

# CEO COMPENSATION AND CREDIT DEFAULT SWAPS: EVIDENCE FROM THE U.S. AND GERMANY

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## ABSTRACT

Executive compensation is designed to create incentives for CEOs to act in the best interest of shareholders. Short-term (bonus) and equity-based incentives induce risk taking behaviors of the CEO that could further change a firm's risk exposure. This article examines the linkage between compensation components and the impacts on a firm's credit risk using data from the U.S. and Germany. In the U.S., we find a positive relation between equity-based compensation and credit default swap spreads. Similar positive relation is also found between short-term incentive bonus pay suggesting compensation induce more risk taking for the U.S. firms. However, we do not find significantly positive relation between equity-based incentive and a firm's credit risk in German firms. Our results seem to indicate that bonus pay is large portion of pay for German CEOs therefore restraint CEOs' risk taking strategies.

## INTRODUCTION

Executive compensation is designed to align corporate agents' (CEOs and other executives) incentives with those of its owners (shareholders). CEO pay is typically composed by fixed salary, bonus, stocks granted, options granted and long term incentive plans. Some compensation pay is more performance based (i.e. bonus) and others are used to make CEOs shareholders themselves (equity based incentives). A certain change in the compensation structure is likely to change executives' incentives and alter their behaviors, particularly in risk-taking and shifting strategies. Changing strategies leads to settings of capital structure, usage of debts and eventually increase/decrease bankruptcy risk exposures for a company.

This article examines the linkage between compensation components and the impacts on a firm's credit risk. Few studies have examined the relation between CEO ownership/compensation and bond returns or credit risk (Carlson and Lazrak 2009). However, almost all studies focus on the U.S. firms. We examine the relations of compensation and firms credit risks in two very distinct markets: U.S. and Germany. We are also particularly interested in performance based and equity based compensation and their impacts on a firm's risk exposure.

Germany and the U.S. markets are the classic representatives of divergent financial systems. Thus, the German financial system is seen, in particular, as a classic example of a bank based and control oriented financial system. Whereas the U.S. market, on the other hand, is regarded as a traditional representative of a market oriented financial system (see Allen and Gale (1995)). A central role in the discussion of financial systems is played by the different kind of relationships between companies and banks and the resulting scope and extent of informational advantage. In countries of the bank oriented type like Germany long-term customer bank relations are the norm, while in market oriented countries like the

U.S., a less intensive relation between company and bank is evident. The fundamental difference between the corporate governance systems in Germany and the U.S. is referred to as an 'insider versus outsider system' in the literature.

We choose these two distinct markets to examine compensation structures and the impacts on firms' risk exposure. Is compensation structure comparable worldwide or a countrywide phenomenon? How do incentive pays (bonus and equity based) alter CEOs' behavior and further leads to firms' credit risk? The global credit derivative market has grown enormously in recent years. The Credit Derivative Report 2006 of the British Bankers' Association (BBA) which carries out extensive international market research yearly, and whose studies also supply detailed information regarding market structure, reported that the market was worth approximately 350 billion U.S. Dollars in 1998. In 2004 the outstanding nominal volume was approx. 5,021 billion U.S. Dollars, in 2006 it was approx. 20,207 billion U.S. Dollars and for the end of 2008 the prognosis by the BBA was approx. 33,120 billion U.S. Dollars. The volume has quadrupled from 2004 to 2006.

We estimate short term incentive pay (bonus) and equity based pay (stocks and options granted) impact on firms' credit risk. We adopt different econometric models to examine this relationship. In the U.S. data, we find a positive relation between equity based compensation and CDS spread of the firm. The higher the equity based component, the more credit risk a firm is exposed to. We also find a similar positive relation between short-term incentive bonus pay and CDS spread. Short term compensation incentive also increases a firm's credit risk.

On the other hand, German compensation speaks a different language. Equity based compensation is not a significant driver of a firm's credit risk. There exists a negative relation between bonus pay and CDS spread. Bonus is a relative larger component of CEO pay in Germany compared to that in the U.S. A large component of German CEO pay is tied to short term incentive. Although there could be limited downside risk for CEOs to choose risky project, the high proportion of the pay from bonus could restraint CEOs' risk taking behaviors. This could possibly explain our findings on negative relation between bonus and credit risk; we offer other explanations in our discussion of the results.

Our article contributes to this literature by showing that managerial compensation is a significant determinant of a firm's credit risk in the U.S. However, managerial compensation could speak a different language in Germany and influence a firm's credit risk differently. We organize the paper as the following. Next section we review prior literature and develop several hypotheses. Section 3 we present empirical analysis and conclude.

