The Salience of Creditors' Interests and CEO Compensation

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Abstract

This paper shows that firms adjust CEO compensation policies when creditors' interests are more salient. This effect helps explain controversial compensation practices such as weak performance incentives and short pay duration. Our findings also show that to mitigate the agency cost of debt, compensation contracts can reflect not only the firm's capital structure but the debt contract itself. For example, firms tend to contract on accounting-based goals when creditors do as well. Our analysis relies on a regression discontinuity design around loan covenant violations. We also confirm our conclusions studying a broad sample of financially constrained firms seeking debt financing.

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The literature on CEO compensation is complex and controversial (Edmans, Gabaix, and Jenter, 2017). Several features of compensation contracts raise concerns about the optimality of these contracts, contributing to a long–standing debate on the possibility of rent extraction. Prominent examples include a weak pay-performance relation, a tendency to use short-term incentives, and the possibility of performance metrics being rigged (see, e.g., Jensen and Murphy, 1990; Bebchuk and Fried, 2003; Morse, Nanda, and Seru, 2011). This literature generally studies CEO compensation through the lens of shareholders' interests. Clearly boards' fiduciary duties are to shareholders. Yet, there are theoretical reasons to expect boards also to consider the interests of another claimant–the firm's creditors. For example, Jensen and Meckling (1976) argue that CEO compensation contracts should incorporate creditors' interests to mitigate the agency cost of debt. However, operationalizing this concept is not straightforward. While Jensen and Meckling argue that the CEO's debt-equity ratio should equal the firm's, Edmans and Liu (2011) predict that the relative ratio should vary with firm characteristics. Moreover, considerations of creditors' interests can influence other aspects of compensation, such as pay horizon or performance metrics selection. In such cases, debt contracts may signal creditors' preferences regarding the desired compensation contract.

Do creditors' interests influence CEO compensation contract design? If so, how? In particular, do firms aim to change CEO leverage to reflect firm capital structure? Is it possible that compensation contracts reflect features of the debt contract itself? Can these considerations help explain controversial pay practices? To address these questions, we investigate whether and how compensation policies change in situations when the board of directors and/or management are likely to perceive an increase in the salience of creditors' interests, such as when firms need to (re)negotiate with creditors.[1]

Consideration of creditors' interests can influence compensation policies in two different ways. First, it could lead the board to write a compensation contract that is more creditor-friendly. John and John (1993) predict that the compensation contract helps mitigate the agency costs of debt by serving as a commitment device. In their framework, the compensation

[1]In recent behavioral economics studies, salience often refers to "disproportionate salience" and implies optimization failure due to bounded rationality (see, e.g., Gabaix, 2014). In this paper, salience does not imply optimization failure, but simply refers to something of greater importance. In this way, we use salience consistent with how it is used in the legal and managerial literatures (see, e.g., Mitchell, Agle, and Wood, 1997; Marshall and Ramsay, 2012).

contract signals the borrowers' intent to pursue policies consistent with lenders' interests to ease renegotiation with their lenders and/or to receive better borrowing terms. Second, consideration of creditors' interests can also lead to a less creditor-friendly contract. Because CEOs' incentives can be swayed by the performance terms in debt contracts, boards may not believe that they need these terms in the compensation contract (Rhodes, 2016). Furthermore, existing evidence suggests that creditors can influence CEO turnover (Nini, Smith, and Sufi, 2012), which could exacerbate CEO career concerns. In that case, compensation contracts may include offsetting terms to try to mitigate these potentially detrimental effects.

Empirically assessing creditors' interests, or more precisely what firms perceive their creditors' first-order interests to be, is a difficult task. Certainly, creditors care about firms' ability to repay their loans. Depending on the circumstances and their preferences, creditors may view specific corporate policies favorably, such as increasing cash retention, decreasing risk taking, and adopting a particular horizon for cash flows, etc. Yet, incentivizing CEOs to act on all these dimensions at the same time is difficult, and the desired compensation contract can be ambiguous. For example, creditors could prefer equity-based to cash-based compensation to protect firms' cash reserves. Alternatively, they may want to avoid equity-based compensation because it may give executives risk shifting incentives (John and John, 1993). This paper uses features of the debt contract to gauge creditors' first-order considerations. Our evidence indicates this approach turns out to be crucial to teasing out the effects of creditors' interests.

To identify the effects of creditors' interests on compensation policies, we use a regression discontinuity design (RDD) around loan covenant violations following Chava and Roberts (2008) and Falato and Liang (2016). Violations give creditors the contractual right to recall the loan and end further lending commitments, increasing creditors' bargaining power in renegotiations (Chava and Roberts, 2008). The RDD helps us to mitigate standard endogeneity concerns since an effect of debt contracts on compensation contracts could be driven by reverse causality or an omitted variable.[2] The literature uses this setting to capture an increase to "creditor control rights" (Ferreira, Ferreira, and Mariano, 2017). Although creditors may actively demand changes in compensation, it is unlikely that creditors obtain

[2]For example, there is evidence that debt covenants tend to be less stringent when compensation contracts are more creditor-friendly (Anantharaman, Fang, and Gong, 2014; Cheng, Chen, Lo, and Wang, 2017).

explicit rights over CEO compensation design. Thus, a potential change in compensation policy would be the result of the board responding to a violation, allowing us to test whether boards consider creditors' interests when designing CEO compensation contracts, and if so, what the contracting outcome would be.

We test the argument in Jensen and Meckling (1976) that an increase in the CEO's personal leverage helps mitigate the agency cost of debt by making CEO's compensation payoff more debt-like. We find the ratio of inside debt pay, such as deferred compensation and pensions, to equity pay, such as restricted stock and stock options awards, increases significantly following a covenant violation (almost double the unconditional mean, or an increase of one within-firm standard deviation).[3] We find some evidence that this effect is concentrated among firms in which the ex-ante level of CEO leverage is below the optimal one as predicted by Campbell, Galpin, and Johnson (2016), i.e. where the agency cost of debt is potentially greater.[4]

Next, we test how several aspects of compensation contracts differ when creditors' interests are more important. We study the sensitivity of compensation to stock returns (i.e., delta) and the vesting duration of CEO awards. John and John (1993) argue that a stronger pay-performance relation signals to lenders that CEOs have risk-shifting incentives. Moreover, lenders' interests are contractually limited to the maturity of the loan, likely a shorter horizon than that of shareholders who are residual claimants. Thus, creditors should prefer a compensation contract with a lower delta and a shorter horizon. Consistent with these predictions, we find that a covenant violation unconditionally leads to a 4-9% decrease in CEO pay delta, and a 8-13% decrease in CEO pay duration. Hence, two controversial aspects of CEO compensation, a low pay-for-performance sensitivity and short pay duration, may be outcomes of firms attempting to mitigate the agency cost of debt.

These two effects are a function of the debt contract itself. The decrease in delta is concentrated among loans that include a leverage covenant, signaling that creditors are concerned about the firm increasing its risk-profile. Moreover, the decrease in pay duration

[3]Past research argues that inside debt is related to greater alignment between firm management and creditors (Sundaram and Yermack, 2007; Edmans and Liu, 2011; Wei and Yermack, 2011; Cassell, Huang, Manuel Sanchez, and Stuart, 2012).

[4]We find no significant differential effect if we set the optimal ratio of CEO leverage to firm leverage to one.

is stronger when the remaining loan maturity is low. Hence, the firm's response is a function of the debt contract, resulting in a compensation contract that tends to mirror the debt contract when creditors' interests are more prominent.

This mirroring effect is even more apparent when we study the choice of performance metrics in CEO compensation contracts. Boards and creditors can choose to contract on accounting metrics or on metrics generated external to the firm such as stock prices or credit ratings. We begin by testing whether performance-contingent awards granted to CEOs are more likely to be written on accounting-based metrics following a violation because creditors may prefer these measures and consider them to be strong indicators of a firm's ability to repay its debt (Bizjak, Kalpathy, and Mihov, 2018; Li, Wang, and Wruck, 2017). Our RDD analysis indicates firms' reliance on accounting metrics does not change following a violation.

This lack of evidence may not be surprising because creditors do not always perceive accounting performance to be the best indicator of a firm's credit quality. They may prefer a metric generated outside of the firm, such as credit ratings (see, e.g., Ball, Bushman, and Vasvari, 2008). To identify creditor preferences for the use of accounting metrics, we study the use of earnings-based covenants and performance pricing grids written on accounting metrics in loan contracts. We find that when an outstanding loan contains one of these terms, a violation leads to the subsequent compensation contract relying more heavily on accounting-based performance goals than on stock price goals.

We also investigate changes in compensation policies for executives other than the CEO. While we find that the decrease in delta also extends to other executives, the other facets of the compensation contract do not appear to change for non-CEO executives. Since the CEO is likely to be the principal decision-maker in the company, tailoring her compensation package is likely to be the most effective in reducing the agency cost of debt.

Our analysis supports a causal interpretation of the effects of covenant violations and thus provides internal validity for our inferences. However, it is possible that these effects appear only locally and after an increase in creditor control rights and that creditors' interests have little effect on compensation policies outside of these events. To assess the generalizability of our conclusions, we study a second empirical setting that relies on a broader sample of firms and keeps creditor control rights constant. Using a measure created by Hoberg

and Maksimovic (2015), we test whether compensation policies in firms that are financially constrained and trying to get debt financing are different.[5] We expect these firms to be more attentive to creditors' interests since they wish to raise debt, thereby allowing us to gauge potential effects of creditors' interests on compensation policies. Our evidence generally confirms the effects documented in our RDD analysis, providing support to the external validity of our conclusions. We also verify the robustness of our RDD analysis by employing a battery of tests following prescriptions from Roberts and Whited (2013) such as robustness to bandwidth selection and density assumptions (see Internet Appendix).

Finally, using matching analysis based on reported covenant violations, our additional analysis indicates that firms include higher earnings per share (EPS) performance targets in CEO compensation contracts after reporting violations.[6] This result suggests that firms impose more difficult performance targets. In line with this evidence, the media reports that creditors are concerned about executives extracting rent through the use of easy goals (Dow Jones Newswires, 2016). Adopting stricter performance targets can also be a way for managers who might be using the covenant violation strategically akin to the evidence presented in Matsa (2010) to avoid a pay cut.

Our findings contribute to the literature in several ways. First, we shed new light on the effects of creditors' interests on CEO compensation. Our evidence helps explain some controversial aspects of modern executive compensation, such as a low pay-performance sensitivity and a short pay horizon (Jensen and Murphy, 1990; Bebchuk and Fried, 2003). Our findings suggest these practices could in fact be the result of boards attempting to mitigate the agency cost of debt rather than sub-optimal practices.

Our findings also show the mechanisms through which compensation can mitigate the agency cost of debt. One popular mechanism in the literature concerns the leverage of the CEO relative to the firm. Existing studies find support for this mechanism by testing how loan terms react to the level of CEO inside debt or leverage (Wei and Yermack, 2011; Anantharaman et al., 2014). We contribute to this literature by providing evidence that

[5] Hoberg and Maksimovic (2015) use textual analysis of 10-Ks to gauge the extent to which firms are financially constrained and are seeking debt financing. Covenant violations in our RDD setting are not related to the Hoberg and Maksimovic (2015) measure, indicating that our tests are not nested within one another.

[6] When examining the EPS targets, we use matching analysis instead of the RDD because data constraints severely limit our sample size. We therefore view these results as suggestive.

boards actively change CEO leverage. Our results also suggest the ratio of CEO leverage to firm leverage targeted by the board is different than one, consistent with Edmans and Liu (2011) and Campbell et al. (2016).

We also introduce a novel mechanism, namely writing a compensation contract that mirrors the debt contract. Debt contracts can signal creditors' preferences to the board, influencing the compensation contract if the board uses it as a commitment device. Our results provide evidence for this mechanism, revealing a complementary effect between debt and compensation contracts. Our conclusions contrast with those in Rhodes (2016), who finds substitution effects in performance metrics selection, though this inconsistency may stem from our different methodologies. Several papers provide evidence of a complementary effect by showing that compensation contracting affects loan terms (Ortiz-Molina, 2006; Tchistyi, Yermack, and Yun, 2011; Bizjak et al., 2018; Li et al., 2017). Our paper augments the literature by documenting the reverse effect, going from debt to compensation contracts.

Related to our work, Francis, Hasan, and Sun (2011), Ferreira et al. (2017), and Balsam, Gu, and Mao (2018) study changes in the structure of compensation around covenant violations.[7] By studying a much larger set of compensation contracting practices and testing the interacted effects with firm's capital structure and debt contracts, our paper can address our motivating questions and allows us to make the above contributions. Our study also shows that compensation contracts can become more creditor-friendly not just by reducing risk-taking incentives as documented by these papers, but also by the novel mechanism of mirroring features of the debt contract.[8] While Balsam et al. (2018) also use an RDD, a causal interpretation of their findings is problematic because there is a strong difference in the ex-ante risk levels of their control and treatment firms, which violates the identifying RDD assumption that firms are ex-ante similar across the threshold. This is particularly concerning because their outcome variables are affected by risk.[9] Our study does not suffer

[7] In a less closely related paper, Carter, Hotchkiss, and Mohseni (2018) examine whether the compensation contracts of executives at *distressed* firms have market, accounting, or cash flow-based metrics in them. In contrast in one of our tests, we examine whether compensation contracts rely more heavily on accounting or externally generated measures at firms that are not necessarily distressed, though we do not exclude these firms. Additionally, we employ an identification strategy to help us establish causality.

[8] Furthermore, firms also tend to reduce pay horizon, which arguably does not fit well with an intent to reduce risk-taking, but could be explained by creditors' horizons, captured by loan maturities.

