The Compression in Top Income Inequality during the 1940s

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Abstract

The 1940s were a decade of sharp contraction in wage inequality, particularly at the top of the distribution. We study this narrowing using a new dataset on the compensation of top executives. Relative to average earnings, median executive pay declined 0.34 log points from 1940 to 1949. We find that government regulation—including explicit salary restrictions and taxation—had, at best, a modest effect on top incomes during the war period. Instead, a decline in the returns to firm size and an increase in the power of labor unions contributed greatly to the compression in executive pay relative to other workers' earnings.

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1. Introduction

The 1940s stand out as a notable decade in US economic history because it was a period of sharp contraction in wage inequality that affected nearly all parts of the distribution of wage and salary income. This episode was followed by an unparalleled era of relative equality that lasted for the subsequent thirty years. While much research has investigated the causes of this persistent narrowing for individuals below the 90th percentile of the distribution, little is known about the factors influencing incomes at the very upper end. This omission is particularly regrettable since the compression was far more severe and prolonged at the top of the income distribution (Piketty and Saez 2003, Atkinson, Piketty and Saez 2009).

Many unusual forces were at play in the 1940s that could have contributed to the decline in inequality. World War II was accompanied by tight labor markets, inflation, rising union strength, and substantial government intervention in the labor and product markets (Goldin and Katz 2008). These factors have been found to have only a modest role in explaining the compression in incomes below the 90th percentile during this period. Instead, the current consensus attributes much of the decline in inequality to technological change that raised the relative demand for unskilled workers at the same time that the supply of skilled workers was rising (Goldin and Margo 1992, Juhn 1999). However, this explanation may be less salient for the upper end of the wage distribution for several reasons. For example, the supply of top earners, such as corporate executives, may not have been affected by improvements in education to the same extent as middle-income workers. Moreover, some government policies, such as progressive taxation, might have mattered more in the highest part of the income distribution.

Analysis of the determinants of high incomes during the 1940s has been hampered by a lack of individual-level data.[1] For example, the income measures available from the decennial Census—the most widely used data source for incomes in this period—are topcoded for individuals with earnings in the top percentile of the wage distribution.[2] Therefore, we study top incomes by assembling a new dataset on the remuneration of top corporate executives. Corporate officers have been among the highest-earners throughout the twentieth century, and their remuneration provides a unique opportunity to examine top incomes in a period for which no comprehensive micro-data are available.[3]

Our dataset contains information on the compensation of the three highest-paid executives in a balanced panel of 246 publicly-traded corporations in 1940, 1942, 1946, and 1949. These data are unique in that they provide information on individuals' earnings at the very top of the income distribution for a broad sample of firms. Other datasets on executive pay during this period (Lewellen 1968, Frydman and Saks 2010) are smaller samples and do not allow for analysis spanning a broad range of firm sizes and industry characteristics. Besides reflecting the forces driving the rewards to reaching the top of the corporate ladder, evidence on executive pay may help us to understand the compression in top incomes more generally. Managerial positions were common among the highest-paid wage earners during this period.[4] Furthermore, the earnings of all corporate officers accounted for a non-trivial fraction—5 to 6

[1] The current knowledge of incomes in the top 1 percent of the distribution prior to the 1960s is based mostly on aggregated data from tax return statistics (Kuznets 1953, Piketty and Saez 2003).

[2] The 1940 Census was the first one to collect information on labor income. The top code for wage and salary income was $5,001 and $10,000 in the 1940 and 1950 Census, respectively. In both years, these values roughly correspond to the threshold for the top 1 percent of the wage distribution (Piketty and Saez 2003). We are unaware of any other individual-level datasets that cover a large group of individuals at the top of the distribution.

[3] For example, in the sample that we describe below, only 1 percent of the executives fall below the 99.5th percentile in the aggregate distribution of wages and salaries.

[4] Nearly half of the individuals with top-coded wages in the 1940 and 1950 Censuses—which is roughly equivalent to the top 1 percent of the wage distribution—listed their occupation as "manager, official or proprietor (nec)," the occupational category that is the most likely to contain executives (albeit with some error).

percent—of aggregate wages and salaries during the 1940s (Piketty and Saez 2003). Another advantage of our data is that they allow us to investigate changes in pay in the pre-, during- and post-World War II periods, which is not possible with Census data.[5]

Consistent with other studies of this period, our data show a sharp decline in inequality between executives and other workers from 1940 to 1949 (Goldin and Margo 1992, Piketty and Saez 2003, Goldin and Katz 2008, Frydman and Saks 2010). Although the nominal value of executive pay increased, it failed to keep up with the earnings of most other workers. For example, the median executive in our sample received 24 times average annual earnings in the economy in 1940, but only 17 times average annual earnings in 1949.[6] The decline in relative compensation began during WWII, but intensified after the war. Thus, war-related forces might be partly responsible for the compression in inequality, but other reasons are needed to explain why the compression continued after the end of the war.

In order to examine potential explanations for the lack of growth in executive pay relative to the rest of the workforce, we separate our analysis into two parts. First, we assess the role of government policies that might have restricted growth in remuneration. War-related salary restrictions seem to have had a modest effect during WWII, but they cannot account for the persistently slow growth in executive pay after the end of the war. In addition, we find no evidence that the high income tax rates during this period restricted executive pay. Second, we study the role of non-regulatory determinants of executive pay and of the ratio of executive pay

[5] Since our dataset begins in 1940, we cannot assess whether relative executive pay was anomalously high in this year, thereby exaggerating the decrease in inequality during the next 10 years. However, the available evidence suggests that the wage distribution was even more dispersed prior to the Great Depression (Douglas 1926, Lebergott 1947, Ober 1948, Stigler 1956, Goldin and Katz 2008). Moreover, top wage shares were relatively stable through the 1920s and 1930s, and did not decline sharply until the 1940s (Piketty and Saez 2003). The 1940s also seem to have been a watershed for racial differences in wages (Smith and Welch 1989, Bailey and Collins 2006).

[6] The magnitude of this decline (in log points) is similar to the contraction between the 90th and 10th percentiles of the aggregate wage distribution (Goldin and Margo 1992).

to average industry earnings, which we refer to as "relative executive pay."[7] These determinants include a number of individual, firm and industry characteristics that have been found to affect compensation in later decades, as well as a few other measures that may have disproportionately affected top incomes during the 1940s. We find that the decline in relative executive pay was related to a drop in the return to firm size and a growing negative correlation between compensation and industry unionization. The economic magnitude of these effects is quite large, more-than offsetting increases in pay owing to expanding firm size, rising firm profitability, and increasing pay in war-related industries.

The growing negative correlation between executive pay and industry unionization occurred gradually over the decade and suggests that the ability of labor unions to constrain the earnings of managers strengthened during the 1940s.[8] The interpretation of the reduction in the returns to firm size is less clear, as multiple mechanisms could generate a correlation between firm size and executive pay.[9] Because the drop in the return to firm size was concentrated between1940 and 1942, factors that changed gradually over the course of the decade (such as the return to managerial skills) are unlikely candidates to explain this phenomenon. Instead, this effect may be related to forces that changed rapidly, such as improvements in corporate governance triggered by new SEC regulations or changes in social norms with the advent of the war. Whatever the underlying mechanism, the correlation between firm size and executive pay remained low for some time: Extending our analysis to 1955 reveals that the return to firm size remained relatively low through the mid-1950s.

[7] Throughout the paper, we use a variety of measures of workers' earnings to calculate this ratio due to data availability. Although we describe the specific measure in each case, we generally refer to the ratio as "relative executive pay" for simplicity.

[8] Indeed, other research has found that the power of labor unions contributed to the compression of the lower end of the income distribution during this period and an expansion of the lower end of the distribution later in the century (Goldin and Margo 1992, Freeman 1993, DiNardo, Fortin and Lemieux 1996, Firpo, Fortin and Lemieux 2007).

[9] For example, large firms may offer higher pay to attract talented managers (Rosen 1982, Tervio 2008, Gabaix and Landier 2008). Alternatively, compensation may be higher if corporate governance is weaker in larger firms.

The non-regulatory determinants of pay explain a large fraction of the variation in the *level* of compensation in all years in the sample, as well as most of the *change* in average pay from 1940 to 1946. On the other hand, with the exception of a small contribution from unionization, these factors cannot account for the continued decline in relative executive pay from 1946 to 1949. Thus, other factors not directly taken into account in our analysis played a significant role in the continued compression of top incomes from 1946 onwards. It is possible that war-related events had a prolonged indirect effect on the distribution of earnings by altering social norms towards income inequality. Other unobserved factors, such as changes in the supply and demand for skill, may have also played a more important role during this period. Although we cannot fully explain the changes in the income distribution in the post-war years, our analysis suggests that the compression in income inequality would not have been as severe had the returns to firm size remained at their 1940 level, had unions not become better at restricting executive pay, and had the government not frozen salaries during the war.

2. Data description

2.1 Sources of data on executive pay

Most of our analysis is based on a new dataset on executive pay in the 1940s that we construct using two reports published by the National Industrial Conference Board (NICB). Each report gives the remuneration (salary plus bonus) paid to each of the three highest-paid officers at two different points in time in a sample of about 500 publicly-traded firms.[10] Although the names of the firms and executives are not disclosed, the reports show compensation and net sales in both years for each firm. Therefore, each report can be treated as a 2-year panel. The report

[10] Although these reports do not include other forms of pay, this omission is not an important limitation because other forms of pay were rarely used during this period (Frydman and Saks 2010).

published in 1948 includes remuneration and sales for 1942 and 1946, while the report published in 1951 includes similar information for 1940 and 1949.[11]

An attractive feature of the NICB data is that they are based on proxy statements and private reports filed with the Securities and Exchange Commission (SEC), and therefore the information is arguably more accurate than survey data. However, the reports do not describe the sample selection methods used by the NICB. Moreover, the raw data are not likely to present an accurate view of changes in the distribution of earnings over the 1940s because the 1948 report contains a significantly larger sample (762 firms) than the 1951 report (545 firms). Because of the difference in sample size, the average firm in the 1951 sample is a good bit larger than the average firm in the 1948 sample.

To compare the distribution of pay across all four years in a consistent manner, we restrict the sample in several ways. First, we drop non-manufacturing firms because those included in the NICB reports do not appear to be representative of the non-manufacturing sector of the economy.[12] Then, we use *Moody's Manual of Investments* to identify the firms included in each report and create a balanced panel. After matching all manufacturing corporations by net sales and industry to firms in *Moody's*, the final panel includes 246 firms that we can match across all four years—we refer to these data as the NICB sample.[13] For these corporations, we

[11] The 1948 volume only discloses the sum of the remuneration paid to the three highest-paid officers in each firm in 1942 rather than the amounts earned by each executive. To obtain individual observations on remuneration for 1942, we use a 1946 volume that reports compensation in 1942 separately for the three highest-paid officers and we match firms in the 1946 volume to the 1948 volume by industry and net sales.

[12] As shown in Appendix Table 1, the industrial composition of non-manufacturing firms in the NICB sample is not similar to firms traded on the New York Stock Exchange. Non-manufacturing firms comprise only 13 percent of all corporations included in the NICB reports but almost 36 percent of NYSE-traded firms.

[13] Specifically, we use an index of firms by industry in the 1950 *Moody's* manual to find firms in the same industry and with the same net sales in 1940 and 1949 as firms in the 1951 NICB sample. We are able to match 358 out of 435 firms in this manner. Then we match these firms by industry and net sales in 1942 and 1946 to the 1948 sample, which reduces the final panel to 246 firms for which we have data for all 4 years.

use several editions of the *Moody's* manuals to hand-collect financial information and other firm characteristics.