## **HYPOTHESIS DEVELOPMENT**

In Merton's 1976 seminal paper, the value of a corporate debt depends on three items: the required return on riskless debt, the provisions contained in the indenture, and the probability that the firm will be unable to satisfy some or all indenture requirements. Credit risk is particularly related to the probability of default that is a function of the volatility of a firm's operations.

It has long been described in prior literature that principal-agent relations are prevalent in economic organizations. A problem of moral hazard may arise when an individual agent engage in risk sharing under conditions those actions taken privately will affect the outcome. The source of this moral hazard problem is due to asymmetric information among individuals and actions taken by these individuals cannot be observed and contracted upon. Through the mechanism of executive compensation, firms

may be able to decrease the level of agency problem and align manager personal interests with shareholders wealth.

Several studies have examined compensation structure and its impacts on managerial firm risk management. Tufano (1996), Smith and Stulz (1985), and Stulz (1984) discuss managerial risk aversion as a driver of corporate risk management. Managers whose human capital and wealth are poorly diversified strongly prefer to reduce the risk to which they are exposed. Model of Smith and Stulz suggests that managers with greater stock ownership prefer more risk management, while those with greater option holdings prefer less risk management. Stocks provide linear payoffs whereas options provide convex payoffs.

Compensation could include performance sensitive or/and performance insensitive components. Murphy (1999) has documented the rapid growth of equity-based compensation (in the form of stock and options) in recent years. Fernandes et al also find that U.S. executives receive more equity-based compensation compared to executives in other countries. The average CEO in U.S. receives 42% of his pay in the form of stock or options, more than double compared to CEOs in other countries.

However, based on special features of the package it also provides managers different incentives for risk taking. This may leads to a change in companies' risk profile. We survey in the following of lieterature on agency problem and excutive compensation to develop testable hypothese. Equity-based executive compensation may mitigate these conflicts of interest by providing a more direct link between manager and shareholder wealth. However, contracting theory predicts that greater equity-related compensation may exacerbate the agency problems of debt (Bryan et al 2006).

Benston and Evan (2006) studies banks CEO ownership structure and suggests that CEOs who are not significant stockholders generally will avoid taking actions that shift risk to debtholders. Unlike limited-liability stockholders (who can lose only the funds invested in their shares), the expected value of high-risk projects for these CEOs generally is negative. Several forms of incentive based compensation could be used to align the interests of CEOs with that of shareholders (to give incentives for risk taking or risk shifting). They postulate that short-term incentives (bonuses) may be more effective than long-term incentives (stock options and rights and non-stock-related long-term incentive pay) as an incentive for CEOs to shift risk to debt holders. Bonuses are linked with accounting measures. They can be "manipulated" and so there is no (or no early) negative consequence. CEO gets bonus, even when the firms fails later (see also Noe et et al. 1996). Stock options offer the possibility of greater rewards should the risks taken succeed.

In a study that examines the role of corporate governance in the 2007-2008 credit crisis, Erkens, Hung and Matos (2009) hypothesize that CEO bonus pay is associated with larger losses during the crisis and more risk taking before the crisis. Equity-based compensation is associated with smaller losses and less risk taking. They define equity-based compensation as the sum of restricted shares, long-term incentive plans (LTIP), and stock option awards scaled by the sum of salary and other annual compensation. Bonus pay is scaled by the sum of salary and other annual compensation.

From the Merton model, it can be derived that investing in risky projects increases the value of the option the shareholders have on a levered firm. This is the asset substitution or risk shifting problem (see also Galai and Masulis (1976) and Jensen and Meckling (1976). Jensen and Meckling (1976) suggest that when risky debt is outstanding, equity has a convex payoff structure such that shareholders gain by shifting into higher risk projects even when the incremental net present value is negative. Their analysis

suggests, that the proportion of equity controlled (owned) should influence the firm's policies and also leverage and CDS-spreads.

Based on the literature above, we hypothesise the following:

***Hypothesis 1:*** There is a positive relation between equity-based compensation and CDS spreads.

***Hypothesis 2:*** There is a positive relation between short term incentive pay (bonus) and CDS spreads.

***Hypothesis 3:*** There is a positive relation between CEO ownership and CDS spreads.

## EMPIRICAL RESULTS

### U.S. SAMPLE

Our main variables of interest are the compensation components and their influence on credit risk. We hypothesized (Hypothesis 1) that there is a positive relation between equity-based compensation and CDS spreads. It is shown that the proportion of CEO's equity-based compensation clearly matters for credit risk. The coefficients in the regressions are strongly significant with the expected sign. A high level of the equity-based component in compensation drives credit risk and therefore CDS spreads. When CEOs' compensation is aligned with shareholders, they tend to take risky projects due to limited downside risk. This action would lead to an increase in a firm's risk exposure in terms of credit risk. The results clearly argue in favor of hypothesis 1.

