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Historical Trends in Executive Compensation 1936-2002

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Abstract

Soaring levels of executive compensation during the past two decades have sparked an interest in CEO and other top management pay. But have executives always been paid like superstars? We add a new perspective on the incomes of corporate officers by constructing the first panel dataset to follow top executives in large firms from the 1930s to the present. By documenting these trends, we provide a foundation for an understanding of the rise of professional management.

This paper presents initial results from a sample of the 3 highest-paid executives in 50 firms extending from 1936 to 1969. After a sharp drop of 25% in the early 1940s, it took 25 years for the real value of executive compensation to regain its pre-World War II level. Despite this remarkable stability, the introduction of stock options and long-term incentive compensation significantly changed the structure of pay during this period.

As executive compensation failed to keep pace with the growing earnings of the average worker in the economy, income inequality declined. Disparities between executives and workers have increased again in recent years, so that the long run trends in income inequality have followed the well-documented U-shaped pattern over the course of the century. Due to the growing use of stock options, income inequality in the 1990s was far higher than anything observed since the beginning of our data.

1. Introduction

Ever since the late nineteenth century when corporate ownership became separated from corporate control, top management emerged as a leading professional group (Berle and Means 1932, Chandler 1977). As the decision-makers in the modern corporation, top executives are responsible for a large fraction of all economic assets. Because the structure of pay shapes managerial incentives, compensation practices have significant consequences for firm performance. Although an extensive literature has addressed recent trends in executive pay, little is known about the evolution of compensation practices during earlier times. In this paper we document how the levels and structure of executive compensation have evolved over the course of the twentieth century, providing a foundation for an understanding of the rise of professional management.

Despite the growing size of firms, we find a remarkable stability in the real value of executive compensation from 1936 to 1969. Although an expansion in hierarchies predicts higher compensation at the top (Rosen, 1992), pay increases were even smaller than wage gains made by an average worker. This finding could be the result of the supply of top management growing faster than demand for corporate executives. Another explanation is that organizations within the firm may have changed as corporations evolved from family-run to professionally-managed. Over time, transformations in the roles and responsibilities of top officers may have led to declines in relative pay.

Another interesting finding is that the distribution of compensation among executives was stable during this period. This evidence suggests that changes in the

market for executives or in the structure of organizations had a similar effect on all top management. In contrast, recent increases in executive pay are even larger for CEOs than for other top officers, indicating that the role of CEOs is different today than it was in the past.

In recent years, the soaring increase in the remuneration of top CEOs has stimulated an extensive literature concerning the absolute and relative levels of executive pay.¹ Moreover, executive compensation has risen more rapidly than almost any other group, creating a striking widening in the income gap between CEOs and the average worker in the economy.² One salient feature of this increase is the large role of stock options. By raising the sensitivity of pay to firm performance, the use of stock options has significant consequences for aligning managerial incentives with those of shareholders.³ Despite the recent attention, these instruments of incentive-based pay are not a new phenomenon. A common practice for remunerating key employees in large corporations, stock option grants were also an important component of compensation packages in the 1950s and 1960s (Lewellen, 1968). Moreover, the problem of how to provide incentives to managers has been discussed in the academic literature since at least the pioneering work of Taussig and Barker (1925).

Given that the structure of pay is relevant for managerial incentives, it is unfortunate that the basic facts surrounding the longer run trends in executive compensation are not well known. Therefore, in this paper we develop a new dataset on

¹ The real value of CEO compensation has grown at a remarkable rate of 8.4% per year over the 1980-1994 period (Hall and Liebman, 1998).

² The compensation of the top 100th CEO listed in Forbes's annual survey on executive compensation was 59 times larger than the average production worker in 1979 but 311 times larger by 1999. This measure of compensation includes salaries, bonuses and the value of exercised stock options.

³ The correlation between CEO pay and company performance has significantly increased in recent years (Murphy 1999). Hall and Liebman (1998) find that most of this increase can be attributed to the increasing use of stock and option grants and revaluations of stock and option holdings.

executive compensation spanning most of the 20th century, which will allow us to investigate the following questions. First, how have the trends in the absolute and relative levels of managerial pay evolved over the century? In particular, a study of long-run changes in the disparity between managers and workers, as well as among executives within a firm, can shed some light into the many contended causes of the recent growth in income inequality. Second, how has the structure of managerial pay changed over time? As the use of incentive-based compensation practices has fluctuated, the degree to which managerial decisions are aligned with shareholders' objectives may also have changed.

Various researchers have studied earlier trends in executive compensation but each study uses a different sample design, different methodologies to value the components of compensation, reports different summary statistics, and spans a brief period.⁴ Consequently, these studies cannot be used to obtain a consistent description of how executive compensation has changed over time. We construct the first comprehensive panel data on managerial pay extending from the late 1930s to the present. The basis of our information on executive compensation is from corporate reports. Since its establishment in 1934, the Securities and Exchange Commission (SEC) has required publicly held corporations to disclose the compensation of top officers in 10-K reports and annual proxy statements. Using a sample of these corporate reports for a large number of firms, we collect information on the amount of compensation paid to individual executives over the past 70 years.

This new dataset has several advantages in a study of the long-run changes in executive compensation. Since the SEC has not significantly changed its reporting requirements, we are able to construct measures of the different components of

⁴ A few examples include Baker (1938), Roberts (1959), Lewellen (1968), and Wattel et al. (1978).

compensation that are comparable over time. In particular, by valuing stock options granted in the 1950s and 1960s in a manner consistent with current research, we are able to compare the previous heyday of stock option use to the large rise in stock option grants in the 1990s.⁵ The data from proxy statements are especially valuable in this respect because for this period stock option gains were not recorded on personal income tax returns, which are the other primary source of information on the incomes of top earners. Another benefit of assembling this dataset is that we do not restrict our sample to CEOs but follow the careers of other top executives as well. By comparing CEOs with other top managers, we hope to add to our understanding of how the market for managers evolved over time.

The rest of the paper is organized as follows. In Section 2 we describe the data sources and our sample of firms and top executives. Section 3 presents trends in the level of executive compensation and describes changes in the structure of pay over time. In Section 4 we examine trends in income inequality, both among executives and between top officers and average workers. Finally, Section 5 concludes.

2. Executive compensation data

2.1 Sources of data on executive pay

Because compensation practices were generally well-kept firm secrets in the early decades of the twentieth century, only scattered data are accessible today.⁶ For example, when management of the railroads was taken over by the federal government in World

⁵ While Lewellen (1968) documents a significant amount of stock option grants during the 1950s and 1960s, his results are hard to interpret because the methodology he used to value these derivatives is not comparable to current procedures, as we discuss later in more detail.

⁶ Occasionally the remuneration of corporate officers was revealed in court records (Baker, 1938). Another source of information would be payroll records from individual firms.

War I, extremely high salaries of railroad officers were revealed. Public scrutiny of executive compensation intensified during the 1920s, when the salaries of railroad and banking executives were published in the popular press.⁷ 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 Depression, the nation became increasingly troubled by “lavish stipends and bonuses” accruing to the managers of large public corporations.⁸ Prompted by these concerns, the Reconstruction Finance Corporation, the Federal Trade Commission, and several other institutions requested information on the compensation of officials in firms under their respective jurisdictions.⁹ These dispersed efforts to monitor the compensation practices of major corporations were centralized with the establishment of the Securities and Exchange Commission (SEC) in 1934.