The final dataset appears to be representative of most corporations in the economy, since changes in the net sales of the sampled firms are similar to changes in aggregate corporate income and gross receipts per firm in the manufacturing sector (see Table 1). Moreover, the industrial composition of the NICB sample is similar to that of manufacturing firms that traded on the NYSE (see Appendix Table 1).[14] We further assess the representativeness of the sample by calculating the rank of each NICB firms in the NYSE according to market value For the firms that were not traded on the NYSE (25 percent of the sample), we impute the rank as the rank of the NYSE-traded manufacturing firm with the closest market value.[15] The rankings of the NICB firms are similar in all four years, again suggesting that the firms in this sample are broadly representative of publicly-traded manufacturing firms.

The similarity of the NICB sample with aggregate manufacturing statistics on sales and market value reduces the concern that survivorship bias may limit the representativeness of the data. As a further check, we compared samples drawn from two other NICB reports with data on executive pay in 1942 and 1955. Each of these reports covers a single year, so the firms included are not required to have survived for any period of time and consequently they are more likely to be representative than the 2-year panels from which we create our balanced panel. The changes in executive pay from 1942 to 1955—including the level of pay and the correlations of pay with

[14] The industry names used in the NICB reports are not linked to industry codes. Therefore, we match the reported industry names to our best guess of the 2-digit Standard Industrial Classification (SIC) code based on industrial classification manuals from 1945.

[15] Other exchanges on which the NICB firms were commonly traded, as reported in *Moody's*, are the Midwest Stock Exchange (22 percent of the sample), the New York Curb Exchange (15 percent) and the Detroit Stock Exchange (9 percent).

firm and industry characteristics that we document below—are similar to the balanced panel. Thus, our results do not appear to be affected by the sample design.

Since not all firms report the compensation of all three officers in every year, we further balance the panel by dropping observations where we do not observe an officer of the same pay-rank in the same firm in all four years.[16] This restriction ensures that changes in the distribution of pay over time are not driven by changes in the number or rank of officers in the sample. The final sample covers 631 executives in each year, with a few more officers who are the highest-paid in their firm than individuals who are the second or third highest-paid.[17]

To evaluate the representativeness of the level of compensation in the final NICB sample, we compare our data to the shares of aggregate wages and salaries earned at the top of the income distribution from Piketty and Saez (2003). Because the aggregate wage shares are measures of income inequality as opposed to nominal levels of pay, we transform the NICB compensation data into a measure of earnings inequality by dividing executive remuneration by average earnings per full-time equivalent employee from the National Income and Product Accounts. As shown in Table 2, nearly all of the executives in the NICB sample fall above the 99.5th percentile of the wage and salary distribution. For the three reported categories of income in this range, changes in average and median relative executive compensation are similar to changes in the corresponding group's share of aggregate wages.[18] Thus, the NICB sample broadly reflects the changes in the distribution of income in the top 0.5 percentile of the aggregate distribution of wages and salaries.

[16] Imposing this restriction reduces our sample by 39 percent.
[17] Out of the 631 executives included in each year, 39 percent are the highest paid in their firm, 33 percent are the second highest paid, and 28 percent are the third highest paid.
[18] The remuneration paid to executives falling below the 99.5th percentile is not always representative of aggregate trends in income inequality. However, only a few executives in the NICB sample fall into this part of the distribution.

A few limitations of the NICB sample are that it does not track individuals over time and it does not report annual changes in pay. Because some aspects of our analysis hinge on studying annual changes in pay for an individual executive, we sometimes use an annual dataset on executive pay constructed by Frydman and Saks (2010), which we call the Frydman-Saks sample. Collected from firms' proxy statements and other corporate reports, these data contain annual information on the compensation of top executives in the 50 largest publicly traded firms in 1940, 1960, and 1990. While this dataset contains a total of 101 firms, it is an unbalanced panel and usually has about 70 firms in each year. To maximize the number of observations, we include data on all of the executives reported for each firm (an average of 6 per firm).[19]

2.2 Trends in executive pay

Unlike the subsequent six decades, the 1940s were a period of decline in the real value of top executive pay (Frydman and Saks 2010). Figure 1 shows the distribution of remuneration relative to the price level in each year of the NICB sample. The real value of pay rose at most points of the distribution from 1940 to 1942, but then decreased from 1942 to 1946 and fell further from 1946 to 1949.[20] On balance, the drop in executive compensation from 1940 to 1949 was substantial; the average decreased 11 percent and the median decreased 8 percent.

The distribution of pay across executives also narrowed somewhat during this time period, especially at the bottom end. Relative to the median, remuneration at the 10th percentile increased by 35 percent from 1940 to 1949, while the 25th percentile increased 6 percent. By contrast, both the 75th and 90th percentiles declined only 3 percent relative to the median. These

[19] Frydman and Saks (2010) analyze only the 3 highest-paid executives in each firm. See the data appendix of that paper for a detailed description of the sample selection and data characteristics.
[20] The nominal value of pay increased every year, but it was not large enough to keep up with inflation after 1942.

results echo Piketty and Saez (2003), who find that the share of aggregate wages and salaries contracted more for individuals at the very top of the income distribution.

The compression between lower-paid and higher-paid executives can also be seen in other aspects of the NICB sample. Compensation declined less in firms that were small in 1940, in industries with low levels of executive pay in 1940, and in firms that paid their executives below their industry median in 1940 (see Table 3). Moreover, the contraction in pay differentials also occurred within firms. While the highest-paid executive was paid 1.9 times more than the third highest-paid manager in his firm in 1940, the difference in their paychecks had declined to 1.7 by 1949.

Comparing executives to the average worker, the pay gap between most executives and average earnings contracted more sharply than the pay differences across executives. As shown in Table 3, average executive pay decreased 30 percent relative to average earnings in the economy. Executive pay fell by a similar amount when compared to average earnings or production worker wages in the officer's own industry instead of the economy-wide average.[21] By contrast, the pay gap between various groups of executives generally decreased only about 10 percent. Moreover, the compression between executive pay and average worker earnings was relatively large for most executives in the sample. Relative to average earnings in the economy, executive pay fell by at least 20 percent in more than ¾ of the sample. For most executives, this compression occurred primarily during and after WWII.[22]

3. Explaining the trends in executive pay

[21] Average industry earnings are wages and salaries per employee at the 2-digit level as reported in the 1951 *Survey of Current Business*. Wages per production worker are measured at the most detailed industry category possible (usually 3-digit SIC) from the *Census of Manufactures*.

[22] The executives in the top 10 percent of the distribution experienced a somewhat different pattern, as their relative remuneration declined significantly in the pre-war and war periods, but was flat after the war.

3.1.1 Explicit restrictions on earnings

As part of the command economy during WWII, the federal government instituted restrictions on salaries and wages that may have reduced top incomes relative to the rest of the earnings distribution. With the aim to restrain inflationary pressures, Roosevelt introduced two types of restrictions on high salaries in October 2nd, 1942 (Public Law 729, "An Act to Amend the Emergency Price Control Act of 1942, to Aid in Preventing Inflation, and for Other Purposes"): a cap on top salaries, and a broader limit on salary increases. The salary cap limited labor earnings to less than an amount that would exceed $25,000 after federal income taxes were paid (equivalent to $54,428.57 pre-tax earnings in 1942, according to the text of the law, and to $67,200 in 1943, according to IRS regulators cited by the media).[23] The restriction against salary increases prohibited salaries in excess of $5,000 from rising above their level of September 15, 1942.

The establishment of the strict cap on salaries generated significant controversy. On the one hand, this restriction received wide support from labor unions, which perceived them as a way to ensure that wage earners did not unequally bear the burdens of the war (Leff 1991) and to limit corporations from profiting from inflated incomes due to the war effort. On the other hand, opponents emphasized that the caps would only affect a small number of individuals and, consequently, would not keep inflation at bay or improve the economy.[24] According to this view, the caps were an attack on enterprises and their executives, who would suffer a very drastic economic adjustment and who were already subjected to "equality of sacrifice" through a

[23] This limit applied to labor income prior to any deductions, federal taxes other than income taxes, and state taxes. However, gross salaries could exceed the cap in order to allow individuals to fulfill prior commitments, such as insurance policies due, federal income taxes previously agreed upon, and other fixed payments that would otherwise result in "undue hardship." Earnings from investments were not affected by the salary limitations.

[24] For example, James F. Byrnes, the director of the Office of Economic Stabilization in charge of regulating the salary caps, estimated that "[the] salary limitation in 1942 would affect only 3,000 persons. From the fury of the protests one would think it affected three million persons" (Wall Street Journal, November 17th, 1942).

progressive tax schedule.[25] In the end, these arguments won. Only six months after the law was signed, Congress repealed the salary ceiling by an overwhelming majority. Thus, the cap on earnings had no direct impact on high incomes.

In contrast to the salary cap, the prohibition against salary changes remained in place until November 1946. Although this restriction was enforced, exceptions were allowed to correct maladjustments or inequalities, to aid in the prosecution of the war, or for individual merit raises, promotions, reclassifications, and productivity increases under an incentive plan as determined by previously established salary agreements or rate schedules. A firm wanting to change salary and bonus payments outside of these provisions would require the approval of the Commissioner of the Salary Stabilization Unit.[26] High penalties for violating the regulations were imposed to ensure that companies did not abuse these regulations.[27] From 1942 to 1946, the Salary Stabilization Unit processed about 750,000 applications (which is equivalent to roughly 30 percent of the number of covered individuals) for permission to increase salary or bonus payments, suggesting that firms took these regulations seriously.[28]

Prior work suggests that restrictions prohibiting *wage* (i.e. wages and salaries of individuals earning less than $5,000 per year) increases reduced aggregate income inequality because exceptions were granted more often to low-income workers (Goldin and Margo 1992,

[25] For example, the Wall Street Journal run a series of articles in November of 1942 on "The New Poor," describing the hardships faced by top executives due to the salary limitations.
[26] The Salary Stabilization Unit was created by Treasury decision in October 29, 1942 to administer the provisions of the regulations on salaries, a role conferred to the Commissioner of the Internal Revenue Service by the Act of October 2, 1942. The Unit was in charge of stabilizing all salaries in excess of $5,000 per annum. The National War Labor Board made decisions on wages and on salaries below the $5,000 level.
[27] In case of a violation, employer and employee could each be fined up to $1,000 and/or be sent to prison for up to a year. Moreover, the entire amount of an illegal salary payment could be disallowed as a deduction from taxable corporate income.
[28] There is no comprehensive evidence on the fraction of applications that were denied, but denials do not appear to have been infrequent. For example, the Unit processed 44,189 appeals to previous rulings during the fiscal year of 1945 (U.S. Treasury Department, 1946). The Unit also denied requests in several visible cases, such as in the request of a salary readjustment for the president of the New York Stock Exchange (Wall Street Journal, May 27th, 1944).

Rockoff 1986).[29] Similarly, the prohibition against salary increases may have contributed to the compression in top incomes if these restrictions were more binding than the limits on wages. Because firms were allowed to modify wages and salaries in certain circumstances, the combined effect of the salary and wage restrictions on the distribution of income is not clear. Therefore, we examine the effect of these regulations in a number of different ways.

First, we assess the impact of the salary regulations using annual data from the Frydman-Saks sample. As shown in Figure 2, about 15 percent of executives received no salary increase (defined as salary plus annual bonus) in the pre-war and post-war periods.[30] By contrast, the fraction of executives with no pay increase was 27 percent from 1943 to 1945. Therefore, it appears that the regulation did prevent some salary changes during the war. However, its influence was not too strong, as about 25 percent of the executives in this sample still obtained large wage increases when the regulation was in place (dashed line in Figure 2).[31]

This sample also suggests that firms did not abuse the provisions of the regulation in order to increase the compensation of their executives. The likelihood of job promotion among top executives did not increase during the war years, as one would expect if promotions-in-name-only were used to bypass the regulation.[32] Moreover, the positive association between being promoted and receiving a pay increase was not different during the war than in other periods.

