PAY CUTS FOR THE BOSS:
EXECUTIVE COMPENSATION IN THE 1940S

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ABSTRACT

Executive pay fell during the 1940s, marking the last notable decrease in the past 70 years. We study this decline using a new panel dataset on the remuneration of top executives in 246 firms. We find that government regulation—including explicit salary restrictions and taxation—had, at best, a modest effect on executive pay. By contrast, a decline in the returns to firm size and an increase in the power of labor unions contributed greatly to the reduction in executive compensation relative to other workers' earnings from 1940 to 1946. The continued decrease in relative executive pay remains largely unexplained.

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INTRODUCTION

The 1940s witnessed the sharpest drop in executive compensation in at least the past 70 years, and possibly even longer.[1] The earnings of lower-paid workers did not fall as much as those of corporate officers, leading to a substantial narrowing of the pay gap between executives and other workers.[2] More generally, the aggregate distribution of income contracted markedly during this period, as earnings at the top did not keep up with those of the bottom of the distribution.[3] Even though these changes make the 1940s stand out as a unique decade in U.S. economic history, little is known about the reason for this drop in executive compensation because research has focused mostly on the earnings of workers at or below the 90th percentile. This paper fills in this gap by providing new evidence on the determinants of executive compensation during the 1940s and assessing explanations for its decline.

Many unusual forces were at play in the 1940s that could have contributed to the decline in executive pay, both in absolute terms and relative to the earnings of lower-paid workers. World War II was accompanied by tight labor markets, inflation, rising union strength, and substantial government intervention in the labor and product markets.[4] Yet these factors have been found to have only a modest role in explaining the compression in income inequality below the 90th percentile during this period. Instead, the current consensus attributes much of the

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[1] Frydman and Saks, "Executive Compensation"; and Piketty and Saez, "Income Inequality." The share of aggregate wages and salaries paid to corporate officers fell by more during the 1940s than any other time since 1917, when aggregate data were first collected in tax records (Piketty and Saez, "Income Inequality").

[2] Frydman and Saks, "Executive Compensation."

[3] Goldin and Margo "Great Compression"; Piketty and Saez, "Income Inequality; and Atkinson, Piketty and Saez, "Top Incomes."

[4] Goldin and Katz, *Race*.

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.[5] This explanation may be less salient for the upper end of the wage distribution because the supply of top earners was likely not expanded by improvements in education to the same extent as middle-income workers. Moreover, some government policies, such as progressive taxation, might have mattered more for top income earners.

The available evidence prior to 1940 suggests that the subsequent drop in executive pay was probably not the consequence of a return to normal levels from unusually elevated values. For example, the real value of executive pay was roughly flat from 1929 to 1936.[6] In addition, a variety of data sources imply that the wage distribution was not unusually wide in 1940.[7] Thus, the drop in executive pay and coincident contraction in income inequality during the 1940s marked a noticeable departure from historical trends.

Empirical analysis of the decrease in high incomes during the 1940s is sparse due to a lack of individual-level data.[8] 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.[9] Also, commonly-used

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[5] Goldin and Margo, "Great Compression"; Juhn,"Wage Inequality."

[6] Baker, "Fluctuation"; and Piketty and Saez, "Income Inequality."

[7] Douglas, "What is Happening"; Lebergott, "Wage"; Ober, "Occupational"; Stigler, *Trends*; Goldin and Katz, *Race*, Piketty and Saez, "Income Inequality"; Smith and Welch, "Black"; and Bailey and Collins, "Wage Gains."

[8] 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, *Shares*; Piketty and Saez, "Income Inequality").

[9] 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

sources of data on executive pay begin in the 1970s at the earliest. Consequently, to investigate the causes of the decline in executive pay during the 1940s, we assemble a new dataset on the remuneration of top corporate officers.

Our dataset contains information on the compensation of the three highest-paid executives in a balanced panel of 246 publicly-traded manufacturing corporations in 1940, 1942, 1946, and 1949, allowing us to investigate changes in pay before, during and after World War II. These data are unique in that they provide information on executives' earnings at the very top of the income distribution for a broad sample of firms. Other datasets on executive pay during this period, such as those constructed by Willbur G. Lewellen and Carola Frydman and Raven Saks, were hand-collected from primary sources and are therefore contain at most 100 large corporations.[10] While providing a consistent view on the trends in pay over a longer horizon, these datasets do not allow for a comprehensive analysis of the determinants of compensation, which requires a broad range of firm sizes and a large number of firms within each industry.

Besides contributing to the literature on executive pay, our paper also has implications for the broader changes in wage inequality during this period. Corporate officers have been among the highest-earners throughout the twentieth century, so their remuneration provides a unique opportunity to examine top incomes in a period for which no comprehensive micro-data are

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correspond to the threshold for the top 1 percent of the wage distribution (Piketty and Saez, "Income Inequality"). We are unaware of other individual-level datasets that cover a large group of individuals at the top of the distribution.

[10] Lewellen, *Executive Compensation*; and Frydman and Saks "Executive Compensation."

3

available.[11] Furthermore, the earnings of all corporate officers accounted for a non-trivial

fraction—5 to 6 percent—of aggregate wages and salaries during the 1940s.[12]

Consistent with other studies of this period, our data show a sharp decline in inequality

between executives and other workers from 1940 to 1949.[13] 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. 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.

We separate our analysis into two parts. First, we assess the role of government policies

that might have restricted growth in executive pay relative to the rest of the workforce. War-

related salary restrictions had a modest effect during WWII, but they cannot account for the slow

growth in executive pay after the end of the war. We also 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 the ratio of executive pay to average industry earnings, which we refer to as

"relative executive pay."[14] These determinants include individual, firm and industry

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

[12] Piketty and Saez, "Income Inequality."

[13] Goldin and Margo, "Great Compression"; Piketty and Saez, "Income Inequality"; Goldin and Katz, *Race*; and
Frydman and Saks, "Executive Compensation."

[14] 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.

characteristics that have been found to affect compensation in later decades, as well as a few other measures that might have mattered 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 large, more than offsetting increases in relative pay owing to expanding firm size