Debt Dynamics in Executive Compensation*

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Abstract

We examine the incorporation of debt performance metrics (DPMs) into executive compensation contracts as a strategic response to the agency costs of debt, highlighting a nuanced approach beyond equity-focused incentives. Using a manually collected dataset, we find that approximately 19% of US publicly traded firms incorporated DPMs in their compensation contracts between 2007 and 2020. The likelihood of including DPMs increases after creditors' monitoring incentives increase due to credit quality deterioration or debt maturity pressure. To allow causal inferences, we use the exogenous default of lenders' other clients and observe that focal companies are more likely to include DPMs in compensation contracts when lenders perceive an increased likelihood of future insolvency. We demonstrate that shareholders incorporate more non-debt metrics in their incentive programs in response to DPM inclusion, and they request the inclusion of DPM before corporate borrowing. Our results indicate that firms with DPMs in compensation contracts reduce future R&D intensity and SG&A expenses. Our study highlights the importance of debt-related factors in executive compensation and contributes to understanding the agency costs of debt.

Keywords: Debt Performance Metrics (DPMs), Executive Compensation, Agency Conflict
JEL Codes: G39, M12, M52, G30

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1. Introduction

Executive compensation research often focuses on the misalignment of corporate executives' and shareholders' objectives. A large body of empirical research has examined how equity-based compensation can mitigate this misalignment. However, given the significant role of debt financing in fulfilling value-creation, John and John (1993) argue for a more holistic approach to compensation design that incorporates the full spectrum of external funding, including both equity and debt. This broadened perspective recognizes that while aligning executives' incentives with those of shareholders can enhance value-creation, it can also inadvertently exacerbate the risk-shifting dilemma between shareholders and bondholders, potentially escalating the indirect costs associated with corporate debt. The economic trade-offs encountered when the interests of shareholders and creditors diverge, the agency costs of debt necessitate mechanisms to safeguard the value of debt instruments against such concerns.

Theory suggests that shareholders ultimately bear the agency costs of debt through the mechanism of higher interest rates demanded by creditors. However, creditors may not want to raise interest rates as higher rates occasionally heighten agency conflicts (Tirole, 2006). On one hand, a higher interest rate diminishes the borrower's stake in projected profits, thereby motivating the borrower to engage in misconduct. On the other hand, higher interest rates tend to attract low-quality borrowers who are less affected by increased rates in a world of information asymmetry. Therefore, several alternative mechanisms such as debt covenants, direct monitoring, and convertible debt seek to bring into balance the agency costs of different external claims. John and John (1993) further indicate that managerial compensation may play a role in achieving this balance.

Our research offers new empirical evidence showing that companies integrate debt-related

performance metrics (DPMs) (e.g., credit ratings, debt to EBITDA ratio) into executive compensation contracts. We define the incorporation of DPMs in compensation structures when firms: (1) plan to reward managers based on specific debt-related ratios (e.g., credit ratings, debt to EBITDA ratio); (2) determine managerial compensation based on debt-related targets (e.g., debt reduction, debt financing); (3) plan to reward managers based on a financial metric with the explicit intention of addressing debt concerns. For instance, Appendix A Example 1 shows that Trinity Industries, Inc. allocates a 15% "credit rating" weight in the 2010 stock program's performance measurement. Achieving a "BB+" (or "BBB-") rating allows the manager to obtain 70% (or 200%) of the compensation target. These metrics directly link debt performance to managerial compensation rather than through stock performance metrics, presumably aligning managerial interests more effectively with creditor interests.

We collect DPMs from annual proxy statements. We gather every proxy statement from firms listed on major U.S. stock exchanges throughout the 2007-2020 proxy seasons using the EDGAR system. By applying manually synthesized regular expressions, we have identified DPM contracts, ultimately amassing a comprehensive dataset comprising 3,127 firm-years with DPM agreements. Based on our manually collected data, we find that roughly 19% of US publicly traded firms have incorporated DPMs into their compensation contracts at least once between 2007 and 2020. As shown in Table 1, DPMs typically concentrate on debt or leverage levels, borrower repayment ability, and the firm's credit rating.[1]

We explore the reasons behind firms including DPMs. We provide examples (see Appendix B Example 2.1 and Example 2.2) showing that both shareholders (i.e., their concerns on liquidity)

[1] Online Appendix Figure IA.1 shows that in contrast covenant focus more on performance-based metrics.

and lenders can incentivize the compensation committee's decisions to include DPMs.[2] We argue that including debt performance metrics (DPMs) in executive compensation contracts can be a viable solution to mitigate the agency cost of debt. Empirically, we find that borrowers are more likely to use DPMs in response to increases in their credit risks, as measured by their expected default frequency and credit rating. We also note that in periods of high market credit risk, proxied by high Moody's Baa–Aaa credit spread, borrowers obtain less debt financing while using DPMs more frequently as a response. This evidence is consistent with the notion that lenders' demand for monitoring plays a crucial role in compensation contract design.

To allow causal inferences, we rely on the exogenous default of other clients of the same lender. Our difference-in-difference results indicate that focal companies are more likely to include DPMs in their compensation contracts after the lender's perception of future default likelihood increases. Specifically, our findings suggest that after lenders experience recent payment defaults in their portfolio, their current borrowers are more likely to incorporate DPMs in their compensation designs, even when defaulting borrowers are in different industries and geographic regions from the current borrower.

Similarly, we posit that when the company has the principal's payment approaching the debt's maturity, we expect an increase in DPM inclusion in the compensation contract as the creditors become more concerned about the firm's risk-taking choice. Our empirical evidence supports the notion that debt maturity pressure influences DPM inclusion. We investigate the time series pattern

[2] Before the Tax Cuts and Jobs Act (2017), a compensation plan's performance goals would only qualify for exclusion from the Section 162(m) deduction limitation of the Internal Revenue Code if the plan's material terms were disclosed to and approved by shareholders ahead of the payout. While it is common for a compensation plan's performance goals to (be required to) be disclosed to and approved by shareholders ahead of the payout, the compensation committee overall has substantial discretionary power in determining the inclusion of DPMs (see examples 1.1 and 1.2 in Appendix B). The compensation committee exercises discretion if it believes such designs are in the best interests of both the company and its stockholders.

of DPM inclusion relative to the maturity year of the "big payment." We observe that during the two years before the big payment, firms are more likely to include DPM or increase the number of DPMs in the compensation contract. In addition, as we move farther from the big-payment due year, we observe that firms are less likely to include DPM in the compensation contract.

Based on the argument that shareholders bear the agency costs of debt, shareholders should be expected to actively incorporate creditors' interests as it lowers the firm's capital cost. Against that backdrop, we next turn to explore the shareholders explicitly. First, we find that in response to including DPMs, shareholders introduce more non-debt metrics into their incentive programs. This finding suggests that shareholders tend to balance the lower risk-taking incentives introduced by DPM.

We next explore the scenarios where shareholders may voluntarily demand DPM, and we posit that when the firm experiences high growth opportunities, shareholders are more willing to include DPM either for debt financing or to mitigate the creditors' concern of increasing monitoring (because firms may take more risky projects). Our findings suggest that before new borrowing, either in the form of bond or loan, firms tend to include DPM in the compensation contract, aiming to pledge the borrower's developing creditworthiness, and thus benefit from the diminished agency expenses of debt.

To further explore the benefit of DPM on the firm's borrowing cost, we compare the firm's cost of borrowing between their two consecutive financing activities, focusing on a sample of firms with multiple financing during the sample period. We find that if the firm includes DPM in the compensation contract before funding, the same firm's borrowing cost decreases substantially more than the counterparts that do not include DPM. Further, this real effect of DPM only

manifests in loan borrowing, not with borrowing from the bond market, consistent with the notion that bondholders are more easily diversified in the secondary than lenders, and lenders have greater access to private information about the firm operation than bondholders.

Our hypothesis centers on the risk-shifting explanation (Jensen and Meckling, 1976), while the results so far could also be consistent with the debt overhang theory (Myers, 1977). Shareholders concerned with large levels of existing debt deterring future investment could also choose to include DPMs in the compensation contract. In this scenario, lowering the immediate debt costs is a secondary outcome. Yet, our empirical evidence does not suggest debt overhang explanation of DPM inclusion. Specifically, our identification test indicates that when lenders change their perception of future default risk, DPM inclusion increases. This finding is inconsistent with debt overhang which implies that shareholders voluntarily adjust leverage, regardless of the credit risk of the firm. Further, we do not observe significant increases in debt-reduction metrics in DPM after the shock.[3] In additional analysis, we split DPMs into debt-reduction type and other, and we find that the main effect concentrates on the non-debt-reduction DPMs. Overall the evidence does not suggest shareholders may use the managerial compensation mechanism to address debt overhang concerns.[4]

In our last set of results, we explore the real activity consequence of DPMs. Again, using Trinity Industries as an example, after incorporating "credit rating" DPMs for the performance period 2010-2012, the company maintained its target level of "BB+" and then achieved the

[3] We do observe a significant increase in other types of DPMs after the perceptions of their current lenders change.
[4] Another way to eliminate debt overhang problem is to renegotiate past debt contracts (Myers 1977). DPMs may facilitate more favorable terms during debt renegotiation, such as extending the maturity date, which could ultimately alleviate underinvestment concerns. A case in point is American Axle & Manufacturing Holdings, Inc., which established its 2010 threshold award level for net operating cash flow based on projections submitted to lenders during the amendment of their senior credit agreements and refinancing all senior debt maturities through 2014 (See Appendix A Example 4).

investment-grade "BBB-" in May 2013, indicating a reduction in the company's credit risk following the introduction of DPMs. Empirically, we show that firms decrease their future R&D intensity and SG&A when they have DPMs in the compensation contract. The negative associations suggest managers are less likely to take risky investments in the presence of DPMs. Alternatively, shareholders may have predicted the low-growth opportunities and thus are more likely to approve the inclusion of DPMs in the previous years. In this context, DPMs are a mechanism that shareholders use to limit overinvestment in risky projects.

In conclusion, our empirical findings suggest borrowers consider agency costs of debt when designing executive compensation contracts. Prior studies show that compensation policy is associated with the agency cost of debt (Duru et al. 2005; Billett et al. 2010; Bizjak et al. 2019; Li et al. 2020). Including DPMs in executive compensation agreements helps mitigate these costs, which can also be addressed through alternative mechanisms, such as debt covenants between borrowers and lenders, as well as inside debt included in managerial compensation (Sundaram & Yermack, 2007)[5]. Our study contributes to the compensation literature by offering initial evidence of using debt-related performance metrics (DPMs) in executive compensation contracts, complementing prior research by exploring another form of incorporating debtholders' interests into managerial compensation design[6]. Intuitively, DPMs target debtholders' concerns more directly than stock-based performance metrics.

[5] Our results are robust when we control for CEO's inside debt-to-equity ratio and other CEO characteristics.
[6] Carter et al. (2020) shed light on the role of debt performance metrics in aligning incentives with creditors' priorities, particularly through cash-flow-oriented strategies that firms employ in times of financial stress to bolster cash flow. Our study differs from theirs in several respects. First, while they emphasize cash flow metrics as a barometer of debt leverage, our analysis shows that such metrics are rarely described as debt-centric in the borrowing firms in our data collection. Second, their reliance on the Incentive Lab database captures a limited range of debt performance metrics (1.36%), while our methodology uncovers a much broader range of these metrics. Third, their narrative focuses on adaptive compensation policies in the midst of fiscal challenges, but our approach extends to a broader analysis that encompasses a broader temporal and strategic spectrum.

While recent studies have attempted to provide evidence on the consideration of agency cost of debt in executive compensation designs, the majority of them only focus on the scenario when the lenders exercise their control rights (i.e., around loan covenant violations), as seen in Balsam et al. (2018), Akins et al. (2019), and Armstrong et al. (2023)[7]. Our study offers distinct insights by focusing on normal times where shareholders incorporate creditors' interest in the compensation contract, not only when contingencies happen, as modeled in John and John (1993). We contribute to the literature by showing the presence of debt performance metrics (DPMs) in the compensation contract, directly targeting debtholders' concerns. Against this backdrop, our study offers empirical evidence based on the arguments in John and John (1993) in a more complete manner.

2. Background and Hypotheses

2.1 Background

A common view is that shareholders possess an inherent call option within their investment, as proposed by Merton in 1974. This option allows shareholders to reap the benefits of the firm's value exceeding the face value of debt while creditors endure asset volatility. To bring risk-averse managers' priorities in line with their own, shareholders may create incentive structures that encourage pursuing riskier investments. Consequently, this may generate risk-shifting motivations for managers, who can benefit from high-risk projects despite potentially negative net present values (Jensen and Meckling, 1976).

Creditors, recognizing the risk-seeking tendencies of borrowers, attempt to curtail such

[7] These studies do not emphasize the dynamic aspect of speculative monitoring. For example, short-term creditors engage in a vigilant form of engagement, opting to strategically withdraw by not renewing debt obligations when they encounter unfavorable news, rather than directly influencing firm management (Tirole, 2006). This can be seen as a prudent risk management strategy that allows creditors to protect their interests without the complexity of intervention.

behavior through vigilant monitoring and implementing loan covenants.[8] Notably, though compensation contracts serve as effective monitoring mechanisms, little research highlights the role of debt within managerial compensation policies. An exception lies in the work of John and John (1993), who contend that the combination should inform optimal compensation structures of all external claims issued by a firm rather than solely equity. Focusing only on aligning managerial incentives with shareholder interests can exacerbate risk-shifting issues between shareholders and creditors, leading to elevated agency costs of debt.

2.2 Hypotheses Development

To tackle the agency cost of debt, including debt performance metrics (DPMs) in executive compensation contracts can be a viable solution. Although debt contract covenants are commonly employed to align the interests of debtholders and managers, incomplete contracting theory highlights the challenges of delineating creditor rights for all potential contingencies. Debt covenants may reduce firm value by limiting corporate insiders' discretionary power to handle unforeseen circumstances.

While debt covenants can address some incentive problems, they may not resolve all issues, and renegotiation can be costly and limited by coordination and free-rider problems. Therefore, DPM contracting can provide an alternative way for lenders to monitor borrowers without strict restrictions. By specifying a debt-related target and its corresponding compensation reward, managers are incentivized to take positive actions, improving the borrower's credit quality. Interestingly, Christ et al. (2012) find that penalty contracts can engender greater distrust than reward contracts.

[8] Creditors often engage in various practices to exert control and reduce the risk associated with their investments in firms (Hong et al. 2021). These methods include imposing stringent conditions on corporate undertakings, diligently seeking updates and raising inquiries about ventures with a high risk, exercising influence over managerial decisions via board representation, and brandishing the specter of loan recalls, leadership reshuffles, or even foreclosures to ensure compliance with their stipulations.

Consequently, DPM contracts that offer rewards instead of penalties may encourage higher management efforts under contingencies not governed by the contract.

