The rise in executive compensation in the United States in recent decades has triggered a large amount of public controversy and academic study. Critics are quick to point out that the wages of chief executive officers have skyrocketed in a period when earnings of typical workers have grown far more slowly.

And in the early years of this decade, when many executives took home large compensation packages even as the stock market tanked, investors felt like salt was being rubbed in their wounds. Scholars have generally used three types of economic arguments to explain the phenomenon of rising CEO pay. The first explanation attributes the rise to the widespread adoption of compensation packages with high-powered incentives like stock options, performance bonuses, and restricted stock since the late 1990s. And with greater volatility in the business environment, risk-averse CEOs must be offered – and paid – compensation packages that have higher value to compensate for their riskiness in order to keep them on the job.

In the post-Enron era, a second explanation gained momentum. Lucian Bebchuk of Harvard University, a proponent of the “skimming” view, argues that CEO compensation can be explained by an increase in managerial entrenchment. Secure in their positions, and operating with little effective oversight, “managers will seek to take full advantage of it and will push firms toward an equilibrium in which they can do so.” In this view, stock-option plans are seen as a way to increase CEO compensation without attracting too much notice from the shareholders. A milder form of the skimming view has been expressed by scholars who attribute the explosion in the level of stock-option pay to an inability of boards to evaluate the true costs of this form of compensation.

A third explanation attributes the increase to changes in the nature of the CEO job. To compensate CEOs for the increased likeliness that they will be fired, companies must pay them more in the short term. And some scholars have noted that CEO jobs have increasingly placed a greater emphasis on general rather than firm-specific skills, a trend that increases CEOs’ outside options and thus places upward pressure on pay.

“A-list movie stars have the potential to turn an average movie into a blockbuster and change the economic model for the studios – and thus command astronomical salaries – while most other actors earn far less. Just so, the market for CEOs produces a fat-tailed distribution curve, with those at the very top earning much more than those in the middle.”

The most basic prediction of our theory is that the average CEO compensation should be proportional to the average size of the firms in that group, and that it should grow accordingly. Now, in the US, between 1980 and 2003, the average asset market value of the largest 500 firms (including debt and equity) increased (in real terms) by a factor of 0.6 – i.e., it rose 560 percent. This rise can be decomposed as follows: both the asset price to earnings ratio and earnings have increased by a factor of approximately 2.5 during that period. The model therefore predicts that CEO pay should increase by a factor of 6.

Did it? To find out, we used two different indices of CEO compensation...
tion. The first was based on the data of Michael Jensen, Kevin Murphy, and Eric Wruuck, whose sample runs from 1970 onwards and is based on all CEOs included in the S&P 500, using data from Forbes and ExecuComp. Their measure of CEO total pay includes cash, restricted stock, and value of stock options granted using ExecuComp’s modified Black-Scholes approach. (A shortcoming of these data is that total pay prior to 1972 excludes option grants, and total pay between 1978 and 1991 is computed using the amounts realized from exercising stock options, rather than the implied value at date of grant. The latter can create a mechanical positive correlation between stock-market valuations and pay in the short-run.) Our second index was based on the data from Carola Frydman and Raven Saks, and includes cash compensation, bonuses, and the Black-Scholes value of options on the date they were granted. The data are based on the three highest-paid officers in the largest 50 firms in the US in 1940, 1960, and 1990. The correlation of the mean asset value of the top 500 companies in Compustat is 0.93 with the first dataset and 0.97 with the second data set. When we charted the data (see Figure 1), an interesting pattern emerged: CEO compensation as produced by both datasets closely tracks the rise of market capitalization. In other words, it seems the six-fold increase of CEO pay between 1910 and 2000 can be fully attributed to the increase in market capitalization of large US companies.

Global View

It is frequently noted that in the US, CEOs are paid far more than their counterparts in Europe and Asia. And so we thought it would be useful to evaluate comparative CEO pay across countries using the model. The model predicts that CEOs heading similar firms in different countries will earn different salaries. If there are two firms of equal size, one German, one American, our model predicts the salary of the American CEO would be higher than that of the German CEO because large American companies are in substantially larger number, so that the competition of firms to hire top managerial talent is higher. Indeed, despite a recent trend, national CEO markets are still quite segmented, e.g., due to language barriers. Our model also predicts that countries where stocks have risen at a less robust rate than stocks have in the US would also show lower executive compensation growth.

Testing the model internationally is challenging. In most countries, public disclosure about executive compensation is either non-existent or much less complete than in the US. The variation in tax systems, pension benefits, perquisites, and the cost of living across countries also makes comparisons difficult. For each country, we computed the median net income of the top 50 firms, which gives us a proxy for the country-specific reference firm size. We choose net income as a measure of firm size, because market capitalization is absent from the Compustat Global data set. We choose 50 firms, because requiring a markedly higher number of firms would lead to too many countries from the sample. When we ran regression analysis on these figures, we found that the variation in typical firm size accounts for about a half of the variance in CEO compensation across countries. (See Figure 2)

Interestingly, country characteristics that have often been put forth as important determinants of variations in executive CEO compensation across countries, such as the percentage of family-controlled companies, social attitudes toward inequality (which can be retrieved from the World Value Survey), have no predictive power once controlling for our measure of firm size.

Surprising Findings

The model also produced some surprising findings. Perhaps the most surprising one is that the dispersion of CEO talent appears to have become much smaller at the top. If we rank CEOs by talent, and, at the head of a firm, replace CEO number one by CEO number two, the value of that firm will decrease by only 0.02 percent. This means that the spaces between talents can look very small. However, these very small talent differences translate into considerable compensation differentials, as they are magnified by the size of very large firms. If there is a past CEO who is worth $200 million, most other actors earn far less. Just so, the market for CEOs produces a fat-tailed distribution curve, with those at the very top earning much more than those in the middle. It would be interesting to apply the analytics of the present paper to these markets such as finance, law, and entertainment and see to what extent variations in the sizes of stakes (size of funds, size of contested amounts in lawsuits, concert revenues, movie revenues) explain the evolution in top pay in these markets. In every instance, scholars would not be surprised to find that compensation bears a direct relation to the size of the enterprise involved, and to the competition for the talent in question. And perhaps that is the most significant contribution this model can make to the discussion about executive compensation, the others might have exerted substantial impact has increased) the others might somehow be “forced to follow.” Here again, other firms might be forced to align their compensation policy to these new standards. Our model allows us to calibrate such contagion effects, whether they are due to market forces or not. For example, we predict that if 1 percent of the firms pay their manager twice as much as the market (e.g., due to poor corporate governance), then all firms will have to increase CEO compensation by 5 percent.

Clearly, a superstar effect is at work here. The best managers are paired with the largest firms, which allows them to command a high compensation. A-list movie stars have the potential to turn an average movie into a blockbuster, and change the economic model for the studios – and thus command astronomical salaries – which the market is unwilling to pay. This is why, at least in the United States, our model allows us to explain the evolution of top pay in these markets.

XAVIER CARBAIX is associate professor of economics at the Massachusetts Institute of Technology. AUGUSTIN LANDIER is assistant professor of finance at NYU Stern.

FIGURE 1
Executive Compensation and Market Cap of Top 500 Firms
Normalized to 1 in 1990

FIGURE 2
CEO Compensation and Country Firm Size in 2001
Size produced by mean net income of country’s top 50 firms

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