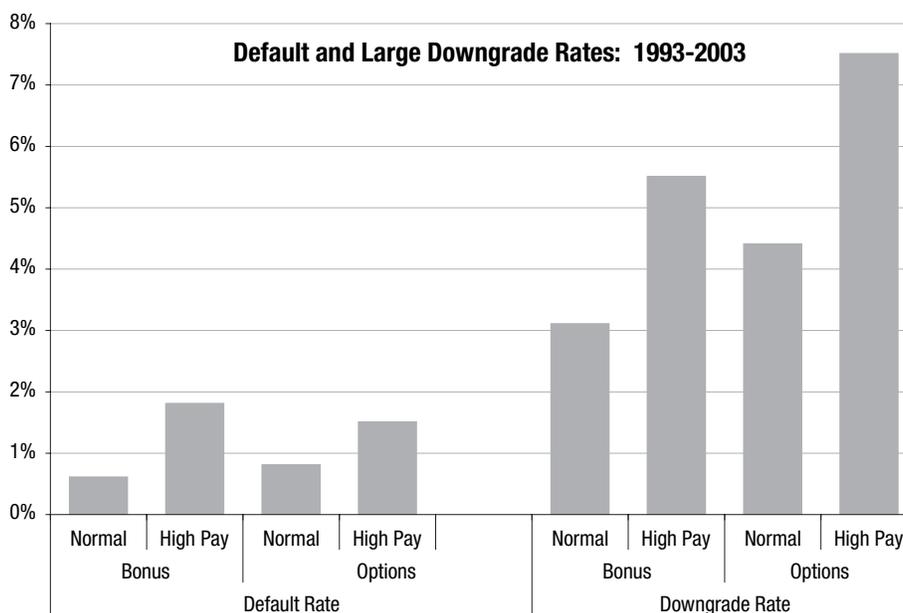


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CEO Compensation and Credit Risk

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Summary

We examine the empirical relationship between executive compensation and credit risk. For each of the three major components of CEO compensation – salary, bonus, and stock option awards – we derive estimates of “unexplained” compensation as pay that deviates substantially from expected pay based on firm size, past performance, and other variables. We then relate these measures of unexplained compensation to the risk of default and large rating downgrades between 1993 and 2003.

After controlling for a variety of firm characteristics, including industry effects and long-term ratings, we find that large, positive, unexplained bonus and option awards are predictive of both default and large rating downgrades. Variations in salaries, however, do not appear to be predictive of credit risk.

Although the analysis does not directly address the reasons why large bonuses or option grants are associated with greater credit risk, possible explanations can be inferred from the academic literature on CEO compensation, managerial incentives, and board control.

High levels of unexplained compensation may indicate that board oversight is lax and, as a result, management has insufficient pressure to deliver good financial performance.

Large performance-based compensation packages, in particular, may induce managers to:

- Deliver strong short-term financial results and obscure longer-term structural problems.
- Pursue high risk strategies with very strong positive, but also very adverse, potential payoffs.

The Link Between CEO Compensation And Credit Risk

This *Special Comment* investigates the empirical relationship between the size of a CEO’s pay package – compared to its expected value as determined by a simple compensation prediction model – and credit risk, as measured by default rates and the frequency of large rating downgrades. To our knowledge, this is the first empirical research to focus on CEO compensation and realized credit risk, although there is an extensive theoretical literature that relates compensation to managerial incentives and a large empirical literature that relates compensation to realized equity returns.

CEO compensation schemes are designed to provide incentives to induce superior managerial performance, consistent with shareholder objectives. Although base salaries tend to be fairly insensitive to firm performance, bonus payments are often tied directly to operating performance through specific formulas, and option grants reward strong expected future operating performance that leads to higher stock prices.