Using managerial compensation contracts to address the agency cost of debt benefits all lenders involved. In contrast, debt covenant contracts create conflicts of interest among different lenders, as loaned amounts and seniority of repayment differ. DPMs in compensation contracts align the interests of all lenders and offer a preferred way to address their concerns, especially when their interests are misaligned. To test our hypothesis that DPMs are used more frequently for firms with stringent lender monitoring, we state our first prediction as follows:

H1: *Firms with stringent lenders' monitoring are more likely to use DPMs in executive compensation contracts.*

From the vantage point of borrowers, Debt Performance Metrics (DPMs) empower them to pledge their developing creditworthiness in forthcoming periods. The specific contractual language specifies particular objectives, allowing borrowers to employ debt-related indicators to convey the extent of their expected credit quality enhancement. Consequently, after examining the structure of executive compensation contracts, potential creditors would logically deduce that managers are driven to harmonize their interests with those of the creditors. As residual claimholders, Shareholders benefit from the diminished agency expenses of debt. Considering the moral hazard dilemma inherent in investment policy, which results in incomplete contracting, borrowers use executive compensation agreements as an unspoken contract to pre-commit creditworthiness, in line with the reasoning presented in John and John (1993).

Appendix A showcases various instances of DPM compensation agreements disclosed in proxy statements. For example, Trinity Industries, Inc. has allotted a 15% weight to "credit rating"

in the performance evaluation of its 2010 stock program. By achieving a "BB+" (or "BBB-") rating, the manager may secure 70% (or 200%) of the compensation target. This performance standard enables the firm to commit to attaining an "investment-grade" rating within the subsequent three-year period.

We hypothesize that companies exhibiting lower credit quality are more inclined to use DPMs. Firms with poorer credit quality often confront unforeseen contingencies and necessitate pre-commitments to enhance their creditworthiness, thereby reducing the expense of future borrowing. Simultaneously, their existing lender might enforce heightened monitoring due to escalating credit risks. Our second prediction is articulated as follows:

H2: *Firms with lower credit quality are more likely to use DPMs in executive compensation contracts.*

We posit that the pressure exerted by impending debt maturity significantly influences the inclusion of DPMs within a company's compensation structure. As debt maturity looms, lenders grow increasingly apprehensive about the borrower's capacity to repay, fueling concerns surrounding the firm's ongoing viability. The potential ramifications of these concerns include the possibility of inefficient liquidations (Diamond, 1991, 1993; Sharpe, 1991) or the forced sale of vital assets at distressingly low prices (Brunnermeier and Yogo, 2009).

Further, debt overhang theory suggests that the pressure exerted by maturing debt may cause shareholders or management to be compensated with stock options to internalize only a fraction of the potential benefits of investment, thereby leading to underinvestment.[9] While DPMs can occasionally contribute to underinvestment issues, these metrics generally offer greater control for shareholders. Additionally, DPMs may facilitate more favorable terms during debt renegotiation,

[9] Debt overhang, formalized by Myers (1977), captures the insight that investment often leads to external benefits that accrue to the firm's debt claims.

such as extending the maturity date, which could ultimately alleviate underinvestment concerns.

A case in point is American Axle & Manufacturing Holdings, Inc., which established its 2010 threshold award level for net operating cash flow based on projections submitted to lenders during the amendment of their senior credit agreements and refinancing all senior debt maturities through 2014 (See Appendix A Example 4). Building upon these premises, we anticipate that firms experiencing debt maturity pressure are more inclined to incorporate DPMs into their compensation strategies. We articulate our prediction as follows:

H3: *Firms with higher debt maturity pressure are more likely to use DPMs in executive compensation contracts.*

When the firm expects high growth opportunities or when high-risk projects are planned, the shareholders are eager to obtain debt financing because the lenders bear fixed income while the shareholders obtain incremental call-option benefits from the projects (Harris and Raviv, 1991). Creditors, realizing the moral hazard of the shareholders, mitigate the over risk-taking by insisting on high borrowing costs. With the concern of high costs associated with the new borrowing, shareholders have incentives to request DPMs inclusion, aiming to pledge the borrower's developing creditworthiness. After examining the structure of executive compensation contracts, potential creditors would logically deduce the credit quality enhancement of the borrower in the forthcoming periods. Consequently, as residual claimholders, shareholders benefit from the lower agency debt costs. Building on these premises, we anticipate that DPMs are more likely to be present before new borrowing. We articulate our prediction as follows:

H4*: Firms with higher borrowing propensity are more likely to use DPMs in executive compensation contracts.*

In the intricate dance of compensation arrangements, the board and management collaborate

to design the terms, with the board ultimately giving its stamp of approval as the shareholders' proxy. A fascinating aspect is the shareholders' reaction to employing debt-performance metrics (DPMs). One potential scenario is that shareholders, in response to DPM usage, may opt to incorporate more non-debt indicators within the compensation contracts as a countermeasure against the escalating agency costs of equity. Conversely, it is plausible that shareholders would only endorse the use of DPMs if they do not detrimentally impact their value - meaning that the agency cost of equity remains unaffected by DPMs, thus eliminating the need for adjustments. Although no formal hypothesis is posited for this conjecture, it remains a thought-provoking consideration.

3. Data and Variables

3.1 Sample Construction

We collect DPMs from annual proxy statements. In August 2006, the SEC adopted sweeping changes to its executive compensation disclosure rules that mandate that public companies disclose executive compensation information in their annual proxy statements. The revised regulations require a new "Compensation Discussion and Analysis" (CDA) section. The new CDA section must explain and analyze all material elements of the company's compensation goals, practices, and decisions for the CEO, CFO, three other highest-paid executive officers, and directors.[10] We download all proxy statements during the 2007-2020 proxy seasons through the EDGAR system and then identify DPM contracts using manually summarized regular expressions.[11] Section 3.2 provides more details about our methodology for identifying DPM contracts.

[10] The new rules also require companies to disclose specific quantitative or qualitative performance targets used to determine bonus payouts for executives, unless such disclosure would cause competitive harm by revealing trade secrets or confidential commercial or financial information.
[11] Details on our summarized regular expressions can be requested.

We require sample firms to have a valid Central Index Key (CIK, the EDGAR unique firm identifier). We remove all financial firms due to their unique regulatory status and leverage levels. To derive our full sample, we match the firms with DPM contracts to those listed in the U.S. major stock exchanges based on CIK and the fiscal year in the merged Compustat/CRSP database. Of the 5,690 unique firms, 1,066 (18.73%) have incorporated *DPMs* into their executive compensation contracts at least once from 2007 to 2020.

3.2 The Identification of DPM Contracts

We define the borrowers who have incorporated DPMs (debt performance metrics) in their compensation designs in a given year if they: (1) plan to award the managers based on a specific debt-related ratio (including *Leverage ratio, Credit rating, Debt/EBITDA, Cash flow/Debt, Debt (net of cash), Debt level, Funds from operation/Debt, Cost of debt, Debt and interest coverage, Liquidity,* and *Debt/Earning*).[12] (2) determine their managers' compensation based on a debt-related target (including *Debt reduction, Debt financing, Debt payment, Covenant compliance, and Maintain debt*). (3) plan to award the managers based on a financial metric and indicate that the purpose of including this metric is debt related. For example, Core Molding Technologies, Inc. indicates that "the 2020 annual incentive plan was transitioned from the historical profit-sharing plan to a pay-for-performance plan that awarded improving "EBITDA" which would provide cash flows to stabilize and improve the business and refinance our credit facility." The purpose of including this "EBITDA" metric in the incentive plan is debt related. Therefore, we identify this as a DPM contract.

[12] There are many mechanisms through which compensation policy can provide value-increasing incentives, including performance-based bonuses and salary revisions, stock options, and performance-based dismissal decisions. This study does not distinguish these different mechanisms.

Appendix A lists more examples of firms adopting different DPMs in their compensation contracts.

We identify DPM contracts using regular expressions in Python. We first summarize debt performance metrics by referring to the Incentive Lab Database, which provides the performance metrics for S&P500 and a significant portion of S&P400. The debt performance metrics can have different expressions. For example, "debt to EBITDA" and "net debt to adjusted pro forma EBITDA" should be classified into the same category. Therefore, to better identify debt performance metrics, we do not use keyword search but construct regular expressions of the metrics. Then, we parse all proxy statements and extract three sentences (and 1,000 characters) before and after these debt performance metrics. Next, by reading around 1,000 filtered paragraphs, we manually identify about 150 DPM compensation contracts and summarize regular regressions for these contracts. Then, we identify all DPM contracts by using these summarized regular regressions. Finally, we manually read through and filtered this reduced set of paragraphs by doing several rounds of random checking and filtering to arrive at a final set of 3,127 firm-years with DPM contracts.

3.3 Expected Default Frequency (EDF)

We propose the expected default frequency as a proxy of credit quality. We compute the expected default frequency (EDF) using the Merton (1974) model and the procedure in Bharath and Shumway (2008). That is, for firm *i,* we compute:

$$EDF_{it} = N\left(\frac{-log\frac{V_{it}}{B_{it}} - \left(\mu_{V_{it}} - \frac{\sigma_{V_{it}}^2}{2}\right)}{\sigma_{V_{it}}}\right)$$

Where $N(\cdot)$ denotes the standard normal cumulative density function, V_{it} is the market value of the firm i's assets, B_{it} is the book value of debt coming due that quarter, μ_{Vit} is the expected asset return, and σ_{Vit} its asset return volatility. To compute μ_{Vit} and σ_{Vit}, we use monthly returns. Details on the computation of these values and STATA code refer to the appendix of Gomes, Grotteria and Wachter (2018). We use the median value of quarterly EDF in that fiscal year as our measure of expected default frequency.

3.4 Summary Statistics

Figure 1 Panel A in Appendix C displays the time trend of the number of firms with DPM contracts during the fiscal year 2007-2020. The fiscal year 2007 is the first year in which the CDA section is mandated.[13] Before discussing changes in the number of firms with DPM contracts over time, we note that the average leverage ratio (debt/assets) increases 50% between 2007 and 2020, while the number of firms with DPM contracts increase 210% in the same periods. Interestingly, we notice a significant increasing trend between 2007-2009 and 2015-2020. Figure 1 Panel B displays the industry distribution (Fama & French 12 industries classification) of the number of firm-years with DPMs contracts during the fiscal year 2007-2020. DPMs are common across industries. About 31.4% firm-years with DPM contracts are operating in "Other" and "Chemicals and Allied Products" Industries, while roughly 19% of firm-years in the "Wholesale, Retail, and Some Services" have incorporated DPMs during our sample period (the sample mean is 7% as shown in Table 2 Panel A).

[Insert Figure 1]

Figure 2 further depicts the DPM distribution among the sample firms when they have either

[13] The new CDA section must explain and analyze all material elements of the company's compensation goals, practices and decisions for the CEO, CFO, three other highest-paid executive officers, and the directors.

syndicated loans, bonds, or both. It shows that among the 43% of unique firms that participate in the main debt markets, they include DPM in their managerial compensation contract, strengthening the case of DPM serving creditors' interest.

Table 1 shows the frequency of different DPMs used by firms. The most frequently used DPM is "*Debt Reduction*", about 33.6% of firm-years with DPM contracts incorporate the "*Debt Reduction*" target. Compared to the financial ratio, the debt-related targets are more frequently incorporated (i.e., *Debt Reduction, Debt financing, Debt payment*)[14]. Among all the debt-related financial ratios, the most frequently used are "*Leverage ratio*" (i.e., debt to capital ratio or debt to assets ratio) and "*Credit rating.*" Other common financial ratios in credit agreements are also frequently used in compensation contracts, such as "*Debt/EBITDA*" and "*Cash flow/Debt.*"

[Insert Table 1]

Table 2 Panel A presents summary statistics for the sample of firms listed in the U.S. major stock exchanges during the fiscal year 2007-2020 in the merged Compustat/CRSP database. We exclude those firms with missing values for *Debt/EBITDA, Leverage, Debt/Equity, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth,* and *FirmAge.* All variable definitions and data sources can be found in Appendix D. We winsorize all the continuous variables at the 1st and 99th percentiles to reduce the influence of outliers. 7% of the firm-years contain DPM contracts, while this percentage becomes 26.5% if we only look at those firms that have used DPM contracts during the whole sample period. The average number of DPMs used is 0.1 for a firm in one year.

[Insert Table 2]

[14] The high frequency of the use of debt-related targets DPMs may be caused by our categorization method. For example, if a firm uses free cash flow as a performance measure and then indicates that the use of this measure is to reduce debt, then we count this measure as both the "*Debt reduction*" metric and the "*Cash flow/Debt*" metric.

Table 2 Panel B shows how the firm-level characteristics vary across firm-years with DPMs and firm-years without DPMs. In general, firm-years with DPM contracts have significantly lower credit ratings, higher probabilities of expected default, and higher leverage. These statistics support our second hypothesis that firms with lower credit quality have more incentives to construct executive compensation with DPMs, something we explore further in Section 4.1. Interestingly, these firm-years with DPM contracts usually have larger size, higher tangibility, higher operating cash flow, higher market value, and higher ROA, but lower Market-to-Book ratio and lower Sales Growth. These statistics seem to suggest that, compared to young firms, mature firms are more likely to incorporate DPMs in their compensation designs. Moreover, firms that are covered by rating agencies and firms that have accessed the syndicated loan market are more likely to incorporate DPMs in their compensation designs. These statistics seem to suggest that outside monitoring may trigger the use of DPMs.

4. Empirical Findings

4.1 Credit Quality and DPM Contracting

We use two measures of credit quality to estimate the impact of a credit quality decline on the likelihood of observing a DPM compensation contract in a firm. First, for the full sample, we proxy credit quality by using the expected default frequency (*EDF*) calculated based on Merton's (1974) model. Higher *EDF* indicates a higher default probability. The calculation of *EDF* values can be found in Section 3.3.[15] Second, we use the borrower's credit rating (*CreditRating*) in the

[15] The calculation method of *EDF* causes some missing values. Following Nini et al. (2009), we also use the borrower's debt-to-EBITDA ratio to measure of credit quality. The motivation for using debt-to-EBITDA is that it is easy to measure, available for almost all borrowers, and is the basis for the most common financial covenants utilized by banks. All core results are robust when we use *Debt/EBITDA* to measure credit quality, see Online Appendix Table IA.1 Panel A.

previous year as a measure of credit quality. Larger *CreditRating* indicates better ratings. The drawback of the credit rating measure is that it is only available for rated firms, which comprise 29% of our sample.

[Insert Table 3]

Table 3 presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the measures of borrower credit quality. All regressions control for firm-specific characteristics (including *Assets, Tangibility, OperatingCF, MtB, ROA, Sales-Growth, FirmAge*), year-fixed effects, and firm (or industry) fixed effects. In all regressions, standard errors are clustered for each firm. We use two dependent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *Num-DPM* is the number of debt performance metrics a firm uses in a given year.

Almost in all specifications (except for column (1) in Table 3 Panel A), there is a statistically significant increase in the likelihood of using DPMs and an increase in the number of used DPMs (*NumDPM*) when the value of *EDF* increases or when the value of *CreditRating* decreases. The main results are robust when we further control for CEO characteristics, including the CEO's inside debt-to-equity ratio, total compensation level, tenure years, and CEO duality (as shown in Online Appendix Table IA.1 Panel B). The results suggest that, even within a firm, the worse credit quality is highly associated with the presence of DPMs.

In Table 3 Panel A, we further use the *EDF* quantile indicator variables to explore the impact of a credit quality decline. We define *EDF_High* as a dummy variable that indicates those firm-years with the value of expected default frequency in the highest quantile, and we define *EDF_Low*

as a dummy variable that indicates those firm-years with the value of expected default frequency in the lowest quantile. In column (4), the results show that, compared with other firms (i.e., those with *EDF* value in the 2nd, 3rd, and 4th quantile), firms with *EDF* value in the highest quantile have a higher likelihood (i.e., 5.4% increase) to use DPMs. Given the mean likelihood of 7%, this effect represents a 77% increase in the likelihood evaluated relative to the mean. Compared with other firms, firms with *EDF* value in the lowest quantile have a lower likelihood (i.e., 3.9% decrease) to use DPMs, which represents a 56% decrease in the likelihood evaluated relative to the mean.

