

Measuring CEO Compensation

By Arantxa Jarque and David A. Price

Compensation packages for CEOs of large public companies often include grants of restricted stock and stock options, the value of which to the CEO depends on the future performance of the firm, as well as on the terms of the grants. This value, which is key to evaluating the CEO's incentives, can be estimated in a number of ways. The authors use measures based on the expected values and the realized values of pay to compare the compensation of CEOs in a sample of large public U.S. firms and a subset of financial firms before and after the 2007–08 financial crisis.

The compensation of corporate chief executive officers has long been the subject of public debate and academic study, particularly since the major run-up in CEO pay during the 1990s. In some instances, these controversies have been rooted in questions about the alignment or misalignment of incentives between non-owner CEOs and the firms' shareholders; in others, they have been rooted in normative questions about the justice of CEO pay levels relative to the pay of other employees. Concerns about the magnitude and structure of CEO pay have motivated changes during this period to the tax code and to disclosure and governance requirements for public companies, and the policy debate in this area continues.¹

While understanding the economic issues surrounding CEO pay presents theoretical and empirical challenges, it might seem that the measurement of CEO pay itself would be reasonably straightforward. After all, the Securities and Exchange Commission has long mandated the disclosure of pay arrangements for senior executives at publicly traded companies. But the measurement of CEO pay presents its own

challenges: although CEO pay packages are, to a large extent, disclosed to investors and the public, they are nonetheless often opaque because they tend to include financial instruments such as restricted stock and stock options that are highly contingent and highly difficult for observers to value at the time the instruments are granted. Indeed, it has been argued that even the compensation committees of corporate boards do not have good information about the values of these instruments.²

This *Economic Brief* looks, first, at how changes in compensation structures over time may have led to greater opacity in CEO pay from the perspective of investors and researchers. It then describes two widely used approaches to valuing CEO compensation, which focus on the expected value of pay, as well as an alternative method that focuses on realized value of pay. An advantage of the latter is that it relies less heavily on blanket assumptions about some undisclosed aspects of pay arrangements, information that is necessary to approximate the expected value of the CEO's stock and option grants. Finally, this *Economic Brief* looks at CEO compensation in the

finance, insurance, and real estate (FIRE) sector to compare the three methods and shed light on CEO compensation trends in the FIRE sector relative to those in the market as a whole.

The Opacity of CEO Pay Packages

Public companies typically pay their CEOs and other senior executives through a combination of means, including a salary, variable pay that is based on performance (a “bonus”), grants of restricted stock, grants of stock options, and retirement-related benefits. The recipient commonly gains the right to exercise a grant of restricted stock or stock options over a period of three to five years, known as the “vesting period.” The values of stock and stock option grants are indirectly based on performance to the extent that the CEO’s activities influence the firm’s share price.

The predominant explanation for the use of contingent instruments is that a non-owner CEO presents a principal-agent problem: depending on how the CEO (the agent) is paid, his or her interests might not be well-aligned with those of the shareholders (the principals). If the CEO’s compensation is entirely fixed—that is, noncontingent—the CEO may not have enough incentive to work hard or to take appropriate risks.

In addition to considerations of incentive-setting, the composition of CEO pay packages is influenced by the differing tax treatment of different instruments. For CEOs, it is beneficial from a tax perspective to receive compensation in the form of stock or options. In addition, since 1993, the corporate tax system has disfavored salary compensation: it places a \$1 million cap on non-performance-based compensation to the CEO that the corporation can deduct from its gross income; in effect, from the firm’s point of view, any CEO salary amount over \$1 million is paid with post-tax dollars. Research indicates that this change played a role in the increasing use of contingent pay.³

A further consideration is differences in the instruments’ regulatory treatment. Research at the Richmond Fed and elsewhere has found that changes in

disclosure requirements and accounting standards have high explanatory power regarding the composition of CEO pay.⁴

For researchers seeking to understand CEO pay, the opacity of some of these instruments is of practical interest. Salary and bonus payments are the least opaque; they are just cash payments. But even with these simple instruments, investors and researchers do not fully understand the incentives involved without better information. The way in which future wage and bonus payments depend on the performance of the executive is key, and such details are not usually disclosed: What leads to a salary increase or bonus payout, or the lack of one?