[9] We note an important difference in the RDD implementation. While we follow the literature and use only net worth and current ratio covenants because these covenants are relatively standardized and more difficult

from this problem. Moreover, in contrast to the results in Ferreira et al. (2017) (and verified in our sample), they find a decrease in total compensation, which may also stem from the ex-ante differences across the threshold in their sample.[10]

Finally, our findings contribute to the literature on creditors' role in corporate governance (Shleifer and Vishny, 1997; Roberts and Sufi, 2009b), particularly on their influence on CEO compensation. We extend the findings in Gilson and Vetsuypens (1993) and Eckbo, Thorburn, and Wang (2016) by showing an effect outside of bankruptcy states as well as those in Nini et al. (2012) by pointing to a channel through which creditors can influence firm governance.[11]

1 Conceptual Framework

1.1 Hypothesis Development

We develop two hypotheses concerning the potential effects of an increase in the salience of creditors' interests on compensation policies. The first one, which we denote the *commitment device hypothesis*, predicts that an increase in the importance of creditors' interests will cause compensation contracts to become *more* creditor-friendly. By doing so, firms anticipate easing renegotiation with their lenders and receiving better borrowing terms. In these cases, the compensation contract serves as a commitment device that signals the borrowers' intent to pursue policies consistent with lenders' interests, thereby decreasing the agency costs of debt as predicted in John and John (1993). Because debt contract design can signal creditors'

to manipulate (Chava and Roberts, 2008; Roberts and Whited, 2013; Falato and Liang, 2016), Balsam et al. (2018) use a set of 15 different covenants.

[10] We find the opposite of Francis et al. (2011) regarding changes in delta. However, two of the findings in Francis et al. (2011) – that CEO compensation actively changes before a violation and that the ex-ante structure of compensation is associated with the likelihood of a violation – raise concerns about endogeneity. While CEO compensation is not their focus, Ferreira et al. (2017), using a limited sample, find a drop in stock-options following violations if there are no *ex-post* creditor-friendly changes in board structure, implying that this change in compensation is not creditor-friendly. We reach opposite conclusions.

[11] Alternatively, the changes in corporate policies resulting from a covenant violation may be driving the changes in compensation that we document. However, the change in compensation policy appears in the period directly following the covenant violation, making it unlikely to be the outcome of ex-post changes in corporate policies. Moreover, one can argue that from a theoretical perspective, the compensation contracting decision is primitive to corporate policies initiated by the manager.

preferences to shareholders, firms might align compensation terms with debt contract terms, resulting in a *complementary* effect between debt and compensation contracts.

H1–Commitment Device Hypothesis: *When creditors' interests are more salient, boards will write compensation contracts that are more creditor-friendly. Moreover, boards will align compensation terms with debt contract terms, resulting in a complementary effect between debt and compensation contracts.*

The second hypothesis, which we denote the *career concerns hypothesis*, predicts that an increase in the importance of creditors' interests will cause compensation contracts to become *less* creditor-friendly. This argument relies on the notion that managers' career concerns are likely to be exacerbated when creditors' interests are more important, such as after a covenant violation. Existing evidence suggests that creditors can exert pressure to force managerial turnover after a covenant violation (Nini et al., 2012). In this case, CEOs are likely to be overly-concerned with satisfying debt contract terms and with gaining or maintaining creditors' support for their tenure. This concern may lead CEOs to adopt creditor-friendly policies, such as avoiding risky projects (Jensen and Meckling, 1976). Moreover, Holmström (1999) predicts that exacerbated career concerns alone should lead managers to avoid risky projects regardless of creditors' risk-taking preferences. To offset these detrimental effects, firms should write a less creditor-friendly compensation contract–for example, by providing more risk-taking incentives to their CEOs. Additionally, because CEOs' incentives can be swayed by the performance terms in debt contracts, especially after a covenant violation, boards can regard including these terms as redundant when designing the compensation contract (Rhodes, 2016). Thus, the career concerns hypothesis predicts a *substitution* effect between debt and compensation contracts.

H2–Career Concerns Hypothesis: *When creditors' interests are more salient, boards will write compensation contracts that are less creditor-friendly. Moreover, boards will adjust compensation terms away from debt contract terms, resulting in a substitution effect between debt and compensation contracts.*

In our conceptual framework salience refers to the importance or urgency of considering creditors' interests, as perceived by the board of directors or management. This is different

than the way it is referenced in the behavioral economics literature, in which salient thinking leads to sub-optimal actions. Under our two hypotheses, shareholders' interests still prevail. Boards of directors consider creditor's interests because it either helps them to negotiate better loan terms with their lenders (*H1*) or to mitigate adverse effects from CEO's career concerns (*H2*). Thus, in either case, the change in compensation policies benefits shareholders.

1.2 Empirical Predictions

The above hypotheses lead to several empirical predictions about how compensation policies should change. We summarize them in Table I. For sake of brevity, we describe only the predictions related to the commitment device hypothesis. Those based on the career concerns hypothesis will simply be in the opposite direction.

The first argument predicts that firms will attempt to align CEO leverage with firm capital structure to mitigate the agency cost of debt (Jensen and Meckling, 1976). In general, creditors should favor higher CEO leverage, since it tilts the payoff of CEO compensation to become more debt-like. Thus, under H1, we expect CEO leverage to increase when creditors' interests are salient. However, we expect this effect to be stronger when the ex-ante CEO leverage is lower than the optimal one. While Jensen and Meckling (1976) predict that the optimal ratio of CEO leverage to firm leverage is one, Edmans and Liu (2011) predict that an exact reflection of the firm's capital structure may be sub-optimal and that the ratio should vary depending on firm characteristics. Campbell et al. (2016) find evidence supporting the argument of Edmans and Liu (2011). We therefore predict a greater increase in CEO leverage when the ex-ante ratio of CEO leverage to firm leverage is below the optimal one as predicted by Campbell et al. (2016).

The next argument concerns CEO risk-shifting incentives. John and John (1993) predict that by reducing the sensitivity of compensation to stock price returns (i.e., delta), firms reduce CEO risk-shifting incentives, which in turn mitigates the agency cost of debt.[12] Thus,

[12] A large empirical literature examines whether CEO risk incentives, measured in a variety of ways, impacts firm risk taking (Gormley, Matsa, and Milbourn, 2013; Armstrong and Vashishtha, 2012), financial reporting quality (Erickson, Hanlon, and Maydew, 2006; Armstrong, Guay, and Weber, 2010; Core, 2010; Armstrong, Larcker, Ormazabal, and Taylor, 2013), and tax avoidance (Armstrong, Blouin, Jagolinzer, and Larcker, 2015; Rego and Wilson, 2012).

under H1, we expect delta to decrease when creditors' interests are more salient. Moreover, we expect this effect to be stronger when there is a signal that creditors are concerned about the possibility of risk-shifting. We use the presence of a leverage covenant to capture that signal since Shue and Townsend (2017) show that managers tend to increase firm risk through leverage in response to the risk-taking incentives given in their compensation contracts.

The salience of creditors' interests can also affect the horizon of CEO pay. Because shareholders are residual claimants and creditors are contractually concerned with firm performance up to loan maturity, lenders are likely to favor a shorter performance horizon relative to the one desired by shareholders. Hence, H1 predicts that CEO pay duration should decrease, especially when the loan maturity is low.

Finally, firms might also alter the choice of performance metrics in CEO compensation contracts. Since accounting-based performance can be a strong indicator of a firm's ability to repay its debt, creditors may favor the use of accounting-based metrics (Bizjak et al., 2018; Li et al., 2017). Under this argument, H1 predicts that the compensation contract will rely more heavily on accounting-based metrics than on stock price performance. Moreover, we expect this effect to be stronger when there is a signal that creditors care about accounting-based performance, such as the presence of an earnings-based covenant in the loan contract or the use of accounting metrics in the performance pricing grid.

2 Sample and Main Variables Construction

2.1 Data and Sample Construction

We use different samples for the different aspects of the compensation contract that we study because of data availability. For our RDD analysis, we follow Falato and Liang (2016) in constructing our samples since we also follow their regression-discontinuity design approach. For every package in the DealScan database with non-missing values for the loan amount, we construct a window from the first deal active date to the last maturity date of the facilities in the package. All annual firm and compensation data are joined to these package observations within those dates. We assume that firms tend to design their compensation contracts at the

beginning of the fiscal year. (For example, Lie (2005) shows that equity grants are usually given at the beginning of the fiscal year.) Thus, to gauge the effects of creditors' interests, we use the compensation contract from the fiscal year following the covenant violation.[13] We provide additional details on our database construction in the Internet Appendix.

Because firms are in violation at the end of the previous fiscal year and compensation packages tend to be designed at the beginning of the fiscal year, it is likely that the change in compensation contract occurs before the debt renegotiation. As we can not identify exactly when renegotiations of debt and compensation contracts occur, we caveat that it is possible that boards adjust CEO compensation contracts ex-post, in response to debt renegotiation, as opposed to ex-ante, in anticipation of renegotiation with their lenders. Yet, the ex-post changes in compensation might still be a result of firms attempting to appease their lenders. For example, they might promise to change compensation design to signal their inclination toward creditors' interests. Whether the compensation is changed in response or in expectation, the change is still driven by the increased salience of creditors interests; therefore, our causal interpretations hold. We also note that the balance tests in our robustness analysis show that the effects on compensation contracts do not appear in the year before the violation. These tests can also be viewed as falsifications tests.

2.1.1 Data for Components of CEO Compensation and Delta

We merge compensation data from ExecuComp onto Compustat's annual firm fundamental data. When studying CEO pay delta, we use fiscal years 1995-2005, resulting in 7,103 firm-year observations across 2,504 private loan packages (henceforth, the ExecuComp sample). We limit our sample to fiscal years prior to 2006 for measurement reasons because of the emergence of performance-contingent awards, which makes it difficult to measure the delta of compensation as noted in (Bettis, Bizjak, Coles, and Kalpathy, 2018). In particular, these awards can vest based on multiple accounting metrics and pay out in shares of the company, making it difficult to estimate the sensitivity of pay to stock price performance. Focusing on this period also helps us to avoid any confounding effects caused by the new

[13] Our complementary tests use the contract following the 10k from which the debt delay score is extracted.

disclosure rules and the subsequent reporting changes within the ExecuComp database.[14] We also use ExecuComp to calculate CEOs' inside debt grants (deferred compensation and pension contributions) for use in our CEO leverage tests. Following the same procedure as above, we merge the inside debt data onto Compustat's annual firm fundamental data for the fiscal years 2007-2015, resulting in 3,343 observations across 1,229 private loan packages. We construct this sample from 2007-2015 because these data are not available earlier.

2.1.2 Data for Performance and Vesting Terms in Compensation Contracts

We retrieve performance metrics and goals data from Incentive Lab for 2007-2015 (henceforth, the Incentive Lab sample). Since December 2006, public firms have been required to disclose more information about how they tie CEO compensation to performance in their proxy statements.[15] Incentive Lab collects this information for the 750 largest public firms each year. After 2006, performance-based awards became a popular compensation vehicle (De Angelis and Grinstein, 2015; Bettis et al., 2018). These awards vest conditional on the firm reaching certain performance goals, with the payoff either in cash or equity. Incentive Lab's data includes the definition of the performance metric tied to the grant, along with the weight assigned to this metric. We use the payout target that firms set when writing the compensation contract. Based on this target, we obtain the total amount of compensation tied to performance-based grants, and the percentage of pay tied to each listed performance metric. When computing the pay duration, we use data on the performance horizon from the performance-based awards as well as on the vesting horizon of the time-vesting awards. Observations on a CEO's annual contract are aggregated to the firm-year level, and firm-years with multiple CEOs are hand-checked and removed when incorrect. In the case of a turnover, the new CEO's contract is used.[16] After merging the Incentive Lab data with Compustat and Dealscan, we have 1,573 firm year observations across 831 private loan packages.

[14] ExecuComp reports each firm's valuation of options granted to its CEO for the years 2006 and thereafter. Before 2006, ExecuComp provides its own Black-Scholes valuation of granted options, making the valuations more comparable over this period. Our conclusions are qualitatively similar if we include post-2006 data.

[15] Because the SEC did not implement universal disclosure requirements until December 2006, the span and quality of the data prior to this period is limited (De Angelis and Grinstein, 2015).

[16] We also conduct our analysis on a sample that omits newly hired CEOs. Our results remain unchanged.

2.1.3 Data for Earnings-based Covenants and Performance Pricing Grids in Loan Contracts

When testing how the firm's response to a violation is influenced by existing performance terms in loan contracts, we focus on two different terms: the presence of an earnings-based covenant and the choice of metrics in the performance pricing grid.[17] We gather this information for private loan agreements from DealScan. We omit packages from the sample in the rare case they have multiple terms in the pricing grid (about 120 packages) following Asquith, Beatty, and Weber (2005). We focus on loans with performance pricing terms based on either earnings or credit ratings, though other metrics such as leverage, maturity, and interest coverage are used infrequently. Limiting our sample to loan packages with performance pricing grids results in 1,401 firm year observations across 459 private loan packages.

2.2 Construction of our Main Compensation Variables

2.2.1 Change in CEO Leverage

Our first variable of interest is the change in a CEO's leverage intended by the firm (i.e., coming from changes in compensation policies, not from trades by the CEO). Our measure, Δ *CEO Leverage*, is the ratio of changes to inside debt divided by CEO equity awards, capturing the relative provision of inside debt and equity incentives. Following Wei and Yermack (2011), we measure CEO inside debt as the total balance of the CEO's deferred compensation and the total value of the CEO's pension plans. Changes to deferred compensation are measured as the firm's contribution to deferred compensation. Changes to pension plans are measured as the difference between the current and past year's total value of pensions.[18] Changes in CEO equity are the total value of stocks and options granted to the CEO in a given year.

[17] Performance pricing grids automatically adjust the loan's interest rate depending on firm performance. Better (worse) performance lowers (raises) the rate that the borrower pays. In that sense, the grids provide an incentive zone, rather than just a minimum target like covenant thresholds. This is comparable to what is often included in compensation contracts.