Created to enforce the Securities Exchange Act of 1934, the SEC was put in charge of the disclosure of data by firms participating in the securities market, thereby regulating corporate finance (Seligman 2003). Disclosure of information related to the remuneration of executive officers and directors was intended to deter managers from engaging in wrongful behavior and mismanaging corporate assets (Loss and Seligman, 1995). Thus, the inception of the SEC has made executive compensation available to the public from the 1930s to the present.

⁷ See, for example, “Explains Big Salary of Railroad Head. Charles Frederick Carter Says Competent President Earns it Many Times”, New York Times, December 24, 1922; “Comptroller Seeks Salary Data From National Banks”, Wall Street Journal, February 25, 1921; “Commerce Commission Goes Into Executives’ Salaries”, Wall Street Journal, December 23, 1922; “They Earn Their Salaries”, Wall Street Journal, February 27, 1923.

⁸ “Inquiry Into High Salaries Pressed by the Government”, New York Times, October 29, 1933

⁹For example, the Federal Trade Commission was directed to collect information on the salaries of executives from the companies listed in the NYSE in 1933 (Senate Resolution No. 75, Seventy-third Congress).

Because the SEC's disclosure requirements did not meaningfully change over the years, corporate reports provide a valuable resource for tracking the components of compensation in a consistent manner.¹⁰ Proxy statements contain information on the aggregate remuneration paid to officers in the firm, including bonus payments, contributions towards retirement plans, and stock options. Moreover, these reports also provide detailed descriptions of the plans for each component of pay, which provides an insight into the reasoning behind granting different types of compensation. We use 10-K reports and annual proxy statements to construct a consistent dataset on executive compensation from 1936 to the present.¹¹

2.2 Sample selection and data collection

Our ultimate goal is to collect data on executives working in the largest 50 firms in the economy in each decade from 1940 to the present.¹² Because the ranking of firms by size is fairly consistent over time, we anticipate that our final sample will include about 200 firms. In this paper, our sample includes the 3 highest-paid officers in the largest 50 firms in 1960.¹³ For each of these firms, we collected annual data for as many years as our sources allow.

¹⁰ Since both 10-K reports and in proxy statements have been used to disclose executive compensation at different points in time, we use both these reports as sources of data. A more detailed description of the SEC's reporting requirements and how they changed over time appears in the Data Appendix.

¹¹ Proxy statements have been used by previous researchers, but not to construct a long-term series of executive compensation. Among others, see Roberts (1959), Lewellen (1968), Yermack (1995), and Hall and Liebman (1998). Since data from proxy statements is available in electronic form since 1992 from Compustat, most of the current research on executive compensation is based on firms' proxies. Hence, another advantage of using these corporate reports from earlier decades is that they are consistent with more recent evidence on managerial pay.

¹² This section provides a brief summary of our sample selection and data collection. For complete details, see the Data Appendix.

¹³ Although our complete sample of the largest corporations in 1960 will eventually include 50 firms, the sample in this draft is based on 47 firms. Because these firms were all large at a particular point in time, the trends we describe in this paper may not reflect the pattern of executive compensation more generally.

The current sample includes annual observations from 1936 to 1969 and is supplemented with data from Compustat's Executive Compensation database from 1992 to the present.¹⁴ The majority of the sample (88%) is composed of manufacturing firms, with a large number of automobile producers (for example, Chrysler and General Motors), airplane manufacturers (Douglas Aircraft) and oil companies (Exxon and Amoco). Besides these industrial firms, it also contains communications (AT&T) and retail companies (JC Penney and Woolworth). Table A2 in the Appendix shows the distribution of firms by 2-digit SIC code.

Basic descriptive statistics of our sample are shown in Table 1. Besides including the three highest paid officers in each firm, we also include the company president if this individual is not among the top three.¹⁵ The second column of Table 1 shows summary statistics for the 1992-2002 sample, which is composed of executives working in the same firms that appear in the earlier sample. If a firm in our original sample has merged with a firm outside our sample, we also include executives in the surviving firm.¹⁶

In particular, compensation in these firms may grow faster than average prior to 1960 if the largest firms were also among the fastest-growing firms in the economy. On the other hand, if there is regression to the mean, then we might expect compensation in these firms to be lower than average after 1960. These potential biases will become less severe as we extend the sample with firms that were large at other points in time.

¹⁴ We are currently working on extending the information to include the 1970s and 1980s.

¹⁵ Less than 2% of the company presidents in our sample are not among the three highest paid officers.

¹⁶ We follow this strategy in order to avoid a bias from sample attrition. Once we have the full sample of the largest firms in each decade, attrition will no longer be a concern.

Table 1
Sample Summary Statistics

	1936-1969	1992-2002
Total # of person-year observations	4331	1089
Total # of executives	328	154
Average # of firms in each year	43	33
Average # of years each executive is observed	6.9	4.5
Fraction director	.93	.68

In general, the executives in our sample are the people with most decision-making power in the firm. Although the title “chief executive officer” was not commonly used before the 1970s, 48% of the officers in our sample hold the title “president,” “chairman of the board,” or both. Other frequently observed job categories are “executive vice-president” and “vice-president.” Another indication that these officers were influential decision-makers in the firm is that the vast majority of them served on the board of directors. In contrast, a much smaller proportion of the 3 highest-paid executives were also directors in the 1992-2002 sample. The decline in the fraction of management directors indicates substantial changes in corporate governance over time, which may in turn have limited the influence of CEOs and other top managers on the level and structure of their pay.¹⁷

Because the bulk of current research on executives has focused exclusively on CEOs, part of our research agenda will be to compare the compensation of CEOs with other top management. However, because the title “CEO” was not frequently used until the 1970s, identifying the top decision-maker of the firm is not always obvious. Previous

¹⁷ Of course, this information is clearly insufficient to illustrate changes in corporate governance, which would require information on the composition of the full board of directors, among many other variables. A thorough analysis of this issue is beyond the scope of the present paper but we hope to pursue it in future research.

studies suggest that this person was most often the president of the company, so we identify the president as the CEO where the CEO is not explicitly mentioned (Mace, 1971). In cases where we observe neither a CEO nor a president, we identify the chairman of the board as the CEO (about 2% of the observations).¹⁸

Ideally, it would be useful to have information on the educational, labor market and personal backgrounds of the corporate executives in our sample. Although recent proxy statements contain brief biographical histories of each director in the company, this information was only required since the 1970s. Scattered pieces of information appear in the early proxy statements, but only for a small fraction of the officers in our sample. Hence, we are unable to take these characteristics into account in our present study.

This new panel dataset will allow us to explore many related topics on executive compensation and the evolution of the market for managers. This paper serves as a background for future work by describing the changes in the level of executive compensation, in the structure of pay, in differences between CEOs and other officers, and in long-run trends in income inequality.

3. Historical trends in executive compensation

3.1 Total compensation

We begin by examining the average real value of total compensation in each firm from 1936 to 1969 (see Figure 1).¹⁹ Total compensation is defined as the sum of three

¹⁸ An alternative method would be to identify the CEO as the officer with the highest amount of cash remuneration. In our sample, this person is the president 58% of the time and the chairman of the board 39%.

¹⁹ Real values are measured in year 2000 dollars using the Consumer Price Index. To calculate each of the three measures of compensation shown in the figure, we trim off the top and bottom 5% of the observations in each year so that changes in the annual averages will not be driven by large outliers. Outliers are

main components: cash compensation (salary + bonus), long-term incentive payments and stock option grants.²⁰ From a level of about \$1 million in the 1930s, the average real value of total compensation had fallen to about \$.8 million by 1947.²¹ The decline in real terms is primarily due to a combination of constant nominal wages and a rising price level. An absence of nominal wages gains from 1942 to 1945 is not surprising, because all wage increases at this time were subject to approval by the National War Labor Board (NWLB). However, compensation did not rebound when the NWLB was dissolved at the end of 1945, as might be expected if these rules were the driving factor behind the decline. In fact, the real level of compensation continued to fall until 1949.