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[29] Goldin and Margo (1992) find that wage controls during this period reduced the differential between the 10th and 50th percentiles of the aggregate wage distribution.

[30] It is unlikely that the absence of a salary increase could have been offset by increases in other forms of pay because salaries and annual bonuses were the main source of executive pay during this period (Frydman and Saks 2010). Moreover, the restriction applied to all forms of labor income.

[31] We define a large increase in remuneration as a change in ln(remuneration) greater than 0.06 because this was the average change in compensation during the pre-war and post-war period.

[32] We loosely define a job promotion as a change in the job title of the executive. In most cases, changes in job titles reflect a clear increase in responsibility. However, the change in job titles might entail a decline in responsibility in a few occasions, introducing error into our measure of promotions.

Next, we use industry-level data to assess the relative impact of the wage and salary restrictions on the distribution of income. The National War Labor Board (NWLB), the institution in charge of wage regulations for workers earning less that $5,000 per year, granted exceptions to the wage restrictions more often in low-wage industries in order to reduce inter-plant wage differentials or to increase substandard wages (Goldin and Margo 1992, Rockoff 1986). If these restrictions were influential, we would expect to observe more compression between executive and workers earnings in industries that had lower wages in the pre-war period.

To evaluate this hypothesis, we define low-wage industries as the following 2-digit SIC categories: lumber, textiles, tobacco, apparel, and leather products.[33] The median of average pay in 1940 in these five categories was $15,000, compared to $26,000 in other industries. From 1942 to 1946, average earnings rose more and relative executive pay shrank more in low-wage industries (see Table 4). By contrast, relative executive pay increased more in low-wage industries from 1940 to 1942 and from 1946 to 1949. These patterns are consistent with the possibility that war-related wage policies boosted pay in low-wage industries during the war, but the effect seems to have dissipated after the regulations were lifted.

In addition, the NWLB was more likely to allow wage increases in war-related industries to "aid in the prosecution of the war." The Salary Stabilization Board may have also granted exceptions to salary restrictions for top executives in these industries. Since the restrictions on both executive pay and workers' wages may have been less binding in war-related industries compared to non-war related industries, there is no clear prediction for the net effect of salary and wage regulations on relative executive pay.

[33] We define these five industries as "low wage" because there is substantial gap between the highest industry in the low-wage category ($16,009) and the lowest industry in the high-wage category ($21,229).

Empirically, salary regulations appear to have affected more executives in non-war related industries, as these individuals were less likely to experience increases in remuneration during the war years than officers in war-related industries.[34] The fraction of executives in non-war-related industries in the Frydman-Saks sample with a change in remuneration exactly equal to zero jumped from 14 percent in 1942 to 31 percent in 1943, and remained at this level until it fell back to 12 percent in 1946. By contrast, the fraction of individuals with no change in remuneration in war-related industries only rose from 17 percent in 1942 to 21 percent in the war years. However, the lower incidence of salary freezes during war does not seem to have affected the level of executive pay. In both the Frydman-Saks and NICB samples, median executive remuneration fell more in war-related industries from 1942 to 1946 than in other industries. Average industry earnings also grew more in non-war-related industries from 1942 to 1946, contrary to the expected effect (see Table 4). When we compare the ratio of median executive earnings relative to average industry earnings, we find that relative executive pay declined less in war-related than in other industries during the war period.

In summary, wage and salary policies might have had some effect on reducing top income inequality from 1942 to 1946. However, we find that this effect is relatively modest and did not persist after the regulations had been lifted. These findings suggest that other forces contributed to the narrowing of top incomes relative to the rest of the distribution during the 1940s.

3.1.2 Effect of tax policy

An alternative mechanism through which government policy can directly affect the distribution of income is through changes in the structure of tax rates. Specifically, the reduction in top

[34] Following Goldin and Margo (1992), we define war-related industries as the following 2-digit SIC categories: chemicals, rubber, electrical machinery, other machinery, motor vehicles, and other transportation equipment.

income inequality might be the result of an increase in marginal tax rates on labor income, which could deter firms from awarding extremely large paychecks to their top officers, or a reduction in tax rates on low incomes. The extensive literature on the elasticity of taxable income has found that only high-income earners are responsive to changes in tax rates, so we focus on the effect of tax rates on executive pay (Saez 2004, Goolsbee 1999, Slemrod 2000).

Figure 3 shows the annual marginal tax rate from 1937 to 1949 at 5 levels of real income: $154,000, $323,000, $492,000, $577,000 and $1,922,000. These values are the 5th, 25th, 50th, 75th, and 95th percentiles of the distribution of remuneration in the NICB data in 1940. Tax rates increased at all income levels from 1940 to 1944 and then decreased in the second half of the decade. This pattern seems like an unlikely candidate to explain the changes in the real level of executive pay, which fell in the second half of the decade even though tax rates declined (see Table 3). However, the increase in tax rates mid-decade could have depressed executive pay through 1949 if it takes several years for executive pay to respond to changes in taxation.

The literature concerned with analyzing how taxable income responds to changes in taxation usually expresses an individual's income as a function of his or her "net-of-tax rate" of labor income:[35]

$$\ln(remun_{it}) = \alpha + \beta \ln(1 - \tau_{it}) + \varepsilon_{it} \qquad [1]$$

The parameter of interest is β, the "elasticity of taxable income." Estimates of β range from 0 to 1 (Feldstein 1995, Gruber and Saez 2002, Lindsay 1987, and Saez 1999 and 2004), but the current consensus based on data mostly from the last thirty years is that β is somewhere between 0.12 to 0.4 (Saez, Slemrod and Giertz 2009). Estimates using data prior to the 1980s suggest that β is smaller (i.e less than 0.1) or possibly even negative (Goolsbee 1999, Frydman

[35] See Gruber and Saez (2002) for a theoretical derivation of this relationship.

and Molloy 2009). To address the importance of tax policy on top earnings during the 1940s, we estimate the magnitude of β in this period. For our basic specification, we follow the literature and regress changes in executive pay on changes in the net-of-tax rate:

$$\Delta \ln(remun_{it}) = \alpha_t + \beta \Delta \ln(1 - \tau_{it}) + \Gamma X_{it} + \varepsilon_{it} \quad [2]$$

where $remun_{it}$ is the real value of remuneration for executive i in year t, τ_{it} is the marginal tax rate on labor income, and X is a set of individual and firm characteristics. The regression is specified in changes rather than levels because the progressivity of the tax system creates a mechanical correlation between the level of tax rates and the level of pay. By examining changes in tax rates, we identify the effect of tax rates from tax reforms that alter the tax rate faced by each individual. To ensure that the net-of-tax rate is purely a function of tax policy, we calculate the tax rate in year t as the rate that would have applied to the individual if his or her income had remained at the same level (in real terms) as it was in the previous year (Gruber and Saez 2002).

We cannot follow specific individuals over time in the NICB data, so we use the Frydman-Saks sample for this analysis.[36] Among the covariates, we include the logarithm of lagged real remuneration to account for mean-reversion income (which causes higher-income executives to experience larger reductions in pay) (Gruber and Saez 2002). We also control for lagged job titles, lagged director status, lagged firm market value, lagged firm rate of return, whether the executive changed jobs, and whether the executive changed director status. We calculate an executive's marginal income tax rate assuming that his income is equal to the remuneration paid by his firm and that he files jointly with a spouse.

[36] Estimates of this specification in the NICB data yielded large standard errors and coefficients that varied widely across specifications, perhaps due to noise induced by using changes in pay for a given pay-rank in a firm instead of changes in pay for a given individual.

We start by estimating equation [2] using annual changes in pay and annual changes in the net-of-tax rate from 1941 to 1949. As shown by the first column of Table 5, changes in tax rates are unrelated to annual changes in remuneration.[37] The coefficient β is precisely estimated and we can reject that the elasticity is greater than 0.1 with a p-value smaller than 0.01. This result is robust to controlling for the lagged level of pay in a variety of ways.

One possible reason for a small estimate of β is that executive compensation may adjust slowly to changes in tax policy. A slow adjustment would occur if, for example, compensation packages are not negotiated every year. In this case, the change in pay over a period of *x* years would be a function of the change in tax rates over that period. To assess the delayed response to taxes, the remaining columns of Table 5 report the regressions results for 3-year changes, 5-year changes and 10-year changes in pay and net-of-tax rates. In each specification, the lagged covariates refer to the value of the covariate in year *t-x*. The sample size of the 10-year change regression is fairly small because we observe few individuals for such a long period. To increase the sample size, we extend the sample out to 1959. In every case we can reject an elasticity greater than 0.2, and in all specifications except one we can reject an elasticity greater than 0.1.

In sum, we do not find a strong positive relationship between changes in pay and changes in the net-of-tax rate. The largest estimate of the elasticity of taxable income that we found was 0.08 and our estimates are precise enough that we can easily reject an elasticity of 0.1 in most cases.[38] Thus, executive pay does not appear to have been highly responsive to tax rates during the 1940s.

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[37] As in the NICB sample, we define remuneration as salary + annual bonuses. Although the Frydman-Saks sample contains information on stock options and long-term bonuses, they amount to a negligible fraction of total compensation during this period.

[38] We obtain similarly small estimates of the elasticity when we estimate this parameter from the level of pay in the NICB sample. In this exercise, we regress the logarithm of real remuneration on the logarithm of the net-of-tax rate in a sample that pools all four years but is limited to individuals in the same tax bracket to avoid the mechanical correlation between the level of tax rates and pay.

3.2 Non-regulatory determinants of executive compensation and earnings inequality

The role of government regulation appears to have been relatively modest, leaving much of the contraction of relative executive pay during the 1940s unexplained. A large literature in corporate finance has found various individual, firm, and industry characteristics to be important determinants of executive pay in recent decades.[39] Studies on income inequality also relate disparities in top incomes to other factors, such as the power of unions and the returns to skills (Katz and Murphy 1990, DiNardo, Fortin and Lemieux 1996, Firpo, Fortin and Lemieux 2007, Autor, Katz and Kearney 2004). Following these two literatures, we study the role of non-regulatory determinants of relative executive pay.

3.2.1 Determinants of the level of executive pay and inequality

We start by comparing the determinants of the log level of real executive compensation in 1940 and 1949 using OLS regressions (columns (1) and (2) of Table 6).[40] Consistent with prior findings in the literature, we find positive returns to being the president or chairman of the corporation.[41] The pay gap between executives in these positions and other officers remained relatively constant throughout the decade.[42]

Turning to characteristics of the firm, we find that pay was higher in larger firms. We measure firm size as the logarithm of the real value of net sales, but these results are robust to

[39] See, among others, Rosen (1992), Murphy (1999), and Frydman and Jenter (2010) for detailed reviews on executive compensation.
[40] We cluster the standard errors by firm. In general, standard errors are smaller if we cluster by other variables, such as industry or year.
[41] Indicators for other job titles, such as executive vice president, were not economically or statistically important. Other common job titles included in the omitted category are vice president, secretary and treasurer.
[42] We use all executives in our sample to maximize the amount of variation. To address the concern that the determinants of pay varied by the rank of the executive, we control for job titles when possible. In addition, our results are robust to restricting the sample to executives of the same rank (for example, the highest-paid in each firm).

using the firm's market value or total assets instead. This positive correlation is consistent with many other studies, which usually find firm size to be one of the main correlates with executive pay (Huntsman and Lewellen 1970, Rosen 1992, Graham, Li and Qiu 2009). Interestingly, the returns to firm size fell noticeably during the sample period, as the coefficient on sales was 20 percent lower in 1949 than in 1940.

