extinguishments (EDE).[1] Thus, managers are likely to consider the income statement effect when making repurchase decisions.

Only a small number of studies to date have examined this important aspect of EDE, focusing mainly on managers' incentives to *inflate* earnings using gains from EDE (Barua 2013; Lemayian 2013; Levy and Shalev 2017). For example, Lemayian (2013) and Levy and Shalev (2017) find that firms meet or beat analysts' earnings benchmarks using EDE gains. In addition, Levy and Shalev (2017) report that firms with income-increasing incentives are more likely to choose open market repurchases (rather than tender offers) to record greater gains from EDE. However, these studies do not take into account the fact that firms have been reporting non-trivial amounts of *losses* (rather than gains) from EDE in recent years, partly because of record-low market interest rates.[2] Among Compustat firms with non-zero gains or losses from EDE between 2006 and 2016,

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[1] For example, from 2006 to 2016, 14 percent of non-financial firms in Compustat reported non-zero gains or losses from EDE. Appendix A reports the descriptive statistics for the Compustat sample (i.e., before requiring compensation data from Incentive Lab).

[2] Holding cash flows from debt (e.g., coupon and principal amount) constant, lower interest rates will increase debt prices. Thus, during periods of declining interest rates, repurchasing debt that was issued at a higher rate generally results in losses from EDE, because the market price is greater than the net carrying amount based on the amortized value.

78 percent reported losses, while only 22 percent reported gains. Furthermore, prior research on EDE does not consider the role of managers' bonus incentives, which can lead to diverse (i.e., income-increasing or income-decreasing) reporting incentives (Healy 1985).

Given the prevalence of EDE losses until recently, managers undertaking debt repurchases are likely to recognize accounting losses, potentially adversely affecting their earnings-based bonus awards. This situation can create a potential incentive problem, because managers, concerned about accounting losses, may be reluctant to undertake debt buybacks. Consistent with this argument, a body of research suggests that non-recurring losses included in bonus calculations may deter managers from undertaking value-enhancing activities (Adut, Cready, & Lopez 2003; Dechow, Huson, & Sloan 1994). Moreover, according to Potepa (2020), compensation committees increasingly consider non-recurring losses when determining executive bonuses, exacerbating this incentive problem.

In this study, we examine the circumstances under which managers undertake debt repurchases and recognize losses from EDE, despite its negative effects on reported earnings. Our empirical predictions are based on two streams of theories: earnings management and ratchet effect theories. The earnings management theory suggests that managers have incentives to manage earnings to maximize their compensation, which can be achieved through income-increasing or income-decreasing earnings management (Healy 1985; Watts and Zimmerman 1978). This implies that managers are likely to undertake EDE and incur accounting losses if it increases their bonus awards or at least does not reduce them. Thus, we expect managers to be more likely to recognize EDE losses when earnings are above the maximum performance level set in annual bonus contracts (hereafter, bonus maximum). At this level, managers are unlikely to face penalties for accounting losses because recognizing EDE losses does not substantially reduce current-period bonuses. This is particularly true when earnings remain above the bonus maximum after EDE losses, a scenario common for most firms in our sample.[3] In fact, the expected value of next-period bonus awards may even increase because retiring debt (or refinancing with lower interest rates) would decrease interest expenses in subsequent periods, improving future firm performance.

Managers' behaviors are further reinforced by target-setting practices, where current performance is used to set future targets. The theory on ratchet effects suggests that reporting lower current-period earnings may prevent excessive increases in next-period bonus targets (Kim and Shin 2017; Leone and Rock 2002; Weitzman 1980). Given these non-negative effects of debt repurchases on their compensation, managers are more willing to tolerate income-decreasing actions (e.g., EDE at a loss) when earnings exceed the bonus maximum.

Our empirical tests employ detailed information on CEOs' annual bonus contracts (e.g., threshold, target, and maximum) and their actual performance levels to identify varying income-reporting incentives around achieved performance levels (Kim and Ng 2018). To ensure that EDE-related gains or losses affect the determination of bonuses (and hence managers' income-reporting incentives), we only use firms that include EDE gains or losses in bonus performance metrics. Specifically, we exclude firm-years that solely use sales, cash flows, earnings before interest and taxes (EBIT), and earnings before interest, taxes, depreciation, and amortization (EBITDA). Thus, our sample includes those using earnings-based performance measures such as earnings, earnings per share, and return on assets. In addition, based on annual proxy statements, we identify firm-year observations that exclude EDE gains or losses from earnings for bonus calculations (i.e., those using EDE-adjusted earnings) and then remove them from the sample (Curtis, Li, & Patrick 2021; Potepa 2020).

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[3] In our sample, 90 percent of firms' earnings remain above the bonus maximum even after losses from EDE.

Using 1,135 firm-year observations from 2006 to 2016, we find that managers are more likely to recognize EDE losses when earnings before gains or losses from EDE (hereafter, as-if earnings) are above the bonus maximum. In contrast, we find no such evidence at other performance levels (e.g., near the threshold or the target). These results are consistent with the notion that managers' income-decreasing reporting incentives affect debt repurchases. In terms of economic significance, firms with as-if earnings above the bonus maximum recognize approximately $12.33 million more in losses from EDE than those at other performance levels. Because we control for a host of factors related to liability management (e.g., leverage, interest coverage, credit rating, and debt maturity structure) in the regression model, this result reflects the incremental effects of bonus-based incentives.

To address the concern that our results are driven by correlated omitted variables (i.e., firm performance), we use a regression discontinuity (RD) design. This approach allows us to control for unobservable firm characteristics by comparing EDE gains or losses of companies with very similar performances. Results from the RD analysis suggest that EDE losses significantly increase around the bonus maximum, but not around other bonus cutoffs (i.e., the bonus threshold or target). These results suggest that our findings are not driven solely by firm performance and that managers' income-decreasing reporting incentives play an incremental role in debt repurchases.

We also examine whether bonus incentives affect the choice of repurchase method. Levy and Shalev (2017) find that managers with income-increasing incentives are more likely to use open market repurchases, rather than tender offers, to get more profitable transactions (and to recognize gains) by exploiting bond mispricing. Using data on public bond repurchases, we find that managers are more likely to recognize losses from EDE when as-if earnings are above the bonus maximum, particularly in the case of tender offers compared to other repurchase methods (i.e., open market repurchases or exercising call options). This finding supports the argument that managers with income-decreasing incentives tend to favor tender offers, in which repurchasing firms often pay substantial premiums over the market price, resulting in greater EDE losses being recorded.[4]

We conduct several additional tests. First, we examine whether bonus-driven debt repurchases are associated with managers' future bonuses. If compensation committees undo the effect of EDE losses when setting next-period targets, managers may not fully benefit from recognizing those losses. However, our findings indicate that when as-if earnings are above the bonus maximum, recognizing EDE losses is weakly associated with increases in bonus awards in the following period. This result suggests that bonus-driven debt repurchases provide at least some compensation benefits to managers.

Second, we examine whether bonus-driven debt repurchases have implications for shareholder value (Cheng, Harford, & Zhang. 2015; Young and Yang 2011). If bonus-driven debt repurchases reflect suboptimal behavior aimed at maximizing managers' short-term compensation benefits, they might be associated with poor firm performance in subsequent periods. Alternatively, this practice could benefit shareholders if it mitigates potential incentive problems by motivating managers to undertake debt repurchases. These repurchases could be used to optimize leverage or alleviate agency problems of free cash flows (Jensen 1986) or debt overhang (Julio 2013). However, our empirical tests do not yield evidence indicating a significant relation between bonus-driven debt repurchases and future stock returns, accounting profitability, or dividend payouts. These findings suggest that bonus-driven debt repurchases do not adversely affect shareholder value.

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[4] Mann and Powers (2007) report that firms pay a 5.55 percent premium over the market price of the debt.

Third, we examine whether managers with as-if earnings above the bonus maximum use debt repurchases in addition to, or as a substitute for, other tools that influence earnings such as accrual earnings management and share repurchases. We find a positive association between EDE losses and income-decreasing discretionary accruals, suggesting a complementary relation between the two (Sun 2020; Zang 2012). This result confirms the role of EDE as a device to report lower earnings. In contrast, we do not find a significant relation between EDE losses and share repurchases. This result is consistent with the notion that share repurchases are used to inflate earnings per share (EPS) (Cheng et al. 2015; Kim and Ng 2018; Young and Yang 2011).

Fourth, we use a propensity score matching (PSM) analysis to mitigate concerns that our findings reflect different characteristics of firms with performance above or below the bonus maximum. We find similar results for the matched sample. Our main inferences are also robust to Heckman's (1979) two-stage procedure that alleviates potential sample selection bias related to the choice of performance measures in bonus contracts (i.e., operating or non-operating incomes).

Finally, we examine the relation between bonus incentives and the premium paid by repurchasing firms over the market price of the bond. Since the bond price reflects changes in market interest rates and firm credit quality between the issuance and repurchase dates, the difference between the repurchase and bond prices (i.e., the premium) captures the portion of EDE losses that are purged of the interest rate and credit quality effects. Our findings indicate that managers with as-if earnings above the bonus maximum tend to pay higher premiums when repurchasing bonds, consistent with their income-decreasing reporting incentives.

Our study makes three important contributions to the literature. First, this is one of the few studies that examine the role of income-reporting incentives in debt repurchases. We present compelling evidence that managers' bonus-related income-reporting incentives are an important determinant of debt repurchases. While Levy and Shalev (2017) focus on income-*increasing* reporting incentives in debt repurchases, our results shed new light on the role of debt repurchases as income-*decreasing* devices. Given that the vast majority of repurchasing firms recognize losses, rather than gains, this is an important step toward a better understanding of managers' motives for debt repurchases. In addition, while prior accounting research on debt repurchases has examined public bond repurchases in the open market or through tender offers (e.g., Lemayian 2013; Levy and Shalev 2017), our sample includes a broad range of transactions (e.g., early repayment of loans, exercising calls for bonds), and thus provides a more complete picture of the income statement effects resulting from debt repurchases.

Second, our study adds to the literature on the relation between bonus compensation and non-recurring items. One line of research provides evidence that managers' cash compensation is partly shielded from the negative effect of non-recurring losses (Adut et al. 2003; Dechow et al. 1994; Gaver and Gaver 1998). This practice ensures that managers are not deterred from undertaking necessary activities such as restructuring. However, Potepa (2020) examines more recent data and reports that compensation committees increasingly include negative special items in bonus calculations. Such trends may imply that managers are being penalized for undertaking value-enhancing activities. Our study offers a more nuanced view. We propose that managers are not necessarily penalized for repurchasing debt or recognizing losses because these actions are typically undertaken when firm performance is above the bonus maximum. Therefore, our results shed light on how potential incentive problems regarding recognizing accounting losses from EDE may be mitigated.

Finally, this study is closely related to the literature on bonus-related reporting incentives. Prior studies suggest that managers use discretionary accrual choices (e.g., Bennett, Bettis, Gopalan, & Milbourn 2017; Healy 1985; Holthausen, Larcker, & Sloan 1995; Leone and Rock 2002), share repurchases (Young and Yang 2011; Cheng et al. 2015; Kim and Ng 2018), asset securitizations (Dechow, Myers, & Shakespeare 2010), and real activities management (Bennett et al. 2017) to increase their bonus awards. However, few studies have explored managers' income-decreasing incentives. Given that a substantial portion of firms (e.g., 25 percent in our sample) exceed the bonus maximum, the incentives for managers to reduce reported earnings appear to be an important aspect of their reporting decisions. Using detailed performance-level data on CEO bonus contracts, we identify various incentives of managers (Healy 1985) and show that they engage in real financing transactions, at least partially, to reap compensation benefits.

The remainder of this paper is organized as follows. Section 2 reviews the related literature and presents our empirical prediction. Section 3 describes the data and research design, while our main and additional empirical results are presented in sections 4 and 5, respectively. Section 6 provides the conclusion.

2. RELATED LITERATURE AND EMPIRICAL PREDICTION

Firms commonly retire debt before scheduled maturity in various forms. Some repurchase their debt securities on the open market (open market repurchases) or tender bonds (tender offers). In addition, firms with callable debt can repurchase part or all of their bond issues at pre-determined call prices. Several studies have examined the motives behind debt repurchases and their consequences. Julio (2013) argues that firms repurchase debt to resolve investment inefficiencies (e.g., underinvestment) caused by the agency costs of debt. Xu (2017) suggests that speculative-grade firms retire their bonds before maturity and issue new debt with longer maturity to mitigate refinancing risk. Mann and Powers (2007) find that the main reason for tenders is to eliminate restrictive covenants.[5]

While these studies offer insights into the liability-related motives of debt repurchases, they do not consider the effects on the income statement. Unlike share repurchases, which do not affect reported earnings, debt repurchases directly affect earnings through gains or losses from EDE. Specifically, firms are required to record a gain (loss) when the reacquisition price (including call premiums) is lower (greater) than the net carrying amount of debt (Lange, Fornaro, and Buttermilch 2013).[6] The amount of gains or losses from EDE generally reflects the change in debt price between the issuance and repurchase dates—due to changes in market-wide interest rates and/or firms' credit quality—and additional transaction costs such as prepayment penalties. After 2002, any gains or losses from EDE must be reported above the line (Bartov and Mohanram 2014), because the Financial Accounting Standards Board (FASB) concluded that "the use of debt extinguishment has become part of the risk management strategy of many companies" (SFAS No. 145).[7]

Prior studies note that the decision to undertake debt repurchases is related to managers' income-increasing reporting incentives (Johnson and Klein 1974; Dietrich 1984; Hand et al. 1990; Barua 2013). For example, Barua (2013) argues that a disproportionate number of firms recognizing gains from EDE in the fourth quarter is evidence of using debt repurchases to inflate earnings. Furthermore, Lemayian (2013) and Levy and Shalev (2017) find that firms use gains from EDE to meet or beat analysts' earnings benchmarks.

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[5] In Mann and Powers' (2007) sample, the most commonly stated reasons for tenders are as follows: 1) eliminating restrictive covenants (50%), 2) changes in control (11%), 3) refunding debt (8%), and 4) reducing debt and interest expenses (8%). The motives are unstated for 21% of the sample.

[6] The carrying amount includes the amount due at maturity adjusted for any unamortized premiums or discounts and debt issuance costs.

[7] Before SFAS No. 145, they were reported as part of extraordinary items on the income statement.