Large compensation packages may be a signal, however, that a CEO has undue influence over his or her board of directors. As a result, the expected incentive effects of the compensation package may be ineffective because the CEO can obtain high compensation despite mediocre performance. Evidence that compensation is larger than expected may, therefore, be predictive of poor performance, both from the perspective of equityholders and debtholders.

It is also possible that equityholders and debtholders may view large levels of incentive-based bonus and options differently. Stockholders generally want firm managers to pursue all positive expected value projects – even if they are risky – because stockholders benefit from limited liability and a residual claim on the firm’s assets and they can diversify their holdings across firms. Debtholders, on the other hand, would generally prefer managers to pursue less risky strategies. Since incentive compensation is intended to align manager incentives with stockholder interests, it is reasonable to expect that higher levels of incentive pay (at least based on shareholder-oriented metrics) would be correlated with greater credit risk.

Compensation that is highly sensitive to short-term financial performance may also create incentives for CEOs to manipulate short-term measures of firm’s performance – even if such manipulation adversely affects the firm’s long-term performance. For example, if the CEO’s bonus depends entirely on operating income, the individual has an incentive to adopt aggressive accounting practices to maximize short-term financial results, even if in so doing, long-term financial performance is compromised.¹ It is also possible that managers alter actual operations in ways that hurt the firm in the long term or increase event risk. Examples of this could include cutbacks, by a utility with nuclear

1. *Prior academic research has shown that large executive stock option grants have been associated with accounting restatements and fraud. Specifically, the research showed that there was little relationship between salary and the announcement of an SEC forced restatement, including those related to fraud, or the announcement of a class action law suit proclaiming securities fraud. The relationship between these events and the size of the bonus is always positive but rarely significant. Only stock-based incentives were found to be significantly and positively related to the occurrence of a negative event. (For accounting restatements and fraud, see the papers by Erickson et al or by Johnson, et al. For class action lawsuits, see the paper by Denis, et al.)*

While previous research shows a relationship between option incentives and certain negative events, the focus on these negative events makes it difficult to determine whether option incentives only increase the likelihood of fraud or also increase the overall risk of the firm. It is quite possible that the accounting fraud comes about due to managers attempts to cover up randomly bad results from good but risky projects. Some previous research shows that higher option incentives are related to better firm performance on average lending some credence to this hypothesis. (See, for example, the paper by Hillegeist and Penalva.)

power plants or by an airline, of the ordinary maintenance and repair budget to the bone, or bank cutbacks on internal audit. Larger than expected compensation may also be correlated with higher levels of credit risk if it signals weak oversight from the board of directors. Strong board oversight may be an important safeguard against the risk that management will pursue uneconomic projects that might endanger the firm's future.

The Data Set

We focus exclusively on non-financial corporations in the United States with senior unsecured bond ratings of B3 or higher, from 1993 through 2003. An "observation" for each firm in a year includes its rating at the beginning of the year, a dummy variable indicating whether the firm defaulted within the next twelve months, and another dummy variable indicating whether the firm experienced a "large" rating downgrade of three or more refined rating notches during the subsequent year.

Each observation also includes the three major components of the prior year's CEO compensation – salary, bonus, and stock-based incentive compensation. Stock-based compensation includes both restricted stock grants and executive stock options. However, due to the preponderance of options versus stocks within our sample period, we will refer to this component of compensation as simply "option" compensation throughout the remainder paper. While we expect there could be differences in the incentives caused by stocks and options, we do not test for these in this study. In addition, we track firm revenues and operating income during the prior year, market capitalization at the beginning of the year, CEO tenure in years, and a number of other firm financial performance measures. The financial data is drawn from Compustat, and the compensation data comes from Execucomp.

Altogether, we have 4,485 annual observations on a total of 865 unique firms, with an average of 5.2 annual observations on each firm.² Among these firms, 43 or 1.0% defaulted during the sample period, and 214 or 4.8% incurred "large downgrades," which we define as a change in three or more refined rating notches within any twelve-month period. (Firms can experience more than one large rating change within the twelve-year sample period.)