In Table 3, Panel B, we also use the credit rating category indicator to explore the impact of a credit quality decline. We define "*BB rated or worse*" as a dummy variable that indicates those firm-years with speculative-grade ratings. We define "*A rated or better*" as a dummy variable that indicates those firm-years with credit ratings above A. The omitted group contains those firm-years with the lowest investment-grade ratings (BBB). In column (3), the results show that there is a statistically significant increase (i.e., 8% increase) in the likelihood of a firm using DPMs when moving from the BBB rated to a speculative-grade rating, which is around 51% increase of the mean in the rated sample. However, there is a statistically significant decrease (i.e., a 9.3% decrease) in the likelihood of a firm using DPMs when moving from the BBB rated to the higher investment-grade rating, which is around a 59% decrease of the mean in the rated sample. Furthermore, Morgan (2002) argues that differences of opinion between rating agencies will be both frequent and larger in magnitude when more uncertainty exists regarding the ex-ante distribution of credit risk. In column (4), we include a dummy variable, "*RatingDisagree*", which equals 1 if there exist split ratings for a firm in a given year. Our result shows that the likelihood of a firm using DPMs experiences a significant increase by 3.3% when there exist split ratings, which represent a 21%

increase of the mean in the rated sample. This suggests that borrowers are more likely to use DPMs when more uncertainty exists regarding their credit risks.

Overall, we find that borrowers are more likely to use DPMs in response to increases in their credit risks, as measured by their expected default frequency (based on Merton's (1974) model) and credit rating. This result suggests that aligning managerial behaviors with the interests of creditors becomes more relevant as the riskiness of the debt increases.[16] It is also consistent with the model of John and John (1993), in which a negative relationship between pay-performance sensitivity and leverage is derived.

In Figure 3, we further relate the presence of DPMs to the level of market credit risk. Δ*DPM* is calculated as the difference between realized and predicted DPM probability, derived from the linear regressions that relate the probability of having DPMs to lagged firm-specific characteristics (including *Leverage, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*) and firm-fixed effects. Δ*NetDebt* is calculated as the difference between realized and predicted net debt issuance, derived from the linear regressions that relate the net debt issuance scaled by lagged assets to lagged firm-specific characteristics and firm-fixed effects. Our proxy for high market credit risk is a variable indicating Moody's Baa–Aaa credit spread was greater than or equal to the median value for the years from 2000 to 2020. The results show that when the market credit spread is high, firms are less likely to access debt financing while using DPMs more frequently in the compensation contracts, consistent with the notion that firms use DPM to mitigate creditors' concerns.

4.2 Lender Monitoring and DPM Contracting

Our preliminary tests are consistent with our arguments but allow only limited causal

[16] Online Appendix Figure IA.2 shows that market-wide evidence that DPM inclusion exhibits the same pattern as the overall tightness of debt market.

inferences. To facilitate causal inferences, we rely on a lender-specific shock - defaults in a lender's corporate loan portfolio as a shock to the lenders' monitoring incentives. We estimate the impact of stringent lender monitoring on the likelihood of observing a DPM compensation contract in a firm.

This choice is motivated by several recent papers that strongly suggest that defaults to lender loan portfolios affect lending behavior at the defaulted-upon banks. For example, Murfin (2012) shows that banks write tighter contracts than their peers after suffering recent payment defaults to their own loan portfolios. Christensen et al. (2022) show that lenders respond to recent payment defaults to their own portfolios by increasing the number and strictness of performance-based but not capital-based covenants in debt contracts. They argue that recent defaults can deplete capital and cause the lender to prefer heavier and timelier control over borrowers; further, recent defaults can also inform the lender's screening ability or its inability to control a borrower's moral hazard, thereby impacting its lending behavior. Following these arguments, we predict that lenders who experience recent payment defaults are likely to attach greater value to the monitoring role of DPMs.

To identify payment defaults, following Murfin (2012), we use borrowers reported to be in default or selective default by S&P in Capital IQ S&P credit ratings database. This captures borrowers that have had a payment default on at least one obligation.[17] The default borrowers are matched back to DealScan, which provides the list of loans for each default borrower. After removing loans that were not outstanding at the time of default based on their reported origination and maturity dates, we are left with a record of all the defaults for a given loan arranger and the

[17] This count may miss defaults by small, unrated borrowers, but will capture visible defaults likely to sway loan officer behavior.

timing of those defaults.[18] We identify the current borrowers of the loan arranger that experiences recent payment defaults in its portfolio as the treatment group.[19] If corporate defaults occur in the borrower's region or industry, there could potentially be an econometric issue due to their correlation with local and industry-specific economic factors. These factors influence borrower fundamentals and may be correlated with the use of DPM monitoring for reasons other than lender preferences. To mitigate this issue, we also follow Murfin (2012) and exclude payment defaults in the borrower's geographic region and industry.[20] We collect the default sample over the period 2007–2020.

We use a difference-in-difference research design. We examine the changes in the likelihood of using DPMs of treatment firms, from before their current lenders experience recent payment default, relative to contemporaneous changes for a set of control firms that have the most similar characteristics as the treatment firms but their current lenders do not experience recent payment defaults.

[Insert Table 4]

Table 4 presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the defaults in a lender's corporate loan portfolio. $Post_t \times Default_i$ is an indicator variable that equals one if at least one loan arranger of the borrower has experienced a payment default before the given year, and the borrower's loans arranged by this lender are outstanding at the time of default. All regressions control for firm-specific

[18] We focus on loan arrangers (or managers) assigned during the general syndication (i.e., retail phase) because these lenders are significant syndication participants with large loan commitments (S&P market intelligence 2020, see https://www.lcdcomps.com/d/pdf/LCD%20Loan%20Primer.pdf).

[19] We consider their initial treatment as their treatment time. Our results are robust if we eliminate borrowers for which the first treatment falls before 2007 (i.e., the starting year of our sample period). See Online Appendix Table IA.2.

[20] Within the United States and Canada, the geographic region of the borrower is state and province, respectively. All other domiciles are classified as one international region.

characteristics (including *Debt/EBITDA, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge)*, year-fixed effects, and firm-fixed effects. In all regressions, standard errors are clustered for each firm.

Table 4 Panel A reports the tests on the full sample of firms that have accessed the syndicated loan market during our sample period, excluding defaulting borrowers. Table 3 Panel B further excludes the lenders' current borrowers who are in the same industries or geographic regions as the defaulting borrowers at the time of defaults. We use two dependent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm. In Columns (1) and (2), we report results using a large, unmatched sample of control firms. In Columns (3) and (4), we conduct entropy-balanced matching with three moments. In Columns (5) and (6), we conduct propensity-score matching using nearest neighbor matching with replacement. In Columns (7) and (8), we conduct propensity-score matching using three-nearest neighbor matching with a caliper of 0.03. We conduct all matching based on *Rated, InvestmentGrade, Leverage, MtB, and Assets*.

In all specifications, the results show that after lenders experience recent payment defaults, their current other borrowers experience an increase in the likelihood to incorporate DPMs between 3.6% and 4.2% (depending on the specification), even when defaulting borrowers are in different industries and geographic regions from the current borrower. Given the mean likelihood of 10.5% in the sample of firms that have accessed the syndicated loan market, this effect represents a 34%-40% increase in the likelihood evaluated relative to the mean. These results suggest

that DPMs can serve as a monitoring tool for lenders. This also provides evidence in support of hypothesis one, in which firms with stringent lenders' monitoring are more likely to use DPMs in executive compensation contracts.

As with any difference-in-difference design, our approach assumes that the entire frequency distribution of DPM in the treated and untreated firms would move in parallel in the absence of the treatment. To evaluate the treatment effects of the pre- and post-treatment periods, we use a difference-in-difference event study design. We consider three leads and three lags around the treatment period. We examine the changes in the likelihood of using DPMs of treatment firms, within a six-year window around their current lender's experience of payment default, relative to contemporaneous changes for a set of control firms that have the most similar characteristics as the treatment firms, but their current lenders do not experience recent payment defaults during the sample period. In this test, we have a smaller sample size since we only consider a six-year window around the treatment event. Table 4 Panel C reports the DID event study results. In all specifications, the results show that after lenders experience recent payment defaults, their current other borrowers experience an increase in the likelihood to incorporate DPM, while we do not find treatment effects before the treatment event.

4.3 Repayment Pressure and DPM Contracting

The important aspects of debt maturity are that imminent maturity increases potential costs stemming from repayment risk and refinancing risk. We hypothesize that debt principle repayment pressure plays an important role in spurring the presence of DPMs. To proxy for repayment pressure, prior work focuses on the fraction of a firm's total debt that is due in the next three years. Following Harford et al. (2014), we further exclude debt with less than a year to maturity when

issued[21]. As such, we use the fraction of a firm's long-term debt due in the following years (including the current portion of this debt) as our main proxy for the debt repayment pressure. To better explore the impact of this pressure, we further obtain the distribution of debt maturity by using six indicator variables: *Due_1st_Year%*, *Due_2nd_Year%*, *Due_3rd_Year%*, *Due_4th_Year%*, *Due_5th_Year%,* and *Due_other_Year%*. These variables represent the proportion of long-term debt due in one year, in the 2nd year, in the 3rd year, in the 4th year, in the 5th year, and debts due in more than 5 years, respectively.

[Insert Table 5]

Table 5 presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the debt maturity pressure. All regressions control for firm-specific characteristics (including *Leverage*, *Assets, Tangibility, OperatingCF, MtB, ROA, Sales-Growth, and FirmAge*), year- and firm-fixed effects. In all regressions, standard errors are clustered at the firm level. We use two dependent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm.

In all specifications, our results show that borrowers are more likely to use DPMs in response to the shortening debt maturity; this is especially true when more debts are maturing in 2 years or less. This result is robust when we control for firm-level characteristics, firm-fixed effects, and year-fixed effects. This suggests that, even within a firm, the time-series changes of maturity pressure could trigger the use of DPMs. In columns (2) and (3) of Panel A and Panel B, the results

[21] We do so because these debts are used to finance a firm's short-term assets and other short-term liquidity needs that are often seasonal in nature.

show that firms with a higher proportion of long-term debt due in the next two-year period experience a significant increase in the likelihood of using DPMs, that is, a 10% increase of the proportion of long-term debt due in next two years leads to an approximately 0.25% increase of the likelihood of using DPMs. However, the debt maturity pressure due in the 3rd, 4th, and 5th year does not have a significant impact on the likelihood of using DPMs.

4.4 Shareholders' Response to the Inclusion of DPMs: Non-debt Metrics

As compensation plans are approved by the board representing the shareholders, we further explore the response of the shareholders to the use of DPMs. It is possible that, in response to the use of DPMs, the shareholders put more non-debt metrics in the compensation contracts to mitigate the increasing agency cost of equity. However, it is also possible that, if DPMs do not harm the value of shareholders (i.e., the agency cost of equity does not increase due to the *DPMs*), shareholders would approve the use of DPMs and thus have no need to make any adjustments.

We collect non-debt performance metrics (i.e., non-debt related accounting metrics and stock price metrics) from the Incentive Lab Database, which provides the performance metrics for S&P500 and a significant portion of S&P400, thus leading to a smaller sample. Therefore, in the tests below, we only use a sample of firms that have records in the Incentive Lab Database. To measure the use of non-debt metrics, we count the number of non-debt performance metrics for each firm-year. We collect the sample over the period 2007-2020.

[Insert Table 6]

Table 6 Panel A compares how the number of non-debt metrics varies across firm-years with DPMs and firm-years without DPMs. The results show that firm-years with DPM contracts have significantly more non-debt metrics (i.e., 0.474) in the compensation design. The statistics support

our prediction that in response to the use of DPMs, the shareholders put more non-debt metrics in the compensation contracts to mitigate the increasing agency cost of equity, something we explore further in Table 6 Panel B. This significant difference may come from the systematic differences between firms that have different levels of debt. To mitigate this issue, we further present an analysis of a subsample of firms that have used DPMs during the sample period. Although the magnitude becomes smaller, the results still show that firm-years with DPM contracts have significantly more non-debt metrics in the compensation design.

Table 6 Panel B presents estimated coefficients from linear regressions that relate the number of non-debt metrics to the presence of DPMs and the number of DPMs *(NumDPM)*. All regressions control for firm-specific characteristics (including *Debt/EBITDA, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, and FirmAge*), year- and firm-fixed effects. In all regressions, standard errors are clustered for each firm. We use two independent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm. The dependent variable is the *Number of Non-debt metrics*, which represents the number of non-debt metrics utilized by the firm in the same year. In columns (1) and (2), we conduct the estimation in the full sample, while in columns (3) and (4), we conduct the estimation in a subsample of firms that have used DPMs during the sample period. In columns (5) and (6), we further conduct the estimation using a matched sample. We conduct propensity-score matching using three-nearest neighbor matching with a caliper of 0.03 based on the firm's outstanding amount of syndicated loans scaled by its total assets in a given year.

In all specifications, there is a statistically significant increase in the number of non-debt metrics utilized by the firm when a DPM is imposed in the same year. The results suggest that, even within a firm, the number of non-debt metrics utilized by the firm is highly associated with the presence of DPMs in the same year. This estimation provides evidence that shareholders re-balance the executive incentives in the presence of DPMs, thereby tilting incentives away from the interests of creditors.

It is possible that this increasing trend of non-debt metrics is driven by the worse credit quality. In Online Appendix Table IA.3, we conduct a similar estimation as in Section 4.1 (Table 3) but use the *Number of Non-debt metrics* as the dependent variable. First, we use *EDF* and *EDF* quantile indicator variables as measures of credit quality, and the results show that a credit quality decline does not significantly influence the number of non-debt metrics utilized by the firm. Second, we use *CreditRating* and *CreditRating* category indicators as measures of credit quality. The results show that within a firm, the value of *CreditRating* has a negative association with the number of non-debt metrics utilized by this firm. However, when we look at the industry-level effects (i.e., control for industry-fixed effects), this association reverses (i.e., a positive association between *CreditRating* and the *Number of Non-debt metrics*). We argue that, within a firm, the increasing number of non-debt metrics may be caused by the worse operating situations rather than the worse credit quality. Given that credit analysis is industry-based, we conclude that we find little evidence to support the argument that the increasing trend of non-debt metrics is driven by the worse credit quality rather than the presence of DPMs.

4.5 Debt Financing Needs and DPM Contracting

So far, we have explored the factors that affect the inclusion of DPM in managerial compensation contracts, focusing on the lenders' perspective. We now turn to the shareholders' angle in Table 7. Shareholders, relative to debtholders, are concerned more about obtaining the upbeat potential from growth opportunities. In other words, when such financing needs arise, shareholders are eager to obtain debt financing with a lower cost of borrowing. It follows that shareholders are willing to include DPM in compensation contracts if such an arrangement facilitates loan financing and lowers the cost of borrowing. Table 7 checks whether DPMs are more likely to be included before the issuance of a new debt issuance and whether DPM inclusion helps lower the cost of debt.