Firms likely realize gains from EDE during periods of rising interest rates (e.g., the 1970s), when corporate bonds are traded at a discount. However, since the 1980s, interest rates have steadily fallen and have remained at record-low levels since the 2008 financial crisis. Therefore, holding individual firms' credit quality constant, repurchasing corporate bonds that were issued at higher rates would result in accounting losses. This prediction is supported by the prevalence of losses reported by repurchasing firms, as discussed in the introduction. However, if most debt repurchases lead to recognizing losses, which adversely affects reported earnings and executive bonus awards, the question arises: what motivates managers to undertake these repurchases?

We posit that earnings-based bonus contracts are an important consideration in debt repurchases. According to traditional *earnings management theory* (e.g., Healy 1985; Watts and Zimmerman 1978), managers have incentives to manage earnings to maximize their compensation. In the context of earnings-based bonus plans, it is important to note that the present value of bonus awards can be maximized through income-increasing or income-decreasing earnings management (Healy 1985). A typical executive bonus plan specifies performance levels (e.g., thresholds, targets, and maximums) and the corresponding amounts to be paid at each level. This design creates incentives for managers to engage in income-decreasing actions when pre-managed firm performance is above the bonus maximum or far below the threshold. Conversely, they have incentives to increase earnings when pre-managed firm performance is within the incentive zone or just below the threshold (Gaver, Gaver, & Austin,1995; Guidry, Leone, & Rock 1999; Healy 1985; Holthausen et al. 1995; Kim and Ng 2018).[8] Therefore, managers are likely to engage in

[8] When earnings are just below the threshold, managers have income-increasing incentives to avoid missing the threshold (Cheng et al. 2015; Kim and Ng 2018). However, when earnings are far below the threshold, they may have income-decreasing incentives (e.g., taking a big bath) because they cannot reach the threshold through accounting choices. Reducing current-period earnings increases the probability of meeting the target in the following period. We note that Healy (1985) finds evidence consistent with managers with earnings below the threshold manipulating earnings downward. In contrast, Holthausen et al. (1995), using alternative specifications, find no such evidence.

early debt extinguishment (EDE) and incur accounting losses if it increases their bonus awards or at least does not reduce them. This incentive is particularly strong if (i) it does not significantly reduce their current-year bonus awards and (ii) it benefits managers in the future. These two conditions are likely to be met when earnings are above the maximum performance level. Specifically, at this level, recognizing EDE losses would not substantially reduce current-period bonus payments if earnings remain above the bonus maximum after EDE losses, as is the case for most of our sample firms. Furthermore, it can potentially increase future bonuses by reducing the amount of interest expenses to be recognized in subsequent periods.

In addition, reporting lower current-period income can further increase the expected value of future bonus awards because compensation committees tend to base their target revisions on past performance relative to the target, a practice commonly referred to as "target ratcheting" (e.g., Bouwens and Kroos 2011; Holthausen et al. 1995; Weitzman 1980). Hence, reducing the portion of current-period earnings that exceed the bonus maximum prevents compensation committees from setting next-period targets too high. These incentive mechanisms inherent in typical bonus plans suggest that recognizing EDE losses when firm performance is above the bonus maximum does not substantially penalize managers; in fact, it may even benefit them.

Managers can manipulate reported earnings through debt repurchases because they have substantial discretion over the amount and timing of these transactions. For example, to achieve the desired level of earnings, managers can "cherry-pick" which debt to repurchase after considering embedded gains or losses, as well as decide how much to repurchase (Levy and Shalev 2017). Given that large firms such as S&P 750 firms (i.e., our sample) tend to hold highly diversified debt portfolios to yield either gains or losses from EDE, it is reasonable to assume that managers have a degree of discretion in recognizing EDE losses.

Based on these discussions, we expect that managers are more likely to recognize losses from EDE when their as-if earnings (i.e., earnings before gains or losses from EDE) are above the bonus maximum. Our hypothesis is as follows:

> ***Hypothesis*****:** Managers with as-if earnings above the bonus maximum are more likely to recognize losses from EDE than those with other performance levels.

Given that 1) most debt repurchases likely result in accounting losses during our sample period, and 2) managers lack income-decreasing incentives at other performance levels (e.g., near the threshold or the target), we do not make predictions regarding managers' incentives to repurchase debt at other performance levels. Nevertheless, we define indicator variables for other performance levels in our empirical design, as we discuss in section 3.

3. SAMPLE AND RESEARCH DESIGN

3.1 Sample

We use Incentive Lab and obtain all firms that have available data on CEO bonus contracts from 2006 to 2016.[9] We begin in 2006 because detailed information on executive compensation contracts became available following new disclosure rules introduced by the Securities and Exchange Commission (SEC).[10] We exclude firms in financial industries (SIC codes 6000–6999) because regulatory capital requirements may affect their repurchase decisions (Lubberink and Renders 2020). After merging our data with Compustat, we exclude firm-years that solely use non-earnings performance measures or operating income (and its variants) since EDE gains or losses do not affect these performance metrics.[11] We also delete firm years without information on the

[9] Incentive Lab covers the 750 largest firms in the U.S. in terms of market capitalization. Since the composition of these firms changes each year, Incentive Lab backfills and forward fills to make more data available.
[10] Incentive Lab provides some data on CEO compensation from 1998, but the most complete data begin in 2006.
[11] Specifically, we exclude firm-years that solely use sales, cash flows, EBIT, and EBITDA as performance measures. To address potential sample selection bias, we show the robustness of our results by employing Heckman's (1979) two-stage approach. See section 5 for details.

bonus maximum, target, and threshold, and those for which actual performance values for bonus calculations are not available in the proxy statement. If a bonus contract includes multiple performance measures, we select the one with the highest level of attainment for our analysis.

Finally and importantly, from the firms' annual proxy statements, we identify firm-years for which bonus calculations are based on "EDE-adjusted" earnings (N = 88) and remove them.[12] This process is to ensure that our sample firms do not make adjustments to their earnings by excluding debt repurchase transactions for performance evaluation (Curtis et al. 2021; Potepa 2020). The excluded observations account for 22 percent (52 out of 236) of the firm years with a non-zero value of EDE gains or losses in our sample. For comparison, based on a sample of S&P 1500 firms in 2013, Curtis et al. (2021) report that EDE gains or losses are excluded for 37 percent of firms with a non-zero value of the item.[13] The final sample consists of 1,135 firm-year observations from 2006 to 2016, among which 184 firm-years (16.2 percent) report non-zero gains or losses from EDE. Panel A of Table 1 summarizes the sample selection process. Panel B shows the sample distribution by Fama-French 12 industries, with 21.4% of the sample belonging to the manufacturing industry.

[Insert Table 1 here]

3.2 Model specification

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[12] We exclude firm-years if the firm's proxy statement explicitly states that "EDE gains or losses" are among the items that do not affect bonus calculations. In an additional analysis, we further exclude firm-years if the firm's proxy statement states that "special items" do not affect bonus calculations without referring to them as EDE-related. The results are qualitatively similar, as discussed in section 5.

[13] The difference in the proportion of adjustments in our sample compared to theirs (i.e., 22% vs. 37%) can be attributed to the differences in the sampling process regarding the types of earnings performance measures. The sample in Curtis et al. (2021) includes firms that use operating income (and its variants such as EBITDA and EBIT) as performance measures, but our sample excludes those firms. Curtis et al. (2021) report that adjustments are more commonly made for firms using operating income (and its variants) than for firms using EPS and earnings as performance measures.

To examine the relation between bonus incentives and the recognition of gains or losses from EDE, we estimate the following model using ordinary least squares (OLS) regressions (Cheng et al. 2015; Kim and Ng 2018).

$$
\begin{aligned}
DTEP\_AT_{it} = {} & \lambda_0 + \lambda_1 Above\_Max_{it} + \lambda_2 Near\_Tar + \lambda_3 Near\_Thr + \lambda_4 Below\_Thr \\
& + \lambda_5 Ln(Assets)_{it-1} + \lambda_6 Leverage_{it-1} + \lambda_7 MTB_{it-1} + \lambda_8 Int\_Cov_{it-1} + \lambda_9 OROA_{it-1} \\
& + \lambda_{10} Tax\_rate_{it-1} + \lambda_{11} NOL_{it-1} + \lambda_{12} Cash\_AT_{it-1} + \lambda_{13} OCF_{it-1} + \lambda_{14} Rating_{it-1} \\
& + \lambda_{15} Debt\_Structure_{it-1} + \lambda_{16} PMDA_{it} + \lambda_{17} RAM_{it} + \lambda_{18} Share\_Rep\_AT_{it} \\
& + \lambda_{19} Meet\_Analyst_{it} + \text{Year and industry fixed effects} + \varepsilon_{it} \qquad (1)
\end{aligned}
$$

where, for firm *i* in year *t*, the dependent variable (*DTEP_AT*) is gains or losses from EDE (Compustat item DTEP), deflated by average total assets. Following Kim and Ng (2018), we define four partitioning variables to examine the effects of as-if performance levels on debt repurchase decisions: *Above_Max* equals 1 if as-if earnings are above the bonus maximum, and 0 otherwise; *Near_Tar* (*Near_Thr*) equals 1 if as-if earnings are within 15 percent below the bonus target (threshold), and 0 otherwise; and *Below_Thr* equals 1 if as-if earnings are more than 15 percent below the bonus threshold, and 0 otherwise.

Figure 1 illustrates a typical design of executive bonus contracts and how our performance level variables are constructed. We estimate as-if earnings as follows:

- If the performance measure is EPS, as-if earnings equal EPS minus after-tax gains or losses from EDE divided by the number of shares outstanding.[14]
- If the performance measure is earnings, as-if earnings equal earnings minus after-tax gains or losses from EDE.
- If the performance measure is the return on assets (ROA), as-if earnings equal ROA minus after-tax gains or losses from EDE divided by total assets.
- If the performance measure is the return on equity (ROE), as-if earnings equal ROE minus after-tax gains or losses from EDE divided by equity.

[14] The after-tax gains or losses from EDE are calculated as DTEP multiplied by (1 – effective tax rate). Following Bartov and Mohanram (2014), we estimate firm-specific effective tax rates as the ratio of income tax expense to pre-tax income. We set the effective tax rate between 0 and 1.

- If the performance measure is the return on sales (ROS), as-if earnings equal ROS minus after-tax gains or losses from EDE divided by sales.

[Insert Figure 1 here]

We include several control variables that may affect debt repurchase decisions and the magnitude of resulting gains or losses (Lemayian 2013; Levy and Shalev 2017). We include firm size (*Ln*(*Assets*)), leverage (*Leverage*), and market-to-book ratio (*MTB*) to control for the effect of firm size, leverage, and growth opportunities, respectively. To control for a firm's incentive to change its capital structure, we include interest coverage (*Int_Cov*), credit ratings (*Rating*), and debt maturity structure (*Debt_Structure*) (Xu 2017). Profitability (*OROA*), the cash ratio (*Cash_AT*), and operating cash flows (*OCF*) control for firm performance and financial resources to carry out debt repurchases. The marginal tax rate (*Tax_rate*) and net operating loss carryforwards (*NOL*) control for tax-related incentives to undertake debt repurchases (Graham and Mills 2008).

Since firms may engage in debt repurchases to meet analyst forecasts, as suggested by Levey and Shalev (2017), we add *Meet_Analyst*, an indicator variable that equals 1 if as-if EPS is within $0.05 below the I/B/E/S consensus analysts' forecast estimate, and 0 otherwise. To address the possibility that firms also use other earnings management devices, we include performance-adjusted abnormal accruals (*PMDA*), real activities management (*RAM*), and the amount of share repurchases (*Share_Rep_AT*) (Kim and Ng 2018; Kothari, Leone, & Wasley 2005; Zang 2012). Finally, we include year and industry-fixed effects. Appendix A presents more detailed variable definitions.

4. EMPIRICAL RESULTS

4.1 Descriptive statistics

We first present an overview of EDE gains or losses reported by firms in Compustat. We first report the mean values for selected variables for non-financial firms over the sample period (N = 62,519), without requiring compensation data used for our main analyses. Panel A of Appendix B shows that around 14.1 percent (N = 8,837) of Compustat firms report non-zero gains or losses from EDE, with a mean value (*DTEP*) of −$10.13 million. Firms engaging in debt repurchases tend to be larger, more leveraged, and have higher operating income (but lower net income) compared to non-repurchasers.

In Panel B, among debt repurchasers, 22.0 percent (N = 1,947) report gains from EDE, with an average amount of $34.9 million; 78.0 percent (N = 6,890) report losses, with an average amount of $22.9 million. These statistics confirm the prevalence of accounting losses resulting from debt repurchases. Firms with EDE losses are larger, less leveraged, and more profitable (both in operating and net income) compared to those with gains.

Panel A of Table 2 presents descriptive statistics for the main variables based on our sample (N = 1,135). To mitigate the impact of outliers, we winsorize all continuous variables at the 1st and 99th percentiles of the distribution. For the full sample, the mean value of gains or losses from EDE (*DTEP*) is −$5.5 million. Approximately 16.2 percent (N =184) of the full sample reports non-zero gains or losses from EDE, with 8.7 percent reporting gains and 91.3 percent reporting losses (untabulated). For this subsample, the mean (median) value of gains or losses from EDE is −$33.9 (−$12.6) million (untabulated). The mean value of *Above_Max* is 0.2485, indicating that as-if earnings exceed the bonus maximum in one out of four cases.[15]

[15] The mean value of *Near_Thr* (0.0476) indicates that 4.7 percent of the sample reports as-if earnings just below the bonus threshold. These statistics are consistent with those reported by Kim and Ng (2018). The prevalence of firms with earnings above the bonus maximum suggests that bonus-related income-decreasing incentives may significantly affect managers' reporting incentives.

[Insert Table 2 here]

Panel B presents a Spearman correlation matrix for the key variables. As predicted, gains or losses from EDE deflated by average total assets (*DTEP_AT*) are negatively and significantly correlated with *Above_Max*. This finding provides univariate evidence that firms are more likely to recognize losses from EDE when as-if earnings exceed the bonus maximum.

4.2 Gains or losses from EDE and bonus-related incentives

Table 3 presents the results from estimating Eq. (1), where *DTEP_AT* is regressed on the four performance levels and the control variables. We report *t*-statistics based on the standard errors clustered at the firm level. Column (1) includes *Above_Max* in the regression with the control variables and shows that the coefficient is negative and significant (−0.0009; $t = -4.36$). This result indicates that managers with as-if earnings above the bonus maximum are more likely to record losses from EDE compared to those with other performance levels. In terms of economic significance, the estimated coefficient translates into 0.09 percent of average total assets ($13.70 billion, as reported in Panel A of Table 2), or approximately $12.33 million.