There are several potential explanations for the lack of wage increases during the second half of the 1940s. First, wage and price controls may have been maintained for some time after the war, although they were probably less effective than during wartime (Goldin and Margo, 1992). Also, extremely progressive and high income tax rates may have discouraged salary increases for those at the top of the income distribution (Piketty and Saez, 2001). As we discuss below, the introduction of the “restricted” stock option in 1950, which was not subject to income tax rates, seems consistent with this explanation. Another possible explanation is a rapid increase in the supply of top-level managers, perhaps prompted by the expansion in college-educated workers at that time. Although

particularly a problem in the 1990s, as the well-known examples of Dennis Kozlowski and Jack Welch demonstrate. These cases of exorbitant pay are related to an increase in the cross-sectional variance of executive compensation, which is an issue that we will discuss below.

²⁰ Stock options are valued on the day they are granted using the Black-Scholes formula. We will discuss each of these types of compensation separately later in this section, and a complete description of how each type is calculated appears in the Appendix. Other forms of compensation that were important at this time were pension plans, bonuses that were deferred until retirement, and perquisites. For now, we exclude any type of compensation paid after retirement because the age of each executive is generally unknown, making these payments difficult to value. We also exclude perquisites because the SEC did not require firms to report information on perks until 1978.

²¹ Although there is an increase in the number of firms in our sample as we move from a sample based on 10-Ks pre-1941 to a sample based on proxy statements (see the Appendix for details), a similar decline is apparent when limiting the sample to a constant panel of firms.

this theory is interesting, it is difficult to assess its relevance with our current data due to a scarcity of information on the careers and personal characteristics of the executives.

After this period of decline, the real value of total compensation began to increase in 1949. Although it climbed steadily throughout the next two decades, the rate of increase averaged only about 1.3% per year. Thus, by the end of the 1960s, the real value of executive pay had just barely returned to its pre-war level. Interestingly, cash compensation remained fairly constant throughout the period. As shown by the dashed lines in Figure 1, the increase in total compensation is largely attributable to the growing use of stock options and other forms of long-term incentive payments. Whereas the bulk of compensation was composed of cash compensation in the 1930s, long-term bonus arrangements and stock options accounted for 15% of total compensation by the late 1960s. Hence, the structure of compensation radically changed over the course of our sample period.

3.2 Bonuses and long-term incentives

Despite the impression given by our data, the 1950s were not the first period when incentive compensation mechanisms were a part of managerial compensation. Historical accounts suggest that various forms of incentive compensation were commonly used during the 1920s (Baker 1938, Roberts 1959).²² However, hard evidence concerning the magnitude of these payments is difficult to find because firms were reluctant to divulge the details of managerial compensation. With the onset of the

²² While the use of bonuses or other types of incentive compensation seems to have been almost negligible prior to WWI (Taussig and Barker, 1925), most companies adopted bonus and deferred compensation plans in the 1920s. For example, Baker and Crum (1935) find that 64 out of 100 industrial companies used bonuses to remunerate their executives by 1928.

Depression and large decreases in firm profits, many bonus plans were abandoned or suspended (Baker, 1938).²³ Because bonuses are directly related to firm performance, we would like to separate current bonus payments (bonuses that are both granted and paid out within the same year) from salaries. However, we are unable to identify these two components separately because many firms reported only the sum of the two. Nonetheless, because we do not observe an increase in cash compensation between 1950 and 1969, it is likely that bonuses during this period were relatively stable. Any significant changes in current bonus payments that might have occurred must have been offset by similar changes in salaries. Evidence from the 8 firms in our sample that reported salaries and bonuses separately supports this conjecture, as the value of current bonus payments relative to salaries actually declined from 1947 to 1969.

In contrast to current bonus payments, one type of incentive compensation that did become more important during the 1950s and 1960s was deferred bonuses. As a fraction of total compensation, long-term bonus payments rose from less than 1% in the 1940s to more than 5% in the 1960s.²⁴ Although the details of these plans varied by company, a common deferred bonus scheme was to award payments based on the firm's profits or net income, and then distribute the bonus in equal installments over the next five years. A clear function of these bonuses was to tie compensation to firm performance, as measured by these accounting variables. It is less clear why firms chose to delay payment over several successive years. A plausible explanation is that deferred payment served as a "bond" and provided an incentive for executives to continue

²³ According to Baker, the fraction of firms with bonus plans in active use fell from 70% to about 40% during the Depression.

²⁴ These bonus payments reflect the average amount received by an executive for performance in previous years, rather than an amount awarded to be paid in the future. See the Appendix for details.

working at the firm. For example, the proxy statement of General Motors in 1947 states that structuring their bonus plan in installments will “furnish incentive to executives to remain in the employ of the Corporation” (1947, p 12). Although the explanation seems reasonable, it does not explain why this form of compensation became more popular over time. One possibility is that executives’ mobility between firms increased as the market for managers developed, making retention of these officers a greater concern. However, turnover rates at that time appear to have been small (Roberts 1959).²⁵ Whether pay was an effective means of deterring mobility among top officers has not yet been established, and we hope to pursue this question in future work.

3.3 Employee stock options

Another type of compensation that underwent a large change during the course of our sample period was the employee stock option. Stock options were not commonly used prior to 1950, as only 15% of the firms in our sample had ever granted stock options to an executive officer since the beginning of our data in 1936 (see Table 2). A change occurred in the early 1950s, when many companies instituted a stock option plan. In 1951 and 1952 alone, 34% of the firms granted options for the first time. Stock option grants continued throughout the 1950s and 1960s, and only three corporations (AT&T, Chevron and Kodak) out of 47 had not established a stock option plan by 1969. As firms altered their compensation practices, the number of key employees receiving options soared. While almost no executive received options as part of their compensation prior to

²⁵ Of course, if these types of payments were fulfilling their purpose, then low turnover rates could be a sign of the program’s success, and not an indication of a lack of need.

1950, more than 20% of the managers in our sample were granted an option in 1951. By 1961, the fraction had risen to 40%.

Table 2

Distribution of Firms by Earliest Option Grant

Period	Number of Firms	Cumulative Distribution
before 1936	1	2.2
1941-1946	6	14.9
1950	1	17.0
1951	11	40.4
1952	5	51.1
1953	3	57.5
1954	1	59.6
1955-1960	12	85.1
1961-1967	4	93.6
# firms granted options	44	
Total # firms in sample	47	

Note: Distribution of firms by first year in which a stock option was granted to an executive officer, 1936-1969

A natural explanation for the sudden proliferation of stock options is a change in the tax treatment of options introduced by the 1950 Revenue Act. Although stock options were occasionally granted to executives during the 1940s, they were not an attractive method of compensation since they were likely to be taxed as income (Washington and Rothschild, 1951).²⁶ The 1950 Revenue Act created a new type of instrument, the “restricted” stock option. To avoid being subject to income taxes, a stock option had to satisfy certain conditions regarding the exercise price, the length of time before the option expired, and the length of time the stock had to be held before disposal,

²⁶ As previously mentioned, employee stock options appear to have been more common in the 1920s, but the extent to which they were granted is hard to assess due to the secrecy surrounding these plans (United States Salary and Stabilization Board, 1951). Following the market crash in the 1930s, the use of stock options became essentially nonexistent (Baker, 1938). They then underwent a modest reappearance in the 1940s.

among others. A restricted stock option was subject only to capital gains tax upon disposal of the stock that had been acquired by exercising the option. The Act made options an attractive alternative to cash remuneration because income tax rates at that time were extraordinarily high. Whereas restricted stock options were subject to a capital gains tax rate of 25%, the statutory top marginal income tax rate was 91%. Since many corporate executives fell into a high tax bracket, there was a large incentive to compensate executives with stock options instead of cash income.