Grants of restricted stock or stock options share this lack of detailed information about the rules followed by compensation committees to set the grants’ terms. In addition, the grants are opaque because their exercise in the future is conditional on the CEO having remained with the firm: the probability that the CEO will resign or be fired during the relevant period is generally unknown to researchers (and to investors). Still another layer of opacity, from the perspective of researchers, comes from uncertainty about when the recipient will choose to sell restricted stock shares or exercise options. This choice may be limited not only by formal restrictions on the instruments, but also by informal restrictions (for example, an expectation that a CEO who wishes to sell his or her shares for the sake of portfolio diversity will exercise restraint to avoid sending a bearish signal to the market).

Grants of restricted stock or stock options are also opaque on account of uncertainty surrounding the instruments’ value in the future—again, complicating the task of researchers attempting to value the CEO’s compensation. When attempting to approximate the future value of stock, researchers often use its current market value. For an option grant, more sophisticated methods such as the Black-Scholes formula are used to provide some insight into its future value. Both approaches are thought to be reasonably good approximations of the value of these assets to a well-diversified investor who does not face vesting restrictions. Because CEOs are typically not allowed

to diversify the risk in their compensation packages, however, and face both explicit and implicit vesting restrictions, these valuations remain poor approximations of the value that the CEO actually places on the stocks and options at the time of the grant.⁵ Moreover, disclosure rules do not require firms to reveal the gain that the CEO ultimately derives from selling stock or exercising options.

As shown in Figure 1, the use of these relatively more opaque instruments—option grants being the most opaque, followed by restricted stock grants—in CEO compensation packages has changed over time. This data, drawn from the firms in the S&P Execucomp database (including firms in the S&P 1500) from 1993 through 2014, shows a long-term trend in which a growing number of firms have turned to stock grants or stock options or both as components of CEO pay. In the 2000s, the data also show a marked shift from stock options to restricted stock grants or a combination of the two; this timing is consistent with firms reacting to policy changes unfavorable to options during that period. Among these changes were a provision of the Sarbanes-Oxley Act of 2002 requiring faster disclosure of option grants and the adoption in 2006 of accounting standards that mandated

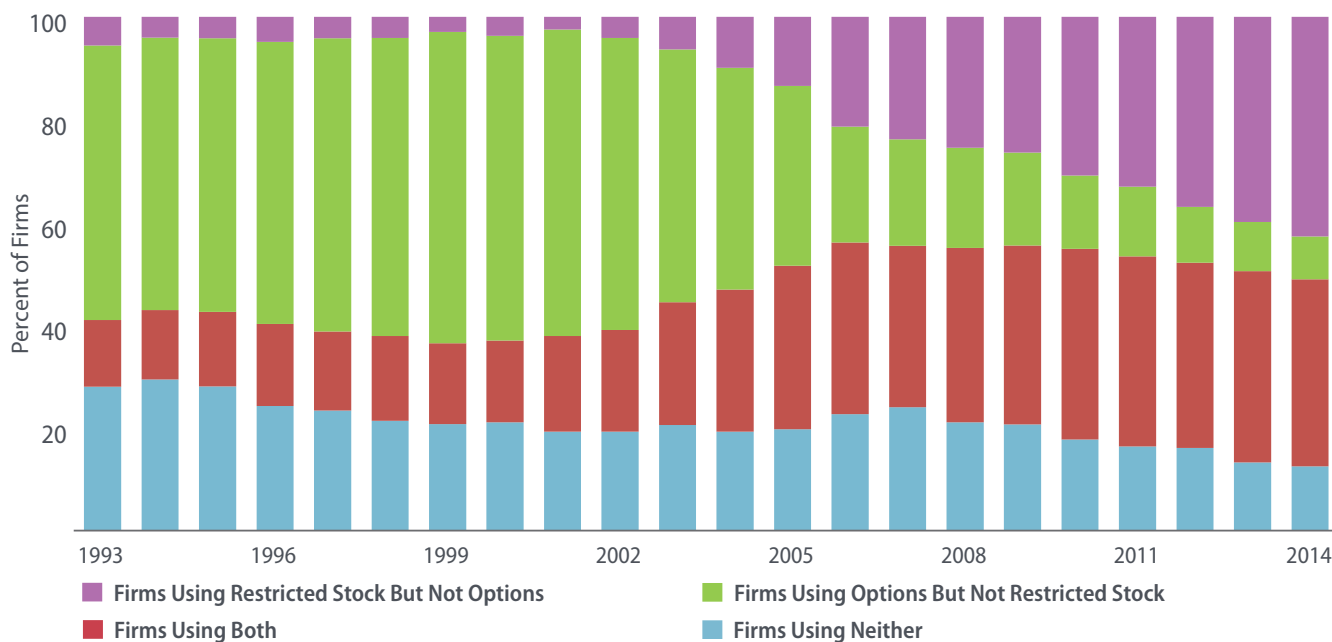
the treatment of option grants as expenses. (The data exclude CEOs who own more than 50 percent of the firm’s shares because these owner-CEOs do not present the same incentive issues as others.)