In column (2), the coefficient on *Near_Tar* is positive and significant at the 10 percent level (0.0002; $t = 1.89$). The result suggests that managers with as-if earnings just below the bonus target are likely to recognize gains from EDE. It is also consistent with Levy and Shalev's (2017) finding that managers with income-increasing incentives are more likely to recognize EDE gains. The coefficient on *Near_Thr* is not significant in column (3), but the coefficient on *Below_Thr* is positive and significant in column (4).[16]

[16] The positive coefficient on *Below_Thr* suggests that managers engage in income-increasing actions when performance is far below the lower threshold. Gaver et al. (1995) and Holthausen et al. (1995) report similar findings, suggesting that managers are concerned with their job security or debt covenant violations when performance is far below the lower threshold. We note that this result is inconsistent with managers taking a big bath (Healy 1985).

In column (5), when all performance level variables are included, only the coefficient on *Above_Max* remains significantly negative (−0.0009; *t* = −4.38), while the others become insignificant. This result is consistent with the notion that managers' income-decreasing reporting incentives affect debt repurchases and the resulting EDE losses.

Next, we define an indicator variable for EDE losses (i.e., *EDE_loss*), which equals 1 if *DTEP* is negative, and 0 otherwise, and then estimate a logistic model. As reported in column (6), the coefficient on *Above_Max* is positive and significant, reinforcing the idea that managers with performance above the maximum are more likely to record EDE losses. We also estimate the main analyses after dropping firm-years with EDE gains (N = 16) and find that the coefficient on *Above_Max* remains significantly negative (untabulated). We repeat the analysis after dropping those with EDE losses (N = 168) and find that the coefficient on *Above_Max* is still significantly negative (untabulated). These results in tandem suggest that income-decreasing reporting incentives affect both EDE gains and losses (i.e., managers are less likely to recognize EDE gains and more likely to recognize EDE losses).[17]

Turning to the results on the control variables, the coefficients on *Meet_ Analyst* are positive and significant in all columns, suggesting that managers with stronger incentives to meet or beat analyst forecasts are more (less) likely to recognize EDE gains (losses). This finding is consistent with Lemayian (2013) and Levy and Shalev (2017). Discretionary accruals (*PMDA*) are also positively associated with *DTEP_AT*. However, real earnings management (*RAM*) and share repurchases (*Share_Rep_AT*) are not significantly associated with *DTEP_AT*.

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[17] We conduct an additional analysis where we define an additional performance level variable for "just above the target." Specifically, *Above_Tar* equals 1 if as-if earnings are within 10% (or 15%) above the bonus target, and 0 otherwise. We find that the coefficient on *Above_Tar* is negative and significant (untabulated). The results suggest that managers are likely to record EDE losses when performance is just above the bonus target. Importantly, the coefficient on *Above_Max* remains significantly negative and its magnitude is four times greater than that on *Above_Tar*.

Overall, the results in Table 3 suggest that firms recognize disproportionately more losses from EDE when as-if earnings are above the bonus maximum. This loss recognition is not significantly related to bonus incentives at other performance levels, such as just below the target or the threshold, or far below the threshold.[18]

[Insert Table 3 here]

4.3 Regression discontinuity analysis

To address potential endogeneity concerns stemming from the association between performance level variables and firms' performance, we employ a Regression Discontinuity (RD) design, following the methodology outlined by Chava and Roberts (2008) and Balsam, Gu, & Mao (2018). This approach allows us to test for any significant discontinuity in EDE losses recognized around the bonus maximum among firms with closely comparable performances, i.e., firms whose as-if earnings are just above (the treatment group) or just below (the control group) the bonus maximum. By doing so, we aim to determine whether the observed relationship between EDE losses and *Above_Max* can be attributed to managers' income-reporting incentives linked to bonuses or if it might be confounded by differences in overall firm performance.

To validate the key identifying assumption of our RD design, which posits that firms cannot strategically choose (or manipulate) their performance levels to self-select into treatment or control groups, we conduct tests following Cattaneo, Jansson, & Ma (2018).[19] Untabulated test results

[18] In our main regression models, we do not include firm-fixed effects since the variable of interest (i.e., indicators for performance levels) shows limited within-firm variation. This restricted variability can be explained by the strong serial correlation in the performance variation (performance relative to targets), as documented in prior studies (Indjejikian and Nanda 2002). In an untabulated test, we re-estimate Eq. (1) by including firm-fixed effects and find that our results remain unchanged.

[19] This implies that in the absence of manipulation, the marginal density of as-if earnings (i.e., earnings that contain all income-reporting choices other than EDE losses) should be continuous around the bonus maximum. If this assumption holds, any variation in performance near the bonus maximum can be treated as exogenous (Lee and Lemieux 2010).

confirm that we cannot reject the null hypothesis that the density of as-if earnings is continuous at the bonus maximum. Specifically, the *p*-values from these tests range from 0.15 to 0.49 depending on the subsamples analyzed below. These findings support the exogeneity of the variation in performance near the bonus maximum, affirming that firms do not strategically manipulate their performance levels.

Next, we test for a discontinuity in EDE losses at the bonus maximum. To do so, we first plot our data in Figure 2, which shows a sharp decline in *DTEP_AT* just above the bonus maximum, indicating a potential discontinuity. To formally test this, we estimate Eq. (2) for a subsample within a narrow bandwidth of performance. Specifically, we use firm-years with as-if earnings falling within a 10-percentage point performance margin around the bonus maximum (hereafter, focused subsample; N = 490).[20]

$$DTEP\_AT_{it} = \lambda_0 + \lambda_1 Cutoff_{it} + \Sigma\lambda Controls + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (2)$$

where, for firm *i* in year *t*, *Cutoff* is an indicator variable that equals 1 if as-if earnings are above the bonus maximum (i.e., treatment firms), and 0 otherwise (i.e., control firms). We use the same set of control variables as in Eq. (1). λ_1 in Eq. (2) is our variable of interest that captures the difference in *DTEP_AT* between treatment and control firms.

Column (1) of Table 4 reports the estimation results of Eq. (2) for the focused subsample. The coefficient on *Cutoff* is negative and significant (−0.0007; $t = -2.40$), indicating a significant decline in *DTEP_AT* when firms exceed the bonus maximum. Although the estimation based on the focused subsample is less biased, it is less efficient due to the limited number of observations (Lee and Lemieux 2010). To alleviate this efficiency concern, we use an alternative RD

[20] Performance margins are defined as as-if earnings less the bonus maximum divided by the absolute value of as-if earnings.

specification, leveraging a larger sample of firms across a broader range of performance levels, i.e., all firm-years with as-if earnings above the bonus target (hereafter, extended subsample; N = 743).

In this specification of RD in Eq. (3), we extrapolate the values of EDE losses for treatment and control firms separately using two different polynomial functions based on the distance between as-if earnings and the bonus maximum (*Distance*):

$$DTEP\_AT_{it} = \lambda_0 + \lambda_1 Cutoff_{it} + P_l(Distance) + P_r(Distance) + \Sigma\lambda Controls \\ + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (3)$$

where $P_l(Distance)$ and $P_r(Distance)$ represent polynomial functions for the observations of control and treatment firms, respectively. λ_1 is still the main variable of interest that captures the difference in extrapolated values of *DTEP_AT* between treatment and control firms. The main difference between the settings in Eqs. (2) and (3) is what λ_1 is designed to capture; λ_1 in Eq. (2) reflects the mean difference in *DTEP_AT* between treatment and control firms, while λ_1 in Eq. (3) reflects the point estimate difference in *DTEP_AT* at the bonus maximum.

When working with Eq. (3), we consider both the 1st (linear) and 2nd order (quadratic) polynomial functions by including (i) *Distance* alone and (ii) both *Distance* and $Distance^2$. We interact *Distance* with *Cutoff* to differentiate between polynomial functions used for control (P_l) and treatment firms (P_r). That is, we estimate the following two equations (the workable version of Eq. (3)) using the extended subsample:

$$DTEP\_AT_{it} = \lambda_0 + \lambda_1 Cutoff_{it} + \lambda_2 Distance_{it} + \lambda_3 Cutoff_{it} \times Distance_{it} + \Sigma\lambda Controls + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (4)$$

$$DTEP\_AT_{it} = \lambda_0 + \lambda_1 Cutoff_{it} + \lambda_2 Distance_{it} + \lambda_3 Distance_{it}^2 + \lambda_4 Cutoff_{it} \times Distance_{it} + \lambda_5 Cutoff_{it} \times Distance_{it}^2 + \Sigma\lambda Controls + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (5)$$

Columns (2) and (3) of Table 4 present the estimation results for Eqs. (4) and (5), respectively. In both cases, the coefficient on *Cutoff* (λ_1) remains significantly negative (−0.0008; $t = -2.23$ and −0.0009; $t = -2.40$, respectively). In column (3), the magnitude of the coefficient indicates that exceeding the bonus maximum is associated with a sudden decrease in *DTEP_AT* by $14.91 million on average.[21]

As placebo tests, we re-estimate three different RD specifications, i.e., Eq. (2) for focused subsamples, and Eqs. (4) and (5) for extended subsamples, using the bonus target and threshold as pseudo cutoffs. The results with the bonus target and the bonus threshold are reported in columns (4)–(6) and columns (7)–(9), respectively. Similar to the analysis of bonus maximum, focused subsamples include all firm-years with as-if earnings within a 10-percentage point performance margin around the bonus target and threshold, respectively. Extended subsamples are carefully constructed to avoid analyzing firms with substantially different performances. These extended subsamples include all firm-years whose earnings lie between the threshold and maximum (for a target cutoff) and below the bonus target (for a threshold cutoff). According to these alternative cutoffs, *Cutoff* is redefined as an indicator variable that equals 1 if as-if earnings are above the bonus target (threshold), and 0 otherwise. *Distance* is also re-measured as the difference between as-if earnings and the bonus target (threshold) divided by the target (threshold). From the results of placebo tests with these alternative cutoffs, we do not find any discernible discontinuity in

[21] We calculate this amount by multiplying the coefficient on *Cutoff* (−0.0009) by the average total assets ($16.57 billion) of the sample used for this analysis.

DTEP_AT around the bonus target (i.e., columns 4–6) or the threshold (i.e., columns 7–9). These findings are consistent with our inference that recognizing losses from EDE is related to managers' bonus incentives, particularly around the bonus maximum.

[Insert Figure 2 and Table 4 here]

4.4 The choice of repurchase method

Next, we examine whether bonus-related incentives affect the choice of repurchase method. Levy and Shalev (2017) argue that firms with income-increasing incentives use open market repurchases (rather than tender offers) because they can obtain more profitable deals by exploiting mispricing.[22] Their result suggests that firms with income-decreasing incentives are likely to use tender offers, where repurchasing firms pay substantial premiums over pre-tender market prices (Mann and Powers 2007).

To test this prediction, we merge our dataset with the Mergent Fixed Income Securities Database (FISD), which provides detailed information on public bond repurchases. The merged sample comprises 194 firm-year observations from 2006 to 2016 and includes three major repurchase methods: tender offers (N = 63), open market repurchases (N = 22), and calls (N = 109). *Tender* (*OMR*) is an indicator variable that equals 1 if the firm uses a tender offer (open market) to repurchase bonds, and 0 otherwise. We then augment Eq. (1) with the interactions between the performance level (e.g., *Above_Max*) and the repurchase method variables (*Tender* and *OMR*).[23]

Table 5 presents the estimation results. Column (1) shows that the coefficient on *Tender* is negative and significant (−0.0012; t = −2.01), which suggests that bonds repurchased through

[22] Managers can also repurchase a small amount on the open market without providing disclosures.
[23] We add an additional indicator variable, *Multi*, that equals 1 if the firm uses multiple repurchase methods during the year, and 0 otherwise. In untabulated tests, we re-estimate the regression after removing firm-years with multiple repurchase methods, and find similar results.

tender offers are more likely to be associated with EDE losses. In contrast, the coefficient on *OMR* is not significant (−0.0003; *t* = −0.21), suggesting that gains or losses from open market repurchases are not significantly different from those from exercising calls.[24] These results are consistent with Levy and Shalev's (2017) finding, suggesting that tender offers impose higher costs on repurchasing firms compared to open market repurchases.

More importantly, in column (2), the coefficient on *Above_Max* × *Tender* is negative and significant (−0.0036; *t* = −3.04), while that on *Above_Max* × *OMR* is insignificant (0.0028; *t* = 1.03). These results suggest that recognizing EDE losses when as-if earnings are above the bonus maximum is more pronounced in tender offers than in open-market repurchases or calls.

In column (3), the coefficient on *Above_Max* × *Tender* remains significantly negative (−0.0027; *t* = −2.20) when we include additional interaction terms between repurchase methods and other performance levels (e.g., *Near_Tar*). The positive coefficient on *Near_Thr* × *OMR* (0.0202; *t* = 3.97) suggests that open market repurchases are used as an income-increasing device when as-if earnings are just below the threshold. Furthermore, the positive and marginally significant coefficient on *Above_Max* × *OMR* (0.0056; *t* = 1.76) suggests that open market repurchases are more likely to be associated with EDE gains when as-if earnings are above the bonus maximum. Overall, Table 5 provides evidence on the choice of repurchase method used for bonus-driven debt repurchases.

[Insert Table 5 here]

[24] An untabulated F-test indicates that the coefficients on *Tender* and *OMR* are statistically different (*p*-value = 0.019).

5. ADDITIONAL ANALYSES

5.1 Subsequent cash compensation

In this section, we examine whether bonus-driven debt repurchases affect next-period cash compensation. On the one hand, recognizing losses from EDE may shift income to the next period by reducing subsequent interest expenses. This could enable managers to avoid excessive increases in future performance targets, potentially leading to higher cash compensation in the following year. On the other hand, compensation committees may undo the effect of EDE losses and set higher next-period targets than what current-period earnings would imply, countering any potential increase in cash compensation.