Modeling Compensation

To determine unexplained compensation, we develop a model that predicts expected salary, expected bonus, and expected option grants based on firm size, past operating performance, CEO tenure, and industry – variables selected from the academic literature on CEO compensation.³ We also include annual dummies to account for the fact that compensation levels rose steadily through the sample period. We estimate three related regression models – one for each of the three major components of compensation. However, we use a regression technique that takes into account the fact that the determinants (both included in and excluded from the model) of compensation are likely to be correlated across the components.⁴

Selecting the timing relationships between the explanatory and dependent variables requires some care. Once executive compensation data are made publicly available, in most cases the actual compensation decisions have been set for over a year. For example, the most recent proxy statement for Moody's Corporation was publicly released on March 23, 2005, and reported CEO salary, option grant, and bonus data for 2004. The salary was determined based on fiscal year 2003 performance and was paid out over fiscal year 2004. The option grant was also based on fiscal year 2003 performance and was awarded in February of 2004. The targets for the 2004 bonus were set in light of the fiscal year 2003's performance, but the actual payout was based on fiscal year 2004's performance. Our models for salaries and options are, therefore, based on data lagged by one year; however, our model for determining bonuses requires data spanning two years – the year for which the targets were set and the year over which performance was measured.⁵ This will likely bias the results of our studies against finding any results because we will be predicting performance

2. Observations pertaining to CEOs with tenures of less than one year were removed from the sample because firms in distress often pay larger amounts to new CEOs as an incentive to turn the firms around. If we had included these observations in the sample, we might have concluded that high compensation predicted credit risk, when the relevant compensation for predicting credit risk was really the package received by the prior CEO.

3. See, for example, the survey on executive compensation by Murphy (1998).

4. In particular, we obtain our coefficient estimates results using a seemingly unrelated regression ("SUR") model that adjusts for correlation between the variables. The appropriateness of the SUR approach was confirmed by the correlation matrix of the residuals from the first-stage regression which indicated positive correlations – salaries and bonuses at 20.7%, salaries and options at 3.5%, and bonuses and options at 7.5%. The regressions were estimated on a weighted basis, where the reciprocal of the natural log of revenues was used as the weight, because compensation shocks to firms with large revenues are likely to be larger than those of other firms. The regressions were run as panels. Since the standard t-statistics associated with panel regression coefficient estimates are likely to be biased upward due to persistent shocks to individual firms, we calculated the t-statistics reported in Table 1 using regression residuals each year and averaging. Calculating the t-statistics in this way is biased downward – rather than upwardly biased as in the standard model.

5. There are complications here, for example that in many cases the bonus award will be based less on a pre-set formula and more on subjective determinants. There are other variations from the standard pattern assumed here, creating some noise around the results. However, we believe our timing assumptions are true for most companies included in the study. The likely effect of firms using different timing patterns on our results will be to create a bias against finding any relationship between pay and credit risk.

over the next year using year-old data.⁶ For simplicity, the fiscal year immediately prior to the proxy report will be called the “current” year, the year prior to that will be called “previous” year, and the following year for which we are forecasting credit behavior will be called “next” year.

Exhibit 1 presents the estimated empirical determinants of the components of compensation. The estimates are consistent with our expectations. Larger firms – measured either by revenues or market capitalization – pay more. Firms with higher operating income pay more. CEOs with longer tenures receive more pay. Variations in CEO salaries are well explained by our model, as evidenced by the high adjusted-R² of 47.4%. Firms tend to be less uniform in their methods for assigning bonuses (adjusted-R² of 21.1%) and even less predictable with their assignment of stock option grants (adjusted-R² of 5.3%). While the model may not perform well in predicting any individual firm’s assignment of options for a given year, the model does appear to correctly flag companies whose option payouts exceed expectations based on firm size, past performance, and industry.