[Insert Table 7]

Table 7 Panel A presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the following issuance of a new bond or new syndicated loan in the same year. Panel A contains the sample of firms that issued at least one new bond or new syndicated loan during the sample period. We find that after controlling for industry and year-fixed effects, the subsequent bond or loan issuance is positively associated with the probability of having DPMs. Economically, in column (1), we find that the likelihood of having DPMs experiences a significant increase by 80% or 47%, respectively. When we split the sample into firms with bonds or loans exclusively, we find similar inferences in columns (3) – (6). We then turn to the consequence of DPM for the cost of borrowing. Table 7 Panel B presents the results with a sample of firms that issue at least two syndicated loans or two public bonds during the sample period. Our strategy here is to compare the cost of borrowing between the first and second borrowing for the same firm. In Panel B, the dependent variable (*Diff_LoanSpread* or *Diff_BondSpread*)

is the difference in yield spread between the current loan and the previous loan (or between the current bond and the previous bond) for the same firm; the independent variable (*DPM*) is a dummy variable indicating if the firm incorporated at least one DPM after the issuance of the prior bond/loan but before the issuance of the current bond/loan. In columns (1) and (2), we observe that the inclusion of DPM in the compensation contract is associated with an approximately 14.2 and 15 basis points lower loan yield spread, respectively, compared to when the firm does not include DPM in the compensation contract before obtaining a new loan. In contrast, in columns (3) and (4), we find no effect on the bond yield spread. Alternative sample results in columns (5) and (6) confirm the findings of the main sample. The results are consistent with the expectations that bondholders have a better second market to diversify their risk than lenders. In addition, loans often grant lenders access to private information about the firm operations, while bondholders usually do not have that. As such, the benefit of DPM on the yield spread only manifests among the loan lenders. Overall, Table 7 results clearly indicate that the shareholders desire the inclusion of DPM when debt financing is beneficial to them.

Our hypothesis centers on the risk-shifting explanation (Jensen and Meckling, 1976), while the results so far could also be consistent with the debt overhang explanation (Myers, 1977). Shareholders concerned with large levels of existing debt deterring future investment could include DPMs in the compensation contract. In this scenario, lowering the immediate debt costs is a secondary outcome. Our descriptive results point to this explanation because debt reduction is a significant component of DPMs (refer to Table 1). In Online Appendix Tables IA.4 and IA.5, we replicate the estimations from Tables 3 and 5, but categorizing DPMs into "debt reduction" metrics and other metrics. We demonstrate that credit risks and debt maturity pressure can prompt

borrowers to incorporate both "debt-reduction" DPMs and other types. However, in Table IA.6, we do not observe significant increases in "debt-reduction" DPMs when lenders change their perception of future default risk. This overall suggests shareholders may use the managerial compensation mechanism to address debt overhang concerns.[22]

4.6 DPM Contracting and Risk-taking Behaviors

In our last set of results, we explore the association between the presence of DPMs and future risk-taking behaviors. Again, using Trinity Industries as an example, after incorporating "credit rating" DPMs for the performance period 2010-2012, the company maintained its target level of "BB+" and then achieved the investment-grade "BBB-" in May 2013, indicating a reduction in the company's credit risk following the introduction of DPMs. Empirically, following prior literature (e.g., Hong et al. (2021)), we use two proxies for risky investments. The first proxy is research and development investments (R&D) intensity. This proxy is motivated by Shi (2003), who shows that "for creditors, the R&D risk dominates their benefits." We scale R&D expenses by sales to obtain R&D intensity. The second proxy is selling, general, and administrative outlays (SG&A). This proxy (SG&A) is motivated by Choi and Richardson (2016), who show that operating leverage (ratio of SG&A to operating costs) is associated with higher asset volatility. We scale SG&A costs by operating expenses to obtain SG&A.

[Insert Table 8]

Table 8 presents estimated coefficients from linear regressions that relate future risky

[22] Another way to eliminate debt overhang problem is to renegotiate past debt contracts (Myers, 1977). DPMs may facilitate more favorable terms during debt renegotiation, such as extending the maturity date, which could ultimately alleviate underinvestment concerns. A case in point is American Axle & Manufacturing Holdings, Inc., which established its 2010 threshold award level for net operating cash flow based on projections submitted to lenders during the amendment of their senior credit agreements and refinancing all senior debt maturities through 2014 (See Appendix A Example 4).

investments to the presence of DPMs and the number of DPMs *(NumDPM)*. All regressions control for firm-specific characteristics (including *Debt/EBITDA, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year- and industry-fixed effects. In all regressions, standard errors are clustered for each firm. We use two independent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm. The dependent variable is $RDIntensity_{t+1}$, $RDIntensity_{(t+1)-(t+3)}$, $SG\&A_{t+1}$, $SG\&A_{(t+1)-(t+3)}$, which represents R&D intensity in the next year, R&D intensity in the next three years, SG&A in the next year and SG&A in the next three years, respectively.

The results show that firms having a DPM contract experience significant decreases in their R&D intensity and SG&A, at least in the next three years. This result is robust to the inclusion of firm-level control variables, industry-fixed effects, and year-fixed effects. These negative associations suggest that managers are less likely to take risky investments after the presence of DPMs. Alternatively, shareholders may have predicted the low growth opportunities and thus are more likely to approve the inclusion of DPMs in the previous years.

5. Conclusion

Based on novel data from the proxy statements, we provide empirical evidence of the dynamics of how companies incorporate creditors' interest in the form of debt-related performance metrics (DPMs) (e.g., credit ratings, debt to EBITDA ratio) into their executive compensation contracts. These metrics appear to help align managerial behaviors with the interests of creditors,

and thus, the managers have incentives to change the operating characteristics of the firm to mitigate the risk-shifting problem between the shareholders and the creditors.

The results show that around 19% of the firms listed in the U.S. major stock exchanges have incorporated DPMs in their compensation designs at least once during the period 2007-2020, particularly after their creditors' monitoring incentives become stronger after their credit quality deteriorates, or when they are facing debt repayment pressure. Further, we find similar results when debt financing benefits the shareholders. We also demonstrate that, in response to the inclusion of DPMs, shareholders put more non-debt metrics in their incentive programs. In addition, we find evidence that firms having a DPM contract experience significant decreases in their R&D intensity and SG&A, at least in the next three years. Overall, our empirical results suggest that borrowers take the agency cost of debt into their executive compensation considerations. Our study contributes to the compensation literature by providing initial evidence on the utilization of debt-related performance metrics (DPMs).

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Appendix A: Examples of DPM in compensation contracts

Example 1: Trinity Industries, Inc.

https://www.sec.gov/Archives/edgar/data/99780/000119312513135351/d505161ddef14a.htm

https://www.sec.gov/Archives/edgar/data/99780/000095012311031796/d80055def14a.htm

In March 2010, the HR Committee approved the establishment of four key metrics in determining equity grants for the performance periods 2010-2011 and 2010-2012. The metrics are (i) cumulative Company ROE, (ii) cumulative net income, (iii) cumulative revenue from acquisitions or organic growth, and (iv) **the Company's credit rating**. Each of these metrics cultivates management concentration on performance improvements linked to long-term stockholder value. Taken together, these metrics compel management to address growth and investment relative to risk and liquidity. The performance-based threshold level and target level performance goals for all named executive officers with respect to the four metrics are shown in Table 5.

Grant Periods	Return on Equity (30% Weight)			Net Income (30% Weight)			Revenue from Acquisition or Organic Growth (25% Weight)			Credit Rating (15% Weight)		
	Threshold	Target	Maximum	Threshold	Target	Maximum	Threshold	Target	Maximum	Threshold	Target	Maximum
2012	5%	8%	15%	$75 M	$125 M	$200 M	$150 M	$250 M	$400 M	BB	BB+	BBB-
2013	8%	12%	20%	$150 M	$200 M	$300 M	$250 M	$375 M	$600 M	BB	BB+	BBB-

Example 2: American Electric Power Company, Inc.

https://www.sec.gov/Archives/edgar/data/4904/000119312510056811/ddef14a.htm

For 2009, the HR Committee also added a credit rating deduction to the funding measure. The credit rating deduction would have reduced the overall score for executive officers by 10% at the HR Committee's discretion **if one of the major credit rating agencies reduced the rating** on the Company's senior unsecured debt during the year. The HR Committee added this feature in 2009 because it believed the Company needed to maintain good access to the financial markets during the difficult economic times.

Example 3: LoJack Corporation

https://www.sec.gov/Archives/edgar/data/355777/000119312510079077/ddef14a.htm

In February 2010, the Committee further refined its practices and replaced the operating income targets with EBITDA targets in order to recognize the importance of cash flow **in light of the Company's compliance covenants** under its new credit facility. These measures more appropriately reflect our enhanced focus on our cash position, drive shareholder value and are directly influenced by management's actions. This performance metric also more closely tracks how management and the Company's lenders measure Company performance.

Example 4: American Axle & Manufacturing Holdings, Inc.

https://www.sec.gov/Archives/edgar/data/1062231/000095012311027006/k50099ddef14a.htm

In support of the Company's 2010 strategic initiatives, the Committee approved the use of net operating cash flow as the sole performance metric to be used in determining 2010 annual incentives for the following reasons:

- Cash flow is a critical financial metric for AAM at this time **due to its impact on liquidity and debt reduction**.
- Increasing cash flow is key to **achieving credit rating upgrades**, which will have a favorable impact on the Company's **cost of future financing**; and

- The Committee believes increasing cash flow benefits AAM stakeholders.

The 2010 threshold award level for net operating cash flow was based on projections provided to AAM's lenders in 2009 in **obtaining amendments to our senior credit agreements** and refinancing substantially all senior debt maturities through 2014.

Example 5: Cheniere Energy, Inc.

https://www.sec.gov/Archives/edgar/data/3570/000119312511057743/dpre14a.htm

2011 Long-Term Incentive Awards. On January 4, 2011, the Compensation Committee also determined that the Company had achieved significant **corporate debt reduction** and milestones related to the liquefaction project at the Sabine Pass LNG terminal during 2010 that deserved recognition and used its discretion to approve a pool of 2,000,000 shares of restricted stock of the Company to be granted to certain employees, including the Executive Officers (the "2011 Long-Term Incentive Awards"). The Compensation Committee determined that the 2011 Long-Term Incentive Awards were appropriate to compensate certain employees, including the Executive Officers, for corporate debt reduction and the elimination of significant interest expense resulting in the improvement of the Company's liquidity position …The specific corporate debt reduction and liquefaction project milestones are outlined below:

• Corporate Debt Reduction

  — Pre-paid $64 million of convertible debt and corresponding interest savings
  — Pre-paid $102 million of term loan debt and corresponding interest savings
  — Reduced by $3 million costs related to corporate overhead and tax payments

……

Example 6: Southwestern Energy Company

https://www.sec.gov/Archives/edgar/data/7332/000120677420001113/swn3648531-def14a.htm

For each NEO, the Compensation Committee also determined the size of the individual component of the annual cash incentive, which together with the formulaic component, comprises the total individual award levels. At target, the individual component would constitute 30% of each NEO's annual cash incentive. The bonus amounts that each NEO actually received reflect both the overall company results and each individual's contributions to the Company's strong operating and strategic performance in 2019. For 2019, the Compensation Committee assessed Mr. Way's individual performance at target. In assessing Mr. Way's performance, the Compensation Committee considered Mr. Way's significant contribution to achieving, among other things, the following:

- **Decreased debt** by repurchasing $62 million of outstanding long-term senior notes at a discount and retiring the remaining $52 million of senior notes due in 2020
- Realized year-end **net debt/EBITDA** was 2.3x

……

Appendix B: The Role of Compensation Committee in DPMs Inclusion

The Compensation Committee plays a significant role in initiating the inclusion of DPMs within a company's executive compensation design. While it is common for a compensation plan's performance goals to be disclosed to and approved by shareholders ahead of the payout, the compensation committee overall has substantial discretionary power in determining the inclusion of DPMs. The compensation committee exercises discretion if it believes such designs are in the company's and its shareholders' best interests. We also have evidence that both shareholders and lenders can incentivize the compensation committee decisions to include DPMs.

1. Compensation Committee's Discretion

We identify two ways to obtain compensation approval from shareholders during the annual stockholders' meeting: binding voting on performance metrics criteria and non-binding advisory voting on executive compensation. We provide examples for both types of approval.

1.1 Binding Voting on Performance Metrics Criteria

The incentive plan proposal, approved by the 2007 annual stockholder meeting (see Example 1.1 below), grants the HR committee broad discretion rights in terms of performance metric choice. With the discretion rights granted, the HR Committee of American Electric Power Company introduced a credit rating deduction to the 2009 incentive compensation package for executive officers (see Appendix A, Example 2).

Example 1.1: American Electric Power Company, Inc.

https://www.sec.gov/Archives/edgar/data/4904/000119312507055149/ddef14a.htm

PROPOSAL TO APPROVE THE SENIOR OFFICER INCENTIVE PLAN

THE BOARD OF DIRECTORS proposes that shareholders approve the American Electric Power System Senior Officer Incentive Plan (the "2007 Plan").

……

The performance objectives are set by the HR Committee at the start of each fiscal year and are based on one or more of the following performance criteria: (i) earnings measures: primary earnings per share; fully diluted earnings per share; net income; pre-tax income; operating income; earnings before interest, taxes, depreciation and amortization; net operating profits after taxes; income before income taxes, minority interest and equity earnings; income before discontinued operations, extraordinary items and cumulative effect of accounting changes, or any combination thereof; (ii) expense control: operations & maintenance expense; total expenditures; expense ratios; and expense reduction; …… **The targeted level or levels of performance with respect to such business criteria may be established at such levels and in such terms as the HR Committee may determine, in its discretion,** including in absolute terms, as a goal relative to performance in prior periods (e.g., earnings growth), or as a goal compared to the performance of one or more comparable companies or an index covering multiple companies.

1.2 Non-Binding Advisory Voting on Executive Compensation

Like American Electric Power Company, the HR committee of Trinity Industries was granted a discretional right during the annual stockholder meeting on the 2004 incentive plan. With this discretion, the HR Committee of Trinity Industries introduced credit rating as a performance measure for executive officers during the performance periods 2010-2012 (see Appendix A, Example 1). In contrast to American Electric Power Company, the HR committee of Trinity Industries further sought advisory approval from shareholders in the 2011 annual stockholder meeting (see Example 1.2 below). While the HR committee may consider the voting outcome, it is overall not binding.

Example 1.2: Trinity Industries, Inc.

https://www.sec.gov/Archives/edgar/data/99780/000095012311031796/d80055def14a.htm
The CEO, the CFO, and the Vice President of Human Resources work with the HR Committee and the Compensation Consultant to develop the framework and design the plans for all compensation components. The CEO and CFO recommend the financial performance measurements for the annual incentive awards and the long-term performance-based restricted stock awards, subject to HR Committee approval.

PROPOSAL 2 — ADVISORY VOTE ON EXECUTIVE COMPENSATION

The Company seeks a non-binding advisory vote from its stockholders regarding the compensation of its executive officers as described in this proxy statement. This proposal provides stockholders the opportunity to endorse or not endorse the Company's executive compensation program through the following resolution:
"Resolved, that the compensation paid to the Company's named executive officers, as disclosed pursuant to Item 402 of Regulation S-K, including the Compensation Discussion and Analysis, compensation tables and narrative discussion is hereby approved."
Because this is an advisory vote, it will not be binding upon the Board of Directors. However, the HR Committee will take into account the outcome of the vote when considering future executive compensation arrangements.