The establishment of this new method of compensation did not pass unnoticed, and the majority of the plans introduced after 1950 were designed to grant restricted options. When a plan was first enacted, it was often described to the shareholders with an explicit recognition of these tax advantages. For example, the proxy statement of one company stated:

“It has been generally recognized that the granting of stock options by a Company to officers and other key employees is a desirable method of providing with added incentive [...] The provisions of the tax laws have heretofore made the accomplishment of those ends difficult. [...] Those provisions of the revenue Act of 1950 were enacted in recognition of the importance in securing the services of competent executives and giving them a more direct interest in the success of the business.” Caterpillar, Proxy Statement, March 25, 1952.

Caterpillar was not alone in recognizing the benefits of granting stock options. Furthermore, as some companies introduced these plans, others felt the need to follow suit. In 1953, the management of General Electric reported the following reasoning to its shareholders:

“Since the passage of the Internal Revenue Code amendment in 1950... over 200 companies whose stock is listed on the New York Stock Exchange, including many competitors of your Company, have adopted stock option plans ... [Such a plan] is essential if the Company is to compete successfully with other companies for the

services of individuals of outstanding ability and accomplishment”. General Electric, Proxy Statement, March 20th, 1953

Even though stock options had become an important means of competing for corporate executives, the economic value of these grants was not large on a pre-tax basis. As a fraction of pre-tax compensation, the Black-Scholes value of stock option grants averaged 3.4% in the 1950s and 5.4% in the 1960s.²⁷ However, it is the after-tax value, not the pre-tax value, of compensation that is relevant from the employee’s perspective. As a fraction of after-tax compensation, the value of options steadily increased from 8.2% in 1951 to 19.4% ten years later.²⁸ To put these values in perspective, at their peak in the early 1960s the after-tax share of stock options in total compensation was almost as high as it was in the early 1990s, about 22%.

To summarize, we have found a sharp downturn of 25% in the average level of executive compensation during the early 1940s, followed by a gradual increase in the next two decades. By 1969, the last year of our current data, total compensation was just 4% higher than in 1940. Compared to changes in compensation experienced during the past decade, the managerial pay was remarkably stable throughout this entire 33-year

²⁷ For consistency with current literature and because it is an accurate measure of the cost to the firm of granting options, we use the Black-Scholes formula to value these derivatives. However, this formula was not derived until 1973, and so it could not have been used to assess the value of these instruments in the 1950s and 1960s. At that time there was no clearly established methodology to price stock options, and because a true market for these derivatives did not develop until the early 1970s, there was no easily accessible market price either. Despite the difficulty in calculating a precise value, numerous accounts acknowledge the relevance of stock options as a means of compensation. For example, in a special panel on stock option plans conducted in 1951, the Salary Stabilization Board concluded that it was “difficult to evaluate in terms of dollars and cents the economic significance of this development, although substantial evidence points to its magnitude”.

²⁸ Lewellen (1968) finds that the value of stock options represented a much higher 40% of after-tax compensation in the 1950s and early 1960s. However, his method to value these derivatives does not agree with current practices. To value stock options, he uses the difference between the exercise price and the market price of the stock at the end of each fiscal year, and then spreads the potential gains from stock appreciation over the duration of the option. This method tends to understate the value of an option relative to the Black-Scholes value because it does not account for the option value when the stock market price falls below the exercise price. On the other hand, it overstates the expected value when realized market gains are larger than expected.

period. In 1992, when our sample based on Compustat data begins, average total compensation in these same firms was \$1.8 million, or roughly 75% higher than in 1969.²⁹ During the next ten years executive pay rose at an astounding rate of more than 14% per year. By the end of the century, the real value of executive compensation was more than 7 times its level prior to World War II.

One potential explanation for the high levels of executive compensation in recent years is that firms have grown progressively larger. There is a well-known positive correlation between the level of executive pay and firm size (for example, Kostiuk 1989, Rosen 1992), a natural consequence if executive responsibilities are related to the scale of the firm or if larger firms hire more able executives. By any measure of firm size, the companies in our sample expanded remarkably between 1950 and 1969: employment grew at an average rate of 2.1% per year, sales at 4.7%, and market value at the blistering pace of 9.7% per year. In contrast, the rate of increase in executive compensation over the same period averaged only about 1.3% per year. The different patterns of firm size and managerial pay are clearly illustrated in Figure 2, which shows the average value of executive compensation relative to the firm's market value. Given the statistics cited above, it is not surprising to see a significant decline in the ratio of executive compensation to firm size from 1940 to 1970. The 1990s experienced an upswing in this ratio, but the value in 2002 was still only half as high as it was in the early 1940s. Thus, relative to firm size, executives' paychecks are still significantly smaller than earlier in the century. This result is particularly surprising given that the remuneration of top

²⁹ Sample attrition as firms go out of business creates an upward bias in the statistics for the 1990s. However, the degree of this bias is likely to be small, as only 4 out of our 50 firms disappear from the sample between 1970 and 1992. Moreover, limiting our calculations to a balanced panel of firms does not change the results substantially.

officers, which is now higher than in any other period since the Great Depression, has caused substantial public outcry.

4. Relative Pay

4.1. CEOs versus other top management

Our discussion thus far has focused on the compensation paid to the average executive in our sample. In what follows, we extend our analysis to consider the distribution of compensation among executives. We start by examining the amount of cash compensation awarded to executives at various percentiles in our sample (Figure 3). The distribution of income was fairly wide in the 1930s, with the officer at the 90th percentile earning about six times the compensation of the officer at the 10th percentile. The disparity of earnings among executives compressed until the end of World War II and then remained relatively stable until the end of our sample. Therefore, a narrowing of income inequality, consistent with the “great compression” documented by Goldin and Margo (1992), occurred even among some of the highest-paid individuals in the nation. Although the distribution had become a bit wider by 1992, it was still more compressed than in the 1930s as the ratio of executive compensation at the 90th to the 10th percentile was about 4.6. Inequality among executives became further exaggerated during the 1990s, surpassing the amount experienced in the pre-war years. By 2002, the cash compensation of the executive at the 90th percentile was almost 9 times the income of the officer at the 10th percentile.

Thus the distribution of cash compensation followed a U-shaped pattern, declining in the 1940s and then increasing in more recent years. However, it is possible

that the use of other methods of compensation altered this picture. To investigate this possibility, we calculate the average fraction of total compensation that is attributable to each form of compensation at different percentiles of the income distribution (see Table 3). As discussed earlier, these statistics confirm that incentive compensation increased from the 1950s to the 1960s, and then again in the 1990s. However, the distribution of these instruments of compensation among the executives remained relatively constant over time.³⁰ Consequently, changes in inequality among executives can be mostly accounted for by changes in the distribution of base salary.

Table 3

LTIP and Stock Options as a Fraction of Total Compensation

	Long-term incentive payments			Stock options		
	1950s	1960s	1990s	1950s	1960s	1990s
<10 th percentile	.004	.027	.156	.053	.061	.312
10 th <<25 th	.009	.033	.162	.030	.060	.302
25 th <<50 th	.024	.056	.145	.037	.067	.337
50 th <<75 th	.024	.052	.162	.038	.054	.327
75 th <<90 th	.017	.028	.155	.023	.032	.313
90 th <	.118	.095	.164	.029	.055	.369
CEOs	.016	.040	.150	.033	.061	.343

Note. Executives are ranked by cash compensation.