Exhibit 1 Determinants of the CEO Compensation			
<u>Explanatory Variables</u>	<u>Dependent Variables</u>		
<u>variables from the previous year</u>	<u>Salary</u>	<u>Bonus</u>	<u>Options</u>
Log of Sales	83.51 (4.95)	114.23 (2.04)	(249.37) (0.64)
Log of Market Capitalization	27.65 (1.87)	47.99 (1.02)	1193.41 (3.37)
Operating Income	0.08 (7.45)	0.22 (6.39)	1.65 (6.30)
<u>variables from the current year</u>			
Log of Sales		243.55 (0.70)	
Log of Market Capitalization		231.52 (1.02)	
Operating Income		0.59 (4.37)	
CEO Tenure (in years)	5.98 (3.16)	3.74 (0.62)	4.25 (0.10)
Adjusted - R ²	47.4%	21.1%	5.3%
<i>Notes:</i>			
1. Sample consists of 4,485 annual observations covering 865 unique firms.			
2. Regressions were estimated using a seemingly unrelated regression model, and residuals were weighted by inverse of firm revenues.			
3. Absolute t-statistics in parentheses indicate significance of estimated coefficients for the panel data but is derived by averaging across annual t-stat estimates derived using the residuals from the SUR for each annual cohort.			
4. Regressions include year, industry, and ratings dummies (not reported).			

CEO salaries are typically benchmarked to the logarithm of firm size, usually measured by sales. Bonuses and stock incentives are typically benchmarked to salary and other performance measures. In our model, the logarithm of sales is highly significant for salary but not statistically significant for bonus or option incentives. The negative coefficient for option incentives might indicate that many smaller firms issue large amounts of options.

Market capitalization is statistically and economically significant for salaries and stock-based incentives. The positive result for salaries may indicate that some firms use the stock market in their assessment of firm size. The size of the coefficient for options is many times larger for stock-based incentives than it is for salaries and bonuses. This might indicate that firms that issue executive stock options focus more on stock performance and therefore have high market capitalizations given their revenue size.

Last year’s operating income is statistically and economically significant for all compensation components. While firms that have performed well may give their employees large one-time bonuses, they will often also reset overall levels of future compensation. This is demonstrated by the increase in salaries and the very large increase in stock option grants.

We also considered other potential explanatory variables, such as changes in working capital, leverage, total assets, cash, quick ratio, net income, return on assets, and the previous year’s rating actions. None was found to be significant when included with those listed in Exhibit 1. Industry dummies were included in the regression but are not presented.

6. The variables for the second year are measured as the positive increase over the previous year because we envision that firms do not set negative bonus targets. CEOs that do not create a positive performance in the second year are expected to get no bonus.

With a model now in hand that explains variations in CEO compensation, it is possible to identify the gap between actual compensation and predicted compensation as “unexplained” compensation (which when negative, should be interpreted as “unexpectedly” low compensation). Because this is a model-based measure of unexplained compensation, many of the compensation packages identified as unexplained can presumably be explained in a straightforward manner by analysts who are well acquainted with the circumstances. Nevertheless, we believe that these models are successful in identifying many of the cases of unusually large and unusually low levels of executive compensation.

Examples of firms caught by the model that ultimately defaulted include Covanta Energy and Enron, both of which defaulted in 2001. Covanta Energy was marked by the model as having high unexplained compensation in six of the seven years prior to its default. Enron was also marked as providing high unexplained compensation in six of the seven years prior to its default.

While a higher number of firms with larger than expected compensation experienced a credit event than would otherwise have been expected, not every firm with larger than expected compensation is necessarily a higher credit risk. The vast majority of these firms never experienced a default or a large downgrade during our sample period. Instead, using compensation as a signal judiciously with other factors may help to highlight the effectiveness of a firm’s governance practices.