2. Shareholders' and Lenders' Impacts on Compensation Committee's Decision

To sum up, while these compensation plans have been approved at the stockholder meetings, the HR committee retains substantial discretionary power in determining DPM inclusions. In addition to stockholder voting, we also present direct evidence of the impacts of shareholders and lenders on the compensation committee's decisions regarding DPM inclusions:

2.1 DPM as a Response to Shareholder Concerns

Chesapeake Energy Corporation disclosed a Q&A section with its compensation committee chair, as shown in Example 2.1. In response to shareholders' concerns about Chesapeake's liquidity, the compensation committee implemented three 'liquidity payout gates' in their 2016 executive bonus plan. They believe that the changes to their compensation plan incentivized performance, including the successful debt refinancing activity.

Example 2.1: Chesapeake Energy Corporation
https://www.sec.gov/Archives/edgar/data/895126/000110465917019420/a17-8020_1pre14a.htm

Q: In light of the challenging commodity price environment and concerns about debt and liquidity, did the board and compensation committee reach out to shareholders?

A: Yes. ……**The Compensation Committee responded to shareholders' views, particularly about our debt load, liquidity and related compensation issues facing Chesapeake, by implementing dramatic changes to our 2016 executive bonus plan**……

First, we instituted three "liquidity payout gates," in which no payout would be made unless all three of the following were achieved at the threshold level, with each contributing transaction subject to board review and approval:
• adjusted asset sales
• debt reduction/refinancing
• amendment to our revolving credit agreement new liquidity performance goals. ……

Q: Do you think that the changes to executive compensation incentives worked?

A: Yes, I do. Chesapeake's one-year total shareholder return (TSR) was 56%, a #2 ranking in our peer

group of 12 exploration and production companies. **We believe that the changes to our executive compensation program incentivized our performance.** Among other things, in 2016 we successfully refinanced substantially all of our near-term maturities, reduced preferred stock obligations and created operating efficiencies by dramatically reducing production and GP&T expenses, both in absolute and on a per barrel of oil equivalent

2.2 DPM as a Response to Lender's Influence

The compensation committee of Lee Enterprises granted discretionary equity awards to its CEO in recognition of the successful completion of debt refinancing in 2012. This decision was influenced by the lenders' significant emphasis on and reliance upon its CEO, as shown in Example 2.2.

Example 2.2: Lee Enterprises
https://www.sec.gov/Archives/edgar/data/58361/000005836113000002/a2013proxydef14a.htm

We have reserved the right to modify grants based on our evaluation of the CEO's performance; to modify the performance measures from year to year; and to make discretionary equity awards in addition to, or in lieu of, awards under our Incentive Compensation Program and the LTIP.

In 2012, following the successful completion of our debt refinancing, we re-examined the total compensation of our CEO, in relation to her industry peers and compared to historic compensation levels. As previously noted, we determined her compensation was not at a level that met our historical compensation practices and target. **We also considered the significant emphasis and reliance placed by our lenders on her continuing leadership as CEO of the Company,** as well as the continued strong financial performance of the Company in relation to its industry peers. At the conclusion of our analysis, we determined to award Ms. Junck a grant of 500,000 shares of restricted Common Stock, which will vest three years after the date of grant.

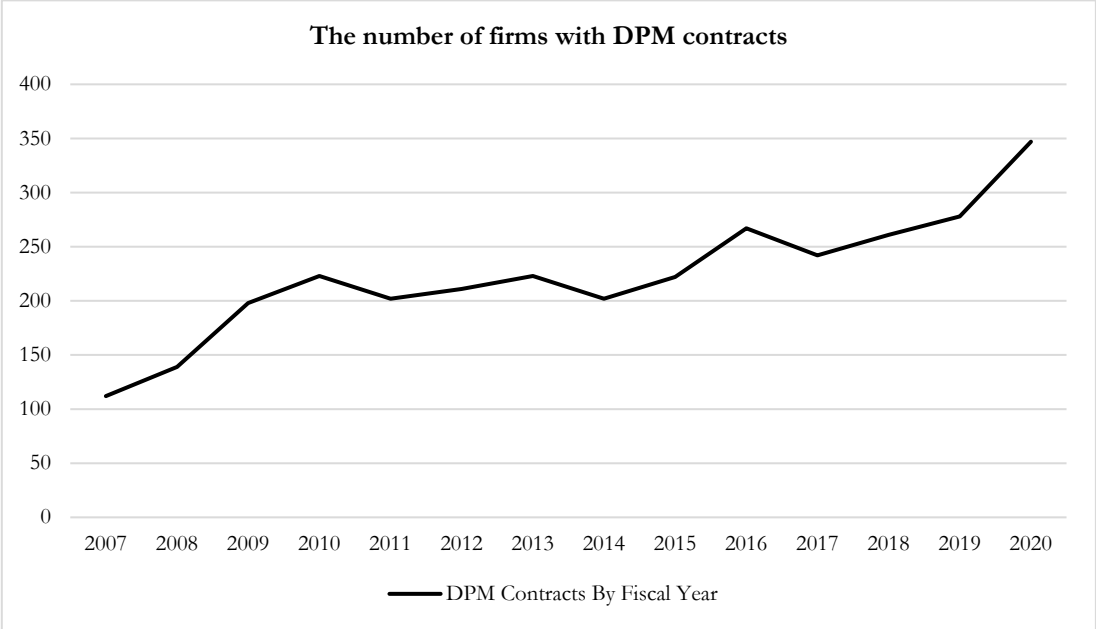
Overall, we have evidence that both shareholders and lenders can incentivize the compensation committee's decisions to include DPMs if the compensation committee believes such designs are in the best interests of both the company and its stockholders.

Appendix C: Figures

Figure 1: DPM Characteristics

The figures present the fraction of 3,127 firm-years with DPM contracts collected from the annual proxy statement over the period 2007-2020, sorted by fiscal year and industry.

Panel A: Number of Firms with DPM contracts



Panel B: Number of Firm-Years with DPM contracts by Industry

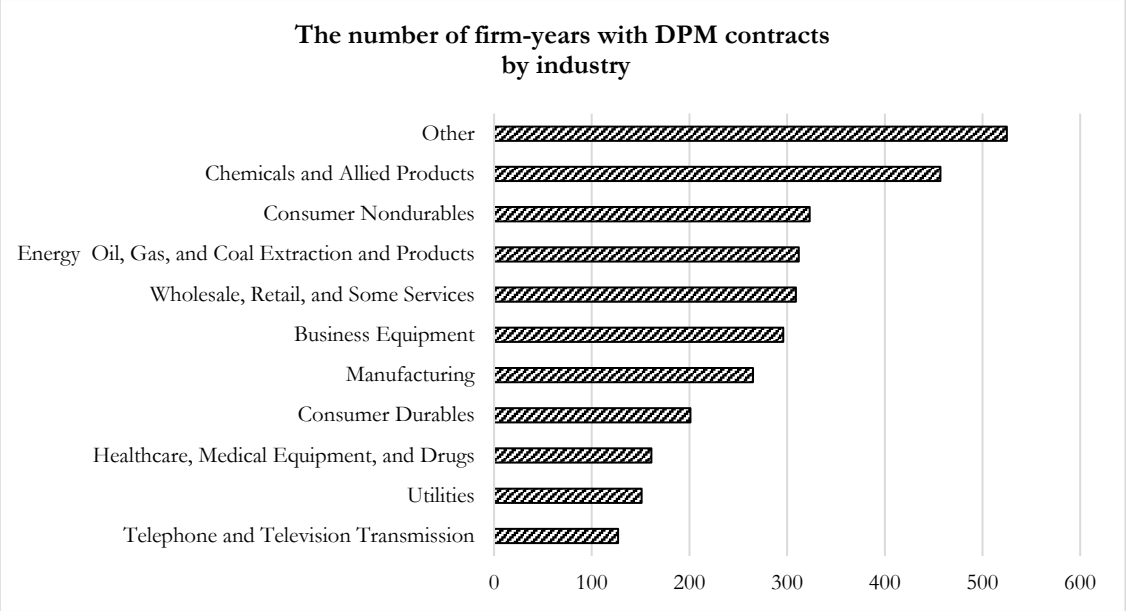


Figure 2: DPMs, Syndicated Loans and Bonds

The figure presents the percentage of unique firms using DPMs over the period 2007-2020 by different groups. We categorize the 5,690 unique firms into different groups based on whether the firms have outstanding loans or bonds during the sample period.

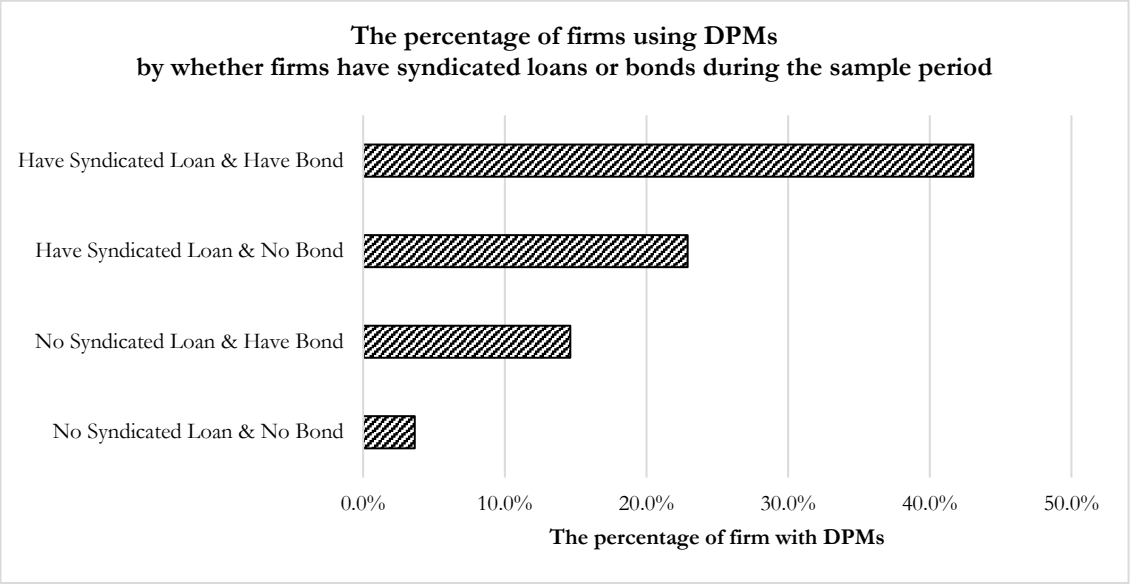
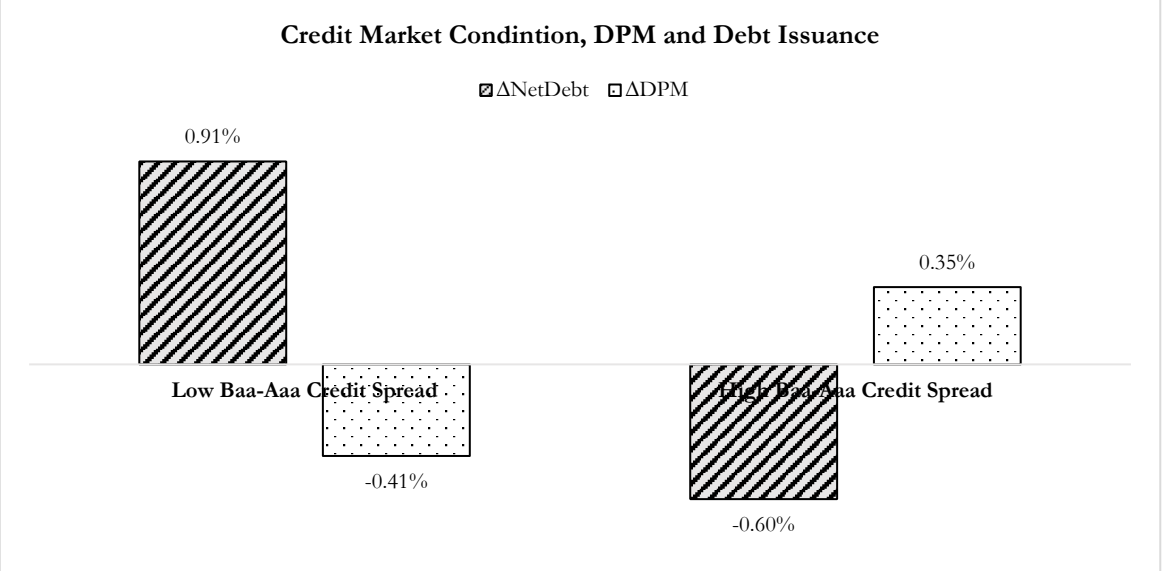


Figure 3: Credit Market Conditions, DPM and Debt Issuance

This figure plots the association of the presence of DPMs, and net debt issuance with market credit risk. ΔDPM is calculated as the difference between realized and predicted DPM probability, derived from the linear regressions that relate the probability of having DPMs to lagged firm-specific characteristics (including *Leverage, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*) and firm-fixed effects. ΔNetDebt is calculated as the difference between realized and predicted net debt issuance, derived from the linear regressions that relate the net debt issuance scaled by lagged assets to lagged firm-specific characteristics and firm-fixed effects. Our proxy for high market credit risk is a variable indicating Moody's Baa–Aaa credit spread was greater than or equal to the median value for the years from 2000 to 2020.



