Abstract

This chapter documents the evolution of executive compensation in large, publicly-traded American corporations over the past century. Executive pay followed a J-shaped pattern. The real value of median total pay declined sharply during World War II, and then fell slowly in the late 1940s. From the 1950s to the mid-1970s, executive pay increased at about 0.8 annually, but it accelerated quickly from the mid-1970s to the early 2000s, reaching rates of 10 percent in the 1990s. The structure of pay also underwent an important transformation. Until the mid-1980s, the compensation of executives was primarily composed of salaries and bonuses. Since then, the use of equity-based pay has become increasingly widespread. The chapter also reviews the main theories for the long-run changes in executive pay, including rent extraction, returns to talent, and the role of government interventions. None of these alone can account for the patterns in executive compensation over time.

Keywords: executive compensation, incentives, employee stock options, rent extraction, competitive labor market, income inequality

Executive Compensation in American Economic History

By Carola Frydman

Ever since the rise of large corporations at the turn of the twentieth century, top executives have composed a small but central part of the American labor force. Their decisions affect the fortunes of some of the largest enterprises in the economy. By influencing managerial decisions, compensation contracts can have a meaningful impact on firm outcomes and, more generally, on economic growth. While the careers and compensation of top managers have received much attention in recent decades, our understanding of the long-run trends in executive pay is more limited. This article provides an overview of the evolution in the level and structure of executive compensation in American publicly-traded corporations over the long run.

I begin by describing how the rise of professional managers created the need to structure compensation contracts to attract, incentivize, and retain talented executives. I then provide a brief overview of the sources of information for the historical study of executive pay, and describe the basic trends in the level and structure of managerial compensation. Finally, I survey the main theories proposed to explain the recent trends in CEO pay and discuss whether these explanations fit the empirical patterns in the data.

This chapter cannot provide a comprehensive review of the extensive literature on executive compensation. Readers interested in this topic from a theoretical and economic history perspective may find several existing surveys, such as Murphy (1999), Frydman and Jenter (2010), Wells (2012), Murphy (2012), Murphy (2013), and Edmans and Gabaix (2015) particularly useful.

A. The Origins of the Executive Compensation Problem

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The history of executive compensation is intimately related to the rise of big business. Until the mid-nineteenth century, production took place in small business units, where there was often little or no distinction between owners, managers, and workers. The development of railroads, the first modern business enterprises, brought about the professionalization of managers, among many other changes. The building of large railroad systems in the 1880s and 1890s required full-time salaried managers at the top that could develop strategies for their firms’ long-term growth, including establishing alliances with other railroads, and making allocation and investment decisions. But these managers’ ability to act independently was often curtailed by active boards that, representing large owners or financing interests, did not always shy away from intervening in managerial decisions.

From 1895 to 1904, the American economy experienced a radical process of industrial “trustification” that transformed the organization of manufacturing and the ownership of corporations. During this period, a vast number of manufacturing firms combined to form large consolidated corporations, many of which dominated their industries (Lamoreaux, 1988). These behemoths often integrated backwards into the supply of inputs, and forwards into distribution, marketing and financing. The increased scale and scope of industrial businesses required a team of professional top managers—individuals who, much as modern executives, were not entrepreneurs, and who often held little or no stock ownership in the company (Chandler, 1977).

The formation of large businesses brought about an increased separation of corporate ownership from corporate control, which in turn gave incentives to chief executives and other top managers to make decisions that maximized their own welfare, even if these actions were costly to shareholders (Berle and Means, 1932). In the early 1920s, the widespread use of the multidivisional form of organization made decision making even more decentralized, and increased the importance of managers below the CEO rank. The separation of ownership from control, and the existence of a decentralized hierarchy of top and middle managers with control rights gave rise to the typical principal-agent problem. As they are today, compensation contracts emerged as one plausible mechanism to incentivize managers, and therefore to alleviate the agency problem.

Relatively little is known about the level and structure of executive compensation prior to the 1930s. For the most part, the pay of top managers was a closely guarded secret. Thus, the historical evidence on executive salaries available for this period is relatively scattered, based on court cases, survey data, or anecdotes—any glimpses they give us into the pay of top managers hardly can be argued to be representative. More systematic revelations regarding the level of pay first occurred during World War I, when railroad corporations became managed by the federal government and the exorbitant salaries of railroad officers were exposed. Public scrutiny intensified during the 1920s, when the compensation of railroad and banking executives were published in the popular press. By the early 1930s, the controversy surrounding the level of pay had extended to executives in all kinds of businesses. As the economy slipped into the Great Depression, the nation became increasingly troubled by the lavish stipends and bonuses awarded to the leaders of large public corporations. Prompted by these concerns, the Reconstruction Finance Corporation, the Federal Trade Commission, and several other government agencies began to request information on the compensation of officials in firms under their respective jurisdictions. Finally, the creation of the Securities and Exchange
Commission (SEC) in 1934 made the disclosure of executive compensation mandatory for all publicly-traded firms. It is only then that a comprehensive and systematic analysis into executive compensation can properly begin.

B. Executive compensation from 1936 to the present

B.1 Data sources

Since 1935, American publicly-traded companies have disclosed the compensation of their highest paid executives in 10-K filings and proxy statements (DEF 14A SEC forms). Disclosure requirements have changed substantially over time; the number of executives and the forms of pay that are reported has grown, and the information contained in proxy statements has become more detailed. For example, firms were not required to report perquisites until the late 1970s, and the actuarial value of pension benefits was first included in these statements in 2006. In 2006, the accounting standards also began to require the reporting of the estimated fair value of stock options and equity-based compensation. These changes in reporting regimes make comparisons over time for some forms of pay—particularly, for equity-based pay and incentive bonuses—more difficult. Yet salaries, bonuses, equity holdings, and stock options can be tracked in a relatively consistent manner until 2005. And despite these limitations, proxy statements are the best primary source of information on the compensation of top executives.

