CEO incentives for risk shifting and its effect on corporate bank loan cost

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ABSTRACT

Using a sample from 1993 to 2010 of U.S. corporate bank loans, we study the relationship between CEO incentives for risk-shifting, proxied by Vega, and the cost of corporate bank loans. Equity-based compensation can enhance risk-shifting incentives, encouraging managers to make risky choices to increase shareholder wealth at the expense of creditors. Our results indicate that firms borrow at higher rates when having CEOs with higher risk incentives. This is consistent with previous literature which state that more equity-based compensation can align CEO and shareholder objectives, but it can also increase the agency cost of debt encouraging lenders to protect themselves against risk-shifting.

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1. Introduction

The use of equity based incentive compensation for chief executive officers (CEOs) has increased dramatically in recent decades. The median exposure of CEO wealth to equity prices doubled in just six years from 1994 to 2000 (Bergstresser & Philippon, 2006). Such changes in compensation have a dramatic impact on the executive's exposure to risk and consequently her decisions on investment and firm risk. These changes in compensation are intended to help overcome under-diversified managers' natural risk aversion and thereby align the CEO's interests more closely with those of shareholders. However, as Jensen and Meckling (1976) argue, equity-based compensation can enhance the conflicts between shareholders and bondholders.

The use of option grants in compensation packages gives executives incentives to increase firm risk, since the Black–Scholes value of an option is increasing in the underlying asset's volatility.[2] Thus, option compensation can exacerbate the agency cost of debt, particularly that arising from risk-shifting. As Jensen and Meckling (1976) show, when managers adopt riskier policy choices they can increase the market value of the firm's equity at the expense of creditors, creating a wealth transfer from the firm's creditors. In the event of a loss, limited liability protects shareholders from losing more than their stake in the firm, however large losses will be absorbed by the bondholders; on the other hand, upside gains are potentially unlimited, thus risk-shifting can benefit shareholders by increasing the chance of large gains.

In this paper, we study the relationship between CEO incentives for risk-shifting, as measured by a higher risk-sensitivity in the CEOs equity portfolio, and the cost of their corporate bank loans. As just argued, equity-based compensation can magnify risk-shifting incentives, encouraging managers to make risky choices that can potentially increase the market value of equity at the expense of creditors. In the event of bankruptcy, the creditors face most of the risk and the cost of these choices, but in the event of successfully obtaining a high payoff in return for high risk, the shareholders will capture most of the benefits.

We argue that lenders protect themselves ex ante against risk-shifting, by charging a higher interest rate on their loans. When comparing two firms with equal risk and characteristics, if one of these firms has a CEO with higher incentives to engage in risk-shifting in the future, then it will pay a relatively higher cost for its bank loan, as lenders force some of the expected future risk-shifting costs on the firm today.

Our results in this paper confirm that banks charge higher rates to firms whose CEOs have higher risk incentives. Our finding highlights the importance of compensation structures in shareholder-lender conflicts and is in accordance with Jensen and Meckling (1976), who argue that more equity-based compensation can lower the agency cost of equity by aligning CEO and shareholder objectives, and at the same time increase the agency cost of debt by encouraging lenders to protect themselves against risk-shifting[3].

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[2] An option provides the holder with downside protection, hence the executive is protected against downside price changes but can benefit for upside price swings.

[3] There is a body of literature that argues that the use of option compensation may induce managers to avoid risky investment opportunities in order decrease the risk of their personal wealth (Brick, Palmon, & Wald, 2012; Tian, 2004). However, this risk aversion is generated by options that are deep in-the-money, which are the same options that generate a negligible quantity of Vega, our measure of risk incentives.

We measure the risk-shifting incentives in CEO compensation by the value of the Greek Vega in the CEO's option portfolio. Vega represents the change in the Black–Scholes option value for a 1% increase in the underlying asset's annualized volatility. We compute Vega for all of the options a CEO owns as reported by the firm in their filings to the Securities and Exchange Commission. The larger the value of Vega the more a CEO benefits from increasing firm risk.

Recent empirical work highlights the effect of Vega on the risk choices of managers and the reaction by bondholders. Coles, Daniel, and Naveen (2006) show that CEOs with higher Vega values take riskier investment choices. Brockman, Martin, and Unlu (2010) find a positive relation between CEO portfolio Vega and short-maturity debt yields. Campbell and Taksler (2003) provide evidence that idiosyncratic equity volatility is positively related to the interest rates on corporate bonds. Billett, Mauer, and Zhang (2010) find a negative bond price reaction to an increase in stock volatility. Daniel, Martin, and Naveen (2004) find that higher CEO risk incentives are associated with higher yields of public bonds. Ortiz-Molina (2006) finds that a higher alignment of managerial and shareholder interests leads to higher borrowing costs when firms have more investment opportunities.

Our results show that firms with CEOs with higher risk-shifting incentives pay a higher interest rate in their bank loans. We find that the elasticity of the bank loan rate with respect to Vega is about 0.23, an economically important magnitude when we consider that Vega is very volatile. For the median bank loan in our sample, an interquartile jump in Vega would result in a 39 basis point increase in the bank loan rate.