To examine these competing scenarios, we estimate Eq. (6) using firm-year observations with performance above the bonus maximum (N = 219):

$$\Delta Cash\_bonus_{it+1} = \lambda_0 + \lambda_1 Loss\_DTEP_{it} + \lambda_2 Ln(Assets)_{it} + \lambda_3 MTB_{it} + \lambda_4 Meet\_Aanlyst_{it} + \lambda_5 Ret_{it+1} + \lambda_6 ROA_{it+1} + \lambda_7 CEO\_Own_{it+1} + \lambda_8 Duality_{it+1} + \lambda_9 Board\_size + \lambda_{10} Ind\_Dir_{it+1} + \lambda_{11} Busy\_Dir_{it+1} + \lambda_{12} Old\_Board_{it+1} + \lambda_{13} CC\_Size_{it+1} + \lambda_{14} Ind\_CC_{it+1} + \lambda_{15} Busy\_CC_{it+1} + \lambda_{16} Old\_CC_{it+1} + \lambda_{17} IRO\_TOT_{it+1} + \lambda_{18} Cash\_bonus_{it} + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (6)$$

where, for firm *i* in year *t*, $\Delta Cash\_bonus_{it+1}$ is changes in CEOs' cash bonuses between years *t* and *t*+1, deflated by total compensation for year *t*. *Loss_DTEP* is an indicator variable that equals 1 if the firm reports losses from EDE, and 0 otherwise. We include several variables to control for firm characteristics (*Ln*(*Assets*), *MTB*, *Meet_Analyst*, *Ret*, and *ROA*), CEO characteristics (*CEO_Own* and *Duality*), and corporate governance (*Board_size*, *Ind_Dir*, *Busy_Dir*, *Old_Board*, *CC_Size*, *Ind_CC*, *Busy_CC*, *Old CC*, and *IRO_TOT*) (Murphy and Sandino 2020). We provide variable definitions in Appendix A.

Table 6 reports the results. We find that the coefficient on *Loss_DTEP* is positive and significant at the 10 percent level (0.0546; *t* = 1.73). This result suggests that recognizing EDE losses in the current year is weakly associated with subsequent increases in cash bonuses. These results are consistent with managers obtaining at least some compensation benefits from recognizing EDE losses when their performance is above the maximum threshold. However, we are cautious about the underlying mechanisms for the following reasons. First, the marginal significance of the result suggests that adjustments in target settings by compensation committees might still be at play. Second, compensation committees might choose not to intervene because 1) they see through managers' incentives to reduce earnings but consider using accounting losses as a less harmful strategy than managers' withholding efforts in real operations (e.g., sales) to reduce earnings, or 2) they cannot distinguish between debt repurchases undertaken for risk management purposes and those done for compensation benefits.

[Insert Table 6 here]

5.2 Effect on shareholder value

Our findings raise an interesting ancillary question: do bonus-driven debt repurchases reflect suboptimal managerial decisions that negatively affect shareholder value? For example, suppose managers forgo profitable investment opportunities to fund debt repurchases for their bonus incentives. In that case, such activities may lead to poor firm performance or reduced dividend payments in subsequent periods. Alternatively, these debt repurchases may benefit shareholders if they are used to optimize leverage or alleviate the agency problems of free cash flows (Jensen 1986) or debt overhang (Julio 2013). Furthermore, recognizing EDE losses may be a non-value-destroying option for managers to decrease reported earnings for their compensation benefits, thereby mitigating "the ratchet effect" (Kim and Shin 2017). Similarly, prior studies such as Al-Shattarat, Hussainey, & Al-Shattarat (2022) and Jiraporn, Miller, Yoon, & Kim (2008) suggest that earnings manipulation, under certain circumstances, may not always be detrimental.

To examine the effect of bonus-driven debt repurchases on shareholder value, we use changes in annual stock returns (*ChRET*), accounting profitability (*ChOROA* and *ChROA*), and dividend payouts (*ChDiv*) as dependent variables (Fama and Babiak 1968; Young and Yang 2011). To focus on CEOs' income-decreasing reporting incentives through EDE, we use the above-maximum subsample to focus on (N = 270−273), similar to the test for subsequent cash compensation. As reported in Table 7, the coefficients on *Loss_DTEP* are all insignificant. These results suggest that the effect on shareholder value is non-detrimental.

[Insert Table 7 here]

5.3 Other earnings management mechanisms

A line of research suggests a potential substitute or complementary relation among earnings management mechanisms (e.g., Burnett, Cripe, Martin, & McAllister 2012; Cohen, Dey, & Lys,. 2008; Cohen and Zarowin 2010; Zang 2012). In Table 3, the positive coefficient on *PMDA* suggests a positive association between gains or losses from EDE and discretionary accruals. In this section, we further examine this relation by using Zang's (2012) two-stage approach. This approach explicitly considers managers' sequential actions (i.e., debt repurchases during the year and accrual management after year-ends). To focus on managers' income-decreasing reporting incentives, we use firms with *Above_Max* = 1 (N = 282).

Following Zang (2012), we first estimate the expected and unexpected gains or losses from EDE (*Pred_DTEP* and *Residual_DTEP*) using a regression model modified from Eq. (1). We then include them in the discretionary accrual regression (see Appendix A for details).[25] As reported in column (1) of Table 8, the positive and significant coefficient on *Residual_DTEP* suggests a

[25] To model the amount of gains or losses from EDE, we include all control variables from Eq. (1) except *PMDA*. We also add four variables to proxy for the costs associated with accruals management: net operating assets (*NOA*), Big 4 auditors (*Big4*), auditor tenure (*Auditor_Tenure*), and firms' operating cycle (*Operating_Cycle*).

complementary relation between debt repurchases and accrual management. This finding suggests that managers with income-decreasing incentives are more likely to recognize EDE losses during the year *and* subsequently engage in accrual management to decrease reported earnings after the year-end.

Next, we explore the association between share repurchases and the recognition of EDE gains or losses as tools to affect performance for bonus calculations. Prior studies find that managers use share repurchases to benefit from EPS-linked bonus plans (Cheng et al. 2015; Kim and Ng 2018; Young and Yang 2011). Following Barton (2001), we model these two actions using simultaneous equation systems. We regress *DTEP_AT* on share repurchases (*Share_Rep_AT*) and the control variables included in Eq. (1). We then regress *Share_Rep_AT* on *DTEP_AT* and a set of control variables affecting share repurchases (Kim and Ng 2018).[26] We limit this analysis to those with performance above the bonus maximum (i.e., *Above_Max* = 1).[27]

As columns (2) and (3) of Table 8 show, the coefficients on *Share_Rep_AT* and *DTEP_AT* are insignificant. This result suggests that the use of debt repurchases is independent of share repurchases.

[Insert Table 8 here]

5.4 Additional tests

5.4.1 Propensity score matching

One potential issue in our main results is the systematic differences between firms with superior performance (i.e., above the bonus maximum) and other firms, which could affect our conclusions.

[26] Specifically, among the control variables in Eq. (1), we exclude *Int_Cov*, *Tax_rate*, *NOL*, *Rating*, and *Debt_Structure* because they are closely related to debt repurchases but not equity repurchases. Following Kim and Ng (2018), we also add four unique determinants of share repurchase decisions: cash dividends (*Div*), share issues during the year (*Share_Issues*), CEO stock option grants (*Restrictedaward_fv*), and CEO restricted stock grants (*Optionaward_fv*) (Aboody and Kasznik 2008).

[27] The requirement for additional control variables reduces the sample size to 264.

To mitigate this issue, we use a PSM approach (Rosenbaum 2010). For each firm with *Above_Max* = 1, we identify a matched pair (*Above_Max* = 0) with the closest probability of exceeding the bonus maximum (i.e., treatment). We estimate a logistic regression model using the control variables from Eq. (1) and match without replacement within a caliper of 0.01. The matched sample includes 556 firm-year observations (278 pairs).

Appendix C presents the results from the PSM models (Panel B) and the covariate balance before and after matching (Panels A and C). As column (1) of Table 9 shows, the result using the matched sample is consistent with our main result.

5.4.2 Heckman's two-stage approach

We note that a potential sample selection bias can arise as we restrict our sample to firms with performance measures that include non-operating income items (e.g., EPS, net income). To address this concern, we use Heckman's (1979) two-stage estimation approach, where the first-stage regression is:

$$\begin{aligned} Pr(\textit{Non-operating Measure}_{it}) = {} & \lambda_0 + \lambda_1 STD\_ROA_{it-1} + \lambda_2 STD\_OROA_{it-1} + \lambda_3 IOR\_TOT_{it} \\ & + \lambda_4 IOR\_TRA_{it} + \lambda_5 Num\_Segment_{it} + \lambda_6 Ind\_Dir_{it} + \lambda_7 Ln(Assets)_{it-1} + \lambda_8 MTB_{it-1} + \lambda_9 Div_{it} \\ & + \lambda_{10} Restrictedaward\_fv_{it} + \lambda_{11} Optionaward\_fv_{it} + \lambda_{12} R\&D_{it-1} + \lambda_{13} Tax_{it} \\ & + \text{Year and industry fixed effects} + \varepsilon_{it} \qquad (7) \end{aligned}$$

The dependent variable (*Non-operating Measure*) in Eq. (7) is an indicator variable that equals 1 if the firm uses non-operating earnings as a performance measure in CEOs' bonus contracts, and 0 otherwise. Following prior studies on the choice of performance measures (e.g., Huang, Marquardt, and Zhang 2014), we include the standard deviation of ROA (*STD_ROA*), the standard deviation of operating ROA (*STD_OROA*), institutional ownership (*IOR_TOT*), transient ownership (*IOR_TRA*), number of segments (*Num_Segment*), the ratio of outside directors on the board (*Ind_Dir*), firm size (*Ln*(*Assets*)), market-to-book ratio (*MTB*), cash dividends (*Div*), restricted stock grants (*Restrictedaward_fv*) and stock option grants (*Optionaward_fv*) to CEOs, R&D expenditure (*R&D*), and effective tax rate (*Tax*).[28] We provide more detailed definitions in Appendix A.

Appendix D presents the results of estimating Eq. (7) using the probit model. As reported in column (2) of Table 9, including the inverse Mills ratio in Eq. (1) does not alter the results.

5.4.3 Other additional tests

In Table 9, we perform several additional tests to check the robustness of our results. First, we limit our main analysis to firm-years with non-zero gains or losses from EDE (N = 184) and obtain similar results, as shown in column (3). Second, we repeat the main analysis after excluding firm-years that use ROA or ROE as performance measures. This is important because our calculation of as-if earnings does not adjust for the effect of debt repurchases on the denominators of these ratios, potentially introducing measurement errors. As reported in column (4), our results are not affected. Third, we repeat the analysis after further excluding observations of firms that have their earnings adjusted to special (or non-recurring) items for bonus calculations, since these adjustments could be EDE-related. It is important to note that, for the main analysis, we only remove firms that have their earnings adjusted specifically to EDE. The results are qualitatively similar when using this alternative sample (N = 638), as reported in column (5). Fourth, we add the CEO portfolio delta (*LogDelta*) in Eq. (1) to control for the effect of equity-based compensation on debt repurchases. We find that the coefficient is insignificant, while that on *Above_Max* remains significantly negative, as shown in column (6).

Finally, we examine the relation between bonus incentives and the premium paid by repurchasing firms over the market price of the bond, or early repayment premiums (ERP). The

[28] We include *STD_ROA* and *STD_OROA* because the relative weights on operating and non-operating earnings measures in bonus contracts may be affected by noise in performance measures (Banker and Datar 1989; Ittner, Larcker, and Rajan 1997).

market price of the bond should already reflect the effect of changes in market interest rates and firm credit quality between issuance and repurchase dates. ERP thus captures additional costs paid by repurchasing firms, which are recognized as part of EDE losses. We define *ERP* as the difference between the repurchase price of the bond and its most recent market price within 60 days of the repurchase date (Mann and Powers 2007). We obtain bond price data from TRACE. We then re-estimate Eq. (1) after replacing *DTEP_AT* with *ERP*. As column (7) shows, the coefficient on *Above_Max* is positive and significant at the 10 percent level. These results suggest that firms with income-decreasing incentives are willing to pay higher premiums above the market price when repurchasing bonds.

[Insert Table 9 here]

6. CONCLUSION

In this study, we examine the relation between managers' bonus incentives and their decisions to repurchase debt and recognize resulting losses. We use detailed information from CEOs' annual bonus contracts, including threshold, target, maximum performance levels, and actual performance, to identify various income-reporting incentives. Our sample consists of 1,135 firm-year observations from 2006 to 2016. We find that managers are more likely to recognize losses from EDE when as-if earnings are above the bonus maximum set in annual bonus contracts, in which recognizing accounting losses does not significantly affect managers' current-period bonus awards. This bonus-related effect is incremental to other factors affecting debt repurchases. Our RD analysis further shows a sharp increase in EDE losses just around the bonus maximum cutoff, attenuating concerns about potential confounding effects from firm performance. We also find that managers with as-if earnings above the bonus maximum are more likely to use tender offers (rather than open market repurchases or exercising calls), use accrual management, and pay higher premiums over the market price of the bond. These findings support the argument that income-decreasing reporting incentives are an important determinant of debt repurchases. Bonus-driven repurchases, however, do not appear to undermine shareholder value.

We acknowledge that this study is subject to some limitations. First, while we remove firm-years that explicitly state excluding EDE gains or losses from earnings for bonus calculation (and also repeat the analysis after removing those with more general descriptions of excluding special items), we cannot completely rule out the possibility that EDE gains or losses are adjusted in calculating performance measures. For example, compensation committees might "reserve the right to exclude" certain items in these calculations. Second, although our findings regarding future compensation provide evidence that managers obtain some compensation benefits from bonus-driven debt repurchases, we acknowledge that these benefits are only weakly associated with next-year compensation. As discussed previously, we are cautious about drawing strong inferences about the underlying mechanisms because compensation committees can make adjustments in target settings or they might not intervene because using accounting losses is perceived as less harmful than managers withholding efforts in real operations for bonus compensation.

Notwithstanding these limitations, this study provides new evidence that bonus-related income-decreasing incentives are an important determinant of debt repurchases. Our results also help reconcile the rising trend in EDE in recent years with the potential incentive problem associated with recognizing EDE losses (Potepa 2020). This study suggests that the practice of including non-recurring items in bonus calculations does not necessarily penalize managers or discourage them from undertaking value-enhancing activities that may result in accounting losses.