Frydman and Saks (2010a) present the longest consistent time series evidence on executive pay available to date. Utilizing the historical collection of annual proxy statements and 10-K forms at Baker Library, they construct a consistent dataset containing detailed information on the compensation of the five highest paid executives in the 50 largest firms in 1940, 1960 and 1990—a total of 101 firms—from 1936 to 2005. This sample is broadly representative of the largest three hundred publicly-traded corporations in each year. It does not, however, cover small firms, and it presents very limited industry variation. The micro-data can be accessed at the authors’ websites.

Researchers focusing on recent decades will find Standard and Poors’ Execucomp database, available at the Wharton Research Data Services (https://wrds-web.wharton.upenn.edu/wrds/), particularly useful. Execucomp provides data collected from the proxy statements for up to 9 executives in the S&P 500 firms for 1992 and 1993 and, starting in 1994, for all companies included in the S&P 500, S&P MidCap 400, S&P SmallCap 600 indices, as well as some additional firms—covering roughly 1,800 companies each year.

Besides these two publicly available datasets, other researchers working on executive compensation have constructed and analyzed data based on various primary sources. Hall and Lieberman (1998) utilize proxy statements to analyze the compensation and equity holdings of chief executives for roughly 500 firms from 1980 to 1994, effectively extending the coverage of Execucomp for CEOs for more than a decade. Frydman and Molloy (2012) utilize reports based on proxy statements published by the National Industrial Conference Board during 1940s—the only period of great compression in executive pay—to study changes in salaries and bonuses for about 250 firms of various sizes. Other useful data sources for historical research include the Forbes compensation surveys for the 1970-1991 period, which report the realized pay for the CEOs of the largest 800 firms in the economy, and the Work Projects Administration data, which
contain information on the salary and bonus paid to the highest paid executives based on proxy statements for about 800 large corporations from 1934 to 1938 (see Jensen and Murphy, 1990).

It is important to note that the available data sources only provide a consistent view of the long-run changes in the level and structure of executive pay for large, publicly-traded corporations. Very little is known about the remuneration of those managing small or privately-held firms in the U.S., both in recent years and in the past. My description of the historical trends in this article is therefore focused on the compensation of the managers of large, publicly-traded corporations.

**B.2 Long-run changes in executive pay**

Much of the debate on executive pay in recent years has centered on whether executives are paid too much, and whether they are properly incentivized. Therefore, I start by describing the long-run changes in the level and structure of pay, and in the incentives that managers receive through their compensation contracts. To provide a long-run view, my discussion of the facts is primarily based on the Frydman-Saks data. For consistency, the analysis is based on the three highest paid executives in the sample—consisting primarily of presidents, chairmen, CEOs, executive vice-presidents, and other top officers. For further details on these data, see Frydman and Saks (2010a) and Frydman and Saks (2010b).

Much of the literature on executive pay focuses on the “ex-ante” grant-date value of compensation, which approximates the cost to the company at the time that the remuneration is awarded. This measure of pay is appropriate, for example, to analyze the role of corporate governance in determining executive compensation. While calculating this estimated, ex-ante value of compensation over the long run is straightforward for some forms of pay, for other types of pay (such as deferred bonuses or long term incentive plans) historical proxy statements often report the cash payments received by an executive in a given year for bonuses awarded in prior years. For these forms of pay, one is forced to use the realized payments. The grant value of employee stock options can be measured using the Black-Scholes formula. To calculate this value, some of the inputs for this formula sometimes need to be imputed (see Frydman and Saks, 2010b, for details).

Another measure of pay is the actual or realized value of compensation, which measures the value that the executive takes home in a given year. This measure is appropriate, for example, to calculate the managers’ elasticity of taxable income—that is, the percent change in taxable pay for a one-percent change in the effective income tax rate. While it is often possible to estimate the realized value from exercised stock options, proxy statements do not always provide a measure of the amount received from deferred bonuses that are contingent on reaching certain performance targets, or the value of payouts from vested restricted stock.

Finally, the academic literature often ignores that risk averse and undiversified executives will value riskier forms of compensation less than what these types of pay cost to their firms. Appropriately adjusting each form of pay for the risk premium of executives is non-trivial, and it is generally sensitive to the choice of models and parameters (see Murphy, 2013).

For most of my description, I focus on the measure of pay that best proxies the grant-date value of compensation in a consistent manner over the long run. Specifically, I define total annual
compensation as the sum of salaries, current bonuses, value of cash or stock paid out from long-term incentive payments, and the Black–Scholes value of stock option grants. For a more detailed discussion on the differences between grant-date pay, realized pay, and risk-adjusted pay, see Murphy (2013).

### B.3. The level of pay

Using the Frydman-Saks data, Table 1 presents the evolution of annual compensation for the three highest paid executives in large American publicly-traded corporations calculated over five to ten year intervals from 1936 to 2005. I start by analyzing the change in the median level of pay. Since the Frydman-Saks sample is broadly representative of the largest three hundred publicly-traded corporations in each year, the trends in median compensation can be interpreted as describing the evolution of pay for the typical executive of the 150th largest publicly-traded firm in the economy.

Panel A of Table 1 reveals a J-shaped pattern in executive compensation over the 1936–2005 period. The real value of median total pay experienced a sharp decline during World War II, which continued but at a slower rate in the late 1940s. Frydman and Molloy (2012) suggest that a strengthening in the power of labor unions may have been partly responsible for the compression in pay during the 1940s. Executive pay increased slowly from the early 1950s to the mid-1970s at an average rate of about 0.8 percent per year. The pace of growth accelerated quickly from the mid-1970s to until almost the end of the sample in 2005. The increase in compensation over this period was most pronounced in the 1990s, when growth rates reached more than 10 percent per year.

