Are CEOs paid extra for riskier pay packages?

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Many prominent models of optimal pay predict that the variance of a pay package should be positively related to the level of pay. This article quantifies the premium paid to Chief Executive Officers for the uncertainty associated with incentive pay in their compensation packages. Our approach deviates from prior research by using *explicit* contract information from actual CEO compensation contract provisions on the relation between performance metrics and performance-based compensation (i.e., cash bonus, stock grants, and option grants) collected from proxy statements. These rich data combined with a simulation exercise allow us to obtain, for each CEO-year, an estimate of the variance of end-of-year pay using information in compensation contracts signed at the beginning of the year. We are not aware of any other empirical study that *directly* estimates the reward for the expected variance of CEOs' total pay packages. We show that the estimated risk premium is 15%. The premiums from cash bonus grants and option grants are significantly smaller than that from stock grants. These estimates of the pay premium can serve as a benchmark to compensation consultants to help them define what CEOs require in compensation for the risk of payout uncertainty.

While there is no dispute that CEO pay should reflect a premium for the risk in pay, how large that premium is remains an open question. As prior studies lacked detailed compensation contract information, they were limited to estimating the premium based on the *implicit* assumption that all firms relied on stock returns as a performance metric, and perhaps also on another metric such as return on equity, often accompanied with assumptions on how the weights placed on the different performance metrics varied across firms. Yet, pay volatility arises not only from stock return volatility but also from the many other performance metrics used in the contracts (e.g., one CEO-year in our sample is exposed to seven performance metrics, with the average firm in our sample using 4.5 performance metrics per pay package), and the weights on these performance metrics are not only different across firms, they can be non-linearly related between each other for the same firm. We use *explicit* and detailed CEO compensation contract information to estimate the pay premium associated with total pay volatility.

Evaluating the premium in CEO pay is nontrivial because pay contracts are generally quite complex. Consider, for example, the simplest contract that includes only salary and a cash bonus grant. The bonus grant may have a threshold payout of 100% of base salary, a target payout of 200% of base salary, and a maximum payout of 400% of base salary. The contract defines a metric, say net sales, and corresponding performance levels that determine the threshold, target, and maximum payouts. For such a contract, we simulate the year-end value of net sales under the assumption that it is normally distributed. We use the prior year value of net sales as the expected value and the prior volatility of net sales as the conditional volatility. For each simulated end-of-year value of net sales, we determine the bonus grant payout. The volatility of these simulated values provides the simulated variance of bonus pay, which in this case equals the simulated variance of total pay since salary is fixed.

In this paper, we are interested in the question of how large the extra pay needs to be to compensate CEOs for bearing risky pay, or what the pay premium is. CEO contracts may include bonus, stock, and option grants in any given year, and multiple grants of each kind are possible, where multiple performance metrics

may be specified across grants and even within the same grant with various threshold types. The performance metrics may (or may not) all have to be met to yield a payout, introducing non-linearities in pay. And, finally, these characteristics may change over time for the same firm-CEO pair. Using these detailed compensation data, we estimate through simulations the variance of total CEO pay for each CEO-year in our sample. The pay premium associated with these many facets of pay uncertainty is given by how total pay relates to the variance of pay.

To obtain an estimate of the risk premium, we regress total CEO pay on the simulated variance of pay. We convert the estimated sensitivity of pay to the variance of pay into a pay premium: the pay premium associated with uncertainty in incentive pay in our sample is 15% of total pay. Effectively, the pay premium is the extra compensation required when uncertainty in pay increases by one standard deviation. In addition, when we decompose the premium into each of the main sources of pay uncertainty: cash bonus, stock grants, and option grants, we find that that stock grants contribute the most to the premium. The sizes of the various risk premiums are 21% for stock grants, 7.6% for bonus pay, and 2.6% for option grants.

In further analyzes, we find that female CEOs, CEOs with early-life exposure to moderately-sized fatal disasters, less overconfident and shorter tenured CEOs appear to demand a higher risk premium consistent with these CEOs being more risk averse.