Approaches to Valuing CEO Compensation

Conceptually speaking, there are two primary approaches to measuring a CEO’s annual pay. One approach is to look at the *expected* value of pay, that is, the value of salary and bonuses paid plus the expected value of contingent elements such as restricted stock and stock options. The other, complementary approach is to look at the *realized* value of pay, that is, the amount of money that the CEO receives during the year from all the components of his or her pay, including salary, bonus, and holdings of stock and options of the firm due to past grants. (That is, this approach includes the actual proceeds of stock sold during the year.)

In practice, economists have used a number of means of implementing these approaches—without necessarily using either approach in its pure form. Two important implementations of the expected value of pay are often referred to as “total direct compensation” and “total yearly compensation.” Total direct

Figure 1: The Changing Use of Stock Options and Restricted Stock in CEO Compensation



Sources: Execucomp and authors’ calculations

Notes: Sample includes all firms in the Execucomp database except those whose CEOs are majority owners.

compensation is the simple sum of salary and bonuses paid plus the expected value of any new grants of stock or options within the year.⁶ It is reported within Execucomp as the variable TDC1. Total yearly compensation (TYC) instead considers the incentive role played by past grants in the current year by adding to the variable TDC1 the current year's change in the expected value of the CEO's stock and option holdings.⁷

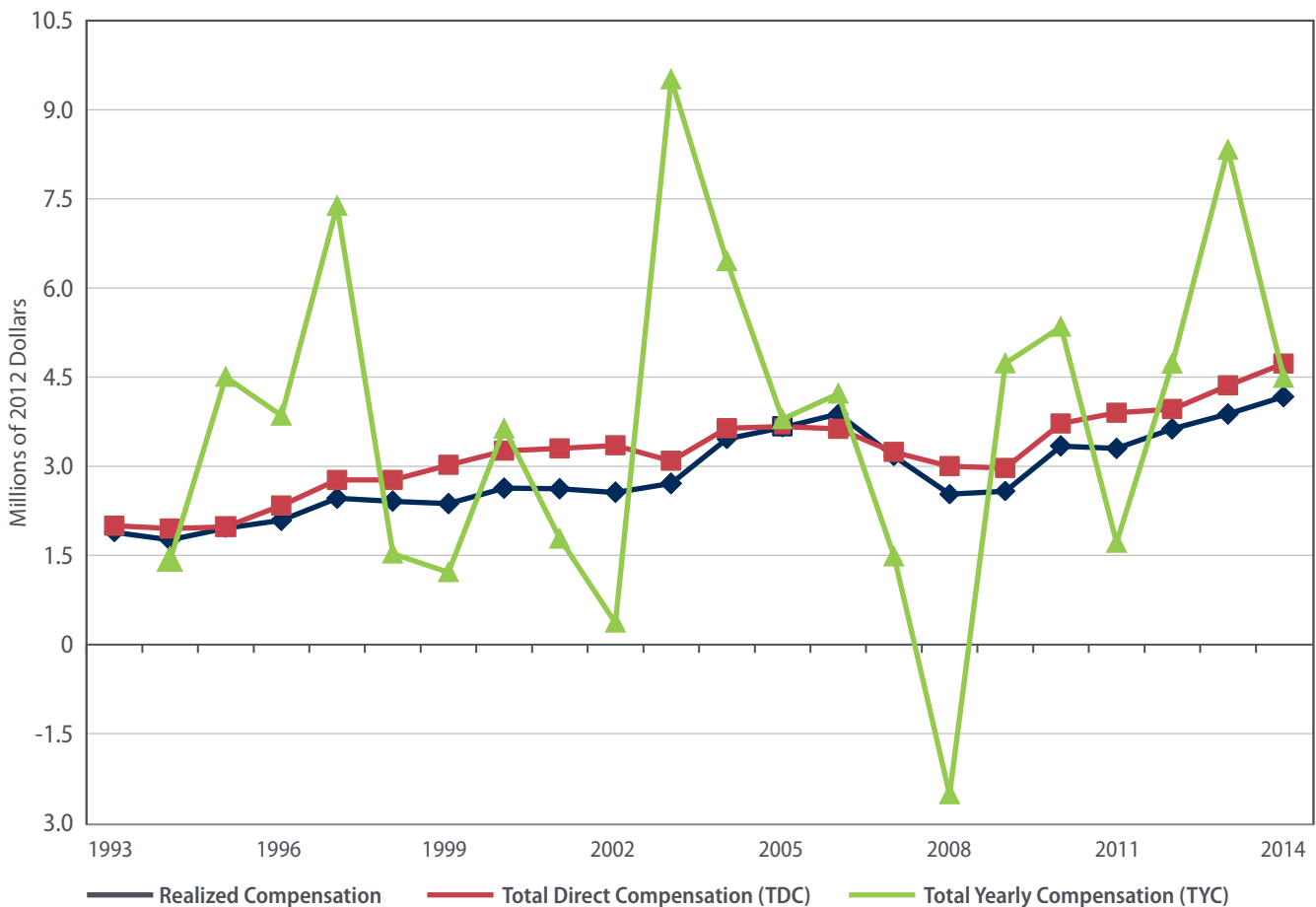