[18] We obtain qualitatively similar results when changes to inside debt are measured as the difference between the current and past year's total value of deferred compensation and pensions.

2.2.2 Characteristics of CEO Compensation

We study the characteristics of CEO compensation using ExecuComp data. See definitions in Appendix A. In particular, we use the natural logarithm of one plus the Black-Scholes delta provided to a CEO through equity grants awarded (i.e., restricted stock plus stock option grants) in a given year (*Ln(Delta)*).[19]

2.2.3 Pay Duration

In the spirit of Gopalan, Milbourn, Song, and Thakor (2014), we define pay duration as the value-weighted average of the vesting period associated with performance-based and time-vesting awards granted to the CEO in a given year:

$$PayDuration_t = \sum_{i=1}^{N} \frac{AwardValue_{i,t}}{TotalAwardsValue_t} \times VestingPeriod_{i,t} \tag{1}$$

where N is the total number of performance and time vesting awards provided in a given year t, $AwardValue_{i,t}$ is the value of a performance or time vesting award i, $TotalAwardsValue_t$ is the total value of awards granted in a given year t, and $VestingPeriod_{i,t}$ is the length of the vesting period in months for each award i granted in year t.[20]

2.2.4 Choice of Performance Metrics

We also study the choice of performance metrics in CEO compensation contracts, particularly the extent to which firms rely on accounting-based versus stock price performance. Following De Angelis and Grinstein (2015), we define *Accounting-based Goals* as the fraction of the value of performance-based awards tied to accounting-based performance measures.

[19] To compute the delta of the stock option grants, we use the stock price at fiscal year end and the annualized stock return volatility of daily returns over the 250 trading days in the prior fiscal year. We set the time to maturity as 0.7 times the time to maturity of each specific option with an upper bound of 10 years and assume that the grant date is July of that year. We set missing maturities equal to 9.5.

[20] Gopalan et al. (2014) use cash bonuses, salary and time vesting awards in their calculation of pay duration, with a duration of zero for cash bonuses and salary. We remove cash bonuses and salary from our calculation because these are ex-post discretionary payments. Instead, we include the ex-ante awards with their corresponding vesting period. We also perform our analysis using two alternative measures. First, we calculate duration using only performance-vesting provisions. Second, we use the exact measure used in Gopalan et al. (2014). Our results are robust to both alternative measures.

2.3 Summary Statistics

Table II presents summary statistics for the ExecuComp and Incentive Lab samples. The firms in our samples are larger than the average Compustat firm because ExecuComp includes S&P 1500 firms and Incentive Lab focuses on the largest 750 firms in a given year.

From the ExecuComp sample, firms pay CEOs an average of $3.8 million in total annual compensation. In the Incentive Lab sample, the median amount of performance-based pay is nearly $2.9 million. The mean of CEO leverage in our sample is 63%. Over 90% of the contracts that feature performance-based awards include some form of accounting-based goal with an average aggregate weight on these goals of almost 70%. The level and ranking of weights placed on different accounting goals in our sample is consistent with prior studies (see De Angelis and Grinstein, 2015; Bettis et al., 2018; Li and Wang, 2016).

For our earnings covenant analysis, we find 79% (77%) of the observations in our ExecuComp (Incentive Lab) sample have earnings covenants. Performance pricing grids are most commonly written on either credit ratings or measures of earnings performance. Slightly more than half (53%) of the pricing grids are written on debt over earnings in the ExecuComp sample and slightly less than half (47%) in the Incentive Lab sample.

3 The Effects of Covenant Violations on CEO Compensation Contracts – RDD Estimates

In this section, we estimate the impact of an increase in the importance of creditors' interests by using loan covenant violations. Creditors hold discretion over how violations are resolved; their options range from an unconditional covenant waiver to full and immediate repayment of the debt. Past studies find that creditors frequently choose to renegotiate the terms of debt, but that both conditional and unconditional covenant waivers are common alternatives (Chen and Wei, 1993; Gopalakrishnan and Parkash, 1995). Thus, the shift in control that

occurs during a covenant violation is often accompanied by opportunities for the firm to commit to creditors in order to obtain a waiver.[21]

3.1 Methodology: A Regression Discontinuity Design Approach

Following Chava and Roberts (2008) and Falato and Liang (2016), we use the distance between a covenant threshold in the loan contract and the respective accounting measure to test the effects of a covenant violation on compensation policies. Particularly, we employ a regression discontinuity design (RDD) around the covenant threshold, where the treatment is violation and the control is nonviolation.

We employ a sharp RDD because a covenant violation meets the criteria of "a known and measured *deterministic* decision rule" (Roberts and Whited, 2013). Our forcing variable is the distance between firms' level of net worth (or current ratio) and the minimum requirement listed in active debt covenants. We use net worth and current ratio covenants, as in Falato and Liang (2016), because these covenants are relatively standardized and unambiguous compared to other covenant types (Dichev and Skinner, 2002).[22] Our treatment variable, $Bind_{i,t}$, is defined as follows:

$$Bind_{i,t} = \begin{cases} 1 & \text{if } z_{i,t} - z^0_{i,t} < 0 \\ 0 & \text{otherwise} \end{cases},$$

where i and t indicate firm and year, $z_{i,t}$ is the firm's observed level of net worth or current ratio, and $z^0_{i,t}$ is the corresponding threshold specified by the covenant.[23]

Our baseline empirical model is:

$$Y_{i,t} = \alpha_0 + \beta_0 Bind_{i,t-1} + \sum_{n=1}^{p} (\beta_1 + \beta_2 Bind_{i,t-1}) Distance^p_{i,t-1} + \eta_i + \lambda_t + \upsilon_{i,t}, \qquad (2)$$

[21] After the breach, creditors may pardon the violation via waivers, renegotiation, or extension of a grace period. Debt contracts may grant a grace period for violating firms to cure the breach of contract. Including observations where a firm avoids technical default due to curing the violation during the grace period should bias against finding an effect around covenant violations.

[22] When multiple distances apply due to multiple covenants (net worth, tangible net worth, and current ratio), we set the distance to be the minimum of the distance values. We define *Distance* further in the appendix.

[23] Some net worth covenants have a moving threshold that is adjusted by a percentage of net income over time. All of our results are robust to dropping these from our sample.

where $Y_{i,t}$ is the dependent variable of interest, $Bind_{i,t-1}$ is the covenant violation dummy, *Distance*, our forcing variable, is the percent distance between the covenant threshold and the firm's corresponding accounting variable,[24] p is the degree of a polynomial control of the distance to the threshold, η_i is a firm fixed effect, and λ_t is a year fixed effect.

Following the recommendation from Lee and Lemieux (2010), we include controls for the forcing variable and its interaction with the treatment variable in all of our specifications. This controls for trends in the outcome variable as firms move away from the violation threshold and allows the trends to differ for firms in violation (to the left of the threshold). We do not include other control variables in our regressions since these controls can distort our estimates (Angrist and Pischke, 2008). In untabulated analysis, we re-run our tests including control variables (such as firm size (natural log of one plus total assets), investment, Tobin's Q, and earnings) measured at the fiscal year-end prior to the year in which the dependent variable is measured. We obtain similar results in all our tests.

Our empirical predictions also state that the effects should vary across the ex-ante CEO to firm leverage ratio and various debt contracts characteristics. To test these predictions, we employ a refined empirical model similar to the one in Chava and Roberts (2008):

$$\begin{aligned} Y_{i,t} = \alpha_0 &+ \beta_0 Bind_{i,t-1}\Gamma_w + \beta_1 Bind_{i,t-1}(1-\Gamma_w) \\ &+ \sum_{n=1}^{p}(\beta_2 + \beta_3 Bind_{i,t-1}) Distance^p_{i,t-1}\Gamma_w \\ &+ \sum_{n=1}^{p}(\beta_4 + \beta_5 Bind_{i,t-1}) Distance^p_{i,t-1}(1-\Gamma_w) + \eta_i + \lambda_t + \upsilon_{i,t}, \end{aligned} \tag{3}$$

We test for effects on different contracting outcomes ($Y_{i,t}$). We estimate equations (2) and (3) using OLS. β_0 captures the unconditional effect of a covenant violation in equation (2) and the conditional effect in equation (3). Because we control for firm-specific heterogeneity, β_0 is driven by the within-firm time-series variation of firms experiencing a net worth or current ratio covenant violation. The violation of these particular covenants constitutes the example of a sharp RDD given in Roberts and Whited (2013). Thus, we attempt to identify a causal

[24] In the event that a firm has both a current ratio and net worth covenant in the debt contract, we use the one for which the firm is performing worse relative to its contractual requirement.

effect of covenant violations on different aspects of the CEO compensation contract. We interpret these effects as driven by a sharp increase in the salience of creditors' interests. It is possible that interests of other stakeholders, such as employees or suppliers, could be driving the effects (see, e.g., Falato and Liang, 2016; Zhang, 2018). However, given our exhaustive set of differential effects across ex-ante debt features and firm capital structure, we believe that the creditors' interests explanation is more plausible.

We estimate equations (2) and (3) in samples limited to observations that fall within specific bandwidths around covenant thresholds. For consistency, we report the results of all our tests using four different specifications. Our first specification relies on a linear estimation (i.e., $p = 1$) and a bandwidth of 20%, following Falato and Liang (2016). However, given our data restrictions, our sample is much smaller than theirs. Estimating optimal bandwidths based on the tradeoff between fit and bias following Calonico, Cattaneo, and Titiunik (2014), the optimal bandwidth varies across our specifications but in general lies around 30% for a linear specification. Thus, in our second specification we employ a bandwidth of 30% and a polynomial of order one. For our third specification, we further expand our bandwidth to 40%, but this time with a polynomial order of two, following (Ferreira et al., 2017). Lee and Lemieux (2010) state that assuming a linear functional form is more appropriate in small bandwidth samples, whereas in larger samples, it is advisable to include higher order controls. Finally, as noted in Roberts and Whited (2013), a sharp RDD with a sufficiently tight bandwidth estimation will likely run into power problems. In our case, this power problem can be even more severe given our small sample size due to data restrictions. To address this issue, we follow the recommendation from Roberts and Whited (2013) and use a larger bandwidth of 100% in our fourth specification. As recommended in Lee and Lemieux (2010), since this bandwidth is larger, we increase the polynomial of order three.

We echo the economic arguments made in Falato and Liang (2016) with regard to the local continuity assumption. To identify a treatment effect with an RDD, all factors other than the treatment should vary continuously around the threshold of interest. In the setting of covenant violations, the main concern is that firms may be sorted on either side of the covenant threshold through manipulation of the forcing variable. The presence of manipulation alone does not invalidate violations as a source of exogenous variation in creditor control. A

RDD requires that firms cannot *perfectly* sort themselves on either side of the covenant threshold (Lee and Lemieux, 2010; Roberts and Whited, 2013). Furthermore, Sweeney (1994) indicates that net worth and working capital are the most commonly violated covenants, suggesting they are more difficult to manipulate than other covenants.[25] Finally, we test for the presence of manipulation by conducting density tests around the covenant threshold (Cattaneo, Jansson, and Ma, 2018). A discontinuity in the density of the forcing variable around the threshold would be an indication of potential manipulation. We fail to find evidence of such a discontinuity. These results are discussed further in the robustness section.

In addition to regression analysis we present graphical plots of each dependent variable around the covenant threshold. The figures plot our estimated outcome variables within a bandwidth of 40%, using a second order polynomial Epanechnikov kernel-weighted estimation. To be consistent with our RDD estimations, our outcome variables are demeaned at the firm- and year-level. We plot the 90% confidence interval for the kernel-smoothed expected value, calculated from the estimated standard errors. The figures also include a scatter plot of the actual data averaged across non-overlapping bins. These means do not always fall within the confidence interval of the estimated functional form because the latter is estimated across a larger bandwidth than the displayed bins and thus smooths the volatility in the underlying data. We also report figures for relevant subsamples to illustrate the conditional effects.

3.2 Change in CEO Leverage

Firms can change the leverage inherent in the CEO's compensation package to make the contract more or less creditor-friendly. Boards can do this by adjusting the mix of equity compensation and inside debt compensation, such as deferred compensation and pensions. Jensen and Meckling (1976) argue that the agency cost of debt can be mitigated by providing managers with incentives that mirror the firm's capital structure. The commitment device

[25] Beneish and Press (1993) also document the frequent violation of net worth covenants. Dichev and Skinner (2002) examine violations of net worth and working capital covenants and point out that the firms in their sample are not in financial distress. Finally, while earnings covenants exclude other comprehensive income, net worth covenants do not (Li, 2010), consistent with lenders not being concerned about a borrower's ability to avoid violating these covenants through the manipulation of transitory earnings.

hypothesis predicts increases in CEO leverage assuming this will be more in line with debtholders' interests.

We test for changes in the CEO's compensation leverage using our RDD setting and report our results in Table III. Columns 1 through 4 report the unconditional effects. We find a statistically significant increase in CEO leverage following a violation across three of the four unconditional specifications. These results indicate that a covenant violation is associated with an increase in Δ *CEO Leverage* of 50 to 100 percent of the unconditional mean. Put in terms of the average firm, this is the equivalent of an increase in Δ *CEO Leverage* of 88-200% of the average within-firm change. Figure I shows the sharp increase in the level of Δ *CEO Leverage* when firms violate a covenant (i.e., moving from the right to the left of the threshold).

Edmans and Liu (2011) argue that an exact reflection of the firm's capital structure may be sub-optimal and provide the CEO with insufficient incentives to promote maximal effort. Hence, one can expect cross-sectional variation in the effect. We examine this possibility by studying how the effect varies when the CEO's relative incentive ratio is below the optimal value predicted by Campbell et al. (2016) (Columns 5 through 8). The coefficient of *Bind* $\times$ *K Below* is positive across all specifications. However, the coefficient is only significant in one specification and borderline in another (Column 6). These results weakly indicate that the increase in CEO leverage after a covenant violation may be concentrated among firms where the ex-ante CEO leverage is lower than optimal, i.e. in firms where the agency cost of debt is potentially greater. Figure II shows the sharper increase in the level of Δ *CEO Leverage* when firms where a CEO's leverage is less than the optimal violate a covenant.