Two important caveats can be made to the previous analysis. First, options were granted slightly more to executives at the upper end of the income distribution in the 1990s. Moreover, it is important to take into account the disproportionate effect of income tax rates on the distribution of after-tax compensation among executives. Because the tax structure was extremely progressive, the after-tax value of stock options

³⁰ An exception is that long-term incentive payments were more skewed towards the top decile of executives in the 1950s than in the 1960s.

relative to total compensation was larger for the highest paid executives in the 1950s and 1960s.

Since executive pay is strongly correlated with firm characteristics (such as firm size), the distribution examined in Table 3 essentially compares executives in high-paying firms to executives in low-paying firms. Thus, we consider the ratio of the CEO's compensation to the average compensation of the other officers in the same company in order to evaluate differences in pay within the firm. Table 4 shows the average of this ratio across firms by decade for each type of compensation. Relative to other high-income officers, CEO compensation steadily declined from the 1930s to the 1960s. This compression of the income distribution within the firm is evident in all measures of compensation. In contrast, the ratio of CEO pay to other executives was significantly larger in the 1990s than in any other period in our study. Overall, the distribution of pay within the firm seems to have followed the same U-shaped pattern that has been documented in other measures of income inequality.

Table 4

Ratio of CEO to Other Officer Compensation

	Cash compensation	Cash comp + LTIP	Cash comp + LTIP + stock option grants
1936-1941	1.54	1.54	1.55
1942-1949	1.46	1.47	1.47
1950-1959	1.37	1.39	1.41
1960-1969	1.28	1.28	1.31
1992-2002	1.93	2.00	2.13

In conclusion, inequality both among executives and between CEOs and other officers within the firm has followed a U-shaped pattern over the century. With the exception of the 1990s, the use of incentive-based pay was distributed with a surprising degree of equality across executives. In contrast, during the 1990s CEOs received a greater amount of stock options relative to their base cash compensation. This finding suggests that there have been important changes in the market for CEOs between the 1960s and the 1990s.

4.2. Inequality between executives and workers

High levels of executive compensation have received much attention in recent years because they have not been accompanied by pay increases for other workers. According to Forbes's annual survey on executive compensation, the ratio of the total pay of an average CEO was about 100 times larger than average earnings of production workers in 1990, and over 360 times larger by 2002 (Hall and Murphy, 2003). To put this recent rise in perspective, next we investigate how the trends in inequality have changed over a longer time period.

Piketty and Saez (2001) have used income tax records to investigate long-run trends in income inequality at the upper end of the distribution. They find a U-shaped pattern over the course of the century that is mainly driven by changes for the top percentile. Since the majority of the executives in our sample fall above the cutoff for the 99.9th percentile of the wage and salary distribution reported by Piketty and Saez, we expect the overall trend in income inequality in our data to follow a similar pattern. Using our data, however, has several advantages over the more general sample based on

income tax records. First, because many of the executives in our sample have extremely high incomes, we are able to take a closer look at changes in the distribution at the very top. A second important advantage is that we can examine the relative importance of different types of compensation in contributing to the surge in inequality during the 1990s. Piketty and Saez address this point by using a supplemental data source, but the data do not provide a consistent picture for the whole century. Finally, we are also able to compare the changes in inequality for CEOs and other top executives, in order to investigate how broad-based the changes in inequality actually were.

As a measure of income inequality, we compare the average compensation of the executives in our sample to average earnings in the economy.³¹ The top panel of Figure 4 shows relative cash compensation for CEOs and other top managers between the years 1936 and 2002. From a level of almost 75 times average earnings, relative cash compensation of CEOs declined steadily during the 1940s and 1950s. The trend reversed sometime during the 1970s or 1980s, so that the amount of inequality experienced in the past few years has only just reached Depression-era levels. The pattern for other executives is similar, although they appear to have made no gains relative to the average worker between 1969 and 1992.

The bottom panel of Figure 4 shows the patterns of inequality when stock option grants are included in executive compensation. For both groups of executives, the level of relative compensation had surpassed its pre-WWII level by the mid-1990s, and

³¹ Average earnings are measured as total wage and salary accruals per full-time equivalent employee from table 6.6 of the National Income and Product Accounts. These earnings include commissions, tips, bonuses, contributions to 401K plans and gains from exercising nonqualified stock options.

inequality continued to increase for the remainder of the decade.³² Again, we see that option grants tended to favor CEOs more than other officers. While the level of inequality for other managers had merely doubled its initial value by the end of the sample, relative compensation of CEOs had tripled.

5. Summary and Conclusion

In this paper, we have presented new evidence on the absolute and relative levels of executive compensation from 1936 to the present. After a pronounced decline during World War II, the real level of managerial pay recovered gradually during the 1950s and 1960s. Compared with the soaring levels of executive compensation in the 1990s, these changes were relatively minor and the real value of total pay averaged about \$1 million during the entire 33-year period.

Since the size of the firm is one of the main predictors of executive pay, the expansion of the scale of corporations over time predicts a steady increase in compensation over time. However, the determinants of managerial pay seem to have been more complex. Relative to the market value of the firm, executive compensation fell substantially from 1940 to 1969. Although it has increased somewhat in recent years, the current level is still about half as high as it was prior to War World II.

While compensation has not kept up with the growing size of firms, top officers have always been among the highest paid individuals in the labor force. For the past 70 years, executives in large firms have been in the highest percentile of the income distribution. Resembling other measures of income inequality, disparities between top

³² Although long-term incentive payments are also included in these figures, they play only a minor role in the increases in inequality.

executives and the average worker in the economy have significantly worsened in recent years. In particular, income inequality in the 1990s was far higher than anything observed since the beginning of our data in 1936. The distribution of income between top executives has also widened in recent decades, as CEOs have disproportionately benefited from the rapid rise in executive pay. Since the composition of pay prior to 1970 does not exhibit large differentials between CEOs and other managers, these findings suggest that the market for CEOs was more integrated with the market for other high-level executives earlier in the century.

One of the major findings of this paper is the increasing use of incentive-based pay over the course of the twentieth century, which highlights the need to understand the causes and consequences of stock option grants. The adoption of stock option plans coincided with changes in tax policy, suggesting that further research should examine how compensation practices responded to the structure of taxation. While the dollar value of stock option grants during the 1950s and 1960s appears small, the effects on managerial incentives may not have been trivial because stock options accounted for a significant fraction of the after-tax compensation package. Hence, our future work will also study how the relationship between executive compensation and firm performance changed over the century. Moreover, various results in our study suggest the need for comprehensive information on the backgrounds of these managers. Therefore, we plan to extend our current data to include personal characteristics of the executives in our sample.

This paper has provided a foundation for a study of the rise of professional managers, as the roles of top management and the organization of firms evolved over the

course of the twentieth century. Soaring levels of compensation in the 1990s have led many to believe that executives have recently joined the ranks of the superstars. However, a longer-term perspective reveals that disparities between top management and workers were similarly large earlier in the century, and so it may be that executives have simply regained their superstar status.