The high levels of CEO pay have continued in recent years, despite the economic downturns (and the concomitant reductions in compensation) of the early and late 2000s. Analyzing the trends in pay from 1992 to 2011, Murphy (2013) shows that the grant-date compensation for the median CEO in S&P 500 firms bottomed out at $7.4 million (measured in year 2011 U.S. dollars) in 2009. By 2011, median CEO pay had reached $9.0 million, almost back to the peak level of $9.3 experienced in 2006, and more than three times the value of median compensation in 1992. Moreover, the pay of the chief executives of SmallCap 600 and MidCap 400 S&P firms increased almost steadily over this period, from a median level of $1.5 million in 1992 to just above $3 million in 2011.

Thus far, I selected the median as the statistic to describe the aggregate changes in compensation. Because executive pay is highly skewed, using averages amplifies the changes in pay. For example, median executive pay grew by 380 percent from the late 1930s to the early 2000s, while the increase in average pay was a much steeper 687 percent over the same period. Focusing on medians is therefore important if the goal is to analyze the experience of the typical manager, particularly during periods of rapid growth in pay or when comparing (as I do later in this section) the remuneration of top executives to the wages of workers.

Table 1 also shows that the distribution of compensation has exhibited a relatively similar pattern to the changes in median pay over time. However, the decrease in the real value of pay in the 1940s, and its rapid increase since the 1980s, were both more pronounced at the top end of the distribution. In recent decades, the rise in the compensation of the highest-paid executives has been so rapid that inequality among executives has increased noticeably.
Whereas the ratio of total pay at the ninetieth to the fiftieth percentile fluctuated between 1.8 and 2.4 from 1936 to 1980, this gap rose to more than 3.5 by 2005. A similar pattern is evidenced within firms, as described by the total pay of the CEO relative to the average compensation of the other two highest-paid officers in the firm. This ratio hovered around 1.4 until the 1970s, but it has risen steadily since then. By the end of the sample in the early 2000s, CEOs earned about 2.6 times more than the other two top executives in their firm. This pattern suggests that the returns to being the main decision maker in large corporations have increased significantly since the 1980s.

Top executives have been among the highest income earners in the economy throughout the past century, so it is perhaps not surprising that the trends in executive pay relative to other workers have been similar to the evolution of income inequality at the top of the income distribution. Figure 1 presents the long run changes in top income and wage inequality in the economy based on the influential work of Piketty and Saez (2003), and contrasts it with the earnings disparities between executives and workers from 1936 to 2005. The square line in Figure 1, measured against the right axis, presents the fraction of total income (excluding capital gains) that accrued to the taxpayers at the top 0.1 percent of the distribution. According to this measure, income inequality has followed a U-shaped pattern over the twentieth century. The top 0.1 percent of income earners received 6.7 percent of the total income in 1936, but this fraction declined rapidly during the 1940s, and it was less than 2 percent in the early 1970s. Since then, the concentration of income at the top experienced a relentless increase, and it surpassed its pre-war levels by the end of the sample period. The disparities in labor earnings at the top of the distribution, however, followed a J-shaped pattern over time. The triangle line in Figure 1 displays the share of the top 0.1 wage income group. These tax units accounted for 4.53 percent of the wage income at the end of the sample in 2005, almost twice more than their level in the late 1930s.

These remarkable changes in income inequality over time are also evidenced when contrasting the pay of top executives with those of workers. The circle line in Figure 1 (with its scale displayed on the left axis), presents the ratio of median executive pay in the Frydman-Saks data to the earnings of the average worker in the economy. This measure of labor income inequality also followed a J-shaped pattern over the twentieth century: a rapid decline in executive-to-worker earnings in the 1940s was followed by a smaller but steady contraction up to the 1970s; inequality then increased at a rapid pace from the 1980s to the end of the sample. In the early 2000s, the median executive earned about 106 times more than the average worker in the economy, about double the level of inequality in the pre-War World II period. While I focus on median executive compensation to calculate this relative pay measure, the academic literature and the popular press often use the mean level of CEO pay instead. But the distribution of executive pay has become much more skewed since the 1980s. Focusing on the compensation for the average executive therefore results in a much more exacerbated increase in inequality. Since average executive pay may be less informative of the experience for the typical top

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2 I focus on the shares of the top 0.1 percent because the majority of the executives in the Frydman-Saks data earned incomes above the thresholds that define this fractile for most of the sample period. See Piketty and Saez (2003) for a thorough description of the evolution in income inequality within the top decile from 1913 to the present, and for robustness of the documented patterns to alternative income measures.
manager, a ratio based on median executive pay may reflect more accurately the overall changes in the dispersion in pay between executives and workers.

In sum, the trends in income inequality at the top and in relative executive pay have been relatively similar since the 1930s. It is important to note that comparisons between these two sources of data should be interpreted cautiously; the Piketty-Saez information is based on the incomes of tax units, while the compensation data represent the pay earned by individuals. Moreover, both sources focus exclusively on the changes in income inequality at the very top of the distribution. For a discussion of the patterns and potential causes of the long-run changes in American income inequality more broadly, see Goldin and Katz (2011) and Lindert and Williamson (2016).

B.4. The structure of pay

Panel B of Table 1 presents the evolution of the major components of executive compensation, using again the Frydman-Saks data. Total compensation is divided into three main forms of pay: salaries and current bonuses, payments from long-term incentive plans, and the grant value of stock options. From 1936 to the 1950s, the pay of top executives was composed mainly of salaries and annual bonuses. As they are today, these bonuses were typically non-discretionary, tied to one or more measures of accounting performance, and paid in either cash or stock. Payments from long-term incentive plans were paid out over several years, again with payment in either cash or stock. These long-term rewards started to make a noticeable impact on the level of pay in the 1960s, and became sizable towards the end of the sample, primarily due to the increasing use of restricted stock plans.