Finally, we find no significant interacted effect (untabulated) if we set the optimal ratio of CEO leverage to firm leverage equal to one rather the using the method proposed by Campbell et al. (2016). Thus, our results suggest that the ratio of CEO leverage to firm leverage targeted by the board is different than one, consistent with the arguments in Edmans and Liu (2011) and Campbell et al. (2016).

3.3 CEO Pay Delta

We test for the effect of a covenant violation on the provision of stock-performance incentives as measured by the natural log of one plus CEO pay delta (*Ln(Delta)*. We also study how this effect varies when there is a leverage covenant in the debt contract, signalling that creditors are concerned about the possibility of risk-shifting.

Table IV reports our unconditional and conditional results on delta in Columns (1-4) and Columns (5-8), respectively. Our point estimates indicate that a covenant violation results unconditionally in a 4% to 9% decrease in provision of delta to CEOs though only statistically significant in one specification. Figure I displays the discontinuity in the 40% bandwidth sample. When conditioned on the presence of a leverage covenant, we find a negative effect for firms with a leverage covenant in an outstanding debt contract, significant in three of the four specifications.[26] This is also shown in Figure II. Note that the increase in the confidence interval just to the left of violation occurs here because of few observations being in this part of the distribution. Supporting the commitment device hypothesis, firms provide fewer stock-performance incentives, especially when lenders signal risk-shifting concerns.

3.4 Pay Duration in CEO Compensation Contracts

In this section, we test the effect of a covenant violation on the duration of CEO compensation. Arguably, creditors have a shorter holding horizon than shareholders since the latter are the residual claimants. As a consequence, a compensation contract with a shorter horizon is likely to be perceived as more creditor friendly, particularly when the remaining maturity of the debt is short. In that case, creditors are likely to further prefer shorter incentives horizon for the CEO to match the maturity of the debt contract.

We estimate equations (2) and (3) using the natural log of one plus pay duration as the dependent variable. We report our RDD estimates in Table V. In Columns (1)-(4), we report the unconditional effect of a covenant violation on pay duration. Subsequently, in Columns

[26] In unreported results, we find that the observed drop in delta is driven by decreases in the provision of restricted stock to the CEO, specifically when conditioned on the presence of a leverage covenant. We also find an unconditional decrease in stock option pay. We find robust results when using either the ratio of stock pay or the total number of granted restricted shares.

(5)-(8), we study the cross-sectional effect for firms with low remaining maturity on their loan package. *Short Maturity* is an indicator variable equal to one when the loan package's remaining maturity is less than 24 months.

Across the first four specifications, the coefficient of *Bind* is negative and is statistically significant in three. The coefficient for *Short Maturity* × *Bind* is negative and statistically significant in each of the specifications. Figure I displays a sharp break in the level of CEO pay duration. This break is more pronounced when the loan contract has short remaining maturity (see Figure II).

Collectively, these results indicate that firms tend to decrease pay horizon following a violation, particularly for CEOs managing firms with low maturity left on their outstanding debt contracts. Hence, these results support the commitment device hypothesis: by shortening pay duration following a covenant violation, particularly when debt maturity is low, CEO compensation contracts become more creditor friendly.[27]

3.5 Performance Measures in CEO Compensation Contracts

3.5.1 Accounting-based versus Stock Price Metrics

Arguably, including accounting-based performance contingent awards in compensation contracts can reduce agency conflicts with debt holders if creditors favor accounting-based performance relative to stock-based performance (Bizjak et al., 2018; Li et al., 2017). In this case, a compensation contract that relies on accounting-based performance rather than stock price performance would be more creditor-friendly. We test the effects of a violation on the use of accounting-based metrics in CEO compensation contracts and report the results in Table VI. The first four columns report results from our unconditional tests. We fail to find statistically significant results that compensation contracts tend to rely more on accounting-based performance contingent awards after debt covenant violations in any of our four specifications. Additionally, we present graphical evidence consistent with a lack of discontinuity in the last panel of Figure I.

[27] Our measure of duration includes both time vesting and performance-contingent awards that are measured over a performance period. We find robust results when excluding time-vesting awards. Our additional evidence suggests that our findings on pay duration are not driven by decreases in equity pay.

3.5.2 Earnings-based Covenant as A Signal of Creditors' Preferences

Creditors might not favor accounting performance unconditionally, which can explain the lack of evidence presented above. The literature provides ample evidence that the quality and attributes of firms' accounting systems affect the design of their loan agreements and whether those contracts rely on accounting outputs (Ball et al., 2008). Because accounting earnings may not always be the most informative signal available to debt holders about credit deterioration, contracts may not include covenants written on earnings.

Consequently, a loan contract with an earnings-based covenant can signal to shareholders that creditors care about accounting-based performance. Under this argument, a compensation policy is more creditor-friendly after a violation if it relies more on accounting-based performance when an outstanding loan has an earnings-based covenant. We test how a violation affects the use of accounting-based metrics in compensation contracts when loans do or do not contain an earnings-based covenant. We report the results in Table VI in Columns (5)-(8). *Earnings Cov* is an indicator variable equal to one if the firm has an outstanding debt contract with an earnings covenant in place when the next compensation contract following a violation goes into effect and zero otherwise. Therefore, the variable of interest in these regressions is the coefficient on *Bind*Earnings Cov*.

This coefficient is positive and is statistically significant in three of the four specifications. The specification with lower statistical significance is the one using the smallest bandwidth sample, where we have fewer observations. Thus compensation contracts are more likely to include rewards based on accounting performance after a covenant violation, but only when the creditors have contracted on accounting numbers as well. These results support the commitment device hypothesis that compensation contracts become more creditor friendly following an increase in creditors' bargaining power. Figure II shows the sharp discontinuity in the use of accounting based performance metrics in compensation contracts following a covenant violation by firms with an earnings based covenant in a debt contract.

3.5.3 Performance Pricing Grids as A Signal of Creditors' Preferences

In this subsection, we study the choice of metrics in performance pricing grids as a signal of creditors' preferences. Performance pricing grids increase or decrease the interest rates borrowers pay on their loans depending on their performance. Thus while earnings covenants in debt contracts provide incentives for firms to keep their income above a certain minimum level, performance pricing grids provide incentives not only to maintain minimum levels, but also to improve. These upside incentives arguably make pricing grids a more natural feature of the debt contract than earnings covenants for comparison to incentives provided by compensation contracts. Moreover, Ball et al. (2008) find that performance pricing grids are more likely to be written on accounting information when earnings are more informative about declining credit quality and on credit ratings otherwise. So pricing grids provide a signal as to creditors' preferences about using accounting to incentivize managers.

We classify loan packages that contain a grid into two categories based on whether their pricing grid is based on accounting measures or on credit ratings.[28] We test how the effects of a violation on the use of accounting-based metrics in compensation contracts vary across loan contracts in which the performance pricing grid is written over accounting performance or not. We report the results in Table VI, Specifications (9)-(12). *Earnings PP* is an indicator variable equal to one if the firm has a performance pricing grid based on accounting metrics and zero if the firm has a pricing grid based on credit ratings. If compensation policies rely more on accounting based incentives following a covenant violation, we expect the coefficient on *Bind*Earnings PP* to be positive and statistically significant. In all four specifications, this is what we find. Our results are actually even stronger here than they are when examining earnings based covenants, potentially because the choice of metrics in the performance pricing grids can represent a more precise signal of creditors' preferences because they provide both upside and downside incentives. Our findings again support the commitment device hypothesis.

[28] We drop the 1% of observations where the loan features both a credit rating and debt to EBITDA performance pricing grid.

3.6 Robustness Analysis

3.6.1 Local-Continuity Assumption

The potential for manipulation around covenant thresholds is a valid concern when considering an RDD framework. However, Beneish and Press (1993) find that there are material costs to violating a net worth covenant, and Sweeney (1994) observes that net worth covenants are the most commonly violated. The relative frequency of violations, suggests that net worth covenants are more difficult to manipulate than other covenants. Consistent with creditors being confident that firms cannot avoid a covenant violation by manipulating transitory earnings, Li (2010) notes that net worth covenants typically include transitory earnings, whereas earnings covenants do not. Similar arguments apply to the use of tangible net worth covenants. Lenders may or may not allow for the inclusion of intangible assets in the calculation of net worth because of the ease in avoiding reductions in intangibles, particularly after 2001 (Frankel, Seethamraju, and Zach, 2008). To address the possibility of manipulation through intangible assets, we repeat our analysis using tangible net worth covenants. Our results remain robust.[29]

Additionally, we conduct density tests around the covenant threshold following the procedure proposed by Cattaneo et al. (2018). This procedure includes estimates of robust bandwidths for testing local continuity. We also test the local continuity assumption using the bandwidths from our analysis. We do not find evidence of a discontinuity. Testing our ExecuComp sample, we observe a t-statistic of -0.35, -0.38, -0.74, and -0.24 when using bandwidths of 20, 30, 40, and 100 percent, respectively. For our Incentive Lap sample, the density test returns a t-statistic of 0.69, -0.34, 0.78, and 0.87 when using a bandwidth of 20, 30, 40, and 100 percent respectively. We find similar results when using the method proposed by McCrary (2008). Figure IA.I in the Internet Appendix presents graphical evidence from the McCrary test.

Dichev and Skinner (2002) argue that managers make accounting choices with the goal of reducing the likelihood of a covenant violation. As proof, the authors provide evidence of a drop in the distribution of observations to the left of net worth and current ratio covenant

[29] We also find robust results when dropping net worth covenants with income escalators.

thresholds. In Chava and Roberts (2006), the working paper version of Chava and Roberts (2008), the authors record a similar drop in observations on the left of the covenant threshold but argue that this drop does not prove manipulation. They run an exercise in which they create a simulated distribution using firms that do not have net worth or current ratio covenants, i.e., a null simulated distribution where there cannot be manipulation to meet these nonexistent thresholds. Using artificial covenant thresholds, they obtain a similar distribution to the one in Dichev and Skinner (2002). Thus, they conclude that the tests in Dichev and Skinner do not show managers manipulating performance to avoid violating these covenants, and that the results in Dichev and Skinner are more likely indicative of lenders setting tight covenants, a possibility that Dichev and Skinner themselves note.

3.6.2 Balance Tests

We test for the balance on several lagged covariates (i.e., firm size, Tobin's Q, earnings, cash flow, return on assets, Z-score, and stock return volatility) and the lag of our outcome variables (i.e., CEO leverage, delta, pay duration, and accounting-based goals). The results are reported in Table IA.II. in the Internet Appendix. We find no significant difference in any of these variables and thus conclude that ex-ante firms' characteristics are similar around the threshold. These results support the notion that closely around the threshold the treatment is not a function of ex-ante firms' characteristics.

3.6.3 Functional Form and Bandwidth Selection

In our main analysis, we regress the outcome variables on an indicator of a technical covenant violation, the forcing variable (distance from the covenant threshold), an interaction between the two, as well as firm and year fixed effects. For simplicity and consistency, we report results using 20, 30, 40, and 100 percent bandwidths. When using the larger bandwidths (40, 100), we also include the quadratic and higher order terms of the forcing variable and its interaction, following the suggestions in Lee and Lemieux (2010).

For robustness, we also verify that our results are not sensitive to estimator or bandwidth choices. As an alternative to our polynomial order regressions, we use an RDD estimation that is based on the recent methodology developed in Calonico et al. (2014). We conduct these

non-parametric tests for our unconditional main variables using the bandwidth selection and bias correction processes provided by Calonico et al. (2014) and reach robust conclusions. To verify that bandwidth selection does not drive our results (in addition to the four specifications reported in the tables), we also perform a sweep of all bandwidths between 15 and 45, and graph the point estimate along with the 90% confidence interval (shaded area in the graph). These graphs use the estimation technique from Calonico et al. (2014) for calculation of estimates and standard errors, using a first order polynomial and Epanechnikov kernel. These graphs, shown in the Internet Appendix (Figure IA.II to V), demonstrate that our results are generally robust to a continuum of bandwidths.

4 CEO Pay Policies when seeking Debt Financing

One possible concern with our results is that we may be capturing direct creditor intervention rather than the board simply considering creditors' interests because we are examining firms around covenant violations. In order to address this concern, we use a setting in which creditors' interests should matter to firms, but where the creditors do not have control rights as a result of covenant violations. We test for differences in compensation policies between firms that are financially constrained and seeking debt financing and those that are not. We expect firms actively trying to get debt financing to be more attentive to creditors' interests, even though creditors do not hold control rights over them. We proxy for financial constraints using *Debt Delay Score*, a measure created by Hoberg and Maksimovic (2015), who use textual analysis of 10-Ks to gauge the extent to which firms are financially constrained and seeking debt financing. Using this measure, Lee, Murphy, Oh, and Vance (2018) show that CEO inside debt is positively related to firms' level of investment when seeking debt financing.

We test for differences across firms in CEO leverage, the natural log of delta, and the duration of CEO pay. In contrast to our RDD analysis, we do not limit our sample to observations where there is a net worth or current ratio covenant. We include all firm-year observations for which there is an active private bank loan, which represents 93% of firms in our sample with a non missing *Debt Delay Score*. Because this test does not utilize the

RDD setting, we also include firm and CEO related covariates, including firm size, earnings, investment, CEO tenure, and Tobins Q.