Executive pay was also higher in more profitable firms, as measured by return on assets. However, other observable firm characteristics, including capital structure (proxied by the book leverage ratio), the firm's growth opportunities (measured by the market-to-book ratio), the firm's age (measured by the year of incorporation), the size of the board of the directors, and the fraction of insiders (i.e., current managers of the firm) on the board, had little impact on the level of pay. [43]

As for the industry characteristics, executive pay was slightly higher in more unionized industries in 1940, but the correlation had become negative by 1949. Although many studies have found labor unions to be an important factor in determining the distribution of wages (Freeman 1993, Card 1992, DiNardo, Fortin, and Lemieux 1996, Firpo, Fortin and Lemieux 2007), evidence on the effect of unionization on executive pay has been mixed (DiNardo, Hallock, and Pischke 1997, DeAngelo and DeAngelo 1991, Gomez and Tzioumis 2006).[44] These correlations show that executive pay in highly unionized industries declined relative to other industries over the 1940s, possibly due to the growing power of unions during this period (Freeman 1998).

[43] The findings for the individual and firm characteristics are robust to using industry dummies instead of the industry-level controls discussed below.

[44] Measuring unionization at the industry level for this period is not straightforward. As described in the data appendix, we use a series of BLS bulletins that report whether the fraction of wage earners under written union agreements was within 5 discreet ranges. When we use the number of work stoppages and strikes as an alternative measure, we find a positive correlation between executive pay and the number of stoppages/strikes in the previous year. It is possible that this result reflects the fact that unions were more confrontational in industries with higher income disparities.

We also find that executives in war-related industries were remunerated more handsomely in 1949, even though compensation was similar in war-related and non-war-related industries in 1940. This widening pay gap might reflect a rise in the demand for war-related products, or it may also be the result of laxer enforcement of wartime regulations on salaries in these industries (Goldin and Margo 1992). Finally, we allow the pay of an executive to be affected by the size of the typical firm in their industry (arguably the relevant labor market for the executive during this period). If firms compete for scarce managerial talent, the overall growth of firms in an industry may lead to an increase in executive pay in that industry, even after conditioning on the size of the executive's firm (Gabaix and Landier 2008). However, we do not find any correlation between executive pay and the number of production workers per establishment in the industry.[45]

Our controls jointly explain about 2/3 of the variation in executive pay in both years, with the majority of the explanatory power due to firm size (50 percent) and job title (10 percent). Thus, these non-regulatory factors appear to be important determinants of the level of executive compensation in the 1940s. These results fit with evidence from later in the century, in which firm and executive fixed effects explain a large fraction of the cross-sectional variation in executive pay (Graham, Li, Qiu 2009).

Since one of our goals is to understand the changes in inequality at the top of the income distribution, we would like to study whether these non-regulatory factors were also important determinants of the gap between executive compensation and the wages of the workers in the executive's firm. Such a specification would be particularly attractive because it would allow us to net out many unobservable factors that are correlated with firm and industry characteristics.

[45] This result also suggests that our estimated effect of firm size on executive pay is not driven by omitted industry characteristics that are correlated with firm size. When we measure average firm size as average net sales per firm in the NICB data, its coefficient is negative.

We lack information on workers' wages at the firm level, so we proxy for inequality with a measure of relative executive pay (in this case, executive pay divided by the average wage of production workers in the industry). Columns (3) and (4) present the determinants of the logarithm of relative executive pay in 1940 and 1949. Overall, we find similar results as for the real level of executive compensation. In particular, the positive return to firm size diminishes between 1940 and 1949, while the negative correlation between pay and unionization strengthens over this period.[46] One notable difference is the war-industry indicator, which shows that relative executive pay was lower in war-related industries than other industries in 1940, but had caught up by 1949. Nevertheless, both specifications show that executive pay (whether measured in real terms or relative to production worker wages) rose more in war-related industries. All together, the covariates account for a slightly smaller fraction of the variation in relative executive pay than of the real dollar value of pay.

Since the results are largely similar for the level of executive pay and its ratio to workers' earnings, for the remainder of the paper we will focus on results using relative executive pay as the dependent variable. However, it is useful to keep in mind that most of the variation in relative executive pay is driven by executive compensation (the numerator) rather than average industry pay (the denominator).

3.2.2 Decomposing changes in executive pay

Because non-regulatory factors were important determinants of the level of relative executive pay in 1940 and 1949, it is possible that these forces also contributed to the change in top income

[46] A concern with measuring production workers' wages at the industry level instead of the firm level is that it does not pick up firm-level variation in workers' wages, which is likely positively correlated with firm size. Therefore, our estimates of the effect of firm size on relative executive pay may be biased upward. If the bias remained constant over time, then it would not affect our finding of a decline in the return to firm size over time.

inequality during this period. To understand how each independent variable has affected changes in relative executive pay over time, the left-hand panel of Table 7 presents an Oaxaca decomposition based on the OLS regression results. This analysis divides the change in average real compensation from 1940 to 1949 into portions attributable to the changes in the quantity of each independent variable, portions attributable to the change in the price (i.e. estimated coefficient) of each independent variable, and portions attributable to the interaction between quantities and prices. Specifically, we calculate:

$$\overline{Y_{49}} - \overline{Y_{40}} = \left(\overline{X_{49}} - \overline{X_{40}}\right)\hat{\beta}_{40} + \left(\hat{\beta}_{49} - \hat{\beta}_{40}\right)\overline{X_{40}} + \left(\overline{X_{49}} - \overline{X_{40}}\right)\left(\hat{\beta}_{49} - \hat{\beta}_{40}\right) \quad [3]$$

where $\overline{Y}$ is the average of the dependent variable, $\overline{X}$ is the average of the independent variables, and $\hat{\beta}$ is the vector of estimate coefficients. An extensive literature has used Oaxaca decompositions to analyze the determinants of changes in earnings distributions (Oaxaca 1973, Blinder 1973, Fortin, Lemieux and Firpo 2010). We discuss some of the limitations of this methodology later in the paper, and show that our main results are robust to using other techniques. For simplicity, we present decompositions based on regressions that exclude variables without a meaningful correlation with executive pay, but results are similar when all variables are included.

The decompositions reveal two main factors that constrained executive pay relative to average industry pay during this period: the decline in the return to firm size, and the emergence of a negative correlation between unionization and remuneration.[47] The economic magnitudes of these effects are substantial. Had the returns to size and unionization remained at their 1940 values, average relative executive pay would have been 0.59 log points higher in 1949 than was

[47] One drawback with Oaxaca decompositions is that they can be sensitive to how the base is chosen. Except where noted below, our results are robust to using different base years.

observed (0.36 due to unionization and 0.23 due to firm size). Given that average relative pay fell by 0.26 log points during this period, these two factors can more-than account for the decline in executive pay relative to other workers. Offsetting these factors were increases in average firm size and average firm profitability (since both larger and more profitable firms remunerate their executives more handsomely). The relative increase in pay in war-related industries also boosted relative executive compensation by 7 percent, although this effect is imprecisely estimated.[48]

Since they are based on OLS regressions, the Oaxaca decompositions reveal the influence of quantities and prices on changes in *average* compensation over time. Because the distribution of executive pay is usually highly skewed, the mean may give a biased view of the changes in compensation for the typical executive. However, focusing on the average may not be too problematic in the 1940s because changes in the mean and median from 1940 to 1949 were fairly similar (see Table 3). Nevertheless, we examine the effects of firm and industry factors on the median of the distribution by estimating a Recentered Influence Function (RIF). As shown by Firpo, Fortin, and Lemieux (2007, 2009), the RIF provides an unbiased estimate of the unconditional moment of a distribution and consequently is a good tool for analyzing different distributional statistics.[49]

Our method for decomposing the median of the distribution is similar to the Oaxaca decomposition of the mean. First, we estimate regressions where the dependent variable is the RIF of the median of executive pay. Second, we use an Oaxaca decomposition to separate out the contributions of changes in the quantities and prices of the covariates to the change in the

[48] One limitation of Oaxaca decompositions is that the contribution of each factor depends on the order in which the contributions are computed. However, our results are fairly insensitive to this ordering.

[49] An alternative method of decomposing changes in a distribution would be to use quantile regressions, such as in Machado and Mata (2005). A drawback of these methodologies is that they rely on specifying the right covariates and functional form for each quantile to accurately estimate the conditional distribution.

median of compensation.[50] As shown in the right-hand panel of Table 7, this methodology produces similar results as the Oaxaca decomposition of the mean: The decline in the return to firm size and the strengthening of the negative effect of unionization reduced the median relative executive pay, while increases in average firm size, firm profitability, and pay in war-related industries boosted executive pay.

To explore how various factors affected the entire distribution of relative executive pay, we estimate similar RIF regressions for every percentile from the 10th to the 90th.[51] The top panel of Figure 4 shows the contributions of the change in the coefficient of each variable (price effect), while the bottom panel shows the contributions of the change in quantity (quantity effect). The change in the coefficient on unionization and the increase in average firm size affected relative executive pay about equally at all percentiles. By contrast, the magnitude of the effects of other factors varied along the distribution. The reduction in the returns to firm size was mainly felt in the lower half of the distribution, while an increase in average unionization reduced relative pay in the upper half of the distribution. The increase in relative pay in war-related industries mainly boosted pay in the bottom 2/3 of the distribution, a result that is not surprising since relative pay tended to be lower in these industries.

In sum, the strengthening of the power of unions had a fairly widespread effect across the entire distribution of executives, whereas the reduction in the return to firm size was mainly evident among lower-paid officers. Meanwhile, an increase in average unionization in higher-paid industries and an increase in relative pay in war-related industries both helped to compress

[50] The decomposition method proposed by Firpo, Fortin and Lemieux involves estimating "counterfactual" coefficients by re-weighting each observation according to its probability of being observed in a different year/group (similar to Dinardo, Fortin and Lemieux 1996). This technique is theoretically appealing because it allows for the price effects in each year/group to be estimated from a similar distribution of characteristics. However, we do not incorporate this re-weighting procedure because the NICB sample is too small to reliably estimate the required weights.

[51] We do not report the extreme tails of the distribution because they are too imprecisely estimated.

the differentials in pay across executives by reducing the remuneration of higher-paid executives more than that of lower-paid executives. In addition, changes in the constant boosted the lower half of the distribution more than the upper half, suggesting that unexplained factors also reduced pay differentials across executives during this period.

3.2.3 Persistence of the reduction in relative executive pay

Following a sharp compression during the war, top income inequality remained relatively stagnant for the next 30 years (Frydman and Saks 2010, Piketty and Saez 2003). To gain insight into whether the factors that reduced relative executive pay from 1940 to 1949 had a long-lasting impact, we expand our analysis into the 1950s. To this end, we use a 1956 NICB report (the last report to disclose information at the firm level), which contains information on the salaries and bonuses paid to the three-highest paid executives in 560 manufacturing firms in 1955. Using the firm's net sales and industry description, we match 126 firms from the 1955 sample to the firms in the 1940-1949 balanced panel.[52]

Table 8 shows Oaxaca decompositions of the change in mean and median relative executive pay from 1940 to 1955, restricting the sample to these 126 firms in both years.[53] Similar to the previous results, we find that relative executive pay was reduced by declines in the coefficients on firm size and unionization, while increases in average firm size boosted pay. Thus, the returns to firm size and unionization had not returned to their pre-war values even by the mid-1950s.[54] The lack of recovery for the 10 years following the end of WWII indicates that

[52] This matching is less reliable than the 1940-49 or 1942-46 samples because the 1955 sample is not a panel, so we must rely on matching net sales in a single year instead of matching two different points in time.
[53] Despite the smaller sample and the omission of some variables (due to lack of data availability), the regression coefficients for this sample in 1940 and 1949 are similar to those estimated in the full sample.
[54] Using the Frydman-Saks sample, the returns to firm size declined from the late 1930s to the mid-1950s, remained at this low level until the 1980s, and then rose in the 1990s.

the war is unlikely to be the sole explanation for this change and suggests that these factors may help explain why top incomes did not keep up with the rest of the economy for the next thirty years.