The most striking change in the structure of pay is the surge in stock option compensation since the 1980s. By tying remuneration directly to share price, stock options give executives an incentive to increase shareholder value. The use of stock options was negligible until 1950, when the Revenue Act established that the payoffs from certain types of employee stock options (called “restricted” options) could be taxed at the capital gains rate rather than at the much higher labor income tax rate that was prevalent at that time. Although many firms quickly adopted restricted stock option plans, the frequency of option grants remained too small to have much of an impact on median pay levels until the late 1970s.

During the 1980s and especially the 1990s, stock options surged to become the largest component of executive pay, particularly for chief executive officers. Option compensation comprised about 20% of CEO pay in the 1980s but rose to about 37% on average in the early 2000s. The rapid expansion in stock option use during the 1990s coincided with an increased awareness of the value of providing incentives by linking CEO pay to share prices following Jensen and Murphy’s (1990) seminal paper. The use of employee stock options has declined during the last decade, perhaps due to the stock market downturn of 2000-2001 and the introduction of mandatory option expensing in 2005. But the importance of equity-based pay in compensation packages has remained strong since the popularity of restricted stock grants.

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3 These two measures of inequality have likely become less comparable over time. The increase in female labor force participation over the last century has led to a reduction in the share of the tax unit income earned by the primary earner over time.
increased over time as the use of stock options dwindled. In 2011, stock awards accounted for 33 percent of the median total pay for the CEOs of S&P 500 companies, whereas the value of stock options granted represented only 16 percent of their pay (Murphy, 2013). While the value of other components of pay has increased over time, the majority of the overall rise in CEO pay since the 1980s is explained by the increase in equity-based pay, in the form of stock options and restricted stock awards.

Although most of the analysis of executive pay has focused on salaries, bonuses, and stock options, executives are remunerated with various other forms of pay including, among others, perquisites, signing bonuses, pension benefits, and termination payments. These important components of pay packages have received less attention because of a lack of data. In recent years, a series of improvements to disclosure rules introduced by the SEC have shed new light on these pay components. For example, Murphy (2013) documents that these forms of “other compensation” accounted for about 7 percent of the total pay for the median CEO of S&P 500 corporations in 2011. While there is little hope of providing information of similar quality for earlier periods, it may still be possible to improve our understanding of the long-run trends for some of these forms of pay (in particular, for pensions) with careful use of historical primary sources.

Since the use of equity-based pay is widespread, executives typically hold a non-negligible portion of their firms’ shares outstanding. Historically, some top executives also had high ownership stakes because they belonged to the firms’ founding family. Fractional equity ownership is not strictly speaking a form of compensation—an executive’s current stock of his firm’s shares is typically much higher than those awarded in his current paycheck, and he may have acquired those shares in ways other than direct compensation. However, equity stakes do play a significant role in determining managerial incentives. Thus, Panel C of Table 1 presents the evolution of the fractional ownership for the median executive in the sample. Equity holdings relative to the firm’s total number of shares outstanding have mostly declined over the century, with most of the contraction occurring during World War II. By 2005, median fractional stock holdings were about one-third of their peak level in the 1930s, when the median executive in the sample held about 0.1 percent of the shares outstanding of the firm that he managed.

B.5 Incentives

Ever since the separation of corporate ownership from corporate control, the principal-agent problem between shareholders and executives has been a central concern for proper corporate governance (Berle and Means, 1932). If managers are self-interested and if shareholders cannot perfectly monitor them, executives are likely to pursue their own well being at the expense of shareholder value. One mechanism to alleviate this agency problem is to design compensation contracts to align the incentives of managers with those of shareholders.

Economic theory suggests that optimal contracts should be tied to the measures that are the most informative about an executive’s contribution to the value of the firm. Since this ideal performance measure is not observable, compensation contracts in practice link the wealth of executives to the firms’ stock price or to accounting measures of firm performance, in the hopes that these measures capture important aspects of the executives’ impact on firm value. Empirically, the quantitatively most important linkage between executive wealth and shareholder value are changes in the value of the managers’ portfolio of firm equity and stock
options to changes in the market value of their firms. Top executives also receive incentives from bonuses based on accounting measures of firm performance, and from the threat of dismissal for poor performance.

The literature on managerial incentives first began to quantify the relationship between CEO compensation and firm performance in the 1950s. Early studies focused, without reaching a satisfactory conclusion, on identifying the measure of firm size or performance (e.g., sales, profits, or market capitalization) that best explains differences in the level of pay across firms. More recently, studies on this topic have quantified the degree of incentives provided by compensation contracts by relating changes in executive pay to stock price performance—what is generally called pay-to-performance. Hall and Liebman (1998) established that revaluations of the portfolio of stock and stock options account for most of the correlation between shareholder and executive wealth, and Frydman and Saks (2010a) showed that this relationship has been strong throughout most of the twentieth century.

The literature has used a variety of metrics to quantify incentives, without reaching a consensus on the “right” measure. More recently, several theoretical studies propose that the appropriate measure of incentives depends on how CEO behavior affects firm value. The current consensus suggests that incentives should be measured by the dollar change in CEO wealth for each dollar change in firm value when the marginal product of CEO actions are independent of the value of the firm. This specification is therefore appropriate for activities such as perk consumption (for example, purchasing a corporate jet) that have the same dollar impact regardless of the initial size of the firm. Instead, when CEO actions have a multiplicative effect on firm value, such as it is the case for corporate reorganizations, the dollar change in CEO wealth for a percentage change in firm value most accurately measures incentives. Finally, when CEO effort has a multiplicative effect on both utility and firm value, incentives are most appropriately measured by the percentage change in CEO wealth that arises from a percentage change in firm value (often scaled by annual pay to avoid this measure to be trivially close to one). See Edmans and Gabaix (2015) for an insightful review of these (and some alternative) models.