Appendix D: Variable Definition

Variables	Description	Source
Main Variables		
DPM	An indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs.	*EDGAR*
NumDPM	The number of debt performance metrics utilized by a firm in the given year.	*EDGAR*
EDF	Expected default frequency (×1000), computed using the procedure in Bharath and Shumway (2008).	*CRSP* *Compustat*
Credit Rating	The numerical equivalent of S&P, Moody's, Fitch senior debt rating in the given fiscal year. It is set as equal to 24 for the highest senior debt rating, through 1 for the lowest senior debt rating. For firms not rated by S&P, we assign the Moody's senior debt rating; for firms not rated by either S&P or Moody's, we assign the Fitch senior debt rating.	*Capital IQ S&P Credit Ratings* *Mergent FISD*
Rating Disagree	Dummy equal to 1 if the firm is assigned different ratings by rating agencies in the given fiscal year.	*Capital IQ S&P Credit Ratings* *Mergent FISD*
Post × Default	An indicator variable that equals one if at least one loan arranger of the borrower has experienced a payment default before the given year, and the borrower's loans arranged by this lender are outstanding at the time of default.	*Capital IQ S&P Credit Ratings* *Dealscan*
Due_1st_Year%	The proportion of long-term debt due in one year.	*Compustat/CRSP*
Due_2nd_Year%	The proportion of long-term debt due in the 2nd year.	*Compustat/CRSP*
Due_3rd_Year%	The proportion of long-term debt due in the 3rd year.	*Compustat/CRSP*
Due_4th_Year%	The proportion of long-term debt due in the 4th year.	*Compustat/CRSP*
Due_5th_Year%	The proportion of long-term debt due in the 5th year.	*Compustat/CRSP*
Due_other_Year%	The proportion of long-term debt due in more than 5 years	*Compustat/CRSP*
Number of Non-debt metrics	The number of non-debt metrics (i.e., non-debt related accounting metrics or stock price metrics) utilized by the firm in the same year.	*Incentive Lab*
Issue_Loan	Dummy equal to 1 if the firm has a new loan issuance in the primary market in the year.	*Dealscan*
Issue_Bond	Dummy equal to 1 if the firm has a new bond issuance in the primary market in the year.	*Mergent FISD*
Diff_LoanSpread	Difference in loan yield spreads (i.e., all-in-spread-drawn) between the current loan and the previous one.	*Dealscan*
Diff_BondSpread	Difference in bond yield spreads (i.e., bond yield minus same-maturity treasury yield) between the current public bond and the previous one.	*Mergent FISD*
DPM_Included	Dummy equal to 1 if the firm incorporated at least one DPM after the issuance of the prior loan but before the issuance of the current loan.	*EDGAR*

RDIntensity	R&D expenses scaled by sales.	*Compustat/CRSP*
SG&A	SG&A costs scaled by operating expense.	*Compustat/CRSP*
Control Variables		
Debt / EBITDA	Ratio of total debt to earnings before interest, taxes, depreciation, and amortization.	*Compustat/CRSP*
Debt / Equity	Ratio of total debt to shareholder equity (i.e., total assets-total liabilities-preferred stock)	*Compustat/CRSP*
Assets	Logged book value of total assets.	*Compustat/CRSP*
Tangibility	The ratio of net PP&E to total assets	*Compustat/CRSP*
OperatingCF	Ratio of operating income before depreciation to lagged total assets.	*Compustat/CRSP*
MtB	Ratio of Market Cap to Book Value of Equity, omitted for negative Book Equity	*Compustat/CRSP*
ROA	Ratio of earnings before interest and taxes to lagged total assets.	*Compustat/CRSP*
SalesGrowth	Calculated as sales minus previous year sales scaled by previous year sales.	*Compustat/CRSP*
FirmAge	The number of years since a company appears in CRSP.	*Compustat/CRSP*
Leverage	Ratio of total debt to total asset (book leverage).	*Compustat/CRSP*
InvestmentGrade	Dummy equal to one if the firm is rated at or above BBB- in the given fiscal year.	*Capital IQ S&P Credit Ratings* *Mergent FISD*
Rated	Dummy equal to 1 if borrower has a current credit rating.	*Capital IQ S&P Credit Ratings* *Mergent FISD*
Syndicated	Dummy equal to 1 if the firm has accessed the syndicated loan market.	*Dealscan*

Table 1: Types of DPMs

This table presents the frequency of different DPMs used by firms. We collect the sample over the period 2007–2020. We define the borrowers have incorporated DPMs (debt performance metrics) in their compensation designs in a given year if they: (1) plan to award the managers based on a specific debt-related ratio (including *Leverage ratio, Credit rating, Debt/EBITDA, Cash flow/Debt, Debt (net of cash), Debt level, Funds from operation/Debt, Cost of debt, Debt and interest coverage, Liquidity and Debt/Earning*). (2) determine their managers' compensation based on a debt-related target (including *Debt reduction, Debt financing, Debt payment, Covenant compliance, and Maintain debt*). (3) plan to award the managers based on a financial metric and indicate that the purpose of including this metric is debt related (e.g., use "EBITDA" as a performance measure because it would provide cash flows to stabilize and improve the business and refinance the credit facility). The high frequency of the use of debt-related targets DPMs may be caused by our categorization method. For example, if a firm uses EBITDA as a performance measure and then indicates that the use of this measure is to refinance debt, then we count this measure as both the "*Debt financing*" metric and the "*Debt/EBITDA*" metric.

Number of DPM contracts			3,127
The Frequency of Metrics	**Debt Target**	Debt reduction	1,050
		Debt financing	598
		Debt payment	574
		Covenant compliance	134
		Maintain debt	40
	Debt to Balance Sheet	Leverage ratio	505
		Debt (net of cash)	112
		Debt level	77
	Credit Rating	Credit rating	471
	Debt to Cash Flow	Debt/EBITDA	328
		Cash flow/Debt	202
		Funds from operation/Debt	54
		Debt/Earning	12
	Liquidity	Liquidity	183
	Cost of debt	Cost of debt	18
	Coverage	Debt and interest coverage	18

Table 2: DPM Contracts and Firm Characteristics

Table 2 Panel A presents summary statistics for the sample of firms listed in the U.S major stock exchanges during the fiscal year 2007-2020 in the merged Compustat/CRSP database. We exclude those firms with missing values for *Debt/EBITDA, Leverage, Debt Equity, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*. *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. *NumDPM* is the number of debt performance metrics used in the given year by a firm. Table 2 Panel B compares firm characteristics between two groups: firm-years with DPM contracts and firm-years without DPM contracts. Larger *CreditRating* indicates better ratings. Higher *EDF* indicates higher default probability. All other variable definitions could be found in Appendix D. We winsorize all the continuous variables at the 1st and 99th percentiles to reduce the influence of outliers.

Panel A: Summary statistics

Variable	N	Mean	SD	Min	p25	p50	p75	Max
DPM	39,326	0.07	0.26	0.00	0.00	0.00	0.00	1.00
NumDPM	39,326	0.10	0.41	0.00	0.00	0.00	0.00	7.00
Debt/EBITDA	39,326	1.80	3.91	-15.64	0.00	1.15	2.97	21.41
Debt/Equity	39,326	0.84	1.65	0.00	0.03	0.36	0.92	11.83
Assets	39,326	6.75	2.10	2.12	5.23	6.70	8.19	11.72
Tangibility	39,326	0.26	0.25	0.00	0.07	0.17	0.40	0.91
OperatingCF	39,326	0.06	0.20	-1.26	0.05	0.10	0.15	0.39
MtB	39,326	0.06	0.12	0.00	0.01	0.02	0.05	0.84
ROA	39,326	0.02	0.20	-1.30	0.01	0.06	0.11	0.34
SalesGrowth	39,326	0.12	0.46	-0.80	-0.04	0.06	0.18	3.24
FirmAge	39,326	17.06	14.63	0.00	5.00	13.00	25.00	55.00
EDF	30,237	0.00	0.01	0.00	0.00	0.00	0.00	0.13
CreditRating	11,347	14.45	3.21	1.00	12.00	14.00	17.00	24.00

Panel B: Univariate Analysis

	Firm-year without *DPM* Contract		Firm-year with *DPM* Contract		Difference in Mean
	Mean	Median	Mean	Median	
Credit Rating	14.59	15.00	13.74	13.00	0.846***
EDF	0.00	0.00	0.00	0.00	-0.002***
Debt/EBITDA	1.67	0.99	3.38	3.12	-1.707***
Debt/Equity	0.78	0.32	1.63	0.96	-0.849***
Leverage	0.20	0.17	0.35	0.34	-0.148***
Assets	6.64	6.57	8.15	8.19	-1.504***
Tangibility	0.26	0.16	0.36	0.27	-0.099***
OperatingCF	0.06	0.10	0.10	0.10	-0.033***
MtB	0.06	0.02	0.03	0.01	0.035***
ROA	0.02	0.06	0.05	0.06	-0.030***
SalesGrowth	0.12	0.06	0.06	0.03	0.062***
FirmAge	16.58	13.00	23.05	19.00	-6.475***
Rated	0.26	0.00	0.62	1.00	-0.360***
Syndicated	0.61	1.00	0.92	1.00	-0.308***

Table 3: Credit Quality and DPM Contracting

This table presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the measures of borrower credit quality. We collect the sample over the period 2007–2020. Panel A contains the full sample, while Panel B only contains those firms with credit ratings. We use two dependent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm. All regressions control for lagged firm-specific characteristics (including *Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year fixed effects and firm (or industry) fixed effects. In all regressions, standard errors are clustered for each firm. We measured the firms' credit quality by their expected default frequency (×1000) computed using the procedure in Bharath and Shumway (2008) and credit rating. Higher *EDF* indicates higher default probability. Larger *CreditRating* indicates better ratings. We define *EDF_High* as a dummy variable which indicates those firm-years with the value of expected default frequency in the highest quantile, and we define *EDF_Low* as a dummy variable which indicates those firm-years with the value of expected default frequency in the lowest quantile. We define "*RatingDisagree*" as a dummy variable, which equals to 1 if there exist split ratings for a firm in a given year.

Panel A: Expected Default Frequency

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DPM_t				$NumDPM_t$			
EDF_t	0.157		0.526**		1.078**		1.553***	
	(0.81)		(2.33)		(2.24)		(3.04)	
EDF_High_t		0.036***		0.054***		0.076***		0.112***
		(4.10)		(5.76)		(4.61)		(6.45)
EDF_Low_t		-0.013***		-0.039***		-0.009		-0.048***
		(-2.79)		(-7.72)		(-1.29)		(-6.13)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	29,772	29,772	30,237	30,237	29,772	29,772	30,237	30,237
Adj. R^2	0.317	0.319	0.062	0.073	0.325	0.326	0.060	0.072

Panel B: Credit Rating

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DPM_t				$NumDPM_t$			
$CreditRating_{t-1}$	-0.022***	-0.021***			-0.042***	-0.040***		
	(-4.58)	(-7.34)			(-4.91)	(-7.50)		
$A\ rated\ or\ better_{t-1}$			-0.093***				-0.159***	
			(-5.86)				(-6.27)	
$BB\ rated\ or\ worse_{t-1}$			0.080***				0.153***	
			(4.93)				(5.59)	
$RatingDisagree_{t-1}$				0.033***				0.054***
				(2.74)				(2.62)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	No	No	No	Yes	No	No	No
Industry FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	11,185	11,347	11,347	11,347	11,185	11,347	11,347	11,347
Adj. R^2	0.335	0.051	0.053	0.038	0.349	0.057	0.057	0.040

Table 4: Shock to Lender's Monitoring Incentives and DPM Contracting

Using a lender-specific shock - defaults in a lender's corporate loan portfolio as a shock to the lenders' monitoring incentives, this table presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the lenders' monitoring incentives. We collect the defaults sample over the period 2007–2020 from Capital IQ S&P credit ratings database. Panel A contains the full sample of firms that have accessed the syndicated loan market excluding defaulting borrowers, Panel B further deletes the lenders' current borrowers who are in the same industries or geographic regions as the defaulting borrowers at the time of defaults. In Panel A and B, $Post_t \times Default_i$ is an indicator variable that equals one if at least one loan arranger of the borrower has experienced a payment default before the given year, and the borrower's loans arranged by this lender are outstanding at the time of default. In Panel C, to evaluate treatment effects of the pre- and post- treatment periods, we also use a difference-in-difference event study specification within a six-years window around the treatment. $Default_{i,t}$ takes a value of one if the borrower's current loan arranger experiences a payment default in its portfolio in current year, zero otherwise. $Pre(-3)_t \times Default_i$, $Pre(-2)_t \times Default_i$, $Post(+1)_t \times Default_i$, $Post(+2)_t \times Default_i$, $Post(+3)_t \times Default_i$, are the 3-year lag, 2-year lag, 1-year lead, 2-year lead and 3-year lead around the default year, respectively. We use two dependent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm. All regressions control for lagged firm-specific characteristics (including *Debt/EBITDA*, *Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year fixed effects and firm fixed effects. In all regressions, standard errors are clustered for each firm. In Column (1) and (2), we report results using a large unmatched sample of control firms. In Column (3) and (4), we conduct entropy-balanced matching with three moments. In Column (5) and (6), we conduct propensity-score matching using nearest neighbor matching with replacement. In Column (7) and (8), we conduct propensity-score matching using three-nearest neighbor matching with a caliper of 0.03. We conduct all matching based on *Rated, InvestmentGrade, Leverage, MtB, Assets*.

Panel A: Defaults

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$
	Full Sample		Entropy Balance: three moments		PSM: nearest		PSM: three nearest	
$Post_t \times Default_i$	0.042***	0.051**	0.039***	0.046**	0.038***	0.040*	0.041***	0.048**
	(3.10)	(2.30)	(2.82)	(2.00)	(2.76)	(1.76)	(2.98)	(2.11)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	23,637	23,637	23,637	23,637	18,107	18,107	22,073	22,073
Adj. R^2	0.322	0.332	0.326	0.331	0.313	0.328	0.318	0.328

Panel B: Defaults Different Region and SIC

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$
	Full Sample		Entropy Balance: three moments		PSM: nearest		PSM: three nearest	
$Post_t \times Default_i$	0.040***	0.052**	0.037**	0.044*	0.036**	0.038	0.040***	0.050**
	(2.78)	(2.12)	(2.49)	(1.77)	(2.44)	(1.51)	(2.78)	(2.03)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	22,090	22,090	22,090	22,090	16,049	16,049	20,137	20,137
Adj. R^2	0.318	0.333	0.323	0.334	0.311	0.331	0.317	0.333

Panel C: Difference-in-Differences Event Study (with leads and lags)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$
	Full Sample		Entropy Balance: three moments		PSM: nearest		PSM: three nearest	
$Pre(-3)_t \times Default_i$	-0.020	-0.047*	-0.020	-0.043*	-0.019	-0.045*	-0.019	-0.046*
	(-1.28)	(-1.89)	(-1.22)	(-1.71)	(-1.17)	(-1.78)	(-1.21)	(-1.83)
$Pre(-2)_t \times Default_i$	-0.013	-0.011	-0.012	-0.008	-0.011	-0.007	-0.011	-0.009
	(-1.05)	(-0.54)	(-0.96)	(-0.39)	(-0.91)	(-0.34)	(-0.89)	(-0.42)
$Default_{i,t}$	0.017	-0.002	0.016	-0.002	0.016	-0.003	0.018	-0.001
	(1.42)	(-0.10)	(1.35)	(-0.11)	(1.32)	(-0.17)	(1.50)	(-0.04)
$Post(+1)_t \times Default_i$	0.046***	0.046**	0.043***	0.043*	0.043***	0.041*	0.046***	0.045*
	(3.08)	(2.03)	(2.87)	(1.87)	(2.80)	(1.75)	(3.07)	(1.94)
$Post(+2)_t \times Default_i$	0.047***	0.051**	0.044***	0.045*	0.043***	0.045*	0.048***	0.049*
	(2.93)	(2.01)	(2.67)	(1.73)	(2.61)	(1.71)	(2.92)	(1.90)
$Post(+3)_t \times Default_i$	0.048***	0.067**	0.042**	0.058**	0.041**	0.056**	0.046***	0.062**
	(2.85)	(2.49)	(2.45)	(2.09)	(2.35)	(2.02)	(2.72)	(2.31)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	15,929	15,929	15,929	15,929	10,416	10,416	14,382	14,382
Adj. R^2	0.343	0.370	0.344	0.357	0.336	0.374	0.340	0.365

Table 5: Debt Maturity Pressure and DPM Contracting

This table presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the measures of debt maturity pressure. We collect the sample over the period 2007–2020. In Panel A, the dependent variable is *DPM*, which is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. In Panel B, the dependent variable is *NumDPM*, which is the number of debt performance metrics used in the given year by a firm. All regressions control for firm-specific characteristics (including *Leverage, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year fixed effects and firm fixed effects. In all regressions, standard errors are clustered for each firm. We measure debt maturity by using six indicator variables: *Due_1st_Year%, Due_2nd_Year%, Due_3rd_Year%, Due_4th_Year%, Due_5th_Year%* and *Due_other_Year%*. These variables represent the proportion of long-term debt due in one year, in the 2nd year, in the 3rd year, in the 4th year, in the 5th year and debts due in more than 5 years, respectively.