APPENDIX A Variable Definitions

Variable	Definitions
Main variables in Eqs. (1)-(4)	
DTEP	Pretax gains or losses from EDE (Compustat item DTEP) in millions of dollars.
DTEP_AT	Pretax gains or losses from EDE divided by average total assets.
EDE_loss	Indicator variable that equals 1 if *DTEP* is negative, and 0 otherwise.
Above_Max	Indicator variable that equals 1 if as-if earnings are above the bonus maximum, and 0 otherwise. As-if earnings are measured as follows: • If the performance measure is earnings per share (EPS), as-if earnings equal EPS less after-tax gains or losses from EDE divided by the number of shares outstanding; • If the performance measure is earnings, as-if earnings equal earnings less after-tax gains or losses from EDE; • If the performance measure is the return on assets (ROA), as-if earnings equal ROA less after-tax gains or losses from EDE divided by total assets; • If the performance measure is the return on equity (ROE), as-if earnings equal ROE less after-tax gains or losses from EDE divided by equity; • If the performance measure is the return on sales (ROS), as-if earnings equal ROS less after-tax gains or losses from EDE divided by sales. If a bonus contract includes multiple performance measures, we use the measure with the greatest performance relative to the target.
Near_Tar	Indicator variable that equals 1 if as-if earnings are within 15% below the bonus target, and 0 otherwise.
Near_Thr	Indicator variable that equals 1 if as-if earnings are within 15% below the bonus threshold, and 0 otherwise.
Below_Thr	Indicator variable that equals 1 if as-if earnings are more than 15% below the bonus threshold, and 0 otherwise.
Cutoff	Indicator variable that equals 1 if as-if earnings are above a cutoff (i.e., bonus maximum, target, and threshold), and 0 otherwise.
Distance	Difference between as-if earnings and a cutoff, divided by the cutoff (e.g., (EPS – cutoff EPS)/cutoff EPS).
Control variables in Eqs. (1)-(4)	
Ln(Assets)	Natural logarithm of total assets.
Leverage	The sum of short- and long-term debts divided by total assets.
MTB	Market-to-book ratio.
Int_Cov	Earnings before interest and taxes divided by interest expense.
OROA	Operating income divided by average total assets.
Tax_rate	Marginal tax rate (https://faculty.fuqua.duke.edu/~jgraham/taxform.html).
NOL	Net operating loss carryforwards divided by average total assets.
Cash_AT	Cash divided by total assets.

OCF	Cash flows from operations divided by average total assets.
Rating	S&P credit ratings with values between 1 (AAA) and 23 (SD).
Debt_Structure	The ratio of debt in current liabilities to long-term debt.
PMDA	Performance-matched abnormal accruals (Kothari et al. 2005), where firms are matched on operating income on assets.
RAM	The sum of abnormal production costs and abnormal discretionary expenses (Zang 2012).
Share_Rep_AT	Amount of stock purchase less any reduction in preferred stock, divided by average total assets (Kim and Ng 2018).
Meet_Analyst	Indicator variable that equals 1 if as-if earnings are within $0.05 below the I/B/E/S consensus analysts' forecast estimate, and 0 otherwise.

Table 6: Subsequent cash compensation

ΔCash_bonus	Changes in cash bonuses deflated by total compensation (*TDC1*) for year *t*.
Loss_DTEP	Indicator variable that equals 1 if the firm reports losses from EDE, and 0 otherwise.
CEO_Own	Shares held by the CEO divided by total shares outstanding.
Duality	Indicator variable that equals 1 if a CEO holds a Chairman's position, and 0 otherwise.
Board_Size	Natural logarithm of the number of directors on the board.
Ind_Dir	Percentage of independent directors on the board.
Busy_Dir	Percentage of directors who hold directorships at other companies.
Old_Board	Percentage of directors who are older than 68.
CC_Size	Natural logarithm of the number of directors on the compensation committee.
Ind_CC	Percentage of independent directors on the compensation committee.
Busy_CC	Percentage of directors on the compensation committee who hold directorships at other companies.
Old_CC	Percentage of directors on the compensation committee who are older than 68.
IOR_TOT	Shares held by institutions divided by total shares outstanding.

Table 7: Effect on shareholder value

ChRet	Changes in market-adjusted stock returns.
ChOROA	Changes in operating income divided by average total assets.
ChROA	Changes in income before extraordinary items divided by average total assets.
ChDiv	Changes in cash dividends divided by the market value of equity.
Loss	Indicator variable that equals 1 if the firm reports negative operating income, and 0 otherwise.
WC	[current assets – cash and short-term investment] – [current liabilities – debt in current liabilities], all divided by total assets.
ICF_AT	Investment cash flows divided by average total assets.
FCF	Operating cash flows less the sum of extraordinary items and discontinued operations, common and preferred dividends, and capital expenditure, all divided by average total assets.

Ln(MV)	Natural logarithm of the market value of equity.
Shares	Natural logarithm of common shares outstanding.
Tangibles	Property, plant, and equipment divided by total assets.
RETE	Retained earnings divided by common shareholders' equity.
TETA	Common shareholders' equity divided by total assets.
STD_ROA	The standard deviation of ROA for the past five years.

Table 8: Alternative earnings management mechanisms	
Residual_DTEP	Residuals estimated from the following model (Zang 2012): $DTEP\_AT_{it} = \lambda_0 + \lambda_1 Share\_Rep\_AT_{it} + \lambda_2 Ln(Assets)_{it-1} + \lambda_3 Leverage_{it-1} + \lambda_4 MTB_{it-1} + \lambda_5 Int\_Cov_{it-1} + \lambda_6 OROA_{it} + \lambda_7 Tax\_rate_{it} + \lambda_8 NOL_{it-1} + \lambda_9 Cash\_AT_{it} + \lambda_{10} OCF_{it} + \lambda_{11} Rating_{it-1} + \lambda_{12} Debt\_Structure_{it-1} + \lambda_{13} RAM_{it} + \lambda_{14} Meet\_Analyst_{it} + \lambda_{15} NOA_{it-1} + \lambda_{16} Big4_{it} + \lambda_{17} Auditor\_Tenure_{it} + \lambda_{18} Operating\_Cycle_{it-1} + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (13)$ where *NOA* is net operating assets (i.e., current assets plus net property, plant, and equipment minus current liabilities, divided by lagged total sales). *Big4* equals 1 for firms audited by a Big 4 audit firm, and 0 otherwise. *Auditor_Tenure* is the natural logarithm of auditor tenure. *Operating_Cycle* is the length of firms' operating cycles measured by days receivable plus days inventory minus days payable.
Pred_DTEP	Predicted values estimated from Eq. (13).
Share_Issues	The dollar value of shares issued by a firm during the year divided by average total assets.
Optionaward_ fv	Natural logarithm of the dollar value of CEO stock option grants.
Restrictedaward_ fv	Natural logarithm of the dollar value of CEO restricted stock grants.

Table 9: Other additional tests	
LogDelta	Natural logarithm of the value sensitivity of CEO stocks and options to a 1% change in stock prices.
ERP	Difference between the repurchase price of a bond and its most recent market price within sixty days of the repurchase date (Mann and Powers 2007). We obtain bond price data from TRACE.

Appendix D: Heckman's two-stage regression	
Non-operating Measure	Indicator variable that equals 1 if the firm's CEO bonus contracts include non-operating earnings or non-earnings performance measures, and 0 otherwise.
STD_OROA	The standard deviation of *ORAO* over the past five years.
IOR_TRA	Shares held by transient institutions divided by total shares outstanding.
Num_Segment	Natural logarithm of the number of business segments of the firm.
Tax	Income tax expense divided by pretax income.
R&D	R&D expenditure divided by sales.

APPENDIX B Overview of Gains or Losses from EDE: Compustat Sample

Panel A. Compustat sample

	Debt repurchasers	Non-repurchasers	Diff. (1)−(2)	*t*-stat	All Compustat sample
	(1)	(2)	(3)	(4)	(5)
$DTEP_{it}$ (in millions)	−10.1295	0.0000	−9.7499	−53.61 ***	−1.4318
$DTEP\_AT_{it}$	−0.0050	0.0000	−0.0050	−35.32 ***	−0.0007
OCF_{it}	0.0012	0.0042	−0.0030	−1.05	0.0038
$Leverage_{it-1}$	0.4388	0.2003	0.2385	7.28 ***	0.2340
$OROA_{it-1}$	0.0037	0.0007	0.0031	33.89 ***	0.0011
ROA_{it-1}	−0.1185	−0.0823	−0.0362	−8.41 ***	−0.0874
$Ln(Assets)_{it-1}$	6.6288	5.7005	0.9283	33.51 ***	5.8317
N	**8,837**	**53,682**			**62,519**

Panel B. Firms with non-zero DTEP

	Gains from EDE	Losses from EDE	Diff. (1)−(2)	*t*-stat	Total
	(1)	(2)	(3)	(4)	(5)
$DTEP_{it}$ (in millions)	34.8937	−22.8523	57.7460	10.87 ***	−10.1295
$DTEP\_AT_{it}$	0.0411	−0.0185	0.0596	30.30 ***	−0.0054
OCF_{it}	−0.0566	0.0138	−0.0704	−9.04 ***	−0.0017
$Leverage_{it-1}$	0.4964	0.4376	0.0588	10.73 ***	0.4505
$OROA_{it-1}$	−0.1001	0.0253	−0.1254	−12.33 ***	−0.0024
ROA_{it-1}	−0.2407	−0.0994	−0.1413	−21.21 ***	−0.1305
$Ln(Assets)_{it-1}$	5.5384	6.9335	−1.3951	−23.57 ***	6.6261
N	**1,947**	**6,890**			**8,837**

This table reports the mean values for selected variables using the Compustat sample (N = 62,519) for the years 2006–2016. In Panel A, the sample consists of non-financial observations from Compustat for firms with available data to calculate the variables presented. Debt repurchasers (non-repurchasers) are firms that report non-zero (zero) gains or losses from EDE. In Panel B, debt repurchasers are split into two groups: firms with gains from EDE and firms with losses from EDE. See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

APPENDIX C Propensity Score Matching

Panel A. Before matching

	Above_Max = 0	*Above_Max* = 1	Diff	*t*-stat
	(1)	(2)	(3)	(4)
$Ln(Assets)_{it-1}$	8.9864	8.9365	0.0499	0.70
$Leverage_{it-1}$	0.2783	0.2877	−0.0094	−1.08
MTB_{it-1}	3.0683	3.0440	0.0243	0.12
Int_Cov_{it-1}	13.8838	9.8837	4.0001	3.36 ***
$OROA_{it-1}$	0.1507	0.1373	0.0134	2.85 ***
Tax_rate_{it-1}	0.1728	0.1862	−0.0134	−1.25
NOL_{it-1}	0.0340	0.0388	−0.0048	−0.91
$Cash\_AT_{it-1}$	0.0777	0.0756	0.0021	0.42
OCF_{it-1}	0.1078	0.1049	0.0029	0.77
$Rating_{it-1}$	8.7456	9.2199	−0.4743	−2.78 ***
$Debt\_Structure_{it-1}$	0.1652	0.1984	−0.0332	−1.54
$PMDA_{it}$	−0.0194	−0.0219	0.0025	0.17
RAM_{it}	−0.0789	−0.0484	−0.0305	−3.04 ***
$Share\_Rep\ \_AT_{it}$	0.0348	0.0290	0.0058	1.89 *
$Meet\_Analyst_{it}$	0.1419	0.0756	0.0663	1.44
N	**854**	**281**		

Panel B. Propensity score model

Dependent variable =	$Above\_Max_{it}$
	(1)
Intercept	−1.3390 (−1.33)
$Ln(Assets)_{it-1}$	−0.0543 (−0.67)
$Leverage_{it-1}$	0.1549 (0.23)
MTB_{it-1}	0.0206 (0.86)
Int_Cov_{it-1}	−0.0078 (−1.31)
$OROA_{it-1}$	−7.0968 *** (−3.15)
Tax_rate_{it-1}	1.1905 ** (2.32)
NOL_{it-1}	1.1227 (1.03)
$Cash\_AT_{it-1}$	0.2115 (0.17)
OCF_{it-1}	7.6612 *** (3.34)
$Rating_{it-1}$	0.0715 * (1.89)

Debt_Structure$_{it-1}$	0.4934 (2.16)	**
PMDA$_{it}$	−0.1773 (−0.51)	
RAM$_{it}$	1.0726 (2.03)	**
Share_Rep _AT$_{it}$	0.0958 (0.05)	
Meet_Analyst$_{it}$	−0.2500 (−1.14)	
Pseudo R^2	3.51%	
Observations	1,135	

Panel C. After matching

	Above_Max = 0	*Above_Max* = 1	Diff	*t*-stat
	(1)	(2)	(3)	(4)
Ln(Assets)$_{it-1}$	8.9459	8.9328	0.0131	−0.15
Leverage$_{it-1}$	0.2865	0.2869	−0.0003	0.03
MTB$_{it-1}$	3.1900	2.9761	0.2139	−0.74
Int_Cov$_{it-1}$	10.7880	10.0220	0.7660	−0.57
OROA$_{it-1}$	0.1419	0.1386	0.0033	−0.59
Tax_rate$_{it-1}$	0.1919	0.1875	0.0044	−0.34
NOL$_{it-1}$	0.0415	0.0371	0.0044	−0.62
Cash_AT$_{it-1}$	0.0795	0.0753	0.0042	−0.70
OCF$_{it-1}$	0.1057	0.1050	0.0007	−0.14
Rating$_{it-1}$	9.1942	9.2050	−0.0108	0.05
Debt_Structure$_{it-1}$	0.1887	0.1989	−0.0102	0.38
PMDA$_{it}$	−0.0235	−0.0221	−0.0014	0.08
RAM$_{it}$	−0.0437	−0.0495	0.0058	−0.48
Share_Rep _AT$_{it}$	0.0309	0.0294	0.0015	−0.39
Meet_Analyst$_{it}$	0.0863	0.1115	−0.0252	0.99
N	**278**	**278**		

This table provides a summary of the PSM procedure based on the ex-ante probability of treatment (*Above_Max* = 1). Panels A and C report the covariate balance of the treatment (*Above_Max* = 1) and control groups (*Above_Max* = 0) before and after matching, respectively. Panel B reports the results of estimating the propensity scores using the logistic regression model using the control variables in Eq. (1). See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