In sum, the theoretical literature suggests that the correct measure of incentives depends on modeling choices. In practice, CEOs engage in a wide variety of activities that scale and do not scale with the size of the firms that they manage, or with their utility. Thus, recent empirical studies on the degree of pay-to-performance present each of the measures corresponding to these various models. Two important considerations regarding these empirical measures are therefore worth mentioning. First, since it is arguably impossible to know the distribution of tasks across these different types of activities for each individual, it is difficult to determine whether an executive is well incentivized overall. Second, determining whether observed compensation contracts optimally address the agency problem between shareholders and CEOs is difficult. Thus, the optimal level of pay-to-performance depends on a host of parameters that are unobservable, such as the executive’s risk aversion or the noise-to-signal ratio in the performance measure. Studies sometimes portray a stronger link between executive and shareholder wealth as evidence for a move towards optimality, but it is important to keep in mind that increases in pay-to-performance could actually be detrimental for shareholder value if the initial level of incentives exposed a risk-averse manager to too much volatility in her pay.

With these caveats in mind, Table 2 uses the Frydman-Saks data to present the long-run evolution in the various measures of incentives. Column 1 of Table 2 shows the dollar change in
wealth for a dollar change in firm value, based solely on changes in executive wealth that are driven by revaluations of stock and option holdings. According to this measure, the incentives of the median executive in the sample declined sharply in the 1940s, recovered in the next two decades, and shrank again in the 1970s. This measure increased rapidly since the 1980s, but it had not regained its pre–World War II level by the end of the sample in 2005. Column 2 reports instead the median dollar change in wealth for a 1 percent change in firm value. Although this measure follows a similar pattern of ups and downs, it paints a different picture of the strength of incentives toward the end of the sample period. Executives have had increasingly more equity at stake for a percent change in shareholder wealth in every decade since the 1960s than at any other point in the sample. According to this measure, incentives were 12 times larger in the 2000–2005 period than at the beginning of the sample in the late 1930s. Finally, column 3 presents an estimate of the elasticity of changes in executive wealth for a moderate improvement in firm performance, where this moderate change is defined as a movement from the median rate of return (8.4 percent) to the seventieth percentile rate of return (22.7 percent) in the sample. The change in executive wealth is scaled by the sum of total compensation and the change in executive wealth at median firm performance. Using this definition, the elasticity of executive wealth to firm value ranged between 1 and 4 in most decades, confirming that managerial incentives were not always small prior to the 1980s.

C. Explaining CEO pay: Theories

The rapid surge in CEO pay since the 1980s has sparked a contentious, and still unresolved, debate about the determinants of executive compensation. While the academic literature has considered many plausible explanations, two main theories have gathered the most attention. First, the level and composition of compensation are often viewed as the outcome of a competitive labor market for managerial talent that optimally assigns executives to firms. According to this “efficient contracting” hypothesis, managerial incentives are set to maximize firm value, and the recent growth in CEO pay is the efficient result of an increase in the demand for scarce managerial talent caused by an expansion in the scale and scope of firms. Based on seminal work by Rosen (1981, 1982), theoretical models in this area are founded on the intuition that higher CEO talent is more valuable in larger firms. Therefore, larger firms should offer higher levels of pay to attract more able CEOs if the labor market for managers is competitive and frictionless (Gabaix & Landier, 2008). Edmans and Gabaix (2015) survey a wide range of assignment models, and show that the empirical predictions of these frameworks depend critically on the modeling assumptions.

In contrast to the efficient contracting hypothesis, other scholars view the high levels of CEO pay as the result of weak corporate governance and acquiescent corporate boards that allow executives to (at least partly) set their own pay and extract excessive compensation (often called rents) from the firms they manage (see, for example, Bebchuk and Fried, 2003). Thus, this view portrays the current high remuneration levels as inefficient. Moreover, the “rent extraction” hypothesis argues that CEOs are more likely to extract rents in forms of pay that are more difficult to observe or to value, such as stock options or stealth compensation (including, for example, pensions, perquisites, and severance pay). This theory has certainly influenced academic research and policy discussion, and many features of executive pay do point to important inefficiencies in pay. However, there has been only limited development of careful models of managerial rent extraction, and consequently there is a lack of specific empirical
predictions based on theory with which to test this hypothesis, and to contrast it with the predictions from the efficient contracting view.

Although these two opposing explanations receive the majority of the attention, they both face limitations in explaining the various features of executive pay in the data. Many other alternative explanations for the rise in CEO pay have emerged in recent years. Murphy and Zábojník (2010) and Frydman (2015) link the trends in compensation to changes in the nature of the job of top executives that have, for example, increased the demand for general managerial skills over time (though the transformation in skills appears to have been more slow-moving than that of compensation). Piketty, Saez and Stantcheva (2014) argue that executives have more incentives to bargain with boards over their pay when tax rates on their labor income are lower, thereby creating a negative relationship between CEO pay and tax rates. Alternatively, it may be possible that the widespread adoption of high-powered incentives since the late 1980s may have caused the sharp increase in the total level of pay during this period, as a way to compensate risk averse executives for the increased volatility in their pay. However, one would then have to ask what caused the increased use of equity-based pay in the first place, and why have the forms of pay utilized to provide incentives changed at specific points in time.