Table VII reports our results using industry fixed-effect regressions. We find a statistically insignificant but positive coefficient on *Debt Delay Score* when testing how it affects CEO leverage. However, the coefficient for *Debt Delay Score* is statistically significant when studying the delta of equity awards and duration distance. Constrained firms seeking debt financing provide fewer stock-performance incentives (*Ln(Delta)*). A one standard deviation difference in *Debt Delay Score* is associated with a standard deviation decrease in delta. Finally, we find the distance between a CEO's pay duration and the remaining maturity of outstanding bank loans decreases. These results are consistent with firms seeking debt financing trying to align CEO incentives with debtholders with the hope of obtaining better borrowing conditions.

5 Additional Analysis

5.1 Compensation Contracts for Executives other than the CEO

We also test how covenant violations affect compensation contracts for executives other than the CEO. The results are reported in Table IA.I in the Internet Appendix. While we find that the decrease in delta holds when looking at the compensation contracts of other executives as well, the other aspects of the compensation contract examined do not appear to change for non-CEO executives. This is not surprising since the CEO is the primary decision-maker in the company; thus changing her compensation package is likely most beneficial in reducing the agency cost of debt.

5.2 Anecdotal Evidence

5.2.1 Loan Covenant Status Provisions in CEO Compensation Contracts

Firms can include provisions in CEO compensation contracts that explicitly link compensation to loan covenant status. Our Internet Appendix provides three examples of this type of

provision - selections from the proxy statements of Hertz Global Holdings, Inc., American Capital, Ltd., and Eastman Kodak Company. This contracting practice provides direct evidence that compensation contracts can react to debt contracts in a creditor-friendly way and supports the conclusions drawn from our RDD analysis.

5.2.2 Quotes from the Popular Press

Weinberg (2017): "*Valeant Pharmaceuticals International Inc. shareholders, slide over: Debt holders are driving the bus. The drugmaker has changed how it calculates executive cash bonuses. Their incentives are no longer tied to adjusted earnings per share, which were used as an executive incentive when the company was a market darling. The bonuses will now be pegged to Ebitda–earnings before interest, taxes, depreciation and amortization–which, as it happens, is also a metric watched by its creditors.*"
Dow Jones Newswires (2016): "*Federal bankruptcy watchdogs and creditors have since challenged many executive bonus plans on the grounds that the incentives are too easily achieved, making them disguised retention plans.*"

5.3 Covenant Violations and EPS Performance Targets

One way for executives to extract rents from the firm is to influence the board to set easily reachable performance goals. For example, existing research shows that CEOs overwhelmingly hit EPS goals in their compensation contracts (Armstrong, Chau, Ittner, and Xiao, 2019; Kim and Yang, 2014). However, the board may respond to an increase in creditor influence by setting performance targets that are harder to reach.

Our analysis focuses on EPS targets, collected from Incentive Lab, because they are the most commonly used performance goals in performance-contingent awards (Bennett, Bettis, Gopalan, and Milbourn, 2017; Bettis et al., 2018). For this part of our analysis, we do not rely on the regression discontinuity research design because the data requirements severely limit our sample size (only 36 observations in the 20 percent bandwidth sample).[30] Instead,

[30]When running the RDD analysis on this limited sample, we find qualitatively consistent results.

we use a matched sample analysis on reported covenant violations to test for their effects on the performance targets used in compensation contracts.

Using the covenant violation dataset from Nini et al. (2012), we construct an indicator variable equal to one if the firm had a covenant violation within the two years prior to the compensation contract being written. One limitation to this is that the list ends in 2008. We match all observations from the start of our sample in fiscal year 2007 through 2010.

We use the matching estimator proposed by Abadie and Imbens (2011) and allow control observations to be matched with replacement. This results in a lower estimation bias but a larger variance. To account for this large variance, we match five control observations to every treated one, similar to what is done in Focke, Maug, and Niessen-Ruenzi (2017).[31] Observations are given weights based on their proximity to the treated observation. The estimator matches exactly on year and Fama-French 12 industry classifications. We also match on the natural logarithm of total assets. The Abadie-Imbens estimator allows for bias adjustments for continuous variables, and we include adjustments for firm size, earnings, leverage, investment, Tobin's Q, and firm age. We check the balance of covariates using clustered t-tests and find no statistical differences across the control and treatment groups. Following (Roberts and Sufi, 2009a), our independent variable of interest is *Covenant Violation*, an indicator equal to one if the firm has reported a covenant violation within the past two years, and zero otherwise. Our results are robust when using lags of three and four years.

Table VIII reports the average treatment effect. We look at the difference between EPS targets and analysts' EPS forecasts (Panel A) and the previous year's realized EPS (Panel B). Columns (1) through (3) report our results using the target, maximum, and minimum goals given in the compensation contract. All six specifications provide evidence consistent with firms *increasing* the EPS targets given to CEOs relative to forecasted and realized past EPS after a violation. These results are consistent with firms imposing more difficult performance targets in the incentive plans when creditors' interests are more salient.

[31] Our results are robust to using a single match and also when matching without replacement.

5.4 CEO Total Compensation, Stock Options, and Restricted Stocks

We also test (untabulated) the effect of a covenant violation on CEO total compensation, the ratio of stock option pay to total pay, and the ratio of restricted stock pay to total pay. It is possible that firms punish management after a violation by decreasing their pay. In addition, a decrease in total pay might appear more creditor-friendly since it can send a signal that shareholders care about the debt covenants and punish the CEO for covenant violations. We find an insignificant difference in total pay between violating and non-violating firms in our different bandwidth samples. This result contrasts with Balsam et al. (2018) but is consistent with Ferreira et al. (2017).

We then test whether violations affect the use of stock options and restricted stock. We find a significant decrease in stock options. The use of restricted stock pay is lower, but the coefficient is not significant. A number of empirical studies find evidence that the provision of stock options leads to risk-taking behavior (see, e.g., Coles, Daniel, and Naveen, 2006; Chava and Purnanandam, 2010; Chang, Fu, Low, and Zhang, 2015; Bakke, Mahmudi, Fernando, and Salas, 2016). Hence, less reliance on stock option compensation may be perceived as being more creditor-friendly. We find similar results if we use the sensitivity of compensation to stock return volatility, a common measure of risk-taking incentives provided to CEOs (Coles et al., 2006), which is consistent with the results in Balsam et al. (2018).

Finally, we repeat our tests on option pay and stock pay conditioning on the presence of a leverage covenant. We find that while changes in option pay do not correlate with the presence of a leverage covenant, restricted stock pay significantly decreases in violating firms whose contract includes a leverage covenant. Our findings indicate that the change in delta when there is a leverage covenant is driven by a change to stock, not option, pay. As our main results indicate that a change in delta is largely concentrated in observations where the debt contract features a leverage covenant, this result suggests that changes to delta are not solely a mechanical outcome due to decreases in the use of stock options.

6 Conclusion

This paper studies the effects of the salience of creditors' interests on CEO compensation policies. Theory predicts that compensation policies should respond to the increased importance of creditors' interests. First, firms can use compensation contracts as commitment devices to facilitate negotiation with lenders and achieve better borrowing terms. Second, an increase in the salience of creditors' interests can create adverse incentives for the CEO due to her career concerns. In this case, the firm may re-contract with the CEO, aligning the compensation contract less closely with the debt contract. These two arguments yield opposite predictions. Under the commitment device hypothesis, the compensation contract will become more creditor-friendly (a complementary effect between debt and compensation contracts), whereas under the career concerns hypothesis, it will become less creditor-friendly (a substitution effect).

Using a RDD research design around covenant violations, which shock the importance of creditors' interests, we find support for the commitment device hypothesis. For example, the compensation payoff changes in ways indicating that firms intend to increase CEO leverage. Furthermore, the pay-for-performance sensitivity decreases, especially when there is a signal that lenders are particularly concerned by risk-shifting. Firms also decrease pay duration, especially if the remaining debt maturity is low. And following a covenant violation, they recontract on performance metrics that are more likely to be favored by creditors. Specifically, if the debt contract contains clauses on earnings performance, the compensation contract is more likely to rely on accounting-based goals following a violation. In additional tests, we study firms that are financially constrained and actively seeking debt financing and find results generally consistent with those from our RDD analysis supporting the commitment device hypothesis.

Our evidence uncovers an important mechanism for compensation contracts mitigating firms' agency costs of debt: the compensation contract can become more creditor-friendly by mirroring the features of the debt contract itself. Considering the debt contract as a signal of creditors' first order interests is important to gauge the effects of creditors' interests on compensation policies. Indeed, our findings indicate that making the compensation

contract more creditor friendly is not just about reducing risk-taking incentives. For example, firms tend to reduce pay horizon, which arguably is inconsistent with an intent to reduce risk-taking. However, it could be explained by creditors' horizon, captured by the maturity of the loan. This result helps explain the use of short-term pay horizon, a practice often viewed as controversial. Our results also help explain the controversy about the lack of strong performance incentives. By reducing the sensitivity of compensation to stock returns, firms appear to provide less risk-shifting incentives, which can help them to mitigate the agency cost of debt.

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A Description of the Main Variables

Appendix A describes the variables used in this study. Compustat and ExecuComp variables are measured at the fiscal year end immediately preceding the package deal-active date.

Variable	**Description**	**Source**
	Firm/Borrower Characteristics	
Total Assets	Book value of total assets (Millions)	Compustat
Total Debt	Book value of total debt (Millions)	Compustat
Book Leverage	Ratio of total liabilities to Total Assets	Compustat
Earnings	Ratio of EBITDA to Total Assets	Compustat
Investment	Ratio of capital expenditure and R&D to total assets	Compustat
Tobin's Q	Ratio of Market Value of assets to book value of assets	Compustat
Altman's Z-Score	1.2×(Working Capital/AT) + 1.4×(RE/AT) + 3.3×(EBIT/AT) + 0.999×(Sales/AT) + 0.6×(Market Value of Equity/LT)	Compustat
Debt Delay Score	Measure of being financially constrained and seeking debt financing	Hoberg and Maksimovic (2015)
	Compensation Contract Characteristics	
Ln(Delta)	The natural log of one plus the Black-Scholes delta provided to a CEO through equity awards (i.e., restricted stock plus stock option grants) granted in a year	ExecuComp
CEO Leverage	Ratio of deferred compensation and CEOs' pension to total CEO equity	ExecuComp
Δ CEO Leverage	Change in annual adjustment to deferred compensation and CEOs' pension over the annual grants of restricted stock and options to the CEO	ExecuComp
K Below	Dummy equal to one when CEO leverage is below the optimal level predicted by Campbell et al. (2016).	ExecuComp
Performance-based Awards	Total performance-based awards granted to CEO (Millions)	Incentive Lab
Pay Duration	Average of performance-based and time-based award vesting periods (weighted by award values)	Incentive Lab
Stock-based Goals	Performance-based awards tied to stock-performance (Ratio)	Incentive Lab
Accounting-based Goals	Performance-based awards tied to accounting goals (Ratio)	Incentive Lab

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Variable	Description	Source
	Loan Characteristics	
Credit Rating PP	Dummy equal to one when performance pricing term is based on a firm's credit rating	DealScan
Earnings PP	Dummy equal to one when performance pricing term is based on debt / EBITDA	DealScan
Covenant Indicators	Indicators equal to one for covenants regarding net worth, leverage, capex, current ratio, coverage ratio and earnings	DealScan
Maturity	Largest facility's maturity, in months (by package)	DealScan
Distance	Percent distance between the firm's current level (net worth, tangible net worth, current ratio) and the threshold set by an applicable debt covenant. When there are multiple covenants, Distance is equal to the minimum value.	DealScan, Compustat
Short Maturity	Dummy equal to one when the remaining maturity on a loan package (latest maturity date in package) is less than 24 months	DealScan, Compustat

Table I. Empirical Predictions under the Commitment Device Hypothesis

Table I presents an overview of the empirical predictions under the Commitment Device Hypothesis. ∼ indicates weaker, but generally consistent results.

Compensation Policies	Complementary Effects (Firm Capital Structure or Debt Contract Term)	Unconditional Predicted Effect	Result	Complementary Predicted Effect	Result
1. *Aligning CEO Leverage with creditors' interests and firm's capital structure*					
CEO Leverage	Ex ante ratio of CEO to Firm Capital Structure lower than the optimal one as predicted by Campbell et al. (2016)	+	✓	+	∼ ✓
2. *Reducing CEO risk-shifting incentives*					
Delta	Leverage covenant	–	∼ ✓	–	✓
3. *CEO incentive horizon and matching it with creditors' horizon*					
Pay Duration	Short-term debt maturity	–	✓	–	✓
4. *Choice of performance metrics that is more creditor friendly*					
Accounting-based metrics	Creditors contract on accounting performance (earnings-based covenant — accounting metrics in performance pricing grid)	+	×	+	✓

Table II. Summary Statistics

Table II presents summary statistics on characteristics of the firm, debt contract, and compensation contract from the sample using ExecuComp data and the sample using Incentive Lab data for contracts. Variables are defined in Appendix A.