Researchers at the Richmond Fed have proposed an alternative measure based on the concept of realized compensation.⁸ While TYC attributes changes in the value of unexercised stock grants and stock options to the current year, realized compensation recognizes only the actual gains from stock grants and stock options in the year in which they are exercised. This measure reduces the need to rely on approximate determinations of the value of the CEO's holdings of

stock and stock option grants. (It does rely on assumptions about the timing of the exercises within the year—which is crucial to compute the actual gains the CEO makes from those trades.)

Figure 2 shows the behavior of expected pay, as represented by the two measures, direct compensation (the variable TDC1 from Execucomp) and TYC (calculated using an algorithm created by Gian Luca Clementi and Thomas F. Cooley of New York University),⁹ as well as an estimate of realized compensation, for CEOs in the Execucomp database. The data are given as median rather than mean values on account of the skewed distribution of CEO pay, with its highly compensated outliers.

Notable in the data is the high volatility of TYC, both in absolute terms and relative to the other mea-

Figure 2: Three Ways to Measure CEO Compensation



Sources: Execucomp and authors' calculations

Notes: Sample includes all firms in the Execucomp database except those whose CEOs are majority owners. Lines show median values.

tures. This volatility stems from the role in TYC of unrealized portfolio gains and losses as portfolio values fluctuate. In addition, the figure illustrates that realized pay tends to be lower than expected pay, perhaps more markedly during contractions.

To be sure, it is not clear that any measure of CEO pay should be considered the sole or optimal measure; a number of measures may have a role to play in assessing incentive effects and in considering other questions related to CEO pay. It is also unclear whether opacity in CEO compensation is excessive from a social point of view or is simply a reflection of the complexity involved in providing appropriate dynamic incentives.