Data Appendix

Sample Selection

Our ultimate goal is to collect data on executives working in the largest 50 firms in every decade from 1940 to the present. We measure firm size by the total value of sales and obtain company rankings from the Compustat database. Compustat assembles a large amount of balance sheet and financial information from corporate reports on publicly traded companies on the NYSE-AMEX and NASDAQ exchanges. The coverage of the database was expanded in 1978 from 2700 to 6000 firms, so firms that were listed prior to 1978 are less likely to be included in the sample.³³ Therefore, we crosscheck our ranking with the rankings published by Fortune, which are available beginning in 1956.³⁴ For the years prior to 1950, a rank ordering of firms by the value of total sales is not available from either Compustat or any other published surveys. Therefore, we rank firms by total market value using the CRSP database. For years when both total market value and total sales are available, the overlap between rankings by these two different measures of firm size is about 50%.

Our data on executive compensation come from corporate reports that were filed with the SEC. Starting in early 1936, the SEC required firms to disclose information on executive compensation in 10-K reports. Firms were asked to report the aggregate remuneration paid to each of the 3 highest-paid officers. Recognizing that the information reported in the 10-Ks was not very detailed, the SEC introduced executive compensation as an item in proxy statements when it revised proxy rules in 1942. At that

³³ See Kothari, Shanken and Sloan (1995) for a more detailed description of survivorship bias in Compustat.

³⁴ Among the 50 largest firms in 1960, we find 3 companies that are missing from Compustat and add them to our sample. We base our ranking on Compustat instead of the Fortune rankings because Fortune only includes manufacturing firms.

time, it was the Commission's perception that "more extensive information [had to] be given on the compensation and dealings of corporate managers".³⁵ Ever since then, proxy statements have contained detailed quantitative and descriptive information on the different components of compensation for the highest paid officers at the firm. Therefore, we collect data from proxy statements between 1943 and 1970 (thus for compensation pertaining to 1942 to 1969), and extend our sample back before 1943 using 10-K reports. Although some firms did not disclose executive compensation in their 10-K reports and the collection of 10-Ks at Baker Library is not quite as extensive as the collection of proxy statements, we were able to find information pertaining to this time period for 41 out of our initial 50 firms. Starting in 1992, we supplement our sample with information on executive compensation, which is electronically available through Compustat's Executive Compensation database. These data are also originally from proxy statements, and so are comparable to the data we collect. Consequently we halt our data collection in 1991 and use subsequent information from this database.

Because we are interested in examining the long-run trends in compensation, we limit our sample to firms for which the Baker Library has proxy statements for a significant number of years. In particular, we examine firms for which we can find proxy statements for at least 20 years between 1943 and 1977³⁶ and at least 3 blocks of 5 consecutive years. If a firm does not have enough information to be included in the sample, we replace it with the next largest firm on the list. In this manner, we move down the list for a given year until the sample includes a total of 50 firms. For example, the smallest firm in our sample based on the 1960 ranking was 60th on the list. Because

³⁵ Securities Act of 1933, Release No. 2887, December 18th, 1942.

³⁶ These dates were chosen because 1943 marks the beginning of standardized reporting requirements in the proxy statements, and 1977 is the latest year that is electronically searchable in the library's catalog.

the ranking of firms is fairly consistent over time, we anticipate that our final sample will include about 200 firms. For each firm that meets our selection criteria, we collect annual data for all of the years for which proxy statements or 10-Ks are available. When a firm in our sample merges with a company outside of our sample, we include the executives in the surviving firm.

Our selection of individuals from each firm in the sample is limited by the number of people that appear in each proxy statement. Initially, the SEC required firms to report aggregate remuneration for each of their 3 highest paid officers. From 1943 to 1978, this requirement was extended to include the 3 highest paid officers, plus any officers who earned above a nominal amount that was increased over time.³⁷ From 1978 to the present, the disclosure requirements extended to the 5 most highly compensated officers whose remuneration exceeded a certain amount.³⁸ Because we observe more than 3 individuals in a given year for most companies, we collect information on the 5 highest-paid officers whenever possible. In our current sample, about 62% of the firm-year observations have information on 5 officers or more. To avoid any potential biases that would arise from having more executives from firms that report information on a larger number of people, in this paper we focus on a sample that is limited to the three highest paid officers in each company. We also include the CEO or company president if this individual is not among the top three officers, which occurs in about 2 % of the observations on CEOs and presidents in our sample.³⁹

³⁷ This level was initially \$20,000. It was raised to \$25,000 in 1948, \$30,000 in 1954, and \$40,000 in 1974.

³⁸ This amount increased from \$50,000 in 1978, to \$60,000 in 1983, and \$100,000 in 1993.

³⁹ In particular, the complete sample will be more heavily weighted by higher-paying firms and individuals in later time periods. We select the highest-paid officers according to aggregate remuneration.

The sample used in this paper includes the largest 50 firms in 1960. Due to the way the proxy statements are organized at Baker Library, we have started by collecting data from proxy statements between 1943 and 1970. Combining this information with information from 10-Ks and Compustat, our current sample covers the years 1936-1969 and 1992-2002.

Information on Executive Compensation

The information on executive compensation contained in the proxy statements comes from several parts of the document. As required by the SEC, each proxy statement contains a table listing the remuneration of directors and highest paid officers in the firm. These tables provide us with data on cash remuneration, bonuses and job titles. Information on any other types of compensation, such as stock options granted and exercised, generally follow this table. Second, most proxy statements include a description of any incentive compensation or stock option plans that were in effect at the time. Not only do these descriptions provide us with more information on stock options and bonuses (for example, the vesting structure of options and deferred bonuses, the tax status of stock options, and the method used to calculate incentive compensation), but they also provide us with an insight into why these forms of compensation were used. Another useful section of the proxy statement is a table that lists all of the nominees for director and their holdings of company stock. Thus we are able to record the stock holdings of all officers who are also directors, which is the vast majority of the sample. Later proxy statements (generally starting in the mid to late 1960s) also contain

biographical information on the age, education and previous job experience of each nominee to the board of directors.

Definition of Variables

Cash Compensation: Salary plus any bonus both awarded and paid out in the same year. These bonuses are generally in the form of cash, although some were given in stock. Stock bonuses are valued using the stock price on the day the stock was given to the executive. Ideally we would like to be able to separate straight salaries from bonuses, but in many cases only total cash remuneration is reported.

Long-term incentive payments: Payments made to the executive as compensation for performance in prior years. These bonuses only refer to amounts that are paid pre-retirement. Generally the bonuses are paid in equal installments during the 4 to 5 years after they are awarded. Although we would prefer to attribute all bonus awards to the year in which they are granted, the majority of firms only report cash amounts paid to the executive in each year. In cases where the firm does reports the amount awarded, to be consistent with the data reported by other firms we turn this value into a flow by using the structure of the bonus plan to estimate the amount paid out each year. The majority of these bonuses are paid in cash, but a few are awarded in stock. Stock bonuses are valued using the stock price at the end of the year that the individual receives the stock.

Options granted: We value options on the day they are granted using the following Black-Scholes formula:

$$\text{Award value} = N[Pe^{dT}\phi(Z) - Ee^{rT}\phi(Z - \sigma\sqrt{T})]$$
$$Z = \frac{\ln\left(\frac{P}{E}\right) + T\left(r - d - \frac{1}{2}\sigma^2\right)}{\sigma\sqrt{T}}$$

N = number of shares awarded

P = stock price on the date of the award. We assume this price is equal to the exercise price of the stock (see below for details).

d = monthly dividend rate = $1/12 * \ln(1+D/S)$ where D is the total amount of dividends paid in the previous year and S is the average stock price in the previous year.

T = time to expiration of the option, measured in months.

r = monthly yield on US treasury securities. For options that expire within 5 years or less, we use an interest rate calculated from securities with a constant maturity of 5 years. For options that expire in more than 5 years, we use the rate based on 10-year securities. Interest rates are obtained from Global Insight's DRI-WEFA Basic Economic Database.