	ExecuComp Sample (1995-2005)				Incentive Lab Sample (2007-2015)			
	Mean	Median	Std. Dev	Obs.	Mean	Median	Std. Dev	Obs.
Firm Characteristics:								
Total Assets	5,788	1,246	16,689	7,103	13,474	2,712	42,747	3,343
Book Leverage	.283	.283	.179	7,072	.283	.276	.194	3,341
Earnings	.133	.129	.0791	7,101	.0857	.0898	.0897	3,341
Investment	.0698	.0441	.0829	7,103	.0552	.0208	.0936	3,343
Tobin's Q	1.7	1.4	.937	7,101	1.42	1.28	.565	3,341
Altman's Z-score	2.55	2.39	1.45	7,101	1.93	1.7	1.47	3,341
CEO Contract Characteristics:								
CEO Total Compensation ($Mil)	3.878	2.064	5.261	7,050				
Ln(Delta)	5.33	5.37	1.74	6,413				
Performance-based Awards ($Mil)					2.94	1.9	3.16	1,522
Pay Duration (years)					2.99	3.00	0.59	1,450
Stock-based Goals					.156	0	.258	1,522
Accounting-based Goals					.699	.75	.291	1,522
CEO Leverage					.63	.0865	1.47	3,108
Δ CEO Leverage					.341	.0159	1.23	2,820
K Below					.366	0	.482	2,128
Loan / Performance Pricing Characteristics:								
Earnings Covenant	.793	1	.405	6,912	.772	1	.419	3,261
Leverage Covenant	.31	0	.462	4,073	.356	0	.479	1,757
Credit Rating PP	.47	0	.499	4,551	.533	1	.499	2,019
Earnings PP	.53	1	.499	4,551	.467	0	.499	2,019

Table III. The Impact of Covenant Violations on CEO Leverage

Table III presents regression-discontinuity test results on the relative use of inside debt and equity pay in CEOs' compensation contracts around the covenant violation threshold. Columns 1 through 4 present results on the unconditional effect of a covenant violation using bandwidths of 20, 30, 40, and 100 percent, respectively. These regressions use polynomial orders of 1, 1, 2, and 3, respectively. Columns 5 through 8 present results on the conditional effect using the same range of bandwidths. In all specifications, Δ *CEO Leverage* is the ratio of changes in inside debt over changes in equity pay. We estimate firm fixed effect regressions. The coefficient of the treatment effect, *Bind*, is an indicator equal to one when a firm is in violation of a covenant. *K-Below* is an indicator equal to one when the ratio of deferred compensation and CEOs pension to total CEO firm equity holdings is below the optimal K star, as predicted by Campbell et al. (2016). *K-Above* is an indicator equal to one when this ratio is above the optimal K star. Polynomial controls comprise the forcing variable *Distance*, which is the percent distance of a firm's net worth (current ratio) from the threshold set by a covenant, and its interaction with *Bind*, as well as higher orders of the two where applicable. Standard errors are adjusted for within-firm correlation and heteroskedasticity. Variables are defined in Appendix A.***, **, and * indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	Δ CEO Leverage				Δ CEO Leverage by K*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bind	0.301	0.670*	0.438*	0.523*				
	(0.93)	(1.91)	(1.80)	(1.74)				
Bind * K-Below					0.575	0.853	0.224	1.276**
					(0.95)	(1.65)	(0.34)	(2.08)
Bind * K-Above					0.038	-0.078	-0.087	-0.000
					(0.12)	(-0.37)	(-0.34)	(-0.00)
Year F.E.	Y	Y	Y	Y	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y	Y	Y	Y	Y
Observations	498	744	983	1,998	316	475	634	1,296
Bandwidth	20	30	40	100	20	30	40	100
Polynomial	1	1	2	3	1	1	2	3

Table IV. The Impact of Covenant Violations on CEO Compensation Delta

Table IV presents regression-discontinuity test results on the provision of stock performance incentives in CEO compensation contracts around the covenant violation threshold. Columns 1 through 4 present results on the unconditional effect of a covenant violation using bandwidths of 20, 30, 40, and 100 percent, respectively. These regressions use polynomial orders of 1, 1, 2, and 3, respectively. Columns 5 through 8 present results on the conditional effect using the same range of bandwidths. *Ln(Delta)* is the natural log of one plus the delta provided to a CEO through equity grants in the given year. We estimate firm fixed effect regressions. The coefficient of the treatment effect, *Bind*, is an indicator equal to one when a firm is in violation of a covenant. *Lev. Cov.*, or Leverage Covenant, is an indicator equal to one when the debt contract features a leverage covenant. *No Lev. Cov.* is an indicator equal to one when the debt contract does not feature a leverage covenant. Polynomial controls comprise the forcing variable *Distance*, which is the percent distance of a firm's net worth (current ratio) from the threshold set by a covenant, and its interaction with *Bind*, as well as higher orders of the two where applicable. Standard errors are adjusted for within-firm correlation and heteroskedasticity. Variables are defined in Appendix A.***, **, and * indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	Ln(Delta)				Ln(Delta) by Leverage Covenant			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bind	-0.459	-0.458*	-0.307	-0.246				
	(-1.29)	(-1.79)	(-1.25)	(-1.34)				
Bind * Lev. Cov					-1.263**	-1.142**	-0.682	-0.666*
					(-2.07)	(-2.44)	(-1.17)	(-1.67)
Bind * No Lev. Cov.					-0.029	-0.010	-0.127	-0.006
					(-0.05)	(-0.02)	(-0.24)	(-0.02)
Year F.E.	Y	Y	Y	Y	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,025	1,636	2,202	4,482	561	920	1,254	2,639
Bandwidth	20	30	40	100	20	30	40	100
Polynomial	1	1	2	3	1	1	2	3

Table V. The Impact of Covenant Violations on the Duration of CEO Pay

Table V presents regression-discontinuity test results on CEO pay duration around the covenant violation threshold. Columns 1 through 4 present results on the unconditional effect of a covenant violation using bandwidths of 20, 30, 40, and 100 percent respectively. These regressions use polynomial orders of 1, 1, 2, and 3, respectively. Columns 5 through 8 present results on the conditional effect using the same range of bandwidths. In all specifications, *Pay Duration* is the log of the award value-weighted average of performance-based and time-based award vesting periods. We estimate firm fixed effect regressions. The coefficient of the treatment effect, *Bind*, is an indicator equal to one when a firm is in violation of a covenant. *Short Maturity* is an indicator equal to one when the debt package's remaining maturity is less than 24 months. *Long Maturity* is an indicator equal to one when the debt package's remaining maturity is equal to or longer than 24 months. Polynomial controls comprise the forcing variable *Distance*, which is the percent distance of a firm's net worth (current ratio) from the threshold set by a covenant, and its interaction with *Bind*, as well as higher orders of the two where applicable. Standard errors are adjusted for within-firm correlation and heteroskedasticity. Variables are defined in Appendix A.***, **, and * indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	Pay Duration				Pay Duration by Debt Maturity			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bind	-0.396*	-0.250	-0.354*	-0.292**				
	(-1.66)	(-1.40)	(-1.91)	(-2.09)				
Bind * Short Maturity					-0.777**	-0.570**	-0.725**	-0.547**
					(-2.07)	(-2.08)	(-2.46)	(-2.52)
Bind * Long Maturity					-0.155	-0.052	-0.129	-0.120
					(-0.75)	(-0.35)	(-0.77)	(-0.88)
Year F.E.	Y	Y	Y	Y	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y	Y	Y	Y	Y
Observations	309	473	632	1,284	309	473	632	1,284
Bandwidth	20	30	40	100	20	30	40	100
Polynomial	1	1	2	3	1	1	2	3

Table VI. The Impact of Covenant Violations on the use of Accounting-Based Goals

Table VI presents regression-discontinuity test results on the use of accounting-based goals in CEO compensation contracts around the covenant violation threshold. Columns 1 through 4 present results on the unconditional effect of a covenant violation using bandwidths of 20, 30, 40, and 100 percent respectively. These regressions use polynomial orders of 1, 1, 2, and 3, respectively. Columns 5 through 8 present results on the conditional effect using the same range of bandwidths. Columns 9 through 12 present results examining the use of accounting in performance pricing grids. In all specifications, *Acct-Based Goals* is the fraction of performance-based awards tied to accounting-based performance measures. We estimate firm fixed effect regressions. The coefficient of the treatment effect, *Bind*, is an indicator equal to one when a firm is in violation of a covenant. *Earn. Cov* and *No Earn Cov.*, indicate when the debt package includes or does not include an earnings covenant. *Earnings PP* and *No Earnings PP* indicate that the performance pricing term in the loan contract is based or is not based on Accounting Earnings (specifically, Debt over EBITDA)–are set to missing if the loan contract does not include a performance pricing grid. Polynomial controls comprise the forcing variable *Distance*, which is the percent distance of a firm's net worth (current ratio) from the threshold set by a covenant, and its interaction with *Bind*, as well as higher orders of the two where applicable. Standard errors are adjusted for within-firm correlation and heteroskedasticity. Variables are defined in Appendix A.***, **, and * indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	Acct-Based Goals				Acct-Based Goals by Earnings Cov.				Acct-Based Goals by Perf. Pricing			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Bind	0.051	0.015	0.061	0.017								
	(0.54)	(0.22)	(0.77)	(0.24)								
Bind * Earn. Cov.					0.201	0.163*	0.209*	0.232*				
					(1.46)	(1.85)	(1.94)	(1.87)				
Bind * No Earn. Cov.					0.052	-0.019	0.041	-0.008				
					(0.46)	(-0.23)	(0.43)	(-0.09)				
Bind * Earnings PP									0.325**	0.473***	0.412**	0.506**
									(2.43)	(5.87)	(2.37)	(2.19)
Bind * No Earnings PP									-0.015	-0.069	-0.050	-0.067
									(-0.24)	(-0.98)	(-0.75)	(-1.00)
Year F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	269	410	553	1,105	269	410	553	1,105	127	203	262	628
Bandwidth	20	30	40	100	20	30	40	100	20	30	40	100
Polynomial	1	1	2	3	1	1	2	3	1	1	2	3

Table VII. Compensation Policies When Seeking Debt Financing

Table VII presents results on how CEO compensation characteristics covary with the firm being financially constrained and seeking debt financing. *CEO Leverage* is the ratio of firm-initiated changes to the CEO's leverage divided by the ratio of the CEO's leverage measured from the year prior. *Ln(Delta)* is the natural log of the delta provided to a CEO through equity grants in the given year. *Duration Distance* is the percent distance between the CEO's pay duration and the average maturity remaining on the firm's outstanding bank debt. *Debt Delay Score* is a measure of a firm's financial constraints as constructed by Hoberg and Maksimovic (2015). Specifically, it measures debt-focused financial constraints. Firm controls include firm size, earnings, investment, CEO tenure, and Tobin's Q. Fama-French 48 industry classifications are used for industry fixed effects. Standard errors are adjusted for within-firm correlation and heteroskedasticity. Variables are defined in Appendix A.***, **, and * indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	CEO Leverage (1)	Ln(Delta) (2)	Duration Dist. (3)
Debt Delay Score	0.217	-0.963***	-6.989*
	(1.607)	(-2.866)	(-1.950)
Firm Controls	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	3,851	12,007	3,678

Table VIII. Covenant Violations and EPS Goals – Matched Sample Analysis

Table VIII displays differences in contract design between firms with and without a past reported covenant violation. The average treatment effects (ATT) estimated using the Abadie-Imbens matching estimator are reported. The dependent variable is the EPS goal set in a CEO's compensation contract. Column (1) considers the target goal, column (2) considers the maximum goal, and column (3) considers the minimum goal. *Covenant Violation* is an indicator equal to one when firms have reported a covenant violation within the past two years. Firms are matched on size (assets) and Fama-French 12 industry classifications. Matches are adjusted for bias for the initial matching variables as well as earnings, investment, Tobin's Q, and firm age. Variables are defined in Appendix A.***, **, and * indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

Panel A: Goal Values, Minus Analyst EPS Forecast			
	Target EPS Goal (1)	Max EPS Goal (2)	Minimum EPS Goal (3)
Covenant Violation	0.975** (2.223)	1.730*** (2.485)	0.829** (2.184)
Observations	618	618	618
Panel B: Goal Values, Growth from Prior Year			
	Target EPS Goal (1)	Max EPS Goal (2)	Minimum EPS Goal (3)
Covenant Violation	1.147** (2.822)	1.482*** (3.193)	0.777** (2.390)
Observations	618	618	618

Figure I. RDD of Outcomes around Covenant Threshold

Figure I plots our estimated outcome variables within a bandwidth of 40%, using a second order polynomial Epanechnikov kernel-weighted estimation. Outcome variables are demeaned at the firm- and year-level. We plot the 90% confidence interval for the kernel-smoothed expected value, calculated from the estimated standard errors.