Default Rates, Downgrade Rates, And Unexplained Compensation

In order to compare the degree of deviations from expectation across firms, we normalized unexplained compensation by its predicted value; i.e., unexplained compensation is expressed as a percentage deviation from the predicted level of compensation.⁷ We then measure annual default rates and downgrade rates for various subgroups of the population. We focus on “large” downgrade rates, defined as a downgrade of three or more refined rating notches with a year, with the particular objective of measuring financial distress at investment-grade firms, which are less likely than speculative-grade firms to default.⁸

The results for various percentile stratifications of the compensation distributions for the full dataset (including both investment-grade and speculative-grade firms) are presented in Exhibit 2. To determine a firm’s position in the distribution of unexplained compensation, the firms are sorted by the appropriate unexplained compensation each year and their position is marked. This is done for all three compensation variables. The sorting is done each year so as to avoid a situation where all of the outliers fall into one year. This maximizes the model’s ability to determine whether it is possible to differentiate between firms in any given year.

Exhibit 2 Variation in Annual Default and Downgrade Rates across the Compensation Distribution						
Position in the Unexplained Compensation Distribution	Defaults Rates			Downgrade Rates		
	Salary	Bonus	Options	Salary	Bonus	Options
0% - 20%	1.0%	1.8%	1.1%	4.9%	10.3%	4.7%
20% - 40%	0.7%	1.2%	0.8%	6.0%	3.8%	4.5%
40% - 60%	1.1%	0.1%	0.7%	3.3%	3.0%	4.0%
60% - 80%	0.7%	0.6%	0.8%	4.5%	2.5%	4.9%
80% - 100%	1.3%	1.1%	1.4%	5.1%	4.3%	5.8%
20% - 90%	1.0%	0.6%	0.8%	4.7%	3.1%	4.4%
90% - 100%	0.9%	1.8%	1.5%	4.6%	5.5%	7.5%
Full sample		0.7%			4.8%	

The first point to notice is that there are no consistent patterns in the middle 60% of the distribution. All of the action appears in the bottom and top quintiles. Interestingly, companies that paid their CEOs the least in bonus compensation (the bottom 20%) experienced the highest default and downgrade rates. This perhaps initially surprising result is easily explained by reverse causality: poor prior performance probably led to low bonus compensation, rather

7. In order to ensure that the excess compensation measured on a percentage makes economic sense even when the model-derived measure of expected compensation is negative and or positive but close to zero, we truncated expected compensation used in the denominator of this measure at a small but positive number. In particular, we assumed in these cases that the denominator took the value of compensation observed by the highest earning CEO within the bottom decile of the population, i.e., \$400,000, \$200,000, and \$40,000 for salaries, bonuses, and stock-based incentives, respectively.

8. Although not reported, we also correlated excess compensation with upgrade rates and generally found no systematic relationship. This finding is unsurprising because upgrades for improved financial performance are normally gradual over time, with at most two rating notch increases per year. Large rating upgrades typically occur when a weaker company is acquired by a stronger company, which often follow (ironically) from deterioration in weaker company’s stand-alone credit risk.

than the reverse. To determine the truth of this hypothesis, we looked at the historical sales growth and the historical operating income growth for the overall sample and for the firms in the lowest unexplained bonus quintile. In the previous fiscal year, the low bonus companies experienced an average decrease in operating income of 20% compared to an average increase of 8.8% per year for the overall sample. The average decrease in the current year was 38%. The poor operating income performance for these companies indicates that these companies would have already been considered to be in distress and the CEO compensation information was likely to provide little additional information.

The more interesting result occurs at the other end of the distribution, in the top 10%.⁹ Firms with high unexplained bonuses and high unexplained option grants experienced dramatically higher default rates and dramatically higher downgrade rates than did the middle 70% of the distribution. The firms in the upper tail experienced operating income growth of 3.0% in the previous year and 13.1% in the current year. A superficial analysis would not likely flag these companies as being in trouble and yet their default rates were between two and three times higher than the middle ranked firms. Downgrade rates were almost two times higher.