Panel A: The presence of DPMs

	(1)	(2)	(3)	(4)	(5)	(6)
			DPM_t			
$Due\_1st\_Year\ \%_{t-1}$	0.025***					
	(3.45)					
$Due\_2nd\_Year\ \%_{t-1}$		0.024***				
		(3.20)				
$Due\_3rd\_Year\ \%_{t-1}$			0.011			
			(1.46)			
$Due\_4th\_Year\ \%_{t-1}$				0.002		
				(0.26)		
$Due\_5th\_Year\ \%_{t-1}$					-0.008	
					(-1.36)	
$Due\_Other\_Year\ \%_{t-1}$						-0.030***
						(-3.77)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	25,074	25,074	25,074	25,074	25,074	25,074
Adj. R^2	0.327	0.327	0.327	0.327	0.327	0.328

Panel B: The number of DPMs

	(1)	(2)	(3)	(4)	(5)	(6)
			$NumDPM_t$			
$Due\_1st\_Year\ \%_{t-1}$	0.039***					
	(3.78)					
$Due\_2nd\_Year\ \%_{t-1}$		0.034***				
		(3.13)				
$Due\_3rd\_Year\ \%_{t-1}$			0.015			
			(1.37)			
$Due\_4th\_Year\ \%_{t-1}$				0.016		
				(1.53)		
$Due\_5th\_Year\ \%_{t-1}$					-0.015	
					(-1.55)	
$Due\_Other\_Year\ \%_{t-1}$						-0.053***
						(-4.00)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	25,074	25,074	25,074	25,074	25,074	25,074
Adj. R^2	0.327	0.327	0.327	0.327	0.327	0.328

Table 6: Shareholders' Response to the Inclusion of DPMs: Non-debt Metrics

Table 6 Panel A compares how the number of non-debt metrics varies across firm-years with DPMs and firm-years without DPMs. We collect non-debt performance metrics (i.e., non-debt related accounting metrics or stock price metrics) from Incentive Lab Database which provides the performance metrics for S&P500 and a significant portion of S&P400. Therefore, in the tables below, we use a sample of firms that have records in the Incentive Lab Database. Moreover, we also present an analysis of a subsample of firms that have used DPMs during the sample period. Table 6 Panel B presents estimated coefficients from linear regressions that relate the number of non-debt metrics to the presence of DPMs (*DPM*) and the number of DPMs (*NumDPM*). In Panel B Column (5) and (6), we also use a matched sample. We conduct propensity-score matching using three-nearest neighbor matching with a caliper of 0.03 based on the firm's outstanding amount of syndicated loans scaled by its total assets in a given year. All regressions control for firm-specific characteristics (including *Debt/EBITDA, Assets, Tangibility, OperatingCF, MtB, ROA, Sales-Growth, FirmAge*), year fixed effects and firm fixed effects. In all regressions, standard errors are clustered for each firm. We use two independent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm. The dependent variable is *Number of Non-debt metrics*, which represents the number of non-debt metrics utilized by the firm in the same year.

Panel A: Univariate Analysis

Sample: Firm with records in the Incentive Lab Database

	Firm-year without *DPM* Contract			Firm-year with *DPM* Contract			Difference in Mean
	Sample	Mean	Median	Sample	Mean	Median	
Number of Non-debt metrics	11,193	2.73	3.00	1,644	3.21	3.00	-0.474***
	Sub-Sample: DPM Firms (i.e., firms that have used DPM in the sample period)						
	Firm-year without *DPM* Contract			Firm-year with *DPM* Contract			Difference in Mean
	Sample	Mean	Median	Sample	Mean	Median	
Number of Non-debt metrics	4,357	2.94	3.00	1,644	3.21	3.00	-0.262***

Panel B: Regression on the number of non-debt metrics

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of Non-debt Metrics$_t$					
	Full Sample		Sub-Sample: DPM Firms		Matched sample: Loan outstanding	
DPM$_t$	0.184***		0.176***		0.162***	
	(3.78)		(3.64)		(2.88)	
NumDPM$_t$		0.116***		0.113***		0.108***
		(3.76)		(3.66)		(3.25)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	12,778	12,778	5,997	5,997	4,682	4,682
Adj. R^2	0.587	0.587	0.522	0.523	0.553	0.553

Table 7: Borrowing Needs, DPM, and Cost of Borrowing

Panel A presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the following issuance of a new debt in the same year. Panel B shows the results of the cost of borrowing in response to DPM inclusion between the two consecutive borrowings for the same firm. We collect the sample over the period 2007–2020. In Panel A, Columns (1) and (2) contain the full sample, Columns (3) and (4) contain the sample of firms that issued at least one bond during the sample period, and Columns (5) and (6) contain the sample of firms that issued at least one syndicated loan during the sample period. Panel B contains the sample of firms that issued at least two syndicated loans or two bonds during the sample period, we further restrict our sample to those firms having both bond and loan issuances during the sample period. In panel B, we exclude convertible bonds, variable coupon bonds, and private placement bonds. All regressions control for lagged firm-specific characteristics (including *Leverage, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*) and industry fixed effects. In Panel B, we also control for Moody's Baa-Aaa Spread, loan-level or bond-level characteristics. In Panel A, standard errors are clustered for each firm. *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. *Num-DPM* is the number of debt performance metrics used in the given year by a firm. In Panel A, the independent variable is *Issue_Loan* (or *Issue_Bond*), which is a dummy variable indicating if the firm has a new loan issuance (or bond issuance) in the year. In panel B, the dependent variable is *Diff_LoanSpread* (or *Diff_BondSpread*), which represents the yield spread difference between the current loan and the prior loan (or between the current bond and the prior bond). For firms issuing multiple bonds in the same year, we only keep the bond with a lower yield spread, resulting in a smaller sample size. The independent variable (*DPM_Included)* is a dummy variable indicating if the firm incorporated at least one DPM after the issuance of the prior loan but before the issuance of the current loan.

Panel A: DPM and Debt Issuance

	(1)	(2)	(3)	(4)	(5)	(6)
	DPM_t	$NumDPM_t$	DPM_t	$NumDPM_t$	DPM_t	$NumDPM_t$
	Full Sample		Firms with Bond Issuances		Firms with Syndicated Loan Issuances	
$Issue\_Bond_t$	0.056***	0.085***	0.034***	0.043***		
	(6.50)	(5.67)	(4.08)	(3.00)		
$Issue\_Loan_t$	0.033***	0.045***			0.018***	0.025***
	(6.18)	(5.19)			(3.31)	(2.88)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	39,326	39,326	13,247	13,247	22,675	22,675
Adj. R^2	0.063	0.060	0.053	0.054	0.055	0.055

Panel B: DPM and Cost of Borrowing

	(1)	(2)	(3)	(4)	(5)	(6)
	Diff_LoanSpread		*Diff_BondSpread*		*Diff_LoanSpread*	*Diff_BondSpread*
	Loan Market		Bond Market		Subsample: Firms with Bonds & Loans Issuances	
DPM_Included	-14.172**	-15.009***	-4.067	-2.809	-11.863*	-6.793
	(-2.55)	(-2.89)	(-0.43)	(-0.30)	(-1.74)	(-0.70)
Controls:						
ΔBaaAaaSpread	Yes	Yes	Yes	Yes	Yes	Yes
Debt Changes	No	Yes	No	Yes	No	No
Firm Changes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
N	2,870	2,870	1,496	1,496	1,716	1,406
Adj. R^2	0.185	0.291	0.103	0.111	0.198	0.106

Table 8: DPM Contracting and Risk-taking Behaviors

The tables present estimated coefficients from linear regressions that relate future risky investments to the presence of DPMs (*DPM*) and the number of DPMs *(NumDPM)*. We use two proxies for risky investments. The first proxy is research and development investments (R&D) intensity. We scale R&D expenses by sales to obtain R&D intensity. The second proxy is selling, general, and administrative outlays (SG&A). We scale SG&A costs by operating expenses to obtain SG&A. We collect the sample over the period 2007–2020. All regressions control for firm-specific characteristics (including *Debt/EBITDA, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year fixed effects and industry fixed effects. In all regressions, standard errors are clustered for each firm. We use two independent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm. In our regressions, the dependent variable is $RDIntensity_{t+1}$, $RDIntensity_{(t+1)-(t+3)}$, $SG\&A_{t+1}$, $SG\&A_{(t+1)-(t+3)}$, which represents R&D intensity in the next year, R&D intensity in the next three years, SG&A in the next year and SG&A in the next three years, respectively.

Panel A: The presence of DPMs

	(1)	(2)	(3)	(4)
	$RDIntensity_{t+1}$	$RDIntensity_{(t+1)-(t+3)}$	$SG\&A_{t+1}$	$SG\&A_{(t+1)-(t+3)}$
DPM_t	-0.108***	-0.038***	-0.035***	-0.031***
	(-3.68)	(-6.92)	(-5.58)	(-4.44)
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	37,144	28,711	33,433	25,623
Adj. R^2	0.226	0.490	0.428	0.405

Panel B: The number of DPMs

	(1)	(2)	(3)	(4)
	$RDIntensity_{t+1}$	$RDIntensity_{(t+1)-(t+3)}$	$SG\&A_{t+1}$	$SG\&A_{(t+1)-(t+3)}$
$NumDPM_t$	-0.059***	-0.022***	-0.023***	-0.022***
	(-3.99)	(-6.48)	(-6.17)	(-5.21)
Controls	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	37,144	28,711	33,433	25,623
Adj. R^2	0.227	0.491	0.429	0.405

Online Appendix

Figure IA.1: Comparing DPMs and Loan Covenants

The figures present the average percentage of different types of DPMs (or loan covenants) used in each firm-year. Following Christensen and Nikolaev (2012), we categorize covenants and DPMs into Capital-based and Performance-based. Specifically, following Christensen and Nikolaev (2012), we categorize covenants into Capital-based covenants (i.e., those covenants based on a function of the following variables: net worth, leverage ratio (debt to asset or equity), loan-to-value, current ratio) and Performance-based covenants (i.e., those covenants based on a function of the following variables: debt to cash flow, coverage ratio). Using the same logic, we categorize DPMs into Capital-based DPM (i.e., debt reduction, debt financing, debt payment, maintain debt, leverage ratio, debt (net of cash), debt level, liquidity) and Performance-based DPM (i.e., debt/EBITDA, cash flow/debt, funds from operation/debt, debt/earning, debt and interest coverage.) The percentage is calculated by dividing the average number of different types of DPMs (or covenants) in each firm-year by the average number of all types in each firm-year.

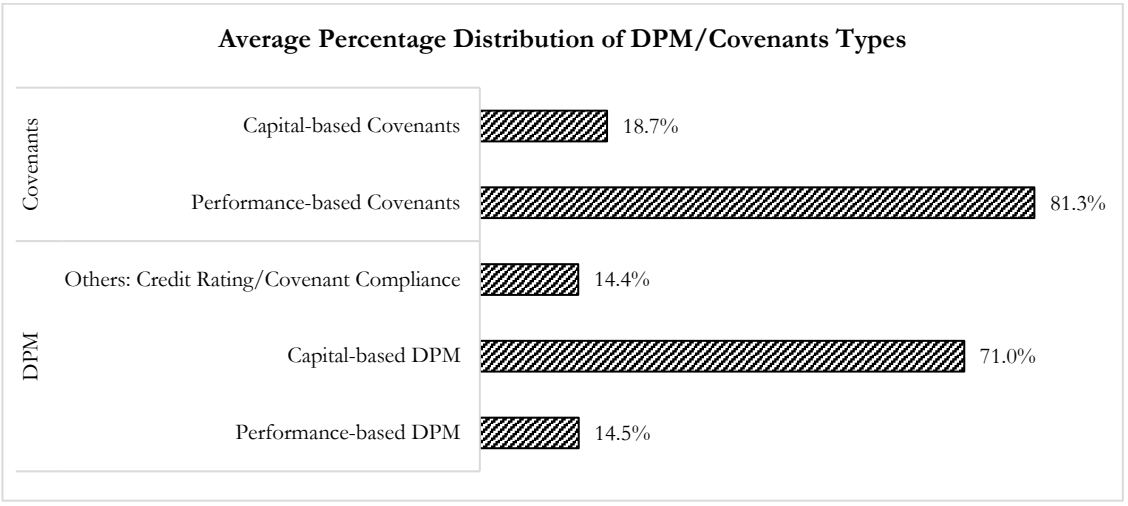


Figure IA.2: Yearly-Trend of DPM Contracts and Bank Lending Standard

The figures present the yearly trend of the number of DPM contracts and the net percentage of domestic banks tightening standards for C&I Loans to large and middle-market firms over the period 2007-2020. Data on lending standards are collected from the Federal Reserve System's Senior Loan Officer Opinion Survey, available online at http://www.federalreserve.gov/boarddocs/SnLoanSurvey/.

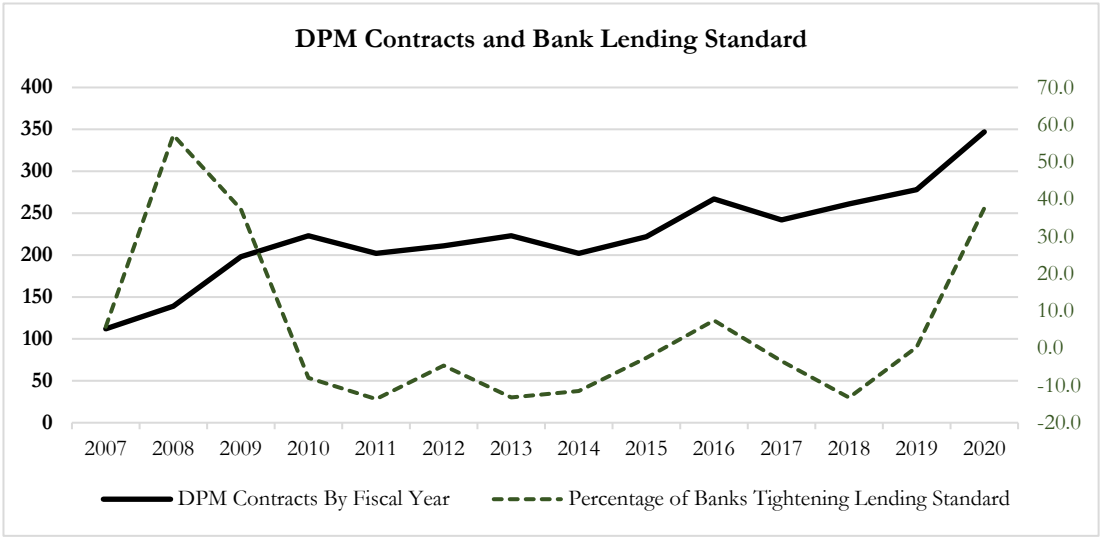


Table IA.1: Credit Quality and DPM Contracting (Robustness Tests)

This table presents robustness tests that relate the probability of having DPMs (or the number of DPMs) to the measures of borrower credit quality. In Panel A, following Nini et al. (2009), we also use the borrower's ratio of debt to EBITDA as a measure of credit quality. Higher Debt/EBITDA indicates lower credit quality. We collect the sample over the period 2007–2020. We use two dependent variables in our regressions: 1) *DPM* is an indicator variable that equals one if the firm has a DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. 2) *NumDPM* is the number of debt performance metrics used in the given year by a firm. In Panel B, we use similar specifications as in Table 3 but further control for lagged CEO-level characteristics. We collect these variables from ExecuComp database, resulting in a smaller sample size. CEO's *Inside Debt/Equity* equals the value of inside debt (pension + deferred compensation) divided by the value of inside equity (stock + options). CEO's *TotalCompensation* is the total compensation-as reported in SEC filing. CEO's *Tenure* is the number of years since an executive became CEO. CEO's *Duality* is a dummy variable taking a value of 1 if the CEO is chairman of the board, and 0 otherwise. We control for firm-specific characteristics (including *Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year fixed effects and firm (or industry) fixed effects. In all regressions, standard errors are clustered for each firm.