σ = standard deviation of monthly stock returns. Monthly stock returns are obtained from the CRSP database and are corrected for stock splits and dividend payments. For options that expire within 5 years, the standard deviation in each period is calculated from the previous 5 years of stock returns. For options that expire in more than 5 years, we calculate the standard deviation using the previous 10 years of monthly stock returns.

The proxy statements generally contain all of the information necessary to implement the Black-Scholes formula. Before 1964, the typical stock option plan granted options that

expired after 10 years and had an exercise price ranging from 95 to 100% of the market price of the stock on the day it was granted. These characteristics are fairly standard because, under the 1950 Revenue Act, an option had to have these characteristics in order to be taxed as capital gains instead of income. When the 1964 Revenue Act replaced “restricted” with “qualified” stock options, these requirements were changed to an exercise price of 100% and duration of 5 years. The majority of the firms changed their stock option plans in order to conform to these new rules. Therefore, when information on the duration of the option is missing, we assume that it is 10 years if the option was granted prior to 1964 and 5 years if it was granted afterward. We make this imputation for 2% of the stock option grants. Because the vast majority of the options were granted with an exercise price equal to the stock price on the day of the grant, we assume that $P=E$ for all option grants.

In some cases (generally in the late 1960s or after), firms report the amounts of stock options awarded and exercised as a total for the previous 5-years. Wherever possible, we combine this information with information from previous proxy statement to estimate the annual amounts of options granted and exercised. For people for whom we can't impute (for example because they do not appear in all of the previous 5 proxy statements), we do not take these grants into account, thereby biasing our estimates of stock option use downwards.

Options exercised: We value options exercised as the difference between the exercise price and the average stock price on the day the option was exercised. The proxy statements report exercise prices adjusted for stock splits. The exercise price is missing

for about 2% of the observations on stock option exercises. Because this is such a rare occurrence, we do not use these data. (If this ever becomes a substantial portion of the data, we will impute the exercise price by assuming that the executive exercises his oldest option first).

Equity holdings: Equity holdings are valued with the stock price at the end of the fiscal year. We include shares that are held by family members and associates, and are thus likely to have an impact on the executive's incentives. Equity holdings are only known for officers who are also directors and sometimes they are only reported for directors who are up for re-election, so we are able to estimate stock holdings for 78% of the executives in our sample.

Job title: Executives are divided into broad job categories based on titles reported in the proxy statement. The following table shows the job categories we use and the distribution of executives among them. When multiple job titles are reported, we record all of them. Some of the executives in our sample hold titles stating only that they are on the board of directors. However, because these individuals earn a substantially large salary, we assume that they are also officers of the firm.

Table A1

Title	Fraction of observations ¹
Chairman of the board	10.8
Chairman of the finance committee	1.1
Chairman of the executive committee	2.4
Chairman (not specified)	1.2
Vice-chairman	1.3
President	18.5
Chief executive officer	1.0
Executive or senior vice-president	15.3
Vice-president	40.8
Secretary	1.0
Treasurer	2.1
Comptroller	1.8
President of a subsidiary	2.9
Other officer of a subsidiary	2.1
Consultant/advisor ²	1.0
Officer, no title specified	4.4

1. Column will sum to greater than 100% because some people hold multiple titles.

2. This term is generally used for former presidents of the firm who have retired but remain on the company's payroll.

Table A2

Distribution of Firms by Industry

Industry	Percent of Firms
Manufacturing	
Food and kindred products	10
Paper and allied products	2
Chemicals and allied products	6
Petroleum and coal products	20
Rubber and misc. plastics products	6
Primary metal industries	8
Fabricated metal products	2
Industrial machinery and equipment	4
Electronic equipment	8
Transportation equipment	
Motor vehicles and equipment	8
Aircraft and parts	10
Ship and boat building	2
Instruments and related products	2
Communications	4
Retail	
General merchandise stores	2
Food stores	4
Apparel and accessory stores	2

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Figure 1: Real Value of Executive Compensation, 1936 – 1969

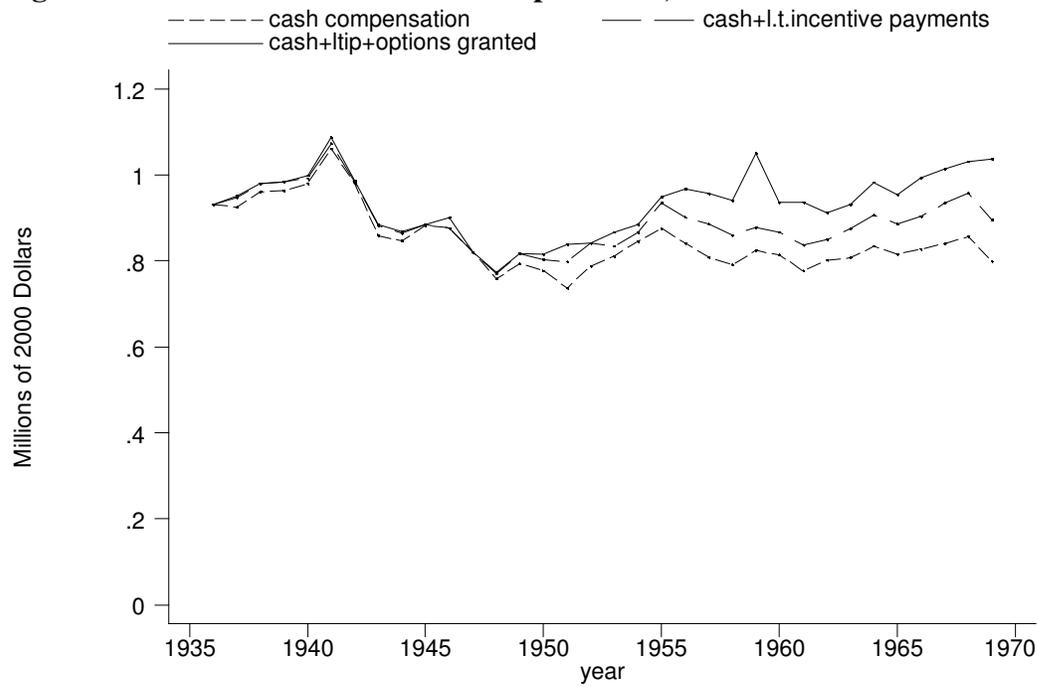
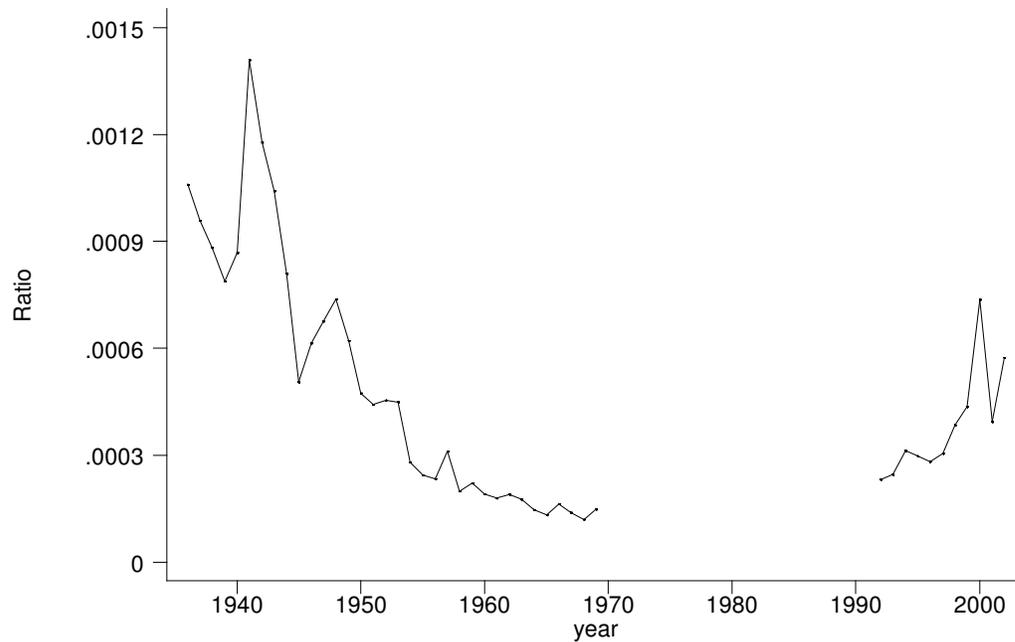
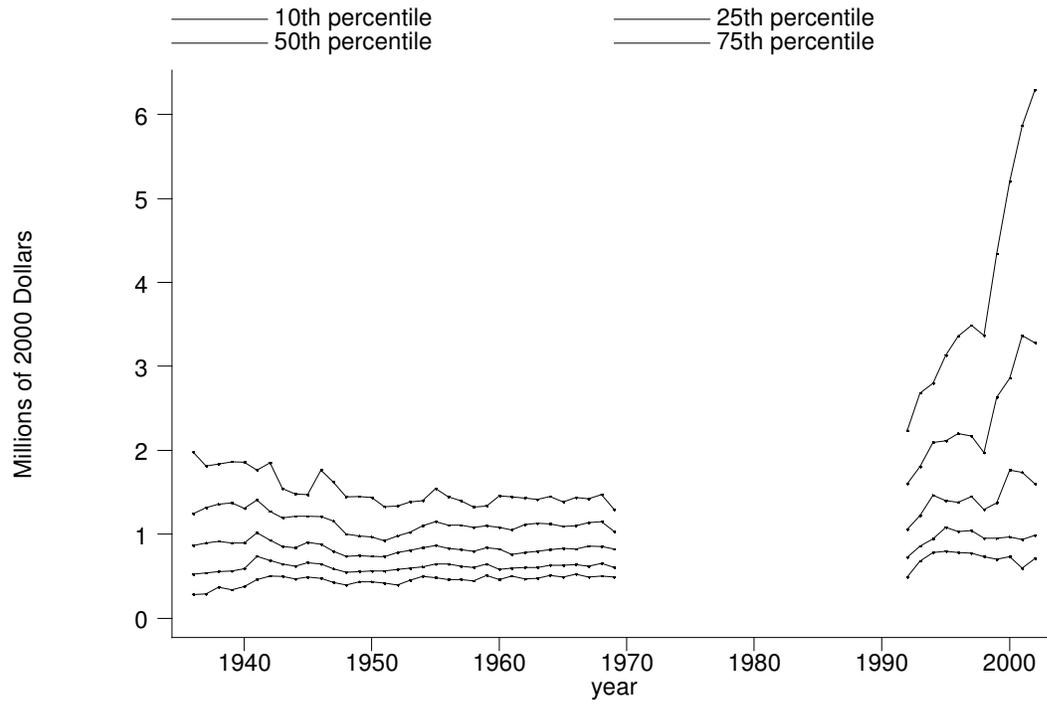