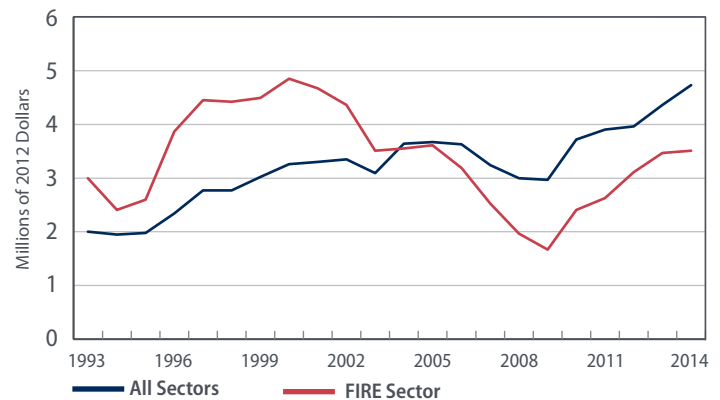
Changes to CEO Pay in the FIRE Sector

A number of the questions about CEO compensation, especially since the financial crisis of 2007–08, have involved the compensation of finance-sector CEOs in particular. For example, post-crisis research has evaluated claims that the crisis was caused in part by poor incentives in compensation packages of bank CEOs.¹⁰

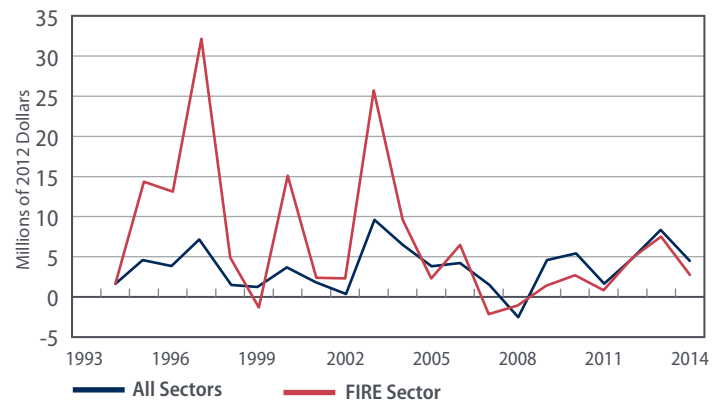
Figure 3 shows how the pay of CEOs in the FIRE sector has compared to the pay of CEOs in all sectors on the basis of the two measures of expected pay (total direct compensation and total yearly compensation) and the measure of realized compensation. For direct compensation, the figure shows that CEO pay was higher in the FIRE sector than in all sectors until around 2004; after that, the two switched places in terms of ranking as CEO pay in the FIRE sector became relatively lower than in large firms generally. Also of note is that total yearly compensation was more volatile for FIRE-sector CEOs before 2004, with CEOs in that sector experiencing higher gains in several years, though not experiencing correspondingly larger losses in other years. After 2004, the movement of total yearly compensation in the FIRE sector was much more consistent with that in the broader group. Research at the Richmond Fed found that these differences between the FIRE sector and all sectors arose from a downward

**Figure 3: Median CEO Compensation
All Sectors vs. FIRE Sector**

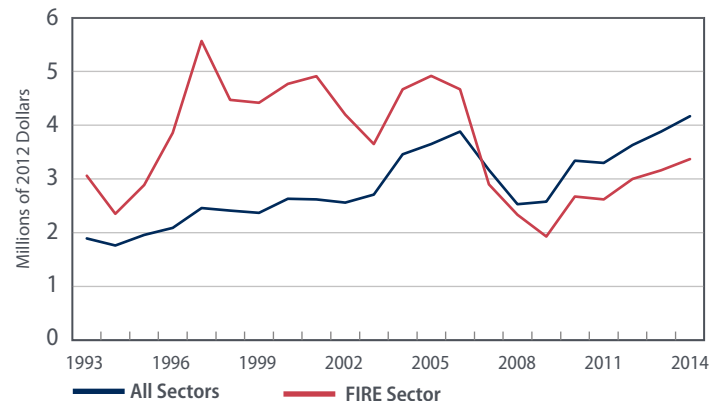
Total Direct Compensation (TDC)



Total Yearly Compensation (TYC)



Realized Compensation



Sources: Execucomp and authors' calculations

Notes: Sample includes all firms in the Execucomp database except those whose CEOs are majority owners. The FIRE sector includes all finance, insurance, and real estate firms in the sample.

trend in the value of new stock and option grants beginning in 2003 that accelerated after 2007.¹¹

The data for realized compensation show that CEOs in the FIRE sector were more highly compensated until 2007. A detailed analysis of the data behind these figures shows decreasing gains from trade of stock in the FIRE sector after 2007 as the main driving change. While the decline at the time of the 2007–08 financial crisis is unsurprising given declining stock prices in that sector during the period, lower compensation in the FIRE sector relative to all sectors persisted.