Indeed, Murphy (2013) notes that most of the explanations commonly offered to account for the total level of pay are relatively mute about the stark changes in the structure of executive compensation that have occurred over time. Instead, he argues, government intervention, in the form of disclosure requirements, tax policies, accounting rules, and legislation, has been a major driver of the trends in executive pay over time. These political factors have often come into play after instances of perceived abuses in compensation, following recessions or financial crises, and at times in which managerial pay is deemed excessive (for example, when compared to the pay of workers).

Finally, the remarkable similar trends in relative executive pay and income inequality described in Section B.3 suggest that the changes in executive compensation over time may also be driven by factors that have contributed to the evolution of disparities in pay more generally. These factors include, among others, skilled-biased technological change (Autor, Katz and Kearney, 2008), globalization (Williamson, 1997), and changes in social norms and labor market institutions (Levy and Temin, 2007).

D. Explaining CEO pay: Empirical evidence

In this section, I describe some of the main pieces of evidence that support or contradict each of the main theories presented in Section C. Since the empirical literature on executive compensation is quite extensive, many important findings cannot be covered in this article. Researchers interested in this area could refer to the surveys by, among others, Murphy (1999), Frydman and Jenter (2010), and Murphy (2013) for further guidance.

Theories of optimal contracting receive strong support from the correlated increase in firm value and CEO pay since the 1980s. Using specific assumptions about the distribution of CEO talent, Gabaix and Landier (2008) show that a competitive assignment model predicts a one-for-one move between the size of the typical firm in the economy and CEO pay. Indeed, a calibration of their model reveals that the growth in median market values can fully account for the increase in total CEO pay in S&P 500 firms from 1980 to 2003. More recently, they have
shown that aggregate changes in firm value and CEO compensation tracked each other fairly well throughout the financial crisis and economic recovery experienced from 2007 to 2011.

Several studies have questioned the estimated correlation between firm size and CEO pay, as well as its interpretation. Critics emphasize, among other points, that the strong correlation between these two variables does not imply that their relationship is causal; indeed, their association could be driven by a third omitted variable, including CEOs’ ability to extract rents. For the purposes of economic historians, however, a more important observation is that the relationship between aggregate executive pay and firm value was almost non-existent from the 1940s to the 1970s. Understanding the factors that drove the changes in these empirical patterns over time remains an open question.

The rent extraction view of CEO compensation has received much public attention, in part because of specific cases of egregious abuses of compensation practices. A persuasive explanation, however, should be able to account for the pay of the typical executive. Moreover, optimal contracting theories can sometimes justify the use of forms of pay often argued to be evidence for rent extraction. For example, large severance payments awarded to ousted CEOs following poor performance can be thought of an ex-ante commitment necessary to incentivize an outsider executive to switch corporations in a competitive labor market. Various other widespread practices, such as CEOs hedging exposures to the value of their own firm created by equity-based pay, stock option backdating, and “pay-for-luck” (that is, the fact that CEOs tend to be rewarded for lucky events beyond their control but are not equally penalized for similar unlucky events), are a bit more immune to this criticism.

It is not entirely clear, however, that managers’ ability to extract rents can explain the long run changes in executive pay. Indeed, most available indicators of corporate governance, such as the independence of corporate boards, were weaker earlier in the century when pay levels were lower, and have actually strengthened in the past four decades, a period of exceptional high levels in CEO pay. However, proxies for corporate governance are imperfect, and it is ultimately difficult to quantitative assess how it has changed over time. But even if the available indicators accurately represent the true changes in governance, it is still possible that other changes have interacted with governance to contribute to the rapid growth in compensation in recent years. For example, social norms against unequal pay and institutions (such as labor unions) that limited extreme pay outcomes weakened over this period.

Changes in the progressiveness of the tax system may also have contributed to the high levels of executive pay. Labor income tax rates were extremely high until 1969, when the pay of top managers was not (relatively speaking) much higher than the wages of the average worker. The rise in CEO pay since then coincided with significantly lower levels in the top marginal tax rates on labor income, which may have given high income earners an incentive to bargain for higher pay (Piketty, Saez and Stantcheva, 2014). If this explanation is correct, then the response to changes in tax rates must be relatively slow moving. For example, the top marginal tax rate on labor income was constant for most of the 1990s, when the pay of top executives experienced the fastest recorded growth rates. Moreover, Frydman and Molloy (2011) show that the elasticity of executive pay to changes in tax rates is remarkably low in the short and medium run.
While some of these theories explain the trends in the level of executive pay reasonably well, they do not offer equally convincing explanations for the changes in the composition of pay packages. As suggested by Murphy (2013), the features of compensation contracts do appear to respond to specific government interventions, such as changes in tax policy, accounting rules, and disclosure requirements. For example, the use of stock options became widespread following the Revenue Act of 1950, which increased the tax advantages of restricted options relative to other forms of pay (Frydman and Molloy, 2011). More recently, firms have substituted restricted stock grants for stock options, perhaps as a consequence of the mandate to expense stock options starting in 2005 (Murphy, 2013). Yet the structure of pay has also evolved at times of limited government intervention, and it is not entirely clear why the level of compensation should respond to these political forces (unless these interventions also affect other factors, such as the outside options of executives or their bargaining power). Corporate boards acting in the best interest of shareholders should ideally replace one form of pay for another in response to regulatory changes, while trying to minimize the wage bill of the firm. In the absence of other forces, political factors may not be sufficient to explain the changes in pay levels over time.

What emerges from a critical assessment of the literature is that none of the proposed theories are fully consistent with the available evidence. Moreover, the rent extraction and the optimal contracting explanations are often cast as competing hypotheses—much of the current work tries to demonstrate that various characteristics of real-world compensation contracts are consistent with either rent extraction or optimal contracting. But theoretical models do not offer clear testable predictions that differ between these two approaches, and so ultimately the approach of the current literature is not very productive. More importantly, the various explanations are not mutually exclusive. For example, a competitive labor market could contribute to inefficiently high levels of pay to attract managerial talent if a subset of firms overpays their executives.