Exhibits 3 and 4 detail the effects of unexplained compensation on default and downgrade rates by rating category. These exhibits reveal that default and downgrade rates are strikingly larger for investment-grade firms (particularly Baa-rated firms) that pay high bonuses or high option grants. Adverse credit implications of high incentive pay are also evident for Ba-rated firms. The results are much weaker for B-rated firms but still directionally consistent with the other rating categories.

Exhibit 3									
Annual Default Rates by Rating and Position Within the Unexplained Compensation Distribution									
	Salary			Bonus			Options		
	Bottom	Middle	Top	Bottom	Middle	Top	Bottom	Middle	Top
	20%	70%	10%	20%	70%	10%	20%	70%	10%
Aaa-Aa	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Baa	0.0%	0.6%	0.0%	0.3%	0.1%	2.5%	0.7%	0.2%	1.6%
Ba	0.4%	1.6%	0.9%	3.0%	0.3%	2.8%	0.9%	1.3%	1.9%
B	7.7%	4.7%	4.1%	6.7%	5.3%	2.0%	5.6%	5.7%	3.5%
Investment Grade	0.0%	0.3%	0.0%	0.2%	0.0%	1.4%	0.4%	0.1%	0.8%
Speculative Grade	2.6%	2.6%	2.1%	4.3%	1.9%	2.5%	2.4%	2.6%	2.6%
All Firms	1.0%	1.0%	0.9%	1.8%	0.6%	1.8%	1.1%	0.8%	1.5%

Exhibit 4									
Annual Large Downgrade Rates by Rating and Position Within the Unexplained Compensation Distribution									
	Salary			Bonus			Options		
	Bottom	Middle	Top	Bottom	Middle	Top	Bottom	Middle	Top
	20%	70%	10%	20%	70%	10%	20%	70%	10%
Aaa-Aa	6.0%	1.8%	0.0%	7.0%	2.2%	0.0%	3.6%	2.4%	3.7%
A	2.2%	3.8%	4.3%	8.5%	2.2%	6.0%	2.7%	2.4%	6.3%
Baa	5.5%	5.2%	4.2%	12.1%	3.0%	5.7%	4.5%	4.6%	11.3%
Ba	5.4%	5.7%	6.2%	11.3%	3.8%	4.6%	6.2%	5.5%	5.8%
B	7.7%	6.4%	5.4%	8.3%	5.6%	8.0%	6.5%	6.4%	7.0%
Investment Grade	4.2%	4.3%	3.8%	10.4%	2.5%	5.4%	3.7%	3.8%	8.4%
Speculative Grade	6.1%	5.9%	5.9%	10.3%	4.4%	5.7%	6.3%	5.8%	6.3%
All Firms	4.9%	4.7%	4.6%	10.3%	3.1%	5.5%	4.7%	4.4%	7.5%

9. We also examined using the top 5% of the distribution as the tail. The results were somewhat stronger. Consistent with our methods throughout this study, we decided to present conservative results where possible.

Regression Results Also Show Incentives Are Associated With Default Risk and Downgrade Risk

Exhibit 5 shows the results of two probit regressions. The first predicts default and the second large downgrades. The purpose of the regression is to determine whether the results presented in the previous tables could be due to industry effects. It will also help answer the question of whether bonuses or option grants are more important for determining credit risk. Specifically, it is possible that one or the other drives the results but that correlation between the two makes it seem that each is important when looked at individually. The equation used in a probit regression is:

$$P(\text{credit event}) = \Phi(a + \beta'x)$$

In other words, the probability of a credit event is equal to the normal distribution of a constant and a series of factors. In this case, the constant and the factors are listed in the first column of exhibit 5. These models are often used for credit event prediction because the predicted probability is always constrained to be between zero and one. Unlike a standard linear regression, though, it is more difficult to interpret the resulting coefficients as probit coefficients are measured in standard deviations instead of slopes. For example, in the default regression, if a company is listed as having high unexplained bonus, then $a + \beta'x$ is increased by 0.42 standard deviations. The measure of goodness of such a regression is the 'percent concordant' or, equivalently, the percentage of companies correctly flagged as defaulting or not defaulting.