Panel A: Proxy Credit Quality by Debt/EBITDA

	(1)	(2)	(3)	(4)	(5)	(6)
		DPM_t			$NumDPM_t$	
$Debt/EBITDA_{t-1}$	0.007***	0.002***	0.004***	0.012***	0.003***	0.007***
	(12.63)	(4.56)	(8.61)	(11.90)	(4.76)	(8.38)
Controls	No	Yes	Yes	No	Yes	Yes
Firm FE	No	Yes	No	No	Yes	No
Industry FE	No	No	Yes	No	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	39,326	38,856	39,326	39,326	38,856	39,326
Adj. R^2	0.017	0.330	0.057	0.018	0.334	0.054

Panel B: Add CEO-Level Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				DPM_t				
EDF_t	0.306		1.257***					
	(0.72)		(3.01)					
EDF_High_t		0.057***		0.086***				
		(4.05)		(5.72)				
EDF_Low_t		-0.009		-0.049***				
		(-1.23)		(-6.30)				
$CreditRating_{t-1}$					-0.027***	-0.023***		
					(-4.77)	(-6.44)		
A rated or better$_{t-1}$							-0.086***	
							(-4.63)	
BB rated or worse$_{t-1}$							0.088***	
							(4.60)	
$RatingDisagree_{t-1}$								0.023*
								(1.67)
				Add CEO-Level Controls				
Inside Debt/Equity$_{t-1}$	0.009	0.008	0.023***	0.023***	0.004	0.021*	0.019*	0.017
	(1.21)	(1.07)	(2.71)	(2.65)	(0.48)	(1.89)	(1.72)	(1.48)
TotalCompensation$_{t-1}$	0.011**	0.012**	0.021***	0.025***	0.012	0.038***	0.039***	0.041***
	(2.21)	(2.50)	(4.05)	(4.80)	(1.28)	(4.20)	(4.33)	(4.29)
Tenure$_{t-1}$	-0.000	-0.000	-0.000	-0.000	0.000	0.000	-0.000	-0.000
	(-0.56)	(-0.57)	(-0.74)	(-0.48)	(0.27)	(0.16)	(-0.08)	(-0.02)
Duality$_{t-1}$	-0.001	0.001	0.006	0.008	0.010	0.020	0.021	0.015
	(-0.05)	(0.12)	(0.65)	(0.85)	(0.55)	(1.39)	(1.44)	(0.96)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No	Yes	No	No	No
Industry FE	No	No	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	16,071	16,071	16,153	16,153	7,854	7,943	7,943	7,943
Adj. R^2	0.304	0.306	0.065	0.079	0.307	0.076	0.076	0.062

Table IA.2: Lender's monitoring incentives and DPM Contracting (Narrow Treatment Group)

Using a lender-specific shock - defaults in a lender's corporate loan portfolio as a shock to the lenders' monitoring incentives, this table presents estimated coefficients from linear regressions that relate the probability of having DPMs (or the number of DPMs) to the lenders' monitoring incentives. We collect the defaults sample over the period 2007–2020 from Capital IQ S&P credit ratings database. Table IA.2 uses the same specification as in Table 4 Panel B but eliminates borrowers for which the first treatment falls before 2007 (i.e., the starting year of our sample period). In all columns in Table IA.2, we use the full sample of firms that have accessed the syndicated loan market. All regressions control for firm-specific characteristics (including *Debt/EBITDA*, *Assets, Tangibility, OperatingCF, MtB, ROA, Sales-Growth, FirmAge*) and year fixed effects. In all regressions, standard errors are clustered for each firm. We conduct all matching based on *Rated, InvestmentGrade, Leverage, MtB, Assets*.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$	DPM_t	$Num\ DPM_t$
	Full Sample		Entropy Balance: three moments		PSM: nearest		PSM: three nearest	
$Post_t \times Default_i$	0.047***	0.063***	0.044***	0.053**	0.044***	0.045**	0.045***	0.057**
	(3.47)	(2.85)	(3.24)	(2.37)	(3.15)	(1.98)	(3.34)	(2.55)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	18,440	18,440	18,440	18,440	11,214	11,214	15,352	15,352
Adj. R^2	0.297	0.309	0.304	0.317	0.289	0.303	0.298	0.309

Table IA.3: Credit Quality and Non-debt metrics

This table presents estimated coefficients from linear regressions that relate number of *Non-debt metrics* to the measures of borrower credit quality. We collect the sample over the period 2007–2020. We collect non-debt performance metrics (i.e., non-debt related accounting metrics or stock price metrics) from Incentive Lab Database which provides the performance metrics for S&P500 and a significant portion of S&P400. Therefore, in the tables below, we use a sample of firms that have records in the Incentive Lab Database. Panel A contains the full sample, while Panel B only contains those firms with credit ratings. The dependent variable is *Number of Non-debt metrics*, which represents the number of non-debt metrics utilized by the firm in the given year. We measured the firms' credit quality by their expected default frequency (×1000) computed using the procedure in Bharath and Shumway (2008) and credit rating. Higher *EDF* indicates higher default probability. Larger *CreditRating* indicates better ratings. We define *EDF_High* as a dummy variable which indicates those firm-years with the value of expected default frequency in the highest quantile, and we define *EDF_Low* as a dummy variable which indicates those firm-years with the value of expected default frequency in the lowest quantile. We control for firm-specific characteristics (including *Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), the inclusion of DPM (*DPM*), year fixed effects and firm (or industry) fixed effects. In all regressions, standard errors are clustered for each firm.

Panel A: Expected Default Frequency

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Number of Non-debt Metrics$_t$							
EDF_t	-0.296	-0.348			-1.238	-1.608		
	(-0.19)	(-0.23)			(-0.52)	(-0.68)		
EDF_High_t			0.084	0.075			-0.117	-0.144*
			(1.38)	(1.22)			(-1.40)	(-1.72)
EDF_Low_t			-0.062*	-0.060*			-0.250***	-0.231***
			(-1.71)	(-1.66)			(-4.12)	(-3.82)
DPM_t		0.166***		0.161***		0.322***		0.309***
		(3.42)		(3.33)		(4.87)		(4.66)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	No	No	No	No
Industry FE	No	No	No	No	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	11,428	11,428	11,428	11,428	11,495	11,495	11,495	11,495
Adj. R^2	0.580	0.581	0.580	0.581	0.144	0.148	0.147	0.150

Panel B: Credit Rating

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of Non-debt Metrics$_t$					
$CreditRating_{t-1}$	-0.055**	0.055***		-0.051**	0.060***	
	(-2.35)	(3.09)		(-2.21)	(3.39)	
A rated or better$_{t-1}$			0.195*			0.214*
			(1.71)			(1.88)
BB rated or worse$_{t-1}$			-0.235***			-0.255***
			(-2.62)			(-2.83)
DPM_t				0.141**	0.230***	0.232***
				(2.49)	(3.47)	(3.50)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	No	No	Yes	No	No
Industry FE	No	Yes	Yes	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	7,211	7,273	7,273	7,211	7,273	7,273
Adj. R^2	0.541	0.152	0.153	0.542	0.155	0.155

Table IA.4: Credit Quality and Types of DPMs

This table presents estimated coefficients from linear regressions that relate the probability of having different types of DPMs to the measures of borrower credit quality. We collect the sample over the period 2007–2020. Panel A contains the full sample, while Panel B only contains those firms with credit ratings. We categorize DPMs into "debt reduction" metrics and other metrics. *DPM* is an indicator variable that equals one if the firm has a certain type DPM contract in the given year, i.e., when the firm incorporates debt performance metrics in their executive compensation designs. All regressions control for lagged firm-specific characteristics (including *Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year fixed effects and firm (or industry) fixed effects. In all regressions, standard errors are clustered for each firm. We measured the firms' credit quality by their expected default frequency (×1000) computed using the procedure in Bharath and Shumway (2008) and credit rating. Higher *EDF* indicates higher default probability. Larger *CreditRating* indicates better ratings. We define *EDF_High* as a dummy variable which indicates those firm-years with the value of expected default frequency in the highest quantile, and we define *EDF_Low* as a dummy variable which indicates those firm-years with the value of expected default frequency in the lowest quantile. We define "*RatingDisagree*" as a dummy variable, which equals to 1 if there exist split ratings for a firm in a given year.

Panel A: Expected Default Frequency

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DPM_t							
	Type: Debt Reduction				Other Types			
EDF_t	0.274*		0.423***		0.172		0.363*	
	(1.88)		(2.65)		(0.94)		(1.82)	
EDF_High_t		0.026***		0.036***		0.027***		0.044***
		(4.23)		(5.94)		(3.30)		(5.00)
EDF_Low_t		-0.003		-0.015***		-0.011**		-0.030***
		(-0.94)		(-5.09)		(-2.44)		(-6.46)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	No	No	Yes	Yes	No	No
Industry FE	No	No	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	29,772	29,772	30,237	30,237	29,772	29,772	30,237	30,237
Adj. R^2	0.251	0.252	0.024	0.033	0.292	0.293	0.058	0.066

Panel B: Credit Rating

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	DPM_t							
	Type: Debt Reduction				Other Types			
$CreditRating_{t-1}$	-0.013***	-0.011***			-0.016***	-0.017***		
	(-3.98)	(-6.36)			(-3.43)	(-6.27)		
$A\ rated\ or\ better_{t-1}$			-0.032***				-0.079***	
			(-4.51)				(-5.16)	
$BB\ rated\ or\ worse_{t-1}$			0.047***				0.064***	
			(4.54)				(4.22)	
$RatingDisagree_{t-1}$				0.018**				0.022*
				(2.38)				(1.94)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	No	No	No	Yes	No	No	No
Industry FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	11,185	11,347	11,347	11,347	11,185	11,347	11,347	11,347
Adj. R^2	0.261	0.036	0.034	0.026	0.323	0.045	0.047	0.035

Table IA.5: Debt Maturity Pressure and Types of DPMs

This table presents estimated coefficients from linear regressions that relate the probability of having different types of DPMs to the measures of debt maturity pressure. We collect the sample over the period 2007–2020. In Panel A, the dependent variable is *DPM (Debt Reduction)*, which is an indicator variable that equals one if the firm has a "debt reduction" DPM contract in the given year. In Panel B, the dependent variable is *DPM (Other Types)*, which is an indicator variable that equals one if the firm has other types of DPM contract in the given year. All regressions control for firm-specific characteristics (including *Leverage, Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year fixed effects and firm fixed effects. In all regressions, standard errors are clustered for each firm. We measure debt maturity by using six indicator variables: *Due_1st_Year%, Due_2nd_Year%, Due_3rd_Year%, Due_4th_Year%, Due_5th_Year%* and *Due_other_Year%*. These variables represent the proportion of long-term debt due in one year, in the 2nd year, in the 3rd year, in the 4th year, in the 5th year and debts due in more than 5 years, respectively.

Panel A: "Debt Reduction" DPMs

	(1)	(2)	(3)	(4)	(5)	(6)
			DPM_t			
			Type: Debt Reduction			
$Due\_1st\_Year\ \%_{t-1}$	0.012***					
	(3.18)					
$Due\_2nd\_Year\ \%_{t-1}$		0.018***				
		(4.08)				
$Due\_3rd\_Year\ \%_{t-1}$			0.001			
			(0.17)			
$Due\_4th\_Year\ \%_{t-1}$				0.005		
				(1.19)		
$Due\_5th\_Year\ \%_{t-1}$					-0.006	
					(-1.38)	
$Due\_Other\_Year\ \%_{t-1}$						-0.018***
						(-3.40)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	25,074	25,074	25,074	25,074	25,074	25,074
Adj. R^2	0.245	0.246	0.245	0.245	0.245	0.246

Panel B: Other Types of DPMs

	(1)	(2)	(3)	(4)	(5)	(6)
			DPM_t			
			Type: Other Types			
$Due\_1st\_Year\ \%_{t-1}$	0.018***					
	(2.64)					
$Due\_2nd\_Year\ \%_{t-1}$		0.011*				
		(1.66)				
$Due\_3rd\_Year\ \%_{t-1}$			0.009			
			(1.37)			
$Due\_4th\_Year\ \%_{t-1}$				0.001		
				(0.17)		
$Due\_5th\_Year\ \%_{t-1}$					-0.005	
					(-0.83)	
$Due\_Other\_Year\ \%_{t-1}$						-0.020**
						(-2.55)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
N	25,074	25,074	25,074	25,074	25,074	25,074
Adj. R^2	0.303	0.303	0.303	0.303	0.303	0.303

Table IA.6: Shock to Lender's Monitoring Incentives and Types of DPMs

Using a lender-specific shock - defaults in a lender's corporate loan portfolio as a shock to the lenders' monitoring incentives, this table presents estimated coefficients from linear regressions that relate the probability of having different types of DPMs to the lenders' monitoring incentives. We collect the defaults sample over the period 2007–2020 from Capital IQ S&P credit ratings database. We restrict the sample to firms that have accessed the syndicated loan market, excluding both defaulting borrowers and the lenders' current borrowers who are in the same industries or geographic regions as the defaulting borrowers at the time of defaults. $Post_t \times Default_i$ is an indicator variable that equals one if at least one loan arranger of the borrower has experienced a payment default before the given year, and the borrower's loans arranged by this lender are outstanding at the time of default. We categorize DPMs into "debt reduction" metrics and other metrics. DPM is an indicator variable that equals one if the firm has a certain type DPM contract in the given year. Panel A presents the results for "Debt Reduction" DPMs, while Panel B presents the results for other types DPMs. All regressions control for lagged firm-specific characteristics (including *Debt/EBITDA*, *Assets, Tangibility, OperatingCF, MtB, ROA, SalesGrowth, FirmAge*), year fixed effects and firm fixed effects. In all regressions, standard errors are clustered for each firm. In Column (1), we report results using a large unmatched sample of control firms. In Column (2), we conduct entropy-balanced matching with three moments. In Column (3), we conduct propensity-score matching using nearest neighbor matching with replacement. In Column (4), we conduct propensity-score matching using three-nearest neighbor matching with a caliper of 0.03. We conduct all matching based on *Rated, InvestmentGrade, Leverage, MtB, Assets*.

Panel A: "Debt Reduction" DPMs

	(1)	(2)	(3)	(4)
		DPM_t Type: Debt Reduction		
	Full Sample	Entropy Balance: three moments	PSM: nearest	PSM: three nearest
$Post_t \times Default_i$	0.014	0.010	0.008	0.012
	(1.48)	(1.09)	(0.81)	(1.31)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	22,090	22,090	16,049	20,137
Adj. R²	0.257	0.262	0.251	0.259

Panel B: Other Types of DPMs

	(1)	(2)	(3)	(4)
		DPM_t Type: Other Types		
	Full Sample	Entropy Balance: three moments	PSM: nearest	PSM: three nearest
$Post_t \times Default_i$	0.035**	0.031**	0.032**	0.035**
	(2.52)	(2.24)	(2.26)	(2.55)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
N	22,090	22,090	16,049	20,137
Adj. R²	0.299	0.306	0.293	0.297