Most empirical studies of the determinants of executive compensation have focused on establishing correlations with various industry, firm, and manager characteristics. The level of pay and incentives tend to be positively correlated with firm size, performance, and growth opportunities, and negatively correlated with firm volatility. Moreover, CEOs receive higher levels of pay if they are hired from outside the firm, and if they are also the chairmen of the board of directors. Recent studies have used modern econometric techniques to decompose the variation in executive pay into five groups of determinants: firm observable time-variant characteristics, manager observable time-variant characteristics, firm unobservable time-invariant characteristics (i.e., firm fixed effects), manager unobservable time-invariant characteristics (i.e., manager fixed effects), and time effects (i.e., year fixed effects) utilizing data from 1992 to the present. Interestingly, manager fixed effects explain a much larger fraction of the variation in pay levels and in incentives than any of the other four groups of determinants. Whether managerial fixed effects were equally important in the past remains an open question.

Recent studies have started to make progress in understanding the causal effects of various forces on the level of pay and incentives, for example by examining exogenous changes in the contracting environment, industry deregulations, shocks to exchange rates and output prices, and regulatory changes to board composition. Economic history may provide a valuable laboratory to advance our knowledge in this area given the many legislative changes introduced.
to regulate executive pay over time (see Murphy, 2012, for a thorough description of this legislative history).

**F. Conclusions and future research**

Although the contemporaneous literature on executive compensation is quite extensive, researchers have mostly focused on the evolution of pay since the 1980s. Except for a handful of studies, this topic remains largely unexplored by economic historians. Yet some of the most significant changes in the structure and the level of top manager pay occurred during earlier time periods. Moreover, the large number of regulatory changes experienced over time may allow economic historians to exploit these sources of “natural experiments” to provide more convincing answers to the effects that various forces have on managerial contracts. In particular, any progress on the causal effect of pay-to-performance on firm outcomes and on managerial risk taking decisions would be welcome.

The long-run trends in the level of executive pay described in this article give rise to some important unanswered questions. While there is some evidence linking the compression in compensation during the 1940s to a weakening of labor unions, we know much less about the factors that led to the stark changes in the structure of CEO pay, and the rapid increase in the growth rate in total pay, since the 1980s. Moreover, the lack of growth in executive pay at a time of rapid growth in firm size during the 1950s and 1960s remains an open challenge.

While the available data provide a consistent view of the changes in executive pay since the 1930s, they have some important limitations. In particular, the Frydman-Saks data do not allow studying changes in executive pay and their determinants across different industries. Moreover, relatively little is known about the compensation of top managers in smaller firms, and in private corporations, throughout the twentieth century. Finally, there is a dearth of systematic information prior to the 1930s. Primary sources from corporate archives may be a useful resource to expand the available historical information and provide valuable new insights on the compensation and careers of an important part of the American labor force over the long run.
G. References


Murphy, Kevin J. 2013. “Executive Compensation: Where we are, and how we got there,” in George Constantinides, Milton Harris, and René Stulz, eds.: *Handbook of the Economics of Finance*, Elsevier Science North Holland.

Murphy, Kevin J., and Jan Zábojník. 2010. “Managerial Capital and the Market for CEOs,” working paper.


The circle line presents the ratio of median total pay for the three highest-paid officers in the Frydman-Saks data relative to average worker earnings in the economy. Total executive compensation is the sum of salaries, bonuses, long-term bonus payments, and the Black-Scholes value of stock option grants. Average worker earnings are the wages and salaries per full-time equivalent employee obtained from Table 6.6 of the National Income and Product Accounts. This measure of relative executive pay is displayed on the left axis. The right axis presents instead two measures of income inequality at the top of the distribution. The square line displays the share of total income (excluding capital gains) that accrued in each year to tax units in the top 0.1 percent of the distribution, as reported in column (5) of Table A1 in Piketty and Saez (2003; online version updated on June 2015). The triangle line presents instead the wage income that accrued in each year to tax units in the top 0.1 percent of the distribution, as reported in (6) of Table B2 in Piketty and Saez (2003; online version updated on June 2015).

Table 1: Level and structure of total compensation by percentile and CEO status, 1936-2005

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<tr>
<td>Three Highest-Paid Officers</td>
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<tr>
<td>10th percentile</td>
<td>0.36</td>
<td>0.40</td>
<td>0.36</td>
<td>0.39</td>
<td>0.45</td>
<td>0.47</td>
<td>0.57</td>
<td>0.91</td>
<td>1.31</td>
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<tr>
<td>25th percentile</td>
<td>0.53</td>
<td>0.59</td>
<td>0.53</td>
<td>0.55</td>
<td>0.60</td>
<td>0.64</td>
<td>0.85</td>
<td>1.35</td>
<td>2.19</td>
</tr>
<tr>
<td>50th percentile</td>
<td>0.85</td>
<td>0.80</td>
<td>0.72</td>
<td>0.77</td>
<td>0.83</td>
<td>0.93</td>
<td>1.33</td>
<td>2.36</td>
<td>4.08</td>
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<tr>
<td>75th percentile</td>
<td>1.24</td>
<td>1.15</td>
<td>1.01</td>
<td>1.09</td>
<td>1.18</td>
<td>1.31</td>
<td>2.05</td>
<td>4.43</td>
<td>9.42</td>
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<tr>
<td>90th percentile</td>
<td>1.80</td>
<td>1.59</td>
<td>1.53</td>
<td>1.63</td>
<td>1.66</td>
<td>1.84</td>
<td>3.18</td>
<td>8.29</td>
<td>16.9</td>
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<tr>
<td>Average</td>
<td>0.97</td>
<td>0.95</td>
<td>0.85</td>
<td>0.94</td>
<td>0.99</td>
<td>1.09</td>
<td>1.74</td>
<td>4.35</td>
<td>7.63</td>
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<tr>
<td>Median CEO</td>
<td>1.11</td>
<td>1.07</td>
<td>0.90</td>
<td>0.97</td>
<td>0.99</td>
<td>1.17</td>
<td>1.81</td>
<td>4.09</td>
<td>9.20</td>
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<tr>
<td>Median Other Top Officers</td>
<td>0.74</td>
<td>0.70</td>
<td>0.65</td>
<td>0.67</td>
<td>0.74</td>
<td>0.82</td>
<td>1.12</td>
<td>1.89</td>
<td>3.02</td>
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<td>Within-Firm Ratio of CEO to Other Top Officers</td>
<td>1.50</td>
<td>1.48</td>
<td>1.38</td>
<td>1.43</td>
<td>1.29</td>
<td>1.42</td>
<td>1.58</td>
<td>2.00</td>
<td>2.58</td>
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Panel B: Structure of Compensation