For this study, we obtain firm characteristics, macroeconomic information, and loan contract information for loans denominated in U.S. Dollars and granted to public non-financial U.S. corporations from 1993 to 2010. Using traditional OLS regressions we do not find a positive relation between loan rates and Vega, but we argue that this is due to an omitted variable bias. In a calibration study, Habib and Ljungqvist (2005) find that firms that grant options with higher Vega are closer to their optimal value, thus it is plausible that "better firms" (or those with better governance structure) are the ones that provide executives with the larger incentives in order to align the CEO's objective with that of the shareholders, and at the same time these firms pay a lower cost of debt because they are optimally governed or managed. This attribute of a "better firm" represents an omitted variable that could bias our estimation results. We correct for this bias by using instrumental variables methodology and then we find that Vega has a positive and statistically significant relation with bank loan spreads. This result is what we would expect concerning rational lenders; it suggests that an increase in equity risk will be paired by an increase in loan spreads as compensation for the risk shifting conflict that creditors go through.

The increase in loan spreads may also be related to cross sectional differences among firms, therefore we test if these can enhance the effect of CEO incentives in loan prices. Following Ortiz-Molina (2006) we first test if firms with more opportunities to take discretionary projects pay a higher loan spread due to higher CEO risk shifting incentives. Then, we test if a previous relationship between the borrower and lender mitigates the effect of risk shifting incentives. We find that firms with higher investment rate and a new relationship with their bank will pay more for their loans as their CEO's risk shifting incentives increase.

To further study the effect of CEO incentives in bank loan contracts, we take a look at the covenant structure. Our findings suggest that banks protect against risk-shifting by borrowers not just by charging a higher interest rate, but also by attaching covenants to the loan in order to restrict management's activities.

The remainder of the paper is organized as follows. We describe our data in Section 2 and develop our methodology in Section 3. Section 4 contains our results and the last section concludes.

2. Data sources

We use the LPC Dealscan database to obtain loan contract information for loans denominated in U.S. Dollars and granted to public U.S. corporations from 1993 to 2010. We match this sample with Standard and Poor's Compustat database to obtain financial statement data for the borrowers. As is standard in the literature, we exclude financial and regulated firms from our sample, as well as firm-years where a company engaged in a merger or acquisition larger than 15% of its book asset value.

We obtain CEO compensation information from the Execucomp database. We require that the executive be expressly identified as the CEO in the database; for the cases where more than one CEO is identified for a firm-year due to succession, we drop the outgoing CEO from our sample and only keep the incoming one as indicated in the Execucomp database. We match each loan with the most recent accounting and compensation data for the fiscal year ending prior to the loan origination date, so that the firm and executive information can be considered predetermined to the loan characteristics.

Lastly, we collect macroeconomic data from the Federal Reserve's FRED database. We construct the term spread as the difference in rates between the ten and one year Treasury notes, and the credit spread as the rate difference between BAA and AAA rated corporate bonds.

For each CEO in our sample we compute the risk incentives in her compensation. Following previous literature such as Coles et al. (2006) and Liu and Mauer (2012) we use the value of Vega in the executive's wealth portfolio as a measure for risk incentives. Vega represents the change in the wealth of the CEO to a 1% increase in the annualized volatility of the firm's stock. From Black–Scholes option pricing we know that the value of an option is increasing in the underlying asset volatility, thus CEOs whose compensation include option grants may have an incentive to increase firm risk, and Vega measures how much they benefit from such action. To compute Vega we follow Core and Guay (1999) and only take into account the executive's option portfolio, since stock grants contain minimal values of Vega unless the firm is in financial distress.

All variables used in this study are defined in the data Appendix A. Our final sample consists of 8527 loans made by 416 unique banks to 1546 firms. We have 2260 unique CEOs in our sample.

Table 1 presents descriptive statistics for firm, loan and executive characteristics. Our need to collect compensation data from the Execucomp database restricts our sample to medium to large firms, since Execucomp consists primarily of firms listed in the S&P 1500 index. In Panel A we observe that firms in our sample have an average of $9 billion in book assets, though this value reflects some very large firms since the median value is only about $2 billion. To mitigate for this positive skewness we use the logarithm of assets in our regressions. We can also observe that firms on average have a moderate amount of leverage, a positive profit margin, and valuable growth opportunities.

Panel B presents loan contract characteristics. The average interest rate spread over the London InterBank Offered Rate (LIBOR) in our sample is 139 basis points though there is substantial variation as evidenced by the standard deviation. The maturity for the average loan is 43 months, while the average size of the loan is over $500 million. Most of the loans in our sample are syndicated and the mean syndicate size is of 10 institutions, suggesting that there is some risk sharing among banks.

We observe CEO compensation characteristics in Panel C. The average cash compensation (salary plus cash bonus) is $1.5 million however the option value represents an important part of total compensation. The ratio Black–Scholes value of option to cash compensation for the median CEO is about 0.5; this ratio is very high for the average CEO since some huge outliers are created by CEOs with "symbolic" cash pay of $1. Our measure of risk incentives is Vega and is equivalent to the wealth change in a CEO portfolio for a 1% increase in equity volatility. Vega is $95 thousand for the average CEO, is positively skewed, and