Figure 2: Executive Compensation Relative to Market Value of the Firm



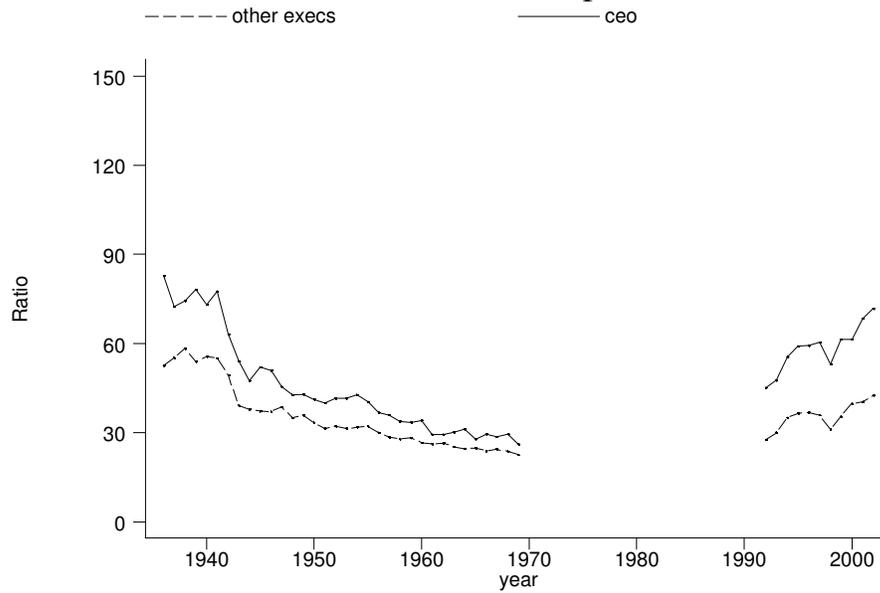
Note. The ratio of average executive compensation to market value is calculated for each firm, and the figure shows the mean across firms. Market value is defined as the number of shares outstanding multiplied by the share price at the end of the calendar year.

Figure 3: Real Value of Executive Compensation by Percentile

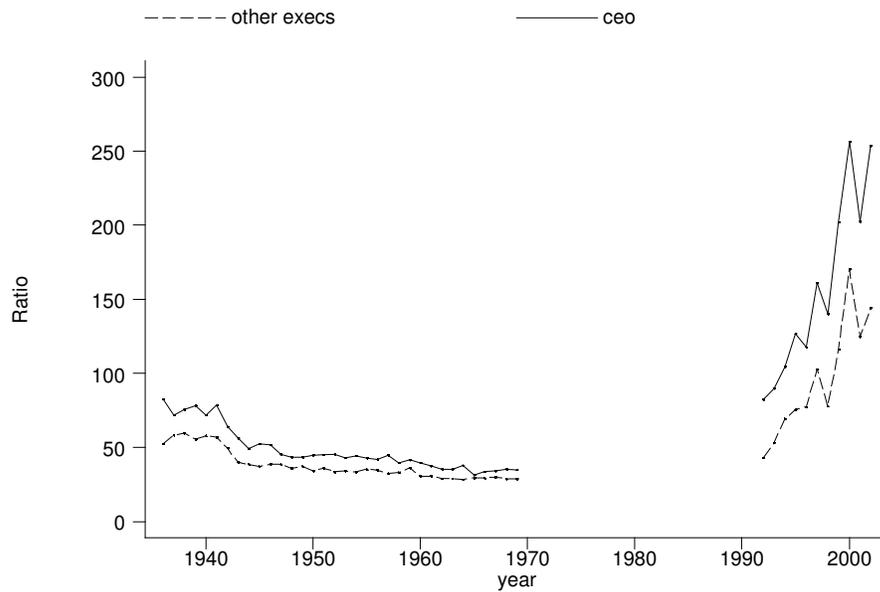


Note: The uppermost line in the figure shows the real value of compensation at the 90th percentile. The lines are shown in ascending order: 10th, 25th, 50th, 75th and 90th.

Figure 4: Executive Compensation Relative to Average Earnings
Cash Compensation



Total Compensation



Note. Total compensation includes cash compensation, long-term incentive payments and stock option grants.