Recent downgrade rates are highly significant and important predictors in both regressions and have the expected signs.¹⁰ It is well known that defaults often follow downgrades. It is less well known that rating migrations often follow previous migrations. This effect is called rating momentum and has been attributed to many causes.

As expected, firms with low bonuses were more likely to experience downgrades and/or defaults. Surprisingly, though, this did not hold for firms with low option payouts. The coefficients on the dummies for low option payouts are very close to zero, both economically and statistically.

High bonus payouts are significantly related to the probability of downgrade and/or default. The results for option payouts are weaker but significant. This could either reflect the older data used to predict option payouts versus that used to predict bonus payouts or it could indicate that bonuses are simply more important for determining the performance of a company.

Exhibit 5: Probit Regression Results					
		Defaults		Large Downgrades	
		coefficient		coefficient	
Intercept		-6.71	***	-2.55	***
Recent Downgrade Rate		0.57		0.68	***
Salary				-0.08	
	Bottom 20%	0.00		-0.11	
	Top 10%	-0.13			
Bonus				0.49	***
	Bottom 20%	0.29	***	0.30	***
	Top 10%	0.42	***		
Option Grants				-0.01	
	Bottom 20%	0.07		0.19	**
	Top 10%	0.13			
Percent Concordant		83.4		81.2	
<i>Dummies representing the annual cohort year, industries, and ratings were suppressed for presentation purposes</i>					

10. Downgrade rates take a value of one if there was a downgrade in the past year, negative one if there was an upgrade, and zero if there were no rating changes or if there was both an upgrade and a downgrade.

Conclusion – Excessive Compensation Packages Are Associated With Higher Levels Of Credit Risk

This Special Comment provides evidence that a connection exists between CEO compensation and overall credit risk. Firms where CEO pay is substantially greater than expected based on firm size, past performance, and other variables experience higher default rates and more frequent large downgrades than do other similarly rated companies.

The research presented here does not, however, explain why higher compensation may be associated with higher credit risk. At least three possible explanations can be inferred from the literature. One, excessive compensation may be indicative of weak management oversight. Two, large pay packages that are highly sensitive to stock price and/or operating performance may induce greater risk taking by managers, perhaps consistent with stockholders' objectives, but not necessarily bondholders' objectives. Three, large incentive-pay packages may lead managers to focus on accounting results, which may, at best, divert management attention from the underlying business or, at worst, create an environment that ultimately leads to fraud.

The correlation we have observed between unexplained compensation and credit risk is based on historical data and may not be constant over time. Developments in the areas of CEO compensation and board oversight may be altering both the time horizon and the risk-return characteristics of management incentives along with the behaviors that they encourage. For example, the use of option grants grew from almost nothing to become the primary method for compensation. More recently, awards of performance shares and restricted stock have gained prominence. Firms will likely continue to experiment with new vehicles intended to induce superior managerial performance. Also, firms often argue that weak industry conditions accentuate the need to retain and motivate capable managers through retention awards and related vehicles and that this is intended to serve both shareholder and bondholder interests. Therefore, even though the model could provide valuable early-warning information in terms of assessing potential credit problems, analysts should also evaluate the relationship between CEO compensation and expected credit risk on a case-by-case basis.