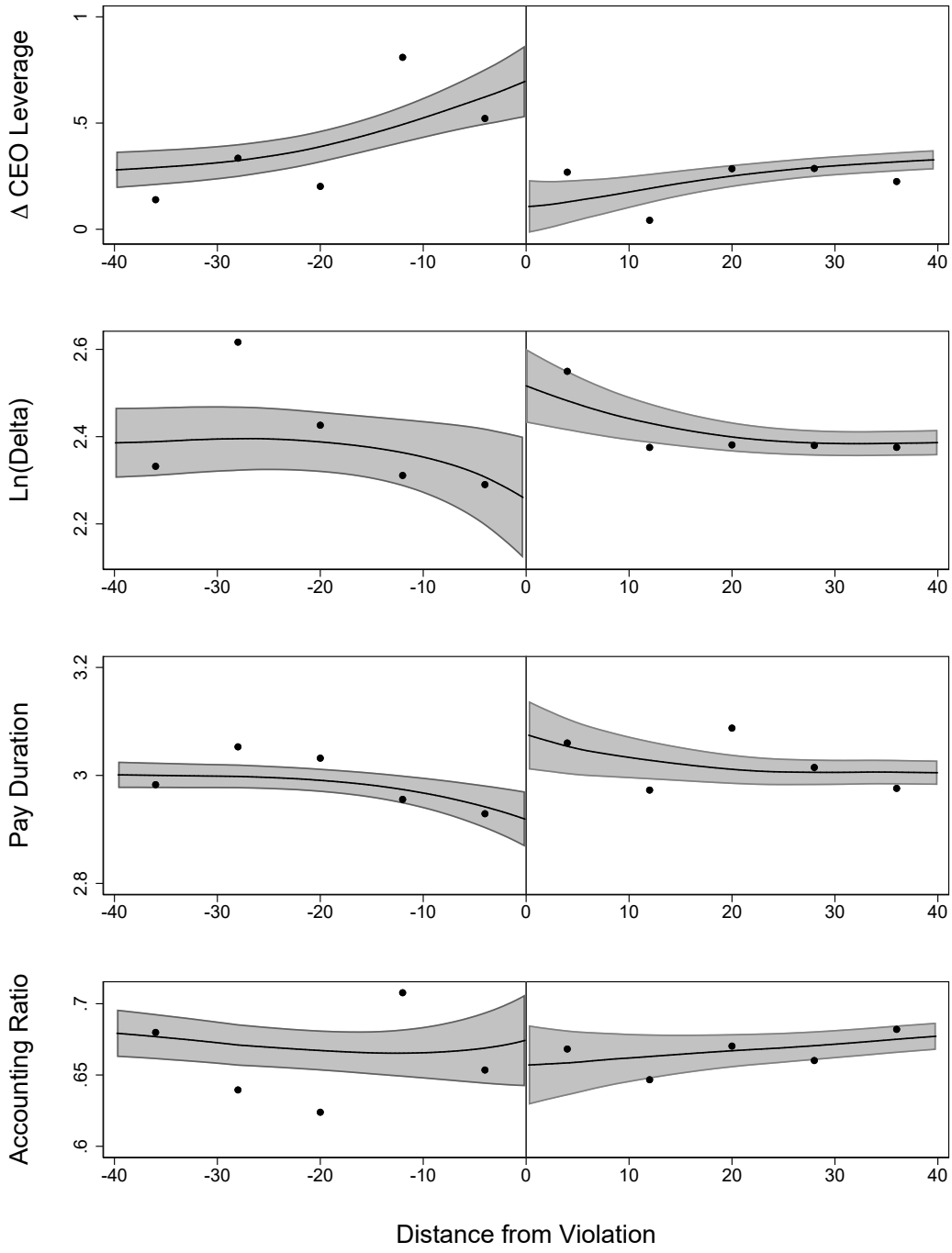
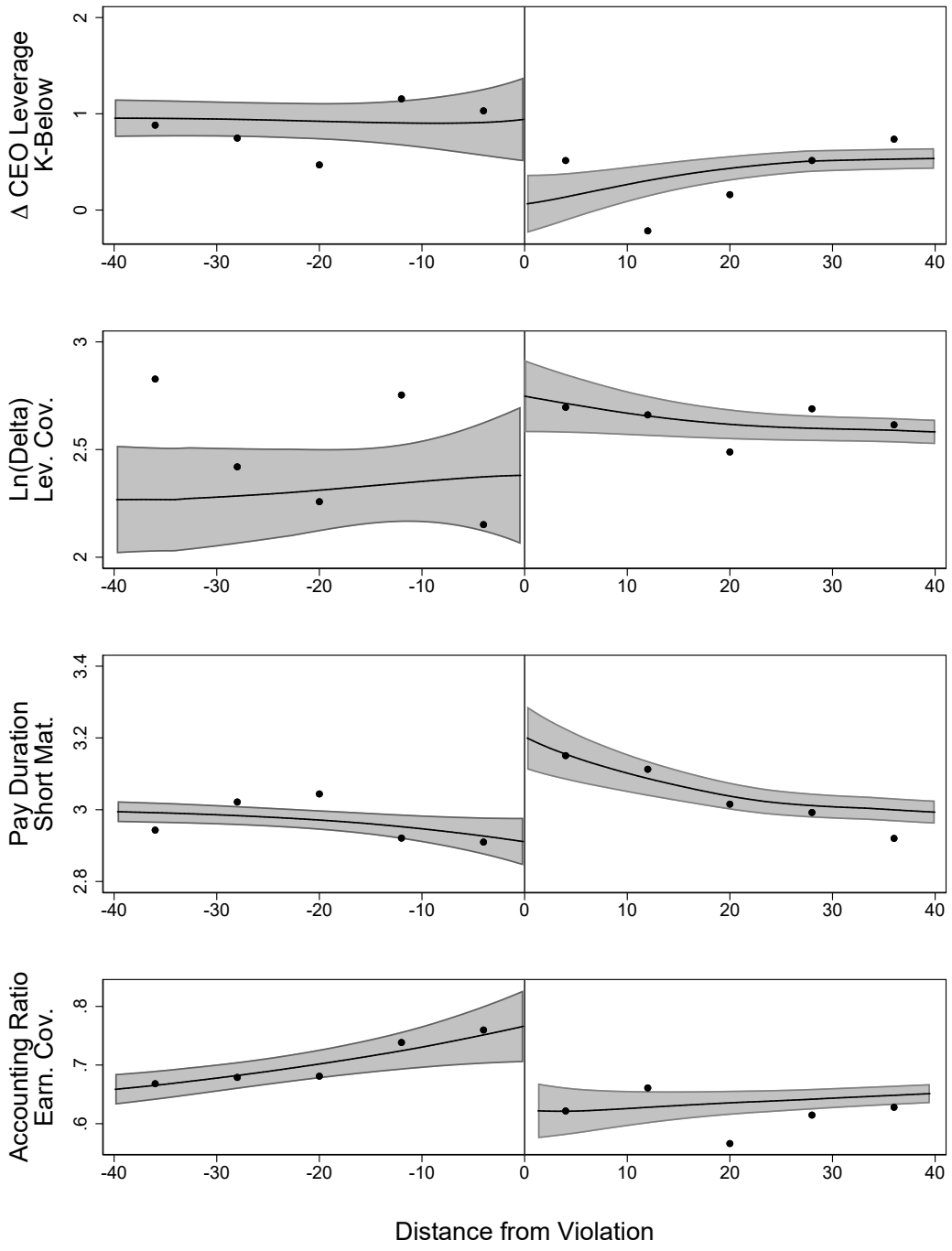


Figure II. RDD of Subsample Outcomes around Covenant Threshold

Figure II plots our estimated outcome variables for relevant subsamples to illustrate conditional effects within a bandwidth of 40%, using a second order polynomial Epanechnikov kernel-weighted estimation. Outcome variables are demeaned at the firm- and year-level. We plot the 90% confidence interval for the kernel-smoothed expected value, calculated from the estimated standard errors.



Internet Appendix

for

The Salience of Creditors' Interests and CEO Compensation

This appendix provides additional details on the construction process of our ExecuComp and Incentive Lab samples. We also provide examples of compensation contracts with payouts contingent on firms not being in violation of debt covenants.

IA.1 Loan Covenant Violation Sample Construction

To construct both our ExecuComp and Incentive Lab samples, we start with the universe of firms incorporated in the United States that have balance sheet information available in the annual Compustat database. While Chava and Roberts (2008) use quarterly data, we use annual data because firms disclose compensation contracts at an annual frequency. Data from Compustat are merged with loan information from Dealscan by matching company identifiers (gvkey) and loan origination and end dates from Dealscan to company identifiers (gvkey) and corresponding dates in the annual Compustat fundamentals file. We use the DealScan-Compustat linking file from Chava and Roberts (2008), which is available on Michael Robert's web page, to perform this merge.

We limit our sample of loans to those that start between 1994 and 2014. We require that each loan contains a covenant restricting a firm's current ratio or net worth and that the corresponding accounting measure be available in Compustat. Loans are frequently grouped together into packages, and included covenants generally apply to the entire group of loans. For each covenant in a loan package, we define an event window for which the firm is bound by the covenant. The starting date of this window is the earliest loan start date in the package, and the end date of the event window as the last maturity date in the package. A firm is in violation of a covenant if the value of its accounting variable falls below the covenant threshold at any period within the event window.

We address several potential issues with the measurement of loan covenant violations following the methods used in prior research (see, e.g., Chava and Roberts, 2008; Falato and Liang, 2016). First, when firms have multiple active deals (i.e. one loan package begins while

another loan package is still active), we define the relevant covenant to be the one that is the tightest. When there are multiple active deals and one is a refinancing of the other, we define the relevant covenant to be that specified by the refinancing deal. In a similar vein, when a firm has a current ratio and a net worth covenant, we again use the covenant that is the tightest. When packages feature a dynamic covenant that changes over the life of the loan, we linearly interpolate the covenant thresholds over the life of the loan. Our results remain unchanged when all packages with dynamic covenants are dropped from the sample. Additionally, we gather post-origination amendments to the loan packages from the DealScan database and adjust any affected covenant details on the date of the amendment. Finally, we check the robustness of our results by excluding violations that occur within the first year of the loan's origination. Dichev and Skinner (2002) and Chava and Roberts (2008) find that a fraction of loans are in violation of their covenants the first quarter after loan origination. Our results remain unchanged when excluding violations that occur within the first quarter or within the first year of the loan's origination.

IA.2 Loan Covenant Status Provisions in CEO Compensation Contracts

From Hertz Global Holdings, Inc., proxy statement dated May 21, 2009, accessed from: www.sec.gov/Archives/edgar/data/1364479/000104746909004189/a2192320zdef14a.htm

> ***Elements of our Compensation Programs*** [...]
>
> ***Long-Term Equity Incentives*** [...]
>
> *Like the stock options we previously have granted, vesting of the performance stock units requires continued employment. We applied this vesting condition in order to retain our senior management during the vesting period. Unlike our stock options, however, we also added a minimum performance condition. 50% of each award*

of performance stock units granted to our named executive officers in 2008 will vest on the first anniversary of the grant date if the consolidated leverage ratio covenants in the credit agreements governing Hertz's senior credit facilities are satisfied during the period from the grant date through the first anniversary of the grant date and the executive is still an employee on the first anniversary of the grant date. If the performance measures described above are satisfied, then the remaining 50% of each award will vest on the second anniversary of the grant date if the named executive officer is still an employee at that time. If the performance measures are not satisfied, then all of the performance stock units will be forfeited. The performance goals for the 2008 performance stock units were selected based on the Compensation Committee's belief that, in the current economic environment, compliance with the covenants in Hertz's senior credit facilities is essential to the financial success of the Corporation and that management should be provided with a direct incentive to achieve this goal.

From American Capital, Ltd., proxy statement dated February 12, 2010, accessed from: www.sec.gov/Archives/edgar/data/817473/000119312512119932/d305915ddef14a.htm

Elements of Compensation [...]

Long-Term Incentive Compensation Plans [...]

Target Awards and Performance Goals. [...]

For the full year 2011, the Performance Goals required each officer to satisfy four out of nine of the following measurement standards with respect to the companys performance above certain confidential levels: (1) gross revenue, (2) pre-tax net operating income, (3) total amortizations, prepayments and exits, (4) employee retention, (5) realizable net asset value per share, (6) uncured new loan covenant violations, (7) return of capital to stockholders, (8) regulatory compliance, and (9) reduction of debt. For each quarter in 2011, the Performance Goals require

each officer to meet three of the following measurement standards above certain confidential levels: items (1), (2), (3), (4), (5), (6) and (9) from above.

From Eastman Kodak Company, proxy statement dated March 30, 2015, accessed from: www.sec.gov/Archives/edgar/data/31235/000120677415001064/kodak_def14a.htm

EXCEL Design and Performance Results

Performance Gate

For 2014, we established a performance gate as part of the EXCEL program, which provided that no payments under EXCEL would be made unless the performance gate was satisfied. The performance gate for 2014 was compliance with our financial covenants contained in the September 3, 2013 exit financing arrangements. We used this performance gate to ensure that no award would be earned absent this financial covenant compliance.

References

Chava, S., and M. R. Roberts. 2008. How Does Financing Impact Investment? The Role of Debt Covenants. *The Journal of Finance* 63:2085–2121.

Dichev, I. D., and D. J. Skinner. 2002. Large-Sample Evidence on the Debt Covenant Hypothesis. *Journal of Accounting Research* 40:1091–1123.

Falato, A., and N. Liang. 2016. Do Creditor Rights Increase Employment Risk? Evidence from Loan Covenants. *The Journal of Finance* 71:2545–2590.

Table IA.I. The Impact of Covenant Violations on Non-CEO Executives Compensation Contracts

Table IA.I presents results the effect of a covenant violation on Non-CEOs' compensation contracts using a regression-discontinuity around the covenant violation threshold. All Specifications present results using a bandwidth of 20% (within 20% absolute distance from the covenant threshold) and linear polynomial controls. The coefficient of the treatment effect, *Bind*, is an indicator equal to one when a firm is in violation of a covenant. Standard errors are adjusted for within-firm correlation and heteroskedasticity. Variables are defined in Appendix A. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

	Δ Exec. Leverage		Ln(Delta)		Pay Duration		Acct-Based Goals	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Bind	0.063		-0.514*		0.047		0.038	
	(0.38)		(-1.68)		(0.30)		(0.99)	
Bind * K-Below		0.008						
		(0.03)						
Bind * K-Above		0.128						
		(0.64)						
Bind * Lev. Cov				-1.369***				
				(-3.00)				
Bind * No Lev. Cov.				-0.011				
				(-0.02)				
Bind * Short Maturity						-0.174		
						(-0.92)		
Bind * Long Maturity						0.161		
						(1.06)		
Bind * Earn. Cov.								0.032
								(0.31)
Bind * No Earn. Cov.								0.043
								(0.96)
Year F.E.	Y	Y	Y	Y	Y	Y	Y	Y
Firm F.E.	Y	Y	Y	Y	Y	Y	Y	Y
Observations	1,912	970	5,524	3,062	897	889	770	770
Bandwidth	20	20	20	20	20	20	20	20
Polynomial	1	1	1	1	1	1	1	1

Table IA.II. Internal Validity: Balance Tests

Table IA.II presents t-tests of firm covariates at t-1 in a tight bandwidth around the covenant violation threshold (adjusted for year and firm fixed effects). Columns (1-7) consider the following *ex ante* covariates: firm size, return on assets, Tobin's Q, earnings performance, firm cash flow, Z-score, and stock return volatility. Column (8) in Panel A and columns (8-10) in Panel B consider the *ex ante* levels of our main outcome variables. Panel A presents the results for variables available in the sample of years between 1995 – 2005. Panel B presents the results for variables available in the sample of years between 2007 – 2015. *Return Vol.* is the standard deviation of daily returns for the 364 calendar days prior to and including the fiscal year end. *Difference* denotes the difference between the right and left side of the violation threshold (equivalent to the *Bind* variable in our main tests). Bandwidths are set equal to 20% on both the right- and left-hand side of the threshold. Standard errors are adjusted for within-firm correlation and heteroskedasticity. Variables are defined in Appendix A. ***, **, and * indicate significance at the 0.01, 0.05, and 0.10 level, respectively.