In conclusion, even though both the value of new stock and option grants and the gains from trade of stock started to recover in 2011, CEO pay in the FIRE sector remained below that in the broader group through the end of the period (2014) according to all three measures of pay.

The realized pay measure captures the actual payouts implied by the compensation package of the CEO given the true performance of the firm. One important advantage of this measure is that since it involves recovering from the data the details of the trades of the CEO, one can construct counterfactual measures of income: how much money would the CEO have taken home if his or her firm had been, instead, one of the top, 95th-percentile performers (or one of the bottom, 5th-percentile ones). Research has found that this sensitivity of income to performance is not significantly different for FIRE-sector CEOs than for the overall group.¹² ■

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Endnotes

- ¹ Today's debates over CEO compensation have antecedents in broadly similar debates during the 1930s, with the decline of the owner-manager and the rise of the non-owner CEO in large U.S. companies. See Harwell Wells, "No Man Can Be Worth \$1,000,000 a Year": The Fight Over Executive Compensation in 1930s America," *University of Richmond Law Review*, January 2010, vol. 44, pp. 689–769.
- ² See the sources cited on p. 273 of Arantxa Jarque, "CEO Compensation: Trends, Market Changes, and Regulation," Federal Reserve Bank of Richmond *Economic Quarterly*, Summer 2008, vol. 94, no. 3, pp. 265–300.
- ³ Jarque (2008)
- ⁴ Kelly Shue and Richard Townsend, "Growth through Rigidity: An Explanation for the Rise in CEO Pay," National Bureau of Economic Research Working Paper No. 21975, February 2016; Arantxa Jarque and Brian Gaines, "Regulation and the Composition of CEO Pay," Federal Reserve Bank of Richmond *Economic Quarterly*, Fourth Quarter 2012, vol. 98, no. 4, pp. 309–348.
- ⁵ Brian J. Hall and Kevin J. Murphy, "Stock Options for Undiversified Executives," *Journal of Accounting and Economics*, February 2002, vol. 33, no. 1, pp. 3–42.
- ⁶ See, for example, Xavier Gabaix and Agustin Landier, "Why Has CEO Pay Increased So Much?" *Quarterly Journal of Economics*, February 2008, vol. 123, no. 1, pp. 49–100; Carola Frydman and Raven E. Saks, "Executive Compensation: A New View from a Long-Term Perspective, 1936–2005," *Review of Financial Studies*, May 2010, vol. 23, no. 5, pp. 2099–2138.
- ⁷ See Rick Antle and Abbie Smith, "Measuring Executive Compensation: Methods and An Application," *Journal of Accounting Research*, Spring 1985, vol. 23, no. 1, pp. 296–325; George-Levi Gayle and Robert A. Miller, "Has Moral Hazard Become a More Important Factor in Managerial Compensation?" *American Economic Review*, December 2009, vol. 99, no. 5, pp. 1740–1769.
- ⁸ Arantxa Jarque and John Muth, "Evaluating Executive Compensation Packages," Federal Reserve Bank of Richmond *Economic Quarterly*, Fourth Quarter 2013, vol. 99, no. 4, pp. 251–285.
- ⁹ Gian Luca Clementi and Thomas F. Cooley, "Executive Compensation: Facts," National Bureau of Economic Research Working Paper No. 15426, October 2009.
- ¹⁰ Rüdiger Fahlenbrach and René M. Stulz, "Bank CEO Incentives and the Credit Crisis," *Journal of Financial Economics*, January 2011, vol. 99, no. 1, pp. 11–26.
- ¹¹ Jarque and Muth (2013)
- ¹² Jarque and Muth (2013)

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