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<tbody>
<tr>
<td>Average Long-Term Pay / Total Compensation</td>
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<tr>
<td>CEOs</td>
<td>0.00</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
<td>0.06</td>
<td>0.05</td>
<td>0.07</td>
<td>0.15</td>
<td>0.23</td>
</tr>
<tr>
<td>Other Top Officers</td>
<td>0.00</td>
<td>0.01</td>
<td>0.01</td>
<td>0.03</td>
<td>0.05</td>
<td>0.05</td>
<td>0.07</td>
<td>0.15</td>
<td>0.22</td>
</tr>
<tr>
<td>Average Stock Option Grants / Total Compensation</td>
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<td></td>
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<tr>
<td>CEOs</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.04</td>
<td>0.07</td>
<td>0.11</td>
<td>0.19</td>
<td>0.32</td>
<td>0.37</td>
</tr>
<tr>
<td>Other Top Officers</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.03</td>
<td>0.05</td>
<td>0.10</td>
<td>0.17</td>
<td>0.27</td>
<td>0.31</td>
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Panel C: Stock Holdings

<p>| | | | | | | | | | |</p>
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</thead>
<tbody>
<tr>
<td>Median fractional stock holdings</td>
<td>0.118</td>
<td>0.045</td>
<td>0.034</td>
<td>0.035</td>
<td>0.037</td>
<td>0.023</td>
<td>0.019</td>
<td>0.030</td>
<td>0.028</td>
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</table>

Based on the three highest-paid officers in the largest 50 firms in 1940, 1960, and 1990 in the Frydman-Saks data. Total compensation is the sum of salaries, bonuses, long-term bonus payments, and the Black-Scholes value of stock option grants. Long-term pay is payouts from long-term bonus awards made in prior years, including restricted stock. In firms where the title CEO is not used, the CEO is identified as the president of the company. Other top officers include any executive among the three highest-paid who is not the CEO. The within-firm ratio is the median across firms of the ratio of the CEO’s total compensation to the average compensation of the two other highest-paid officers in the firm. Median executive to average worker wages is the average across years of the ratio of the pay of the median top executive in each year in the decade to the wages of the average worker in that year from the National Income and Product Accounts. Fractional stock holdings are the proportion of stock held by executives relative to the number of firm shares outstanding at the fiftieth percentile, multiplied by 100. All dollar values are in inflation-adjusted 2000 dollars.

Source: Frydman and Saks (2010)
Table 2: Managerial Incentives from Stock and Option Holdings, 1936 to 2005

<table>
<thead>
<tr>
<th></th>
<th>Dollar gain for $1000 increase in firm value</th>
<th>Dollar gain for 1% increase in firm value</th>
<th>Elasticity of changes in wealth (median to 70th percentile in returns)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1936-40</td>
<td>1.350</td>
<td>18,670</td>
<td>2.0</td>
</tr>
<tr>
<td>1941-49</td>
<td>0.399</td>
<td>6,814</td>
<td>0.64</td>
</tr>
<tr>
<td>1950-59</td>
<td>0.452</td>
<td>13,975</td>
<td>1.60</td>
</tr>
<tr>
<td>1960-69</td>
<td>0.675</td>
<td>38,978</td>
<td>3.54</td>
</tr>
<tr>
<td>1970-79</td>
<td>0.470</td>
<td>21,743</td>
<td>2.03</td>
</tr>
<tr>
<td>1980-89</td>
<td>0.551</td>
<td>34,679</td>
<td>1.92</td>
</tr>
<tr>
<td>1990-99</td>
<td>0.946</td>
<td>120,342</td>
<td>3.66</td>
</tr>
<tr>
<td>2000-05</td>
<td>1.080</td>
<td>227,881</td>
<td>4.12</td>
</tr>
</tbody>
</table>

Based on the three-highest paid executives in the 50 largest firms in 1940, 1960, and 1990 in the Frydman-Saks data. Each column shows the median across all executives in each decade. Column 1 shows the dollar change in executive wealth for a $1,000 change in firm value, and is calculated as the executive’s fractional equity ownership ((number of shares held + number of options held * average option delta) / (number of shares outstanding)) multiplied by $1,000. Column 2 presents the dollar change in executive wealth for a 1% change in firm value, and is the product of the executive’s fractional equity ownership and the firm’s equity market capitalization. Column 3 presents the elasticity of changes in managerial wealth for a change in firm performance from median rate of return to the 70th percentile in returns. The dollar values are in inflation-adjusted 2000 dollars.

Source: Frydman and Saks (2010) and Frydman and Jenter (2010)