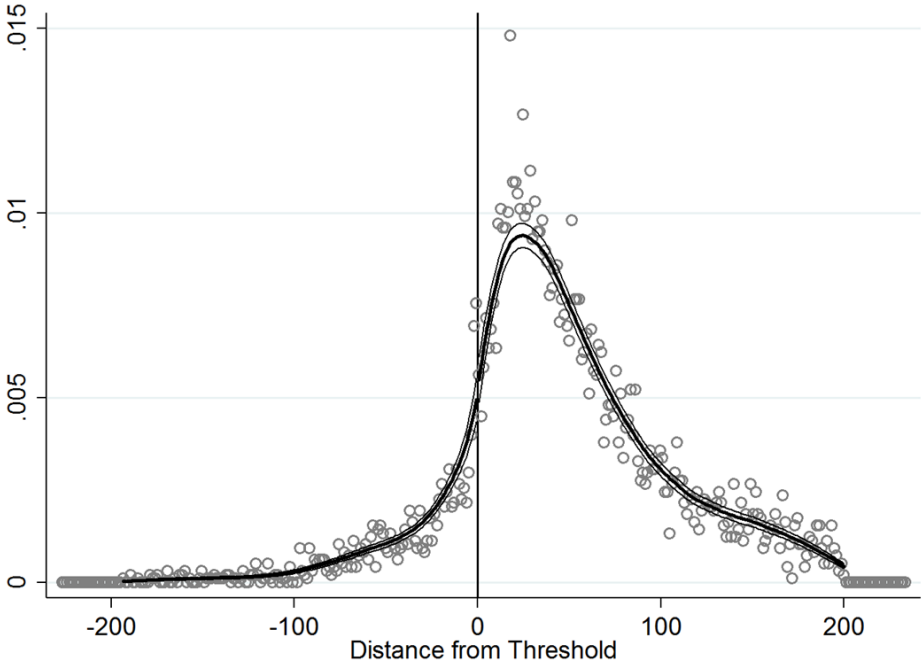
Panel A: Years 1995 – 2005

	Size (1)	ROA (2)	Tobin's Q (3)	Earnings (4)	Cash Flow (5)	Z-score (6)	Return Vol. (7)	Ln(Delta) (8)
Bind	-0.065	-0.002	-0.073	-0.002	0.002	-0.046	0.001	0.256
	(-0.82)	(-0.16)	(-0.65)	(-0.15)	(0.15)	(-0.33)	(0.92)	(0.65)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	771	748	771	771	748	771	1017	762
Bandwidth	20	20	20	20	20	20	20	20
Polynomial	1	1	1	1	1	1	1	1

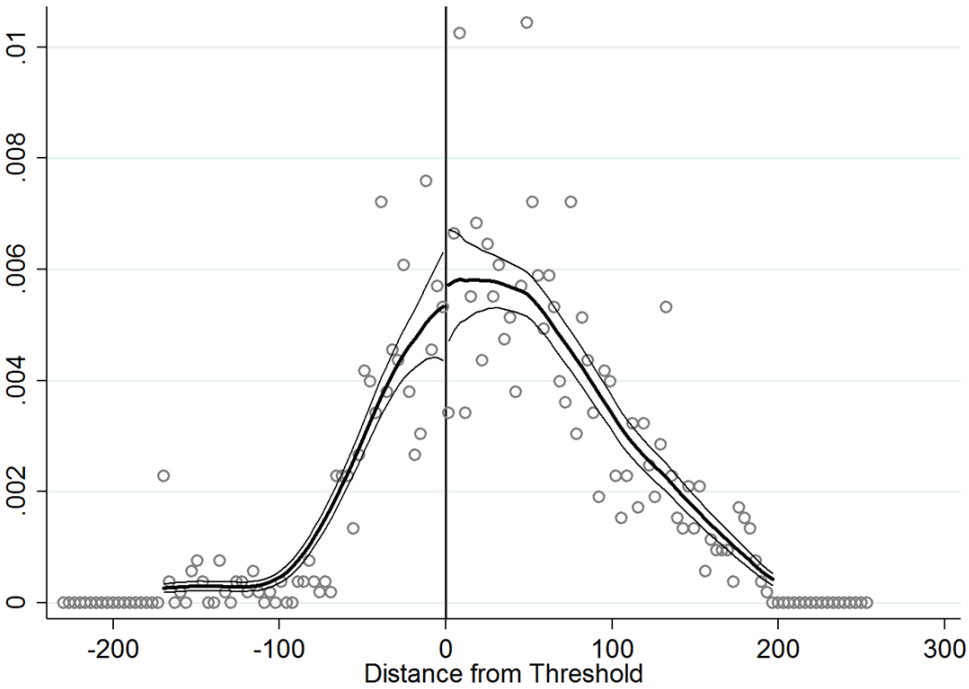
Panel B: Years 2007 – 2015

	Size (1)	ROA (2)	Tobin's Q (3)	Earnings (4)	Cash Flow (5)	Z-score (6)	Return Vol. (7)	Δ CEO Leverage (8)	Pay Duration (9)	Acct. Goals (10)
Bind	-0.036	0.014	0.053	-0.013	0.028	0.010	-0.003	0.318	0.027	0.063
	(-0.54)	(1.35)	(0.81)	(-0.81)	(1.50)	(0.10)	(-1.05)	(0.76)	(1.44)	(0.69)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	480	456	480	480	361	480	543	359	141	119
Bandwidth	20	20	20	20	20	20	20	20	20	20
Polynomial	1	1	1	1	1	1	1	1	1	1

Figure IA.I. McCrary Density Graphs of Distance from Threshold



(a) McCrary Density Graph – ExecuComp Sample



(b) McCrary Density Graph – Incentive Lab Sample

Figure IA.II. Robustness of Δ CEO Leverage RDD Analysis to Bandwidth Selection

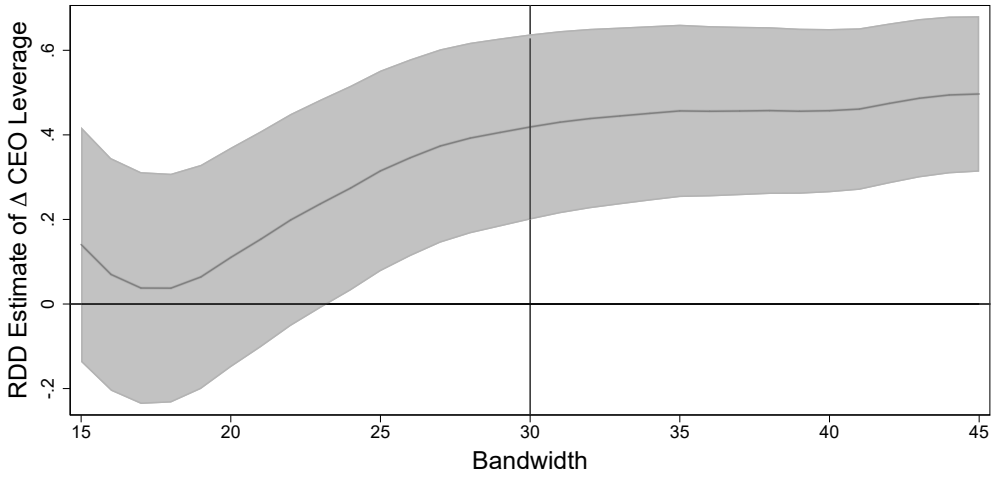


Figure IA.III. Robustness of Log(CEO Delta) RDD Analysis to Bandwidth Selection

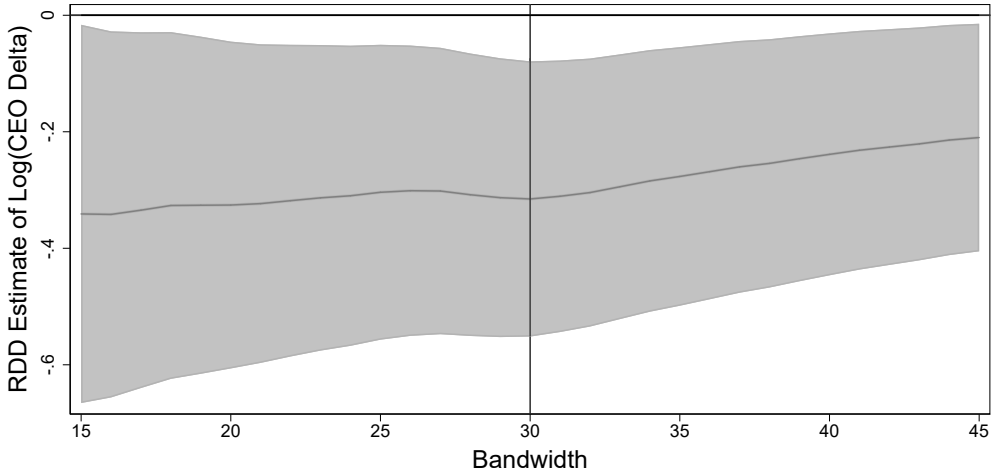


Figure IA.IV. Robustness of Pay Duration RDD Analysis to Bandwidth Selection

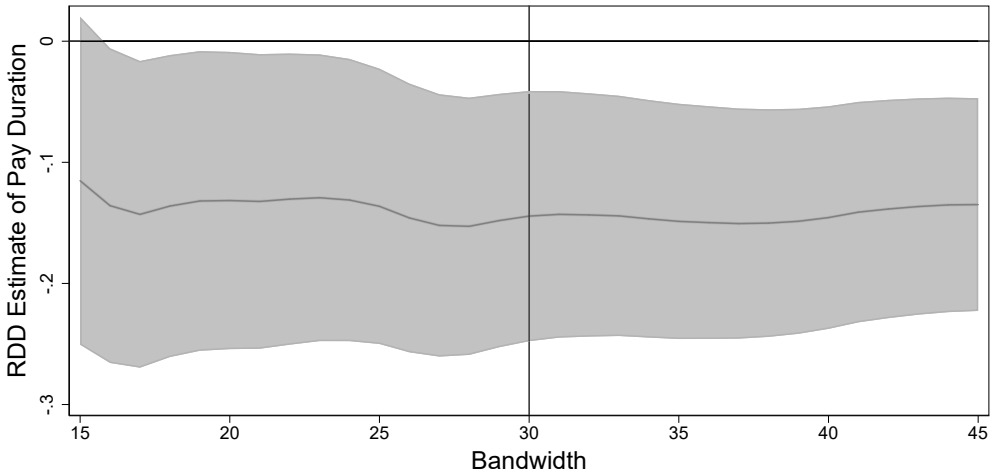
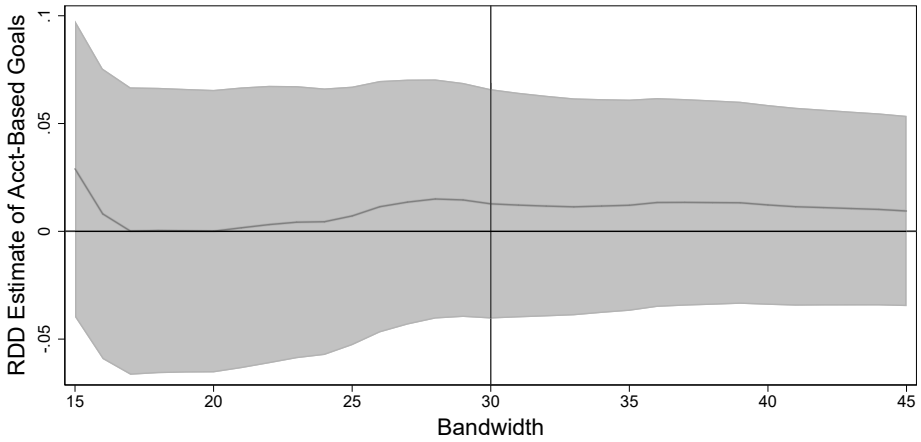
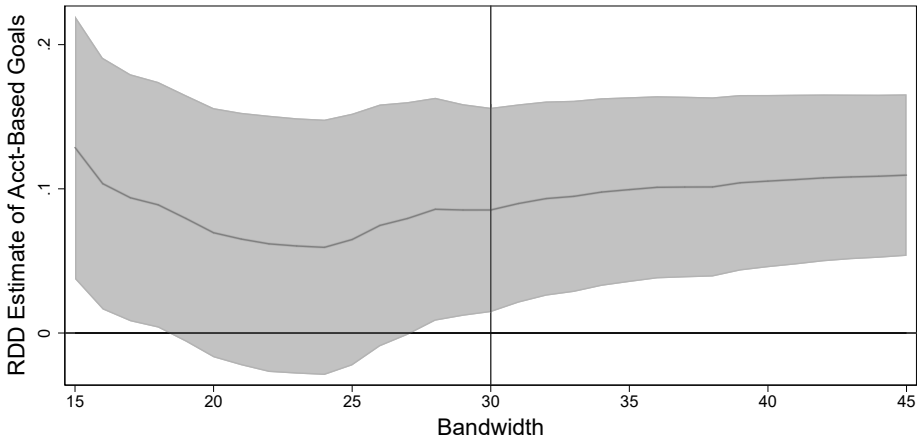


Figure IA.V. Robustness of Accounting-Based Goals RDD Analysis to Bandwidth Selection



(a) Accounting-Based Goals



(b) Accounting-Based Goals And Earnings Covenant in Debt Contract