Related Research

Special Comments:

[Takeover Defenses and Credit Risk, December 2004 \(89713\)](#)

[Moody's Findings on Corporate Governance in the U.S. and Canada, October 2004 \(89113\)](#)

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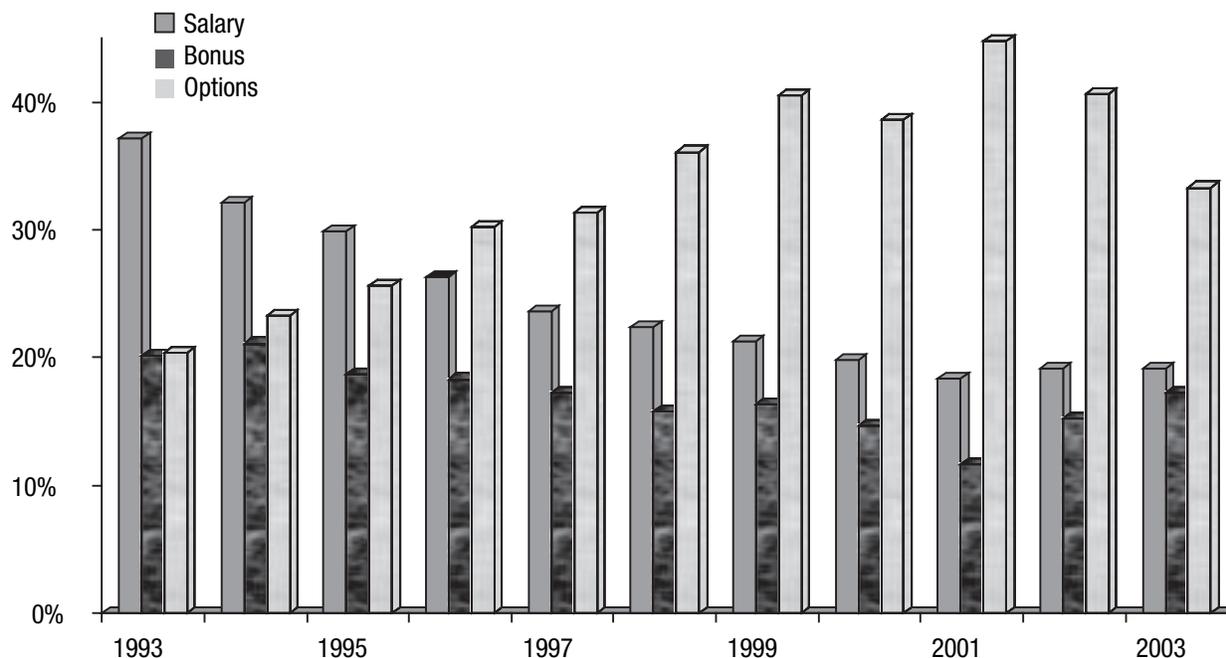
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Appendices

A. Characteristics of the Data

The potential for incentives to affect firm performance has been increasing over the past decade due to significant increases in the size of incentive compensation. The non-incentive portion of compensation, salary, has decreased from 38% of total compensation in 1993 to only 19% in 2003 (Exhibit 1.) While bonuses have decreased as a percentage of total compensation (20% to 18%) they have significantly increased in relation to salary. The largest increase in incentive pay has come from the growth in executive stock options grants. They grew from a relatively small part of overall compensation to become by far the most significant component.

Exhibit A1: Median Share of Compensation



B. Aggregate Downgrade, Upgrade, and Default Rates for Moody's Corporate Bond Issuers

If the probability of a credit event did not depend on rating category, we would not need to control for ratings in our tests. Exhibit B1 shows that the probability of a credit event increases monotonically from higher ratings to lower ratings and so we need to control for ratings in all any test that we conduct. In other words, lower rated firms are in all ways more volatile.

Exhibit B1: Credit Risk 1990 - 2003

	Downgrades	Upgrades	Defaults
Aaa	1.71%	0.00%	0.00%
Aa	2.13%	0.21%	0.00%
A	2.40%	0.10%	0.00%
Baa	3.67%	0.94%	0.27%
Ba	6.10%	1.78%	1.53%
B	6.39%	2.21%	5.11%

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