APPENDIX D Heckman's Two-stage Regression

$$Pr(Non\text{-}operating\ Measure_{it}) = \lambda_0 + \lambda_1 STD\_ROA_{it-1} + \lambda_2 STD\_OROA_{it-1} + \lambda_3 IOR\_TOT_{it} + \lambda_4 IOR\_TRA_{it} + \lambda_5 Num\_Segment_{it} + \lambda_6 OutD_{it} + \lambda_7 Ln(Assets)_{it-1} + \lambda_8 MTB_{it-1} + \lambda_9 Div_{it} + \lambda_{10} Restrictedaward\_fv_{it} + \lambda_{11} Optionaward\_fv_{it} + \lambda_{12} R\&D_{it-1} + \lambda_{13} Tax_{it} + \text{Year and industry fixed effects} + \varepsilon_{it}. \quad (7)$$

Dependent variable =	*Non-operating Measure*$_{it}$
	(1)
Intercept	−0.5526
	(−1.14)
STD_ROA_{it-1}	−1.4961 **
	(−2.26)
STD_OROA_{it-1}	−0.6379
	(−0.69)
IOR_TOT_{it}	−0.1578 **
	(−2.41)
$Num\_Segment_{it}$	−0.0047
	(−0.97)
$OutD_{it}$	0.7173 ***
	(8.01)
$Ln(Assets)_{it-1}$	0.0474 **
	(2.60)
MTB_{it-1}	0.0007
	(0.22)
Div_{it}	5.5401 ***
	(4.02)
$Restrictedaward\_fv_{it}$	−0.0008
	(−0.11)
$Optionaward\_fv_{it}$	0.0110 *
	(1.94)
$R\&D_{it-1}$	−0.7685 **
	(−2.07)
Tax_{it}	0.0377
	(0.62)
Year fixed effects	Y
Industry fixed effects	Y
Pseudo R^2	11.83%
Observations	5,171

This table reports the estimation results of the first stage of Heckman's two-stage regression model, using the probit model (Eq. (7)). The sample is 5,171 firm-year observations with available data in Incentive Lab and Compustat for 2006–2016. See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

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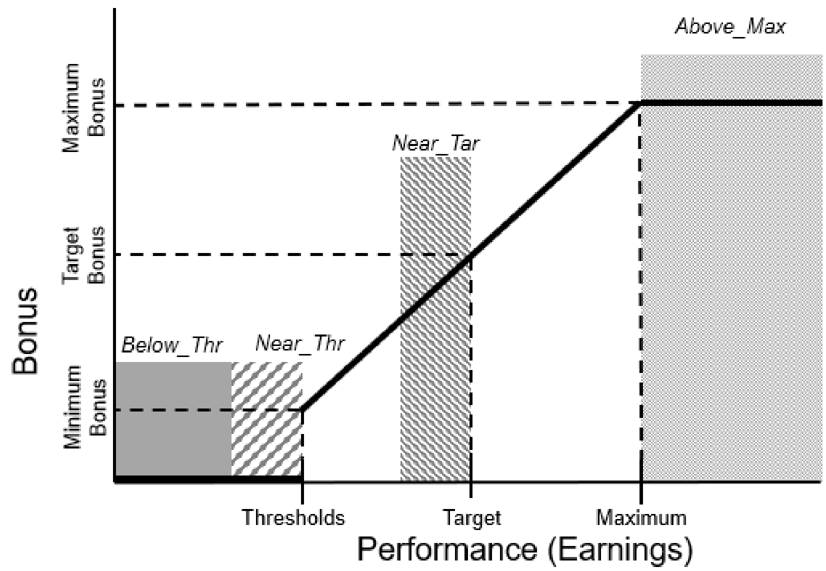
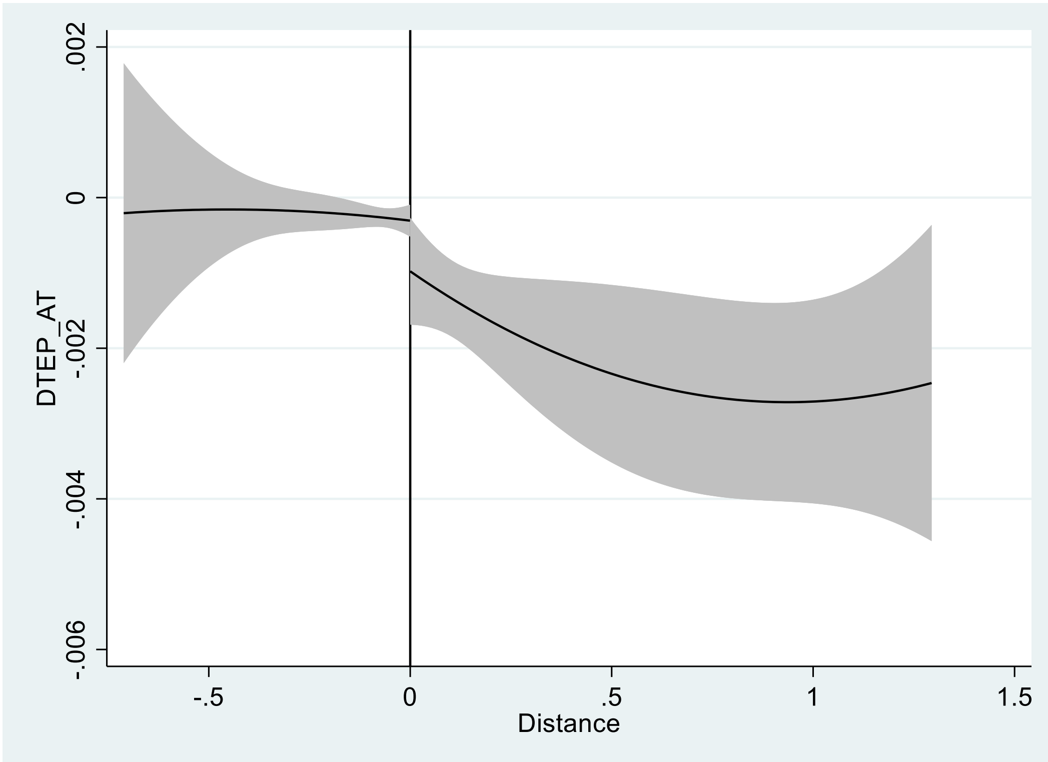
FIGURE 1 Performance Levels in Annual Bonus Contracts



This figure illustrates the typical structure of executives' annual bonus contracts. *Thresholds*, *Target*, and *Maximum* are the performance threshold, target, and maximum, respectively.

FIGURE 2 Regression Discontinuity Plot



This figure presents RD plots based on the quadratic extrapolation reported in column (3) of Table 4. The analysis uses observations with as-if earnings above the performance target (N = 743) for the years 2006–2016. *DTEP_AT* (*y*-axis) is gains or losses from EDE scaled by average total assets. *Distance* (*x*-axis) is the difference between as-if earnings and bonus maximum scaled by the bonus maximum. The solid lines below and above the cutoff (i.e., the bonus maximum where *Distance* equals 0) depict the mean *DTEP_AT* forecasts estimated from Eq. (5). The shaded area captures the 95% confidence interval around the mean forecast.

TABLE 1 Sample Selection

Panel A. Sample Selection

	Obs.
Incentive Lab for 2006–2016	**8,736**
less financial institutions (SIC codes 6000–6999)	(1,382)
less firm-years not using earnings-based performance measures	(552)
less firm-years solely using operating earnings (operating earnings per share, EBIT, operating earnings, or EBITDA) as performance measures	(2,897)
less firm-years without performance threshold, target, and maximum	(1,843)
less firm-years with missing values	(839)
less firm-years that explicitly exclude gains or losses from EDE in bonus calculations	(88)
Final observations	**1,135**

Panel B. Sample distribution by industry

Industry Classification (Fama-French 12 industries)	**N**	**Proportion**
Business Equipment	95	8.4%
Chemicals and Allied Products	88	7.8%
Consumer Durables	28	2.5%
Consumer Nondurables	52	4.6%
Healthcare, Medical Equipment, and Drugs	77	6.8%
Manufacturing	244	21.4%
Oil, Gas, and Coal Extraction and Products	51	4.5%
Telephone and Television Transmission	20	1.8%
Utilities	236	20.8%
Wholesale, Retail, and Some Services (Laundries, Repair Shops)	122	10.7%
Other	122	10.7%
	1,135	100.0%

Panel A of this table reports sample selection. Panel B of this table presents a sample distribution by industry.

TABLE 2 Descriptive Statistics and Correlations

Panel A. Descriptive statistics

Variables	N	Mean	Q1	Median	Q3	Std. Dev.
$DTEP_{it}$ (in millions)	1,135	−5.5008	0.0000	0.0000	0.0000	23.6099
$DTEP\_AT_{it-1}$	1,135	−0.0005	0.0000	0.0000	0.0000	0.0019
$Above\_Max_{it}$	1,135	0.2485	0.0000	0.0000	0.0000	0.4323
$Near\_Tar_{it}$	1,135	0.1753	0.0000	0.0000	0.0000	0.3804
$Near\_Thr_{it}$	1,135	0.0476	0.0000	0.0000	0.0000	0.2130
$Below\_Thr_{it}$	1,135	0.0476	0.0000	0.0000	0.0000	0.2130
Total assets$_{it-1}$ (in billions)	1,135	13.7042	3.7587	6.9044	15.1634	17.7574
$Ln(Assets)_{it-1}$	1,135	8.9740	8.2321	8.8401	9.6267	1.0109
$Leverage_{it-1}$	1,135	0.2806	0.1861	0.2724	0.3603	0.1278
MTB_{it-1}	1,135	3.0623	1.5378	2.3380	3.6350	3.2659
Int_Cov_{it-1}	1,135	12.8899	3.3822	6.6382	12.6581	20.2160
$OROA_{it-1}$	1,135	0.1474	0.0948	0.1366	0.1792	0.0684
Tax_rate_{it-1}	1,135	0.1762	0.0209	0.0928	0.3500	0.1560
NOL_{it-1}	1,135	0.0352	0.0000	0.0000	0.0358	0.0713
$Cash\_AT_{it-1}$	1,135	0.0772	0.0190	0.0580	0.1153	0.0706
OCF_{it-1}	1,135	0.1071	0.0704	0.0986	0.1339	0.0560
$Rating_{it-1}$	1,135	8.8634	7.0000	9.0000	10.0000	2.3113
$Debt\_Structure_{it-1}$	1,135	0.1734	0.0158	0.0810	0.1985	0.2955
$PMDA_{it}$	1,135	−0.0200	−0.0567	−0.0041	0.0348	0.2167
RAM_{it}	1,135	−0.0713	−0.1325	−0.0398	0.0023	0.1463
$Share\_Rep\ \_AT_{it}$	1,135	0.0334	0.0000	0.0114	0.0498	0.0475
$Meet\_Analyst_{it}$	1,135	0.1339	0.0000	0.0000	0.0000	0.3407

Panel B. Spearman correlation matrix

	(2)	(3)	(4)	(5)	(6)	$PMDA_{it}$
(1) $DTEP\_AT_{it}$	0.0465	**−0.2216**	**0.0728**	0.0006	0.0349	**0.0667**
(2) $Share\_Rep\ \_AT_{it}$		**−0.0527**	0.0623	**−0.0521**	−0.0337	**−0.0781**
(3) $Above\_Max_{it}$			**−0.2651**	**−0.1285**	**−0.1285**	−0.0050
(4) $Near\_Tar_{it}$				**−0.1031**	**−0.1031**	0.0093
(5) $Near\_Thr_{it}$					**−0.0500**	0.0247
(6) $Below\_Thr_{it}$						0.0052

This table reports the descriptive statistics and Spearman correlations for the main variables in Eq. (1). See Appendix A for variable definitions. In Panel B, significant correlations are indicated in bold (*p*-value < 0.10, two-tailed test).

TABLE 3 Bonus-related Incentives and Gains or Losses from Early Debt Extinguishment

$$DTEP\_AT_{it} = \lambda_0 + \lambda_1 Above\_Max_{it} + \lambda_2 Near\_Tar_{it} + \lambda_3 Near\_Thr_{it} + \lambda_4 Below\_Thr_{it} + \lambda_5 Ln(Assets)_{it-1} + \lambda_6 Leverage_{it-1} + \lambda_7 MTB_{it-1} + \lambda_8 Int\_Cov_{it-1} + \lambda_9 OROA_{it-1} + \lambda_{10} Tax\_rate_{it-1} + \lambda_{11} NOL_{it-1} + \lambda_{12} Cash\_AT_{it-1} + \lambda_{13} OCF_{it-1} + \lambda_{14} Rating_{it-1} + \lambda_{15} Debt\_Structure_{it-1} + \lambda_{16} PMDA_{it} + \lambda_{17} RAM_{it} + \lambda_{18} Share\_Rep\_AT_{it} + \lambda_{19} Meet\_Analyst_{it} + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (1)$$

Dependent variable =	$DTEP\_AT_{it}$					EDE_loss_{it}
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	0.0025 *	0.0020	0.0021	0.0021	0.0026 *	−9.3492 ***
	(1.75)	(1.43)	(1.51)	(1.55)	(1.75)	(−3.48)
$Above\_Max_{it}$	−0.0009 ***				−0.0009 ***	0.7389 ***
	(−4.36)				(−4.38)	(3.18)
$Near\_Tar_{it}$		0.0002 *			−0.0001	−0.4438
		(1.89)			(−0.46)	(−1.33)
$Near\_Thr_{it}$			0.0000		−0.0003	−0.7095
			(−0.09)		(−1.02)	(−1.12)
$Below\_Thr_{it}$				0.0003 **	0.0000	−0.2787
				(1.97)	(0.16)	(−0.57)
$Ln(Assets)_{it-1}$	−0.0001 **	−0.0001 *	−0.0001 *	−0.0001 *	−0.0002 **	0.5498 ***
	(−2.03)	(−1.71)	(−1.73)	(−1.75)	(−2.05)	(3.27)
$Leverage_{it-1}$	−0.0018 **	−0.0018 **	−0.0019 **	−0.0019 **	−0.0018 **	2.3396 **
	(−2.52)	(−2.39)	(−2.52)	(−2.54)	(−2.50)	(2.09)
MTB_{it-1}	0.0000	0.0000	0.0000	0.0000	0.0000	−0.0313
	(0.84)	(0.65)	(0.65)	(0.65)	(0.81)	(−0.81)
Int_Cov_{it-1}	0.0000	0.0000	0.0000	0.0000	0.0000	0.0016
	(−1.28)	(−0.99)	(−0.96)	(−0.92)	(−1.19)	(0.23)
$OROA_{it-1}$	−0.0003	0.0008	0.0010	0.0008	−0.0002	−0.1121
	(−0.13)	(0.40)	(0.46)	(0.40)	(−0.12)	(−0.04)
Tax_rate_{it-1}	−0.0003	−0.0004	−0.0004	−0.0004	−0.0003	0.5634
	(−0.59)	(−0.87)	(−0.83)	(−0.79)	(−0.58)	(0.60)
NOL_{it-1}	−0.0016	−0.0020 *	−0.0019 *	−0.0019	−0.0016	−0.5315
	(−1.45)	(−1.74)	(−1.68)	(−1.64)	(−1.45)	(−0.34)
$Cash\_AT_{it-1}$	−0.0009	−0.0011	−0.0011	−0.0011	−0.0009	0.6012
	(−0.83)	(−0.97)	(−0.95)	(−0.94)	(−0.83)	(0.28)
OCF_{it-1}	−0.0001	−0.0007	−0.0010	−0.0011	−0.0002	−0.6332