3.2.4 Timing of the changes in relative executive pay

To provide further intuition for our results, we explore the timing of the reduction in the returns to firm size and unionization by estimating OLS regressions for executive pay relative to average industry earnings in each of the four years of the NICB panel (see Table 9).[55]

The higher-frequency data reveal that the drop in the return to firm size occurred mostly between 1940 and 1942, but it remained low throughout the rest of the decade. To gain a bit more insight, we calculate the contribution of the change in the return to firm size at each percentile of the distribution of relative executive pay. As shown in Figure 5, the decline in the return from 1940 to 1942 affected all percentiles but it was more pronounced for higher-paid executives. From 1942 to 1946, the return to firm size did not change much at any percentile. Finally, the return to firm size fell further in the bottom half of the distribution from 1946 to 1949, while it increased in the top half. Overall, the return to firm size at the end of the decade for lower-paid executives was substantially less than its 1940 level. By contrast, the drop in the return for higher-paid executives from 1940 to 1942 was offset by an increase from 1946 to 1949, leaving the change from 1940 to 1949 fairly small.

[55] For this analysis, we divide executive pay by average industry earnings from the National Income and Product Accounts instead of production worker wages from the Census of Manufactures because the Census is only available in 1939 and 1947. Average industry earnings are only available for 2-digit industries, providing less cross-sectional variation than production worker wages. The job title indicators are not available for 1942 or 1946; excluding these variables does not materially change the results for 1940 or 1949. As discussed in the data appendix, we use the same value of unionization in 1946 and 1949 because data for 1949 are not available.

Consistent with the rising power of unions during the 1930s and 1940s, the coefficient on unionization became gradually more negative throughout the decade (see Table 9). Union participation increased substantially in the second half of the 1930s and during WWII, and remained at this elevated level through the mid-1950s (Freeman 1998).[56] Our results suggest that the expansion of unionization coincided with a gradual strengthening of their ability to rein in the compensation of top executives.

Not surprisingly, the narrowing of the pay gap between war-related and other industries occurred mainly between 1942 and 1946.[57] The convergence in relative executive pay across these two types of industries over this period could be driven by increased demand for war-related products or by differential salary regulations, among other factors.

3.2.4 Other potential factors

Although the non-regulatory determinants that we considered thus far seem to account for a significant portion of the changes in executive pay over the 1940s, we have not addressed several other explanations for the contraction in income inequality that are prevalent in other research. In this section we speculate on the possible relevance of these theories for explaining the contraction in top incomes relative to the rest of the distribution.

Goldin and Margo (1992) argue that the compression in the differential between the 90th and 10th percentiles of the aggregate distribution of wages during the 1940s is largely attributable to an increase in the relative demand for less skilled workers at a time of rapid increase in the

[56] Many historians attribute the first spurt in union growth to the Wagner Act and the formation of the Congress of Industrial Organizations (Ashenfelter and Pencavel 1960, Millis and Brown 1950), while a loss of faith in business leadership caused by the Depression might also have contributed to this increase (Freeman 1998). The second expansion in unions might be because economic booms reduce employer opposition to unions, while governments tend to attempt to minimize labor disputes during wars to maximize production (Freeman 1998, Millis and Brown 1950, Taft 1964).

[57] The effects of unionization and war-related industries in each of these three sub-periods were not meaningfully different in different parts the distribution.

supply of more educated workers, as well as to other institutional factors. There is no clear reason why the supply of top executives would have increased during this period, since most managers worked their way up through the firm (Frydman 2007). However, an increase in the demand for less-skilled workers may have raised average pay relative to that of top executives. Thus, it is possible that the decline in the returns to skills also contributed to the contraction in pay at the upper end of the distribution.

Conceptually, it would be possible to incorporate the demand and supply of skills in our analysis by directly controlling for the education and experience of executives and workers. However, we lack this information for the executives in the NICB sample.[58] As an alternative strategy, we calculate the return to skill in the 1940 and 1950 Censuses by industry and assess whether relative executive pay in an industry is correlated with the return to skill among individuals lower down in the income distribution.

To estimate the returns to skill in the Census data, we regress the logarithm of an individual's weekly wage on a set of demographic characteristics and a measure of skill.[59] We measure skills in a variety of ways: the logarithm of experience (which we calculate as age – years of education – 6), the logarithm of years of education, an indicator for obtaining a college degree, an indicator for white-collar occupations, and an indicator for managerial occupations. We estimate the regression separately for each industry and year. Since wage and salary

[58] Even if we had this information, we would only be able to imperfectly study the importance of returns to skills because it is not obvious that managerial talent is strongly correlated with executives' education and experience. Indeed, in modern data executives' fixed effects are important determinants of firm policies, performance, and executive pay even after controlling for these observable characteristics of managers (Bertrand and Schoar 2003, Graham, Li and Qiu 2009).

[59] Following Goldin and Margo (1992), we restrict the sample to all white male wage and salary earners, 18 to 64 years old, whose full-time weekly earnings were more than one-half the minimum wage in the 1940 and 1950 IPUMS samples of the Census. As controls, we include dummy variables for marital status, household headship, foreign birth, and region of residence.

earnings are measured in the year prior to the Census year, the estimated coefficients on the skill variables reflect the returns to skill in 1939 and 1949.

As shown by Table 10, our estimates of the return to skill decreased between 1939 and 1949. For every measure except experience, there was a strong correlation between the return to skill and relative executive pay in 1940, but this correlation had disappeared by 1949. Therefore, it seems unlikely that the returns to skill (as specified in this manner, at least) were important drivers of the decline in relative executive pay during this period.

Another possible reason for the decrease in relative executive compensation is that improvements in corporate governance may have limited the ability of highly paid managers to extract rents. Our proxies for governance (board size and board composition) were not important determinants of pay, but they may be imperfect measures of governance during this period. For example, the quality of governance may have strengthened due to the surge in regulation and disclosure of financial information in the late 1930s and early 1940s.

Finally, a reduction in society's tolerance for income inequality may also have reduced executive earnings relative to other workers (Piketty and Saez 2003, Levy and Temin 2007). Since social norms tend to be persistent, this hypothesis could also explain why top incomes remained relatively low for so long. But why would preferences for inequality have changed during the 1940s? It is possible that the ideas of "equality of sacrifice" that were instituted during the war continued to affect views on inequality and redistribution after the end of the war. Also, government restrictions on high salaries may have altered the public's perception of fairness.

4. Interpretation and Conclusion

Using a new dataset on the compensation of top corporate executives, we examine the reduction in income inequality at the top of the distribution in the 1940s. Mirroring the decline in the aggregate share of wages and salaries of top earners during this period, executive pay rose much less than the average earnings of the workforce from 1940 to 1949. Top officer compensation also failed to keep up with average production worker earnings in their own industry. These declines in relative executive pay were pervasive, as relative pay fell for almost all top corporate officers of publicly traded manufacturing firms.

Our findings suggest that no single cause was responsible for the large contraction in relative executive pay during this period. Government regulation in the form of taxation and restrictions on salaries and wages played a modest role in the first half of the 1940s, but their direct effects seem to be small and cannot account for the persistently low level of relative pay for several decades after the end of the war. We find larger and more persistent roles of several firm and industry characteristics. First, relative executive pay fell more in highly unionized industries than in other industries, suggesting that the power of labor unions to restrict officer's remuneration strengthened gradually over the decade. Second, the return to firm size declined from 1940 to 1942, and remained relatively low until 1949. We also find suggestive evidence that changes in relative demand and supply of skilled workers, which played a large role in the compression lower down in the distribution, did not matter greatly for the decline in relative executive pay in this period.

Interpreting the change in the return to firm size is not straightforward, as multiple mechanisms could generate a correlation between firm size and executive pay. Because the drop in the return to firm size was concentrated between 1940 and 1942, factors that changed gradually over the course of the decade, such as the return to top managerial talent, are unlikely

explanations. Instead, two forces may have changed sharply in this brief period, possibly accounting for the decline in the return to firm size. First, improvement in corporate governance may have disproportionately diminished the ability of managers to extract rents in larger firms. Indeed, SEC's regulations concerning disclosure of executive pay became stricter in 1942, probably bringing heightened scrutiny of the remuneration of executives in the largest corporations. The decline in the return to firm size might also reflect a rapid change in social norms brought about by the start of the war. Since larger firms tend to remunerate their executives more handsomely, changes in societal preferences for fairness and equality of pay may have had a differential impact on executives in larger firms.

While the regulatory and non-regulatory forces that we have identified reduced relative executive pay from 1940 to 1946, they cannot explain the continued decline from 1946 to 1949. It is difficult to rule out that changes in the relative demand and supply of skills played a role during this period. An alternative explanation is that war-related events may have had a prolonged indirect effect on the distribution of earnings by altering social norms towards income inequality. Although we cannot fully explain the changes in the income distribution, our analysis suggests that the compression in income inequality would not have been as severe had the returns to firm size remained at their per-war value, had the power of unions not strengthened, and had the government not frozen salaries during the war.

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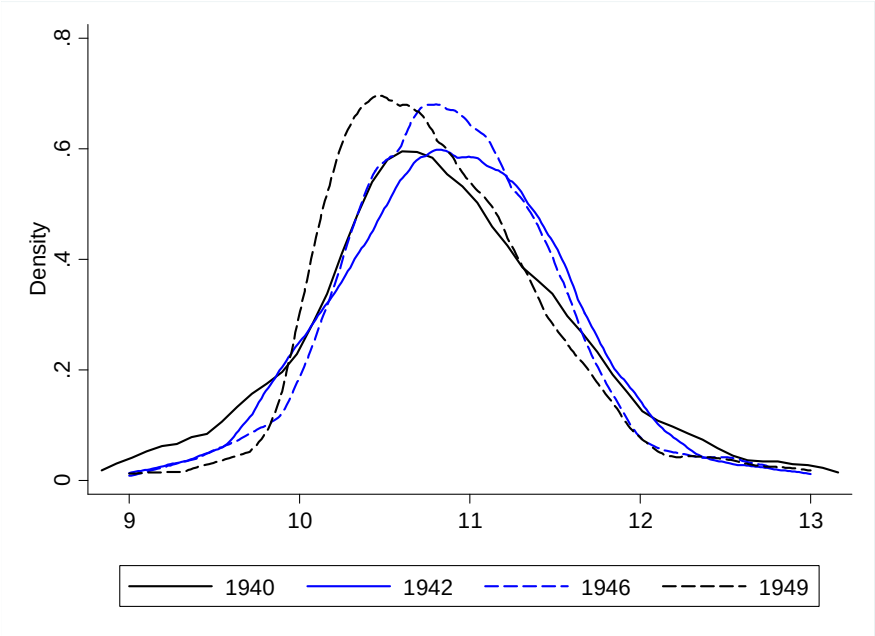
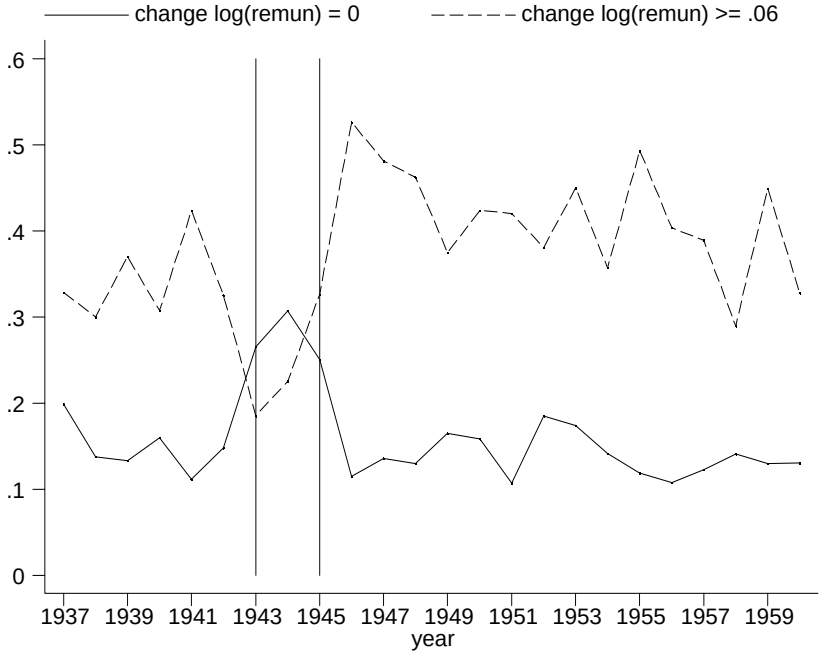
Figure 1
Distribution of Ln(Real Remuneration)