Hypothesis 2 established our prediction that there is a positive relation between short term incentive pay (bonus) and CDS spreads. This hypothesis consistently received strong support, both in terms of the sign as well as statistical significance, in all three regressions. It seems that creditors perceive bonuses as incentive to CEOs to invest in risky projects. Debtholders seem to anticipate and price that risk shifting problem and therefore it is reflected in CDS spreads.

As discussed earlier, prior research shows that credit ratings can explain a large portion of the levels of CDS spreads or bond spreads. Credit ratings produced by the major credit rating agencies aim to measure the creditworthiness of companies, i.e. their ability to meet their debt servicing obligations. They measure credit risk and should catch firm specific credit relevant information. We predicted an inverse relationship (due to our conversion procedure) between the variables CDS spread and rating. In all models, our rating variable has a negative sign and the coefficients are statistically highly significant. This shows that ratings influence CDS spreads significantly.

Merton's (1974) model (and other structural models) can be used to explain risky debt yields. In that models credit spreads depend on leverage and asset volatility. We predicted that our proxies leverage ratio and equity standard deviation are both positively correlated with CDS spreads. As the results in all regressions show these two "structural variables" are indeed a significant determinant of CDS spreads.

Furthermore we find that stock returns are negatively related to CDS spreads. Higher stock returns imply better future prospects and should be associated with lower default risk. This inverse relationship is shown in all regressions and is statistically highly significant. Prior research has shown that accounting based measures of profitability and CDS spreads are negatively correlated. More profitable firms bear less credit risk. We expected therefore a negative relationship between ROA and CDS spread. This hypothesis was strongly supported and the coefficients for ROA are positive and statistically significant in all models.

## **GERMAN SAMPLE**

We now turn to the results of the German sample. The variable rating shows the expected negative sign but loses significance in the fixed effects models. It can be argued that the information content of Credit ratings of German companies is less and rating agencies measure credit risk better for US located companies. One reason could be that they don't take into account sufficiently the special characteristics in European accounting, disclosure and management practice. This could explain why ratings could be not such an important determinant of CDS spreads in the "German market".

Leverage ratio is a significant positive determinant of CDS spreads in the fixed effects models only. Stock return shows predominantly a significant negative relationship with our dependent variable. Equity standard deviation shows no significance in the FE models. Our further firm specific variables ROA and size (measured by total assets) display the expected sign but are not significant.

The hypothesis 1 that higher equity based compensation is associated with higher default risk because of the risk shifting problem is not supported by the results. We had hypothesized (Hypothesis 2) that a higher bonus component in CEO compensation is related with higher CDS spreads. It is interesting to see that the sign is negative in all regressions and significant in the FE model. There seems to be a tendency that creditors approve bonuses. There are several possible explanations for such a tendency. One potential explanation is that bonus pay for German CEOs consist of a large portion of their total compensation (50% on average) compared to U.S. CEOs (13% on average). This high concentration of pay in bonus could restraint CEOs risk taking behavior and leads to a lower credit risk of a firm.

An alternative explanation is that markets are not that efficient in Germany and therefore creditors are not aware of a potential risk shifting problem inherent in short term incentive pay. It could also be that they value bonus payments positive as it reflects (correctly) the profitability of the firm. In the context of the financial system in Germany this could be for reasons of superior or private information. Germany is marked by a high degree of intermediation (linked to monitoring by banks). German universal banks, which are major players in the CDS market have, regarding the traded German companies on the CDS market a potential information advantage. The reason for this can be found in the special role of banks in the German financial system ("relationship banking" or "Hausbankenprinzip"). Potential channels for the generation of information are: direct equity stakes in companies, Supervisory Board members and credit relationships as well as the investment banking relationship.

It is important to note that we were restricted to a small sample for our German panel (due to the lack of compensation data) and that the results have to be interpreted with caution. But they are first evidence that some of the fundamental and well known determinants of CDS spreads are less important for German companies and that compensation structure as well as the influence on CDS spreads is different.

## **CONCLUSION**

This article examines the linkage between compensation structure and its impacts on firms' credit risk exposure. We provide evidence that some components of the U.S. CEO compensation drive the firm's credit default swap spreads. However, our German data does not find consistent results. This could be due to different portions of the CEO pays that are short-term vs. equity based. We believe this paper is the first international study that examines the relation between compensation and firms' credit risk. We are also planning to examine the relation between CEO ownership and CDS spreads in future steps.

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