	(1)	(2)	(3)	(4)	(5)	(6)
	(−0.04)	(−0.38)	(−0.55)	(−0.58)	(−0.09)	(−0.17)
$Rating_{it-1}$	−0.0002 ***	−0.0002 ***	−0.0002 ***	−0.0002 ***	−0.0002 ***	0.4258 ***
	(−3.83)	(−3.66)	(−3.71)	(−3.78)	(−3.73)	(4.71)
$Debt\_Structure_{it-1}$	0.0001	0.0000	0.0000	0.0000	0.0001	0.2787
	(0.78)	(0.29)	(0.26)	(0.15)	(0.81)	(0.61)
$PMDA_{it}$	0.0005 **	0.0005 **	0.0005 **	0.0005 **	0.0005 **	−0.2262
	(2.13)	(2.10)	(2.08)	(2.12)	(2.14)	(−0.57)
RAM_{it}	−0.0009	−0.0010	−0.0010	−0.0010 *	−0.0009	0.9624
	(−1.38)	(−1.65)	(−1.65)	(−1.67)	(−1.37)	(1.34)
$Share\_Rep\ \_AT_{it}$	0.0006	0.0003	0.0005	0.0006	0.0006	−1.8475
	(0.36)	(0.20)	(0.27)	(0.34)	(0.36)	(−0.65)
$Meet\_Analyst_{it}$	0.0004 ***	0.0004 ***	0.0004 ***	0.0004 ***	0.0004 ***	−0.7833 **
	(4.31)	(4.33)	(4.35)	(4.37)	(4.30)	(−2.16)
Year fixed effects	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y
Adjusted R^2	12.91%	9.25%	9.06%	9.18%	12.85%	
Pseudo R^2						22.74%
Observations	1,135	1,135	1,135	1,135	1,135	1,135

This table reports the results from estimating Eq. (1) (columns (1) – (5)) and the logistic model where the dependent variable is EDE_loss_{it} (column (6)). The sample is 1,135 firm-year observations for the years 2006–2016. *t*-statistics (in parentheses) are based on standard errors clustered by firm. See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

TABLE 4 Regression Discontinuity Analysis

$$DTEP\_AT_{it} = \lambda_0 + \lambda_1 Cutoff_{it} + \lambda_2 Distamce_{it} + \lambda_3 Distance_{it}^2 + \lambda_4 Cutoff_{it} \times Distance_{it} + \lambda_5 Cutoff_{it} \times Distance_{it}^2 + \text{Controls} + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (4)$$

Dependent variable =	*DTEP_AT*$_{it}$								
Cutoff =	**Maximum**			**Target**			**Threshold**		
	Focused sample	Extended sample		Focused sample	Extended sample		Focused sample	Extended sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Cutoff_{it}$	−0.0007 ***	−0.0008 **	−0.0009 **	−0.0001	−0.0000	−0.0000	−0.0005 *	−0.0000	−0.0001
	(−2.40)	(−2.23)	(−2.40)	(−0.51)	(−0.38)	(−0.15)	(−1.89)	(−0.08)	(−0.17)
$Distance_{it}$		−0.0013	−0.0016		0.0006	0.0007		0.0008	0.0010
		(−1.39)	(−0.91)		(1.05)	(0.42)		(1.58)	(1.55)
$Cutoff_{it} \times Distance_{it}$		0.0004	0.0018		−0.0005	−0.0007		−0.0005	−0.0005
		(0.29)	(0.57)		(−1.03)	(−0.58)		(−1.14)	(−1.16)
$Distance_{it}^2$			−0.0007			0.0003			−0.0000
			(−0.17)			(0.45)			(−0.59)
$Cutoff_{it} \times Distance_{it}^2$			0.0001			−0.0001			−0.0000
			(0.03)			(−0.26)			(−0.05)
Constant	0.0056 ***	0.0045 **	0.0044 **	0.0043 *	0.0015	0.0014	0.0003	0.0003	0.0003
	(3.61)	(2.37)	(2.28)	(1.91)	(1.52)	(1.50)	(0.12)	(0.17)	(0.21)
Other controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	22.30%	11.10%	11.10%	12.00%	7.60%	7.30%	21.60%	4.30%	3.80%
Observations	490	743	743	534	741	741	163	364	364

Using an RD design, this table reports the results from estimating Eq. (2) (columns (1), (4), and (7)) for the focused sample, and Eq. (4) (columns (2), (5), and (8)) and Eq. (5) (columns (3), (6), and (9)) for the extended sample. *t*-statistics (in parentheses) are based on standard errors clustered by firm. See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

TABLE 5 Repurchase Methods

Dependent variable =			*$DTEP\_AT_{it}$*			
	(1)		(2)		(3)	
Intercept	0.0087		−0.0003		−0.0022	
	(0.53)		(−0.03)		(−0.16)	
$Tender_{it}$	−0.0012	**	0.0004		−0.0001	
	(−2.01)		(0.63)		(−0.11)	
OMR_{it}	−0.0003		−0.0014		−0.0041	**
	(−0.21)		(−0.76)		(−2.19)	
$Above\_Max_{it} \times Tender_{it}$			−0.0036	***	−0.0027	**
			(−3.04)		(−2.20)	
$Near\_Tar_{it} \times Tender_{it}$					0.0015	
					(0.87)	
$Near\_Thr_{it} \times Tender_{it}$					0.0020	
					(0.77)	
$Below\_Thr_{it} \times Tender_{it}$					0.0010	
					(0.51)	
$Above\_Max_{it} \times OMR_{it}$			0.0028		0.0056	*
			(1.03)		(1.76)	
$Near\_Tar_{it} \times OMR_{it}$					0.0005	
					(0.11)	
$Near\_Thr_{it} \times OMR_{it}$					0.0202	***
					(3.97)	
$Below\_Thr_{it} \times OMR_{it}$					0.0019	
					(0.75)	
$Above\_Max_{it}$	−0.0040	***	−0.0031	**	−0.0035	***
	(−2.91)		(−2.43)		(−2.54)	
$Near\_Tar_{it}$	0.0017		0.0022		0.0022	
	(0.79)		(1.04)		(0.94)	
$Near\_Thr_{it}$	−0.0002		−0.0001		−0.0049	**
	(−0.06)		(−0.02)		(−2.33)	
$Below\_Thr_{it}$	−0.0001		0.0004		−0.0005	
	(−0.03)		(0.25)		(−0.27)	
$Ln(Assets)_{it-1}$	−0.0002		−0.0003		−0.0001	
	(−0.16)		(−0.29)		(−0.11)	
$Leverage_{it-1}$	0.0083		0.0075		0.0107	*
	(1.31)		(1.24)		(1.70)	
MTB_{it-1}	−0.0000		−0.0000		−0.0000	
	(−0.10)		(−0.10)		(−0.55)	
Int_Cov_{it-1}	0.0001		0.0001	*	0.0001	**
	(1.44)		(1.72)		(2.12)	
$OROA_{it-1}$	−0.0106		−0.0133	*	−0.0137	*
	(−0.92)		(−1.29)		(−1.34)	
Tax_rate_{it-1}	0.0067		0.0048		0.0059	
	(1.34)		(1.10)		(1.34)	
NOL_{it-1}	−0.0100	***	−0.0115	***	−0.0118	***
	(−2.65)		(−3.08)		(−3.14)	
$Cash\_AT_{it-1}$	−0.0133		−0.0126		−0.0130	
	(−0.94)		(−0.99)		(−1.02)	

OCF_{it-1}	-0.0025		−0.0053		−0.0043	
	(-0.15)		(−0.33)		(−0.25)	
$Rating_{it-1}$	0.0006		0.0007		0.0008	
	(1.14)		(1.25)		(1.50)	
$Debt\_Structure_{it-1}$	0.0040		0.0038		0.0040	
	(1.11)		(1.18)		(1.20)	
$PMDA_{it}$	0.0036		0.0036		0.0042	
	(1.23)		(1.25)		(1.43)	
RAM_{it}	0.0017		0.0033		0.0033	
	(0.20)		(0.40)		(0.38)	
$Share\_Rep\ \_AT_{it}$	−0.0111		−0.0076		−0.0062	
	(−0.42)		(−0.33)		(−0.28)	
$Meet\_Analyst_{it}$	0.0058	**	0.0058	**	0.0054	**
	(2.19)		(2.33)		(2.24)	
$Multi_{it}$	−0.0023	*	−0.0024	*	−0.0023	*
	(−1.70)		(−1.81)		(−1.72)	
Year fixed effects	Y		Y		Y	
Industry fixed effects	Y		Y		Y	
Adjusted R^2	71.50%		73.50%		76.10%	
Observations	194		194		194	

This table reports the results of estimating Eq. (1) after including repurchase methods (i.e., *Tender* and *OMR*) and their interactions with performance-level variables (e.g., *Above_max*). The sample is 194 firm-year observations with available data in Mergent for the years 2006–2016. *t*-statistics (in parentheses) are based on standard errors clustered by firm. *Multi* is an indicator variable that equals 1 if the firm uses multiple repurchase methods during the year, and 0 otherwise. See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

TABLE 6 Subsequent Cash Compensation

$$\Delta Cash\_bonus_{it+1} = \lambda_0 + \lambda_1 Loss\_DTEP_{it} + \lambda_2 Ln(Assets)_{it} + \lambda_3 MTB_{it} + \lambda_4 Meet\_Aanlyst_{it} + \lambda_5 Ret_{it+1} + \lambda_6 ROA_{it+1} + \lambda_7 CEO\_Own_{it+1} + \lambda_8 Duality_{it+1} + \lambda_9 Ind\_Dir_{it+1} + \lambda_{10} Busy\_Dir_{it+1} + \lambda_{11} Old\_Board_{it+1} + \lambda_{12} CC\_Size_{it+1} + \lambda_{13} Ind\_CC_{it+1} + \lambda_{14} Busy\_CC_{it+1} + \lambda_{15} Old\_CC_{it+1} + \lambda_{16} IRO\_TOT_{it+1} + \lambda_{17} Cash\_bonus_{it} + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (6)$$

Dependent variable =	$\Delta Cash\_bonus_{t+1}$
	(1)
Intercept	0.5086 * (1.88)
$Loss\_DTEP_{it}$	0.0546 * (1.73)
$Ln(Assets)_{it}$	−0.0044 (−0.31)
MTB_{it}	−0.0006 (−0.10)
$Meet\_Analyst_{it}$	0.0437 (1.35)
Ret_{it+1}	0.1396 *** (2.69)
ROA_{it+1}	0.7261 ** (2.11)
CEO_Own_{it+1}	−1.3144 * (−1.88)
$Duality_{it+1}$	0.0011 (0.04)
$Board\_size_{it+1}$	0.0421 (0.55)
Ind_Dir_{it+1}	−0.3033 * (−1.74)
$Busy\_Dir_{it+1}$	0.9036 ** (2.15)
Old_Board_{it+1}	−0.0648 (−0.62)
CC_Size_{it+1}	−0.1091 ** (−2.02)
Ind_CC_{it+1}	−0.0298 (−0.41)
$Busy\_CC_{it+1}$	−0.4801 ** (−2.20)
Old_CC_{it+1}	0.0575 (0.86)
IRO_TOT_{it+1}	−0.0498 (−0.76)
$Cash\_bonus_{it}$	−0.1204 (−1.41)
Year fixed effects	Y
Industry fixed effects	Y

Adjusted R^2	13.90%
Observations	219

This table reports the result of estimating Eq. (6). The sample is 219 firm-year observations above the bonus maximum for the years 2006–2016 without missing values and excluding observations with CEO turnovers in year *t*+1. *t*-statistics (in parentheses) are based on standard errors clustered by firm. See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

TABLE 7 Effect on Shareholder Value

Change in performance ($ChRet_{it+1}$ or $ChOROA_{it+1}$ or $ChROA_{it+1}$) = $\lambda_0 + \lambda_2 Loss\_DTEP_{it} + \lambda_4 OROA_{it}$ (+ $\lambda_4 ROA_{it}$) + $\lambda_5 RET_{it} + \lambda_6 Loss_{it} + \lambda_7 Ln(Assets)_{it} + \lambda_8 MTB_{it} + \lambda_9 Leverage_{it} + \lambda_{10} WC_{it} + \lambda_{11} ICF\_AT_{it} + \lambda_{12} OCF_{it} + \lambda_{13} Cash\_AT_{it}$ + Year and industry fixed effects + ε_{it} (8)

$ChDiv_{it+1} = \lambda_0 + \lambda_2 Loss\_DTEP_{it} + \lambda_4 OROA_t + \lambda_5 MTB_{it} + \lambda_6 Leverage_{it} + \lambda_7 WC_{it} + \lambda_8 FCF_{it} + \lambda_9 Ln(MV)_{it} + \lambda_{10} Div_{it} + \lambda_{11} Cash\_AT_{it} + \lambda_{12} Shares_{it} + \lambda_{13} Tangible_{it} + \lambda_{14} RETE_{it} + \lambda_{15} TETA_{it} + \lambda_{16} Loss_{it} + \lambda_{17} STD\_OROA_{it}$ + Year and industry fixed effects + ε_{it} (9)