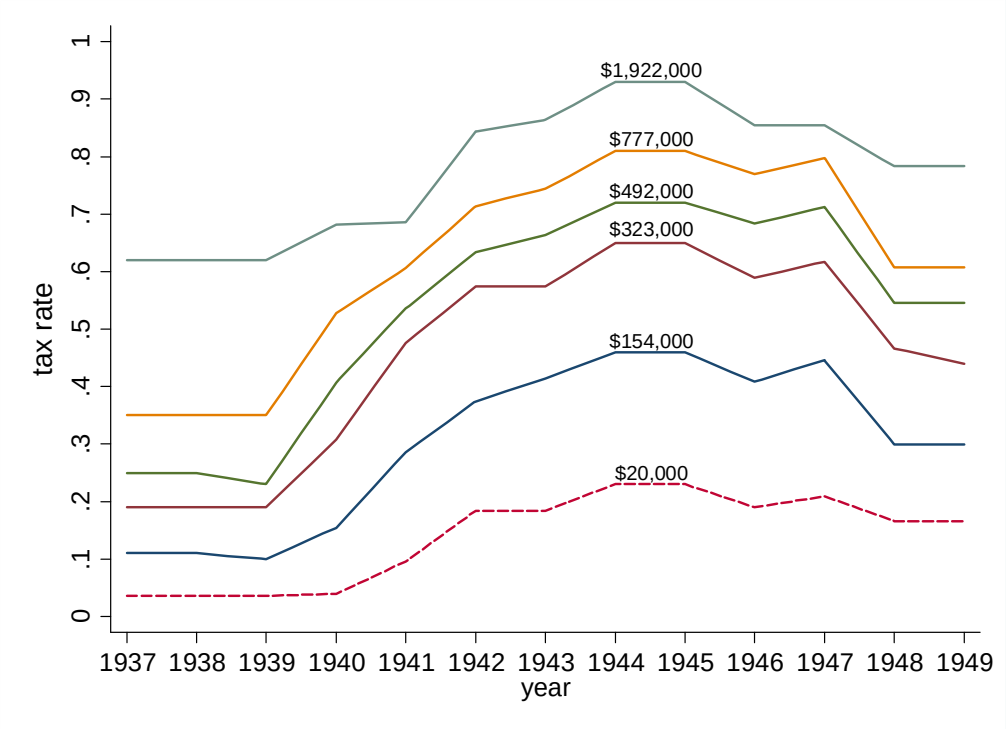
Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Real remuneration is the ratio of nominal salary+bonus to the chain price index for personal consumption expenditures (base year = 2008).

Figure 2
Annual Changes in Remuneration



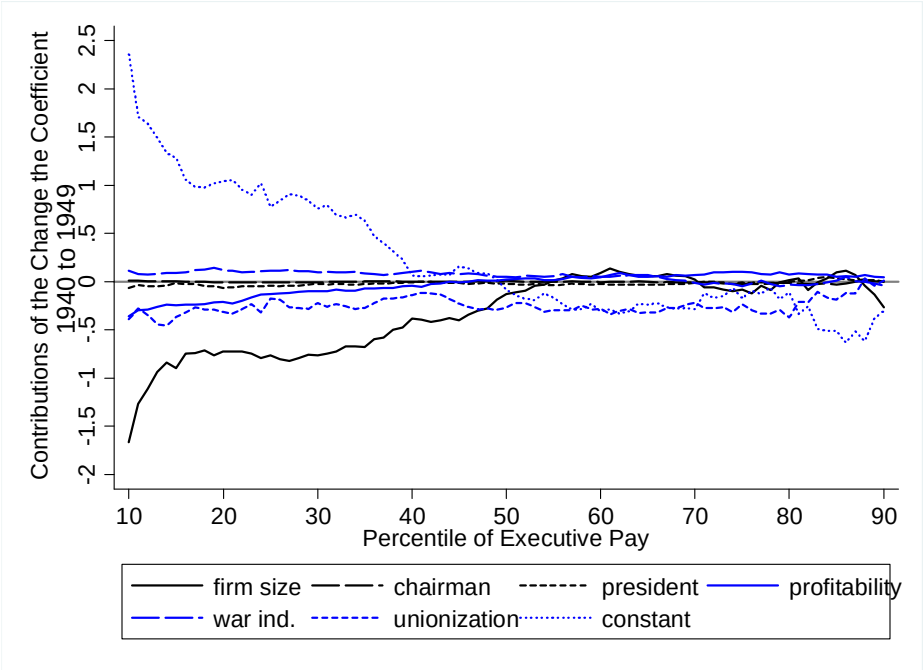
Note. Sample based on all executives reported in proxy statements for the 50 largest publicly traded firms in 1940, 1960, and 1990 (a total of 101 firms) as described in Frydman and Saks (2010). Remuneration is measured as the real level of salary and bonus in year 2000 dollars, using the Consumer Price Index. The average change in log(remuneration) during the pre-war and post-war period was 0.06.

Figure 3
Marginal Tax Rate on Labor Income by Level of Real Income

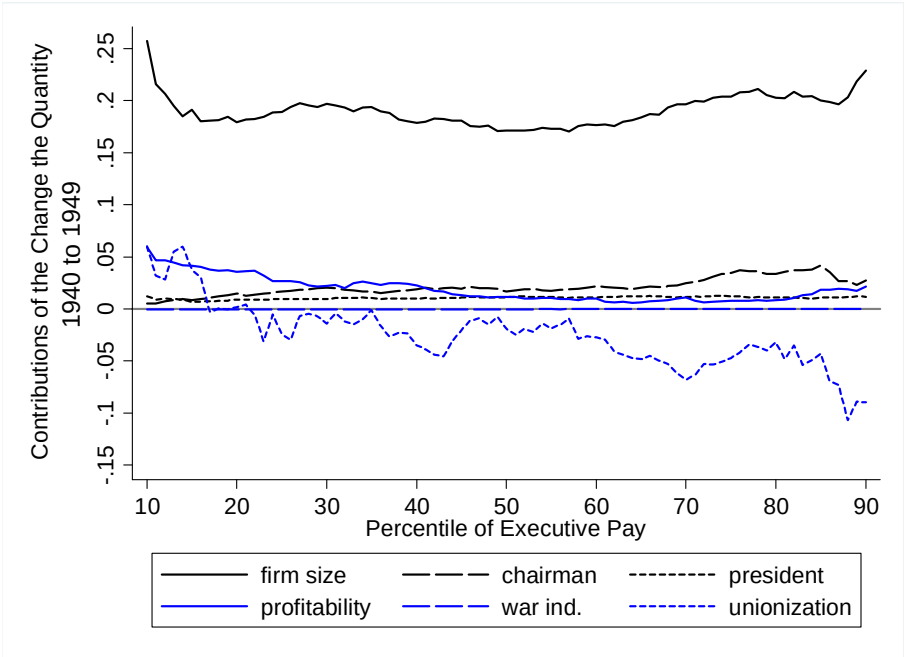


Note. Each line represents the annual marginal tax rate on labor income for a given income level. The solid lines show the 5th, 25th, 50th, 75th, and 90th percentiles of real remuneration in 1940 in the NICB sample, and the dashed line shows the real level of average earnings in the economy in 1940 (from the National Income Product Accounts). The NICB sample comprises the three highest-paid executives in 246 manufacturing firms.

Figure 4
Contributions to Changes in the Distribution of Executive Pay
Contributions of the Change in Coefficient

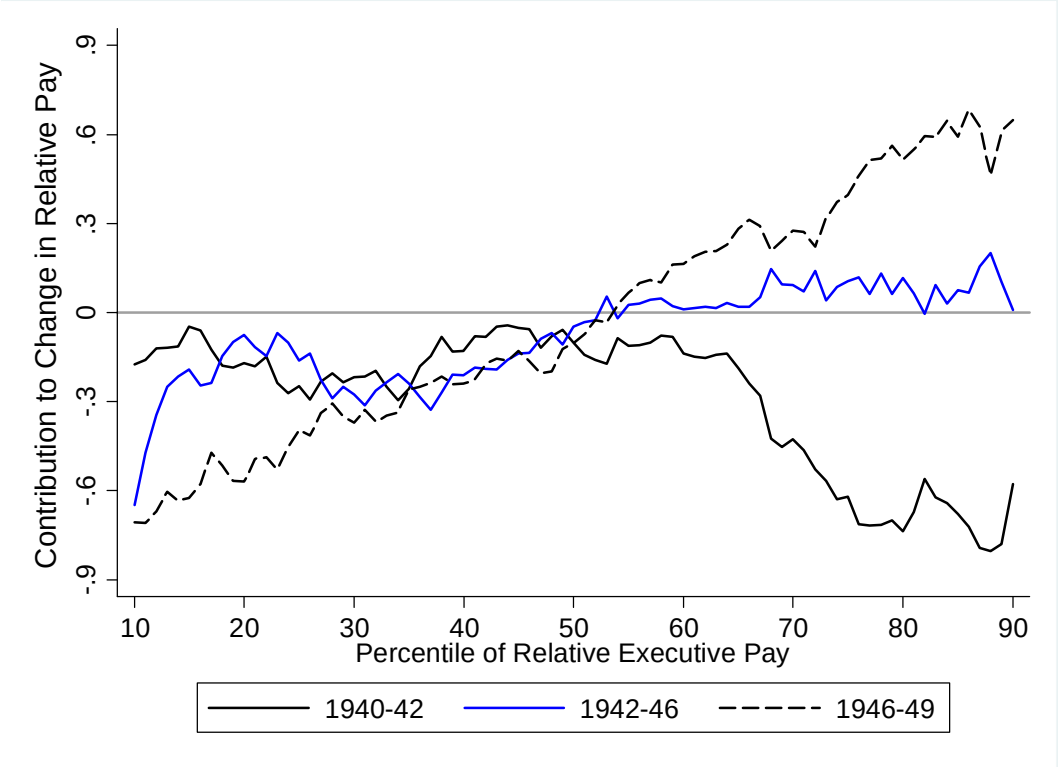


Contributions of the Change in Quantity



Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Each line shows the contribution to the change in the distribution of relative executive pay from 1940 to 1949. Relative remuneration is the ratio of nominal salary+bonus to average industry production worker wages. Contributions are calculated from Oaxaca decompositions based on coefficients from regressing a Recentered Influence Function for each percentile of the distribution of relative remuneration on the covariates listed in the figure.

Figure 5
Contributions of the Change in the Return to Firm Size to the Change in Relative Pay



Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Each line shows the contribution to the change in the return to firm size to the distribution of relative executive pay. Relative remuneration is the ratio of nominal salary+bonus to average industry earnings. Contributions are calculated from Oaxaca decompositions based on coefficients from regressing a Recentered Influence Function for each percentile of the distribution of relative remuneration on the covariates listed in Table 9.