Dependent variable =	$ChRET_{it+1}$	$ChOROA_{it+1}$	$ChROA_{it+1}$	$ChDiv_{it+1}$
	(1)	(2)	(3)	(4)
Intercept	0.0168 (0.08)	0.0612 ** (2.13)	0.0274 (0.99)	-0.0041 (-0.49)
$Loss\_DTEP_{it}$	0.0443 (0.98)	0.0026 (0.48)	0.0021 (0.33)	-0.0016 (-1.06)
$OROA_{it}$	−0.0328 (−0.05)	−0.2304 *** (−3.59)		-0.0041 (-0.49)
ROA_{it}			-0.6358 *** (-5.95)	
RET_{it}	−1.1119 *** (−15.99)	0.0316 *** (3.46)	0.0294 *** (2.86)	
$Loss_{it}$	0.3998 *** (2.63)	0.0565 ** (2.09)	0.0294 (1.06)	
$Ln(Assets)_{it}$	−0.0014 (−0.08)	−0.0050 ** (−2.03)	-0.0007 (-0.30)	
MTB_{it}	−0.0278 * (−1.85)	0.0033 ** (2.40)	0.0063 *** (3.47)	-0.0002 (-0.51)
$Leverage_{it}$	0.1901 (1.07)	−0.0248 (−1.01)	-0.0506 ** (-2.06)	0.0022 (0.38)
WC_{it}	0.2459 (1.07)	−0.0049 (−0.16)	0.0245 (0.68)	-0.0087 (-0.75)
ICF_AT_{it}	−0.0926 (−0.38)	0.0704 (1.54)	0.0292 (0.75)	
OCF_{it}	0.4095 (0.60)	−0.0142 (−0.18)	0.1996 ** (2.15)	
$Cash\_AT_{it}$	−0.0313 (−0.08)	0.0890 ** (1.99)	0.0072 (0.15)	
FCF_{it}				-0.0020 (-0.13)
$Ln(MV)_{it}$				0.0022 ** (2.04)
Div_{it}				-0.2736 *** (-4.38)
$Cash\_AT_{it}$				0.0089 (1.15)
$Shares_{it}$				-0.0018 (-1.34)
$Tangible_{it}$				0.0028 (0.66)

$RETE_{it}$				0.0008
				(1.43)
$TETA_{it}$				-0.0116 **
				(-2.18)
$Loss_{it}$				-0.0090
				(-1.19)
STD_OROA_{it}				-0.0159
				(-0.84)
Year fixed effects	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y
Adjusted R^2	71.51%	30.08%	39.11%	28.42%
Observations	273	273	273	270

This table reports estimation results from regressing Eqs. (8) and (9). The sample is 270–273 firm-year observations above the bonus maximum for the years 2006–2016. *t*-statistics (in parentheses) are based on standard errors clustered by firm. See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

TABLE 8 Alternative Earnings Management Mechanisms

$$PMDA_{it} = \lambda_0 + \lambda_1 Residual\_DTEP_{it} + \lambda_2 Pred\_DTEP_{it} + \lambda_3 Share\_Rep\_AT_{it} + \lambda_2 Ln(Assets)_{it-1} + \lambda_3 Leverage_{it-1} + \lambda_4 MTB_{it-1} + \lambda_5 Int\_Cov_{it-1} + \lambda_6 OROA_{it} + \lambda_7 Tax\_rate_{it} + \lambda_8 NOL_{it-1} + \lambda_9 Cash\_AT_{it} + \lambda_{10} OCF_{it} + \lambda_{11} Rating_{it-1} + \lambda_{12} Debt\_Structure_{it-1} + \lambda_{13} RAM_{it} + \lambda_{14} Meet\_Analyst_{it} + \lambda_{17} NOA_{it-1} + \lambda_{18} Big4_{it} + \lambda_{19} Auitor\_Tenure_{it} + \lambda_{20} Operating\_Cycle_{it-1} + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (10)$$

$$DTEP\_AT_{it} = \lambda_0 + \lambda_1 Share\_Rep\_AT_{it} + \lambda_2 Ln(Assets)_{it-1} + \lambda_3 Leverage_{it-1} + \lambda_4 MTB_{it-1} + \lambda_5 Int\_Cov_{it-1} + \lambda_6 OROA_{it} + \lambda_7 Tax\_rate_{it} + \lambda_8 NOL_{it-1} + \lambda_9 Cash\_AT_{it} + \lambda_{10} OCF_{it} + \lambda_{11} Rating_{it-1} + \lambda_{12} Debt\_Structure_{it-1} + \lambda_{13} PMDA_{it} + \lambda_{14} RAM_{it} + \lambda_{15} Meet\_Analyst_{it} + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (11)$$

$$Share\_Rep\_AT_{it} = \lambda_0 + \lambda_1 DTEP\_AT_{it} + \lambda_2 Ln(Assets)_{it-1} + \lambda_3 Leverage_{it-1} + \lambda_4 MTB_{it} + \lambda_5 OROA_{it} + \lambda_6 Cash\_AT_{it-1} + \lambda_6 OCF_{it} + \lambda_7 PMDA_{it} + \lambda_8 RAM_{it} + \lambda_9 Meet\_Analyst_{it} + \lambda_{10} Div_{it} + \lambda_{11} Share\_Issues_{it-1} + \lambda_{12} Optionaward\_fv_{it} + \lambda_{13} Restrictedaward\_fv_{it} + \text{Year and industry fixed effects} + \varepsilon_{it} \quad (12)$$

Dependent variable =	***PMDA$_{it}$***	***DTEP_AT$_{it}$***	***Share_Rep _AT$_{it}$***
	(1)	(2)	(3)
Intercept	−0.0526	0.0057	−0.0003
	(−0.37)	(0.92)	(−0.01)
Residual_DTEP$_{it}$	7.8681 **		
	(2.36)		
Pred_DTEP$_{it}$	−11.4099		
	(−0.23)		
Share_Rep _AT$_{it}$	0.2518	−0.0528	
	(0.65)	(−0.99)	
DTEP_AT$_{it}$			1.9742
			(0.77)
Ln(Assets)$_{it-1}$	0.0079	−0.0005	−0.0003
	(0.74)	(−1.39)	(−0.10)
Leverage$_{it-1}$	0.0481	−0.0001	0.0190
	(0.14)	(−0.03)	(0.81)
MTB$_{it-1}$	−0.0008	0.0001	0.0019
	(−0.09)	(0.58)	(1.57)
Int_Cov$_{it-1}$	0.0011	0.0000	
	(1.08)	(1.09)	
OROA$_{it-1}$	−0.5254 *	0.0110	0.1674 ***
	(−1.69)	(0.93)	(2.84)
Tax_rate$_{it-1}$	0.0028	−0.0021	
	(0.03)	(−0.85)	
NOL$_{it-1}$	0.0579	−0.0072	
	(0.24)	(−1.43)	
Cash_AT$_{it-1}$	0.0390	−0.0047	0.1224 **
	(0.09)	(−0.59)	(2.48)
OCF$_{it-1}$	−0.0504	−0.0026	0.0875
	(−0.11)	(−0.27)	(1.34)
Rating$_{it-1}$	−0.0008	−0.0001	
	(−0.07)	(−0.78)	
Debt_Structure$_{it-1}$	−0.0087	0.0012	

	(−0.40)	(1.35)	
$PMDA_{it}$		0.0023	0.0054
		(1.63)	(0.53)
RAM_{it}	0.0309	0.0030	−0.0011
	(0.23)	(1.46)	(−0.07)
$Meet\_Analyst_{it}$	0.0827	0.0011	0.0029
	(1.10)	(1.27)	(0.44)
NOA_{it-1}	0.0473		
	(0.33)		
$Big4_{it}$	−0.0296		
	(−0.58)		
$Auditor\_Tenure_{it}$	−0.0058		
	(−0.28)		
$Operating\_Cycle_{it-1}$	0.0000		
	(−0.06)		
Div_{it}			0.2514
			(1.18)
$Share\_Issues_{it}$			0.3604 *
			(1.84)
$Optionaward\_fv_{it}$			0.0006
			(0.05)
$Restrictedaward\_fv_{it}$			−0.0003
			(−0.01)
Year fixed effects	Y	Y	Y
Industry fixed effects	Y	Y	Y
Adjusted R^2	4.90%		
System of Weighted R^2		−8.49%	53.69%
Observations	282	264	264

This table reports the results from estimating Eq. (10) (column (1)) and a system of simultaneous equations in Eqs. (11) and (12) (columns (2) and (3)). The sample is 264–282 firm-year observations with as-if earnings above the bonus maximum for the years 2006–2016. *t*-statistics (in parentheses) are based on standard errors clustered by firm. See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.

TABLE 9 Other Additional Tests

	PSM	Heckman 2nd stage	Non-zero *DTEP*	Excluding firm-years using ROA and ROE for performance measures	Excluding firm-years that exclude special items in bonus calculations	Controlling for CEO portfolio Delta	ERP
Dependent variable =				$DTEP\_AT_{it}$			ERP_{it}
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	0.0061 ***	0.0025	−0.0068	0.0025	0.0008	0.0024	−0.078
	(3.21)	(1.47)	(−1.32)	(1.50)	(0.41)	(1.62)	(−0.45)
$Above\_Max_{it}$	−0.0009 ***	−0.0008 ***	−0.0043 ***	−0.0011 ***	−0.0007 **	−0.0008 ***	0.0561 *
	(−3.55)	(−3.55)	(−4.27)	(−4.09)	(−2.47)	(−3.83)	(1.74)
$Near\_Tar_{it}$	−0.0004	0.0000	−0.0005	−0.0001	−0.0000	−0.0000	0.0198
	(−1.59)	(0.09)	(−0.60)	(−0.53)	(−0.06)	(−0.02)	(0.41)
$Near\_Thr_{it}$	0.0001	−0.0003	−0.0026	−0.0005	−0.0001	−0.0003	0.0759 *
	(0.37)	(−1.04)	(−1.51)	(−1.49)	(−0.31)	(−0.95)	(1.98)
$Below\_Thr_{it}$	0.0002	0.0001	−0.0009	0.0001	0.0005	0.0000	0.1190 **
	(0.42)	(0.79)	(−1.06)	(0.40)	(1.04)	(0.21)	(2.12)
$Ln(Assets)_{it-1}$	−0.0002	−0.0001	0.0004	−0.0001 *	−0.0000	−0.0001	0.0139
	(−1.46)	(−1.76)	(1.20)	(−1.78)	(−0.41)	(−1.37)	(1.15)
$Leverage_{it-1}$	−0.0036 ***	−0.0009	−0.0014	−0.0021 **	−0.0019 *	−0.0013 *	0.1084
	(−2.80)	(−1.29)	(−0.54)	(−2.55)	(−1.85)	(−1.86)	(0.94)
MTB_{it-1}	0.0001	0.0000	0.0001	0.0000	−0.0000	0.0000	−0.0011
	(3.52)	(0.18)	(0.64)	(0.70)	(−0.37)	(0.44)	(−0.42)
Int_Cov_{it-1}	0.0000	0.0000	0.0001	0.0000	−0.0000	0.0000	−0.0002
	(−1.47)	(−0.11)	(1.45)	(−0.97)	(−0.75)	(−0.78)	(−0.19)
$OROA_{it-1}$	−0.0047	0.0006	0.0028	0.0001	0.0024	0.0004	0.0676
	(−1.21)	(0.3)	(0.27)	(0.05)	(0.52)	(0.20)	(0.48)
Tax_rate_{it-1}	0.0005	−0.0002	−0.0001	−0.0003	0.0006	−0.0003	0.0985
	(0.51)	(−0.47)	(−0.04)	(−0.61)	(0.71)	(−0.54)	(0.90)
NOL_{it-1}	−0.0001	−0.0019	−0.0053 ***	−0.0016	−0.0000	−0.0020 *	0.0672
	(−0.07)	(−1.63)	(−2.99)	(−1.47)	(−1.22)	(−1.76)	(1.33)
$Cash\_AT_{it-1}$	−0.0018	−0.0014	−0.0088	−0.0010	−0.0051 ***	−0.0014	−0.0911

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	(−0.81)	(−1.19)	(−1.38)	(−0.79)	(−3.18)	(−1.20)	(−0.36)
OCF_{it-1}	0.0016	0.0001	−0.0170 *	0.0005	−0.0007	−0.0003	0.0582
	(0.48)	(0.04)	(−1.86)	(0.26)	(−0.2)	(−0.15)	(0.14)
$Rating_{it-1}$	−0.0002 ***	−0.0001 **	0.0001	−0.0002 ***	−0.0002 *	−0.0002 ***	−0.0026
	(−3.29)	(−2.42)	(0.86)	(−3.09)	(−1.90)	(−3.31)	(−0.36)
$Debt\_Structure_{it-1}$	0.0003	0.0001	0.0035 **	0.0002	0.0000	0.0002	−0.0676
	(1.00)	(0.84)	(2.31)	(0.99)	(0.20)	(1.13)	(−1.64)
$PMDA_{it}$	0.0009 *	0.0005 **	0.0026	0.0005 **	0.0010 **	0.0005 **	0.0318
	(1.75)	(2.06)	(1.47)	(2.11)	(2.55)	(2.10)	(0.59)
RAM_{it}	−0.0016	−0.0010	−0.0013	−0.0012 *	−0.0003	−0.0009	−0.0043
	(−1.41)	(−1.42)	(−0.39)	(−1.91)	(−0.37)	(−1.42)	(−0.63)
$Share\_Rep\ \_AT_{it}$	0.0051	0.0002	0.0106	−0.0001	0.0004	0.0002	−0.1368
	(1.64)	(0.10)	(0.84)	(−0.03)	(0.14)	(0.13)	(−0.38)
$Meet\_Analyst_{it}$	0.0007 ***	0.0004 ***	0.0016 **	0.0004 ***	0.0003 **	0.0004 ***	−0.0253
	(3.39)	(4.00)	(2.39)	(4.03)	(2.29)	(4.15)	(−0.36)
$Inverse\_Mill_{it}$		−0.0011					
		(−1.31)					
$LogDelta_{it+1}$						−0.0001	
						(−1.19)	
Year fixed effects	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y
Adjusted R^2	24.18%	10.51%	23.26%	13.55%	9.24%	10.53%	9.53%
Observations	556	1,082	184	1,000	638	1,102	162

This table reports the results from several additional tests. The sample is 162–1,082 firm-year observations for the years 2006–2016. *t*-statistics (in parentheses) are based on standard errors clustered by firm. Because of the small sample size, we use a one-digit SIC code for the analyses in columns (3) and (7). See Appendix A for variable definitions. ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively, in two-tailed tests.