Table 1
Summary Statistics of Firms in the NICB Sample

	1940	1942	1946	1949
Number of firms	246	246	246	246
Net sales (millions of 2008 dollars)				
10th percentile	40.0	51.5	65.1	67.8
25th percentile	73.8	121.5	120.3	126.6
50th percentile	167.6	324.9	305.3	315.3
75th percentile	681.3	1096.3	1035.6	1222.1
90th percentile	2200.7	3427.6	2585.8	3758.7
Rank by market value in NYSE				
10th percentile	473	495	581	618
25th percentile	437	464	492	552
50th percentile	313	333	337	377
75th percentile	133	139	139	152
90th percentile	39	49	39	48
Fraction of firms traded on the NYSE	0.74	0.74	0.74	0.74
Fraction of firms reporting pay for 3 officers	0.82	0.82	0.82	0.82
Fraction of firms reporting pay for 2 officers	0.12	0.12	0.12	0.12
Fraction of firms reporting pay for 1 officer	0.06	0.06	0.06	0.06
Manufacturing sector statistics				
Aggregate corporate income (billions of 2008 dollars)	86.1	167.7	133.0	135.9
Receipts per firm with net income >0 (millions of 2008 dollars)	19.8	25.5	19.6	22.2
Number of mfg firms on the NYSE	514	528	595	639

Note. Based on a balanced sample of 246 publicly-traded manufacturing firms listed on NICB reports. Net sales and market value of equity obtained from various editions of Moody's Manuals. Corporate income measured before federal and state income and excess profit taxes (from the National Income Supplement to the Survey of Current Business). Receipts per firm are the value of gross sales as a ratio of the number of tax returns for firms reporting positive net income (from the Statistics of Income).

Table 2
Comparison of Relative Executive Compensation to the Aggregate Distribution of Wages and Salaries

Percentile of aggregate distribution (1)	Time Period (2)	# of Executives (3)	Δ ln(mean relative comp.) (4)	Δ ln(median relative remun.) (5)	Δ ln(share of aggregate wages) (6)
90-95	1940-42	0	--	--	-0.112
90-95	1942-46	1	--	--	-0.077
90-95	1946-49	0	--	--	0.003
95-99	1940-42	1	-0.107	-0.107	-0.133
95-99	1942-46	0	--	---	-0.045
95-99	1946-49	3	-0.249	-0.340	0.014
99-99.5	1940-42	6	-0.155	-0.183	-0.191
99-99.5	1942-46	8	0.000	0.010	-0.014
99-99.5	1946-49	3	-0.002	0.009	-0.025
99.5-99.9	1940-42	99	-0.088	-0.061	-0.160
99.5-99.9	1942-46	84	-0.073	-0.030	-0.100
99.5-99.9	1946-49	74	-0.031	-0.036	-0.031
99.9-99.99	1940-42	357	-0.011	-0.002	-0.081
99.9-99.99	1942-46	338	-0.235	-0.224	-0.243
99.9-99.99	1946-49	347	-0.146	-0.140	-0.089
>99.99	1940-42	169	-0.193	-0.170	-0.129
>99.99	1942-46	200	-0.288	-0.283	-0.321
>99.99	1946-49	205	-0.000	-0.070	-0.085

Note. Column 3 shows the number of executives in the NICB sample with compensation between the cutoffs of the distribution of wages and salaries listed in column 1. Columns 4 and 5 report the change in mean and median relative compensation of the executives with compensation between the cutoffs listed in column 1. Relative compensation is total reported remuneration divided by average wages and salaries per full-time equivalent worker (from the National Income and Product Accounts). Column 6 reports the change in the share of aggregate wages and salaries accruing to the slice of the income distribution listed in column 1. Cutoffs and aggregate wage shares are from Piketty and Saez (2003).

Table 3
Summary Statistics on Executive Pay

	1940	1942	1946	1949	% Change 1940 to 1949
Real pay (year 2008 dollars)					
Average	$685,587	$679,135	$643,708	$612,652	-10.6
10th percentile	$199,921	$237,755	$270,505	$253,294	26.7
25th percentile	$322,950	$354,651	$358,833	$316,617	-2.0
50th percentile	$492,114	$536,269	$536,594	$452,311	-8.1
75th percentile	$776,618	$843,368	$791,090	$687,513	-11.5
90th percentile	$1,245,664	$1,221,795	$1,104,103	$1,103,639	-11.4
Median pay in					
Firms with < median sales in 1940	$338,329	$384,370	$393,613	$334,710	-1.1
Firms with > median sales in 1940	$768,929	$770,061	$712,698	$660,374	-14.1
Industries with < median pay in 1940	$399,843	$446,924	$441,641	$388,987	-2.7
Industries with > median pay in 1940	$615,143	$688,168	$629,891	$547,296	-11.0
Firms with < median industry pay in 1940	$353,707	$392,956	$403,550	$361,849	2.3
Firms with > median industry pay in 1940	$692,036	$705,999	$662,462	$619,666	-10.5
Median pay of highest-paid in firm	599764	688828	662462	542773	-9.5
Median pay of third highest-paid in firm	399843	462301	442745	402557	0.7
Median ratio of highest/third highest paid	1.88	1.82	1.69	1.71	-9.5
Relative to avg. earnings in economy					
Average	33.9	29.7	24.5	23.5	-30.7
10th percentile	9.9	10.4	10.3	9.7	-2.0
25th percentile	15.9	15.5	13.6	12.1	-23.9
50th percentile	24.3	23.4	20.4	17.4	-28.4
75th percentile	38.3	36.9	30.1	26.4	-31.1
90th percentile	61.5	53.4	42.0	42.3	-31.2
Relative to avg. earning in own industry					
Average	28.5	24.3	22.4	20.8	-27.0
50th percentile	21.5	19.0	17.9	15.3	-28.8
Relative to production worker wages in own ind.					
Average	35.1	---	---	25.3	-27.9
50th percentile	26.5	---	---	19.1	-27.9

Note. Based on the three highest-paid executives in a balanced-panel of 246 publicly-traded manufacturing firms. The sample includes 631 executives in each year. 39 percent are the highest paid in their firm, 33 percent are the second highest paid, and 28 percent are the third highest paid. Executive pay is defined as salary and bonus as listed in NICB reports. Average earnings in the economy are average wages and salaries per full-time equivalent worker (from the National Income and Product Accounts). Average earnings in own industry average wages and salaries per full-time equivalent employees (from the National Income Supplements to the Survey of Current Business). Average production worker wages in own industry is the average production worker wages per number of production workers (from the Census of Manufactures). Real pay is in year 2008 dollars, using the Consumer Price Index.

Table 4
Average Earnings and Relative Executive Pay by Industry

	1940	1942	1946	1949
Average Earnings (average across industries)				
War-related	26,925	32,445	31,021	31,188
Non-war-related	20,665	22,828	26,447	26,639
Low-wage	15,326	17,459	22,018	21,246
High wage	26,019	29,873	30,575	31,160
Median Executive Pay				
War-related	454,949	504,018	460,503	391,249
Non-war-related	580,192	584,060	589,641	534,138
Low-wage	553,629	583,027	592,793	559,056
High wage	528,638	544,469	523,759	452,311
Median Executive Pay Relative to Average Earnings				
War-related	2.83	2.74	2.70	2.53
Non-war-related	3.33	3.24	3.10	3.00
Low-wage	3.59	3.51	3.29	3.27
High wage	3.01	2.90	2.84	2.68

Note. Out of a total of 27 industries, we identify 6 as war-related industries and 11 non-war-related industries. There are 5 low-wage industries and 12 high-wage industries. See text and data appendix for the list of industries in each category. The top panel shows the average across industries of average industry earnings (within industry), measured in year 2008 dollars. The middle panel shows the average across industries of median executive pay within each industry. The bottom panel shows the logarithm of the top panel relative to the middle panel.

Table 5
Correlation of Changes in Tax Rates and Changes in Real Executive Pay

	1-year	3-year	5-year	10-year	10-year
∆ln(1-tax rate)	0.024	-0.014	-0.010	-0.096	0.082*
	(0.025)	(0.026)	(0.024)	(0.099)	(0.041)
Ln(real pay[t-x])	-0.097**	-0.232**	-0.344**	-0.391**	-0.453**
	(0.015)	(0.032)	(0.031)	(0.107)	(0.053)
ln(mktvalue[t-x])	0.018*	0.034**	0.040**	-0.045	0.039
	(0.006)	(0.006)	(0.011)	(0.048)	(0.021)
rate of return[t-x]	0.034	0.040	0.074	0.097	0.042
	(0.030)	(0.046)	(0.074)	(0.074)	(0.033)
Cob[t-x]	-0.029	-0.101	-0.090	-0.110	-0.158
	(0.036)	(0.062)	(0.098)	(0.150)	(0.106)
Pres[t-x]	0.071**	0.092**	0.096**	-0.023	0.029
	(0.011)	(0.021)	(0.025)	(0.114)	(0.065)
Evp[t-x]	0.055**	0.079*	0.063**	0.070	0.019
	(0.011)	(0.025)	(0.066)	(0.107)	(0.068)
Vp[t-x]	0.028*	0.045**	0.022	-0.091	0.057
	(0.012)	(0.013)	(0.021)	(0.106)	(0.047)
Director[t-x]	0.023	0.055	0.123*	-0.345	-0.015
	(0.014)	(0.035)	(0.039)	(0.262)	(0.090)
∆job	0.106**	0.168**	0.218**	0.150	0.256**
	(0.021)	(0.024)	(0.019)	(0.102)	(0.043)
∆director	-0.007	0.044	0.104	-0.220	-0.046
	(0.021)	(0.037)	(0.064)	(0.206)	(0.103)
# Obs.	2941	2143	1472	273	1595
Adj. R^2	0.065	0.158	0.224	0.187	0.346
Sample period	1941-49	1941-49	1941-49	1946-49	1946-59

Note. * and ** indicate significance at the 5 percent and 1 percent levels, respectively. Standard errors are clustered by year in columns 1 to 3 and by individual in columns 4 and 5. These choices yield the largest standard errors in each specification. Based on 1 to 11 of the highest-paid executives in 77 large firms. The data are described in Frydman and Saks (2010).

Table 6
Determinants of Executive Pay: OLS Regression

	Dep. Var. = Ln(real remun)		Dep. Var. = Ln(relative remun.)	
	1940	1949	1940	1949
Ln(real sales)	0.369**	0.289**	0.341**	0.269**
	(0.022)	(0.021)	(0.025)	(0.023)
Chairman	0.432**	0.418**	0.429**	0.396**
	(0.065)	(0.047)	(0.067)	(0.051)
President	0.450**	0.400**	0.437**	0.387**
	(0.030)	(0.027)	(0.032)	(0.028)
Leverage	-0.083	0.064	-0.404	0.172
	(0.262)	(0.225)	(0.296)	(0.253)
Growth opportun.	0.083	-0.065	0.096*	-0.041
	(0.054)	(0.072)	(0.055)	(0.076)
Profitability	0.996**	1.576**	0.880**	1.314**
	(0.282)	(0.446)	(0.272)	(0.481)
Fraction insiders	-0.103	-0.137	-0.138	-0.127
	(0.148)	(0.125)	(0.180)	(0.146)
Ln(board size)	-0.013	0.019	0.041	0.055
	(0.097)	(0.105)	(0.104)	(0.114)
Ln(firm age)	0.017	0.067	0.049	0.087
	(0.031)	(0.045)	(0.039)	(0.052)
War industry	0.026	0.086*	-0.147**	0.037
	(0.059)	(0.051)	(0.070)	(0.059)
Unionization	0.067**	-0.043	0.014	-0.088**
	(0.026)	(0.029)	(0.031)	(0.034)
Ln(establ. size)	-0.021	0.013	-0.049	-0.016
	(0.027)	(0.023)	(0.032)	(0.028)
Constant	3.701**	3.910**	1.067**	1.040**
	(0.293)	(0.282)	(0.334)	(0.323)
No. obs.	604	601	602	601
Adj. R^2	0.684	0.637	0.624	0.574

Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Real remuneration is the value of salaries and bonus in year 2008 dollars. Relative remuneration is the ratio of nominal remuneration to average industry production worker wages. For the definition of all other firm and industry variables, see the data appendix. Standard errors are clustered by firm. * and ** indicate significance at the 10 and 5 percent levels, respectively.

Table 7
Oaxaca Decomposition of Mean and Median Relative Executive Pay

	Mean			Median		
	Quantity	Price	Interaction	Quantity	Price	Interaction
Total	0.239**	-0.354**	-0.128**	0.192**	-0.418**	-0.100**
	(0.053)	(0.048)	(0.046)	(0.042)	(0.050)	(0.044)
Ln(real sales)	0.201**	-0.360	-0.036	0.171**	-0.129	-0.013
	(0.053)	(0.165)	(0.019)	(0.028)	(0.116)	(0.012)
Chairman	0.020**	-0.003	-0.002	0.017**	0.009	0.005
	(0.008)	(0.007)	(0.004)	(0.008)	(0.010)	(0.006)
President	0.011*	-0.016	-0.001	0.011	-0.021	-0.001
	(0.006)	(0.014)	(0.001)	(0.013)	(0.027)	(0.003)
Profitability	0.025**	0.041	-0.008	0.012*	0.022	0.004
	(0.011)	(0.047)	(0.010)	(0.007)	(0.049)	(0.010)
Unionization	-0.017	-0.232**	-0.082**	-0.019	-0.268**	-0.095**
	(0.026)	(0.110)	(0.040)	(0.027)	(0.113)	(0.040)
War industry	-0.000	0.067	0.000	-0.000	0.053	0.000
	(0.006)	(0.041)	(0.007)	(0.004)	(0.042)	(0.004)
Constant	--	0.231	--	--	-0.084	--
	--	(0.229)	--	--	(0.202)	--

Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Relative remuneration is the ratio of nominal remuneration to average industry production worker wages. See the data appendix for definitions of the covariates. Standard errors for the decomposition of the mean are clustered by firm. * and ** indicate significance at the 10 percent and 5 percent levels, respectively.

Table 8
Oaxaca Decomposition of Mean and Median Relative Executive Pay
1940 to 1955

	Mean			Median		
	Quantity	Price	Interaction	Quantity	Price	Interaction
Total	0.374**	-0.627**	-0.173**	0.334**	-0.669**	-0.133*
	(0.092)	(0.065)	(0.073)	(0.073)	(0.071)	(0.072)
Ln(real sales)	0.355**	-0.345	-0.054	0.373**	-0.507**	-0.080**
	(0.081)	(0.232)	(0.038)	(0.052)	(0.158)	(0.027)
Unionization	0.018	-0.237*	-0.119*	-0.039	-0.105	-0.053
	(0.049)	(0.135)	(0.070)	(0.053)	(0.140)	(0.071)
War industry	0.000	0.005	0.000	0.000	0.030	0.000
	(0.006)	(0.055)	(0.007)	(0.005)	(0.060)	(0.005)
Constant	--	-0.050	--	--	-0.086	--
	--	(0.272)	--	--	(0.250)	--

Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Relative remuneration is the ratio of nominal remuneration to average industry production worker wages. See the data appendix for definitions of the covariates. Standard errors for the decomposition of the mean are clustered by firm. * and ** indicate significance at the 10 percent and 5 percent levels, respectively.

Table 9
Determinants of Relative Executive Pay Over Time

	1940	1942	1946	1949
Ln(real sales)	0.354**	0.295**	0.289**	0.286**
	(0.019)	(0.018)	(0.022)	(0.021)
Profitability	1.392**	1.849**	1.024**	0.684
	(0.278)	(0.586)	(0.327)	(0.429)
War industry	-0.200**	-0.354**	-0.074	-0.020
	(0.057)	(0.061)	(0.055)	(0.055)
Unionization	0.015	0.007	-0.034	-0.060**
	(0.023)	(0.026)	(0.029)	(0.027)
Constant	-5.953**	-5.574**	-5.622**	-5.717**
	(0.133)	(0.144)	(0.207)	(0.179)
No. obs	612	612	612	612
Adj. R^2	0.560	0.492	0.436	0.479

Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Relative executive pay is the ratio of nominal remuneration to average industry earnings. See the data appendix for definitions of the covariates. Standard errors are clustered by firm. * and ** indicate significance at the 10 percent and 5 percent levels, respectively.

Table 10
The Correlation of Returns to Skill with Relative Executive Pay

	Ln(Exper)	Ln(Educ)	College Dum	White Collar	Manager
Average return to skill					
1940	0.102	0.304	0.444	0.334	0.649
1949	0.088	0.222	0.370	0.238	0.605
OLS coefficient where dependent variable is relative executive pay					
1940	0.053	1.681**	1.424**	2.135**	0.964**
	(1.016)	(0.305)	(0.346)	(0.356)	(0.200)
1949	1.563**	-1.318*	-0.225	-0.542	0.049
	(0.655)	(0.385)	(0.390)	(0.421)	(0.067)

Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Relative executive pay is the ratio of nominal remuneration to average industry production worker wages. Returns to skill are estimated from 1940 and 1950 Census data. See text for details. Standard errors are clustered by firm. * and ** indicate significance at the 10 percent and 5 percent levels, respectively.

Appendix Table 1
Industrial Composition Firms in the NICB Sample Compared to the NYSE

Industry	Fraction of Firms in All Industries		Fraction of Firms in Manufacturing Industries	
	All NICB Firms	NYSE	Final NICB sample	NYSE
Food	0.094	0.084	0.061	0.129
Tobacco	0.008	0.016	0.016	0.025
Textiles	0.030	0.027	0.053	0.041
Apparel	0.021	0.011	0.041	0.017
Lumber	0.016	0.005	0.012	0.008
Paper	0.053	0.027	0.077	0.041
Printing	0.019	0.011	0.029	0.017
Chemicals	0.076	0.065	0.110	0.100
Petroleum/Coal	0.046	0.040	0.073	0.061
Rubber	0.020	0.012	0.004	0.019
Leather	0.017	0.012	0.024	0.018
Stone/Clay/Glass	0.026	0.021	--	--
Iron/Steel	0.036	0.051	0.049	0.079
Nonferrous metals	0.050	0.030	0.033	0.047
Machinery ex. electrical	0.121	0.066	0.110	0.101
Electrical machinery	0.051	0.037	0.061	0.056
Motor vehicles and parts	0.119	0.051	0.156	0.078
Transportation equip. ex. m.v.	0.065	0.032	0.089	0.049
Other manufacturing	0.000	0.055	0.000	0.116
Construction	0.007	0.004	--	--
Railroads	0.015	0.056	--	--
Air transportation	0.007	0.009	--	--
Utilities	0.035	0.047	--	--
General merchandise	0.052	0.038	--	--
Insurance	0.015	0.003	--	--
Other non-manufacturing	0.000	0.200	--	--

Note. Industries are defined using 2-digit SIC codes from 1945 with the exception of construction (1500-1799), iron/steel (3310-3320), nonferrous metals (3330-3360), motor vehicles (3710), and other transportation equipment (3720-3740).

Data Appendix

1. Firm-level data

Net sales: Net sales as reported by Moody's. This measure differs by more than 5 percent from the NICB's reported net sales in only 4 percent of firms. The NICB occasionally reports total sales instead of net sales, so it is less consistent than the Moody's measure.

Total assets: Total assets as reported by Moody's.

Market value (of equity): Total number of common shares outstanding multiplied by the average of the year's low and high share price. Source: Moodys. For the 165 firms for which we have the end-of-year share price and shares outstanding from CRSP, the correlation between CRSP market value and Moody's market value is 0.98.

Book leverage ratio: Debt in current and long-term liabilities divided by total assets. Source: Moodys.

Growth opportunities: The sum of market value, current liabilities and long-term liabilities divided by total assets. Source: Moodys.

Firm profitability (return on assets): net income divided by total assets in the previous year. Source: Moodys.

Firm age: Current year minus the year of incorporation. Source: Moodys.

Board size: Total number of members of the board of directors. Source: Moodys.

Fraction of insiders: Fraction of the board of directors who were also executives of the firm during the year. Source: Moodys.

2. Industry-level data

Average production worker wage: Total production worker wages divided by the number of production workers. Source: 1939 and 1947 Census of Manufactures. We use the most disaggregated industry definition possible, which leads to 37 different values across 15 different 2-digit industry categories. We assign the 1939 data to 1940 NICB data and the 1947 data to 1949 NICB data.

Number of production workers per establishment: Total number of production workers divided by total number of establishments. Source: 1939 and 1947 Census of Manufactures. See above.

Industry productivity: Total value added divided by the number of production workers. Source: 1939 and 1947 Census of Manufactures. See above.

Average industry earnings: Total wages and salaries divided by the number of full-time equivalent employees. Source: 1951 and 1958 editions of the National Income Supplement to the Survey of Current Business. These data are derived from Unemployment Insurance records. Annual data are reported for 2-digit SIC industries.

Unionization: For 1940 to 1949, we use the fraction of wage earners under written union agreements as reported in various Bureau of Labor Statistics Bulletins. The BLS reports data for 52 manufacturing industries, which they divide into groups with fraction unionized between 1-20 percent, 20-40 percent, 40-60 percent, 60-80 percent and 80-100 percent.[60] The BLS does not associate industry codes with each industry name, so we assign a code to each industry name based on 1945 SIC codes. Then we calculate the average proportion unionized for each 2-digit industry using employment shares from the 1940 Census as weights. These reports provide data for 1938, 1941, 1944, 1945 and 1946. We assign the 1938 unionization data to the 1940 NICB data, the 1941 unionization data to the 1942 NICB data, and the 1946 unionization data to the 1946 and 1949 NICB data. To estimate unionization in 1955, we extrapolate the 1949 fraction unionized using the growth rate in union density from 1947 to 1953 reported in Bain and Price (1980). These density estimates are reported for eight industry categories, which are a combination of one or several 2-digit SIC industries.

War-related industries: firms in the following 2-digit categories: chemicals, rubber products, fabricated metal products, electrical machinery, other machinery, and transportation equipment.

Corporate income of the manufacturing sector: Total corporate income before federal and state income and excess profits taxes. Source: 1951 edition of the National Income Supplement to the Survey of Current Business. These data are derived from Unemployment Insurance records.

Receipts per firm in the manufacturing sector: Gross sales of firms reporting positive net income divided by the number of tax returns with positive net income. Source: Statistics of Income.

Industry classification: The industry names used in the NICB reports correspond to various levels of aggregation (two examples are "breweries" and "general industrial machinery") and are not linked to any industry codes. Therefore, we match the reported industry names to Standard Industrial Classification (SIC) codes from 1945. The firms fall into 22 different 2-digit industrial categories, with the majority (87 percent) in manufacturing industries. Appendix Table 1 compares the industrial composition of the sample to publicly-traded firms on the New York Stock Exchange, using data from the CRSP database. As shown by Table 1, the industrial composition of the manufacturing firms in the NICB data is fairly similar to that of firms traded on the NYSE.[61] By contrast, the non-manufacturing firms in the NICB data do not appear to be representative of the non-manufacturing economy more broadly.

[60] The reports for 1938 and 1941 list these categories as "almost entirely without written agreements," "moderate proportion," about half," "large proportion" and "almost entirely" under written agreement.

[61] For several industries, there are a larger number of firms in the NICB reports than were traded on the NYSE because the NICB included public firms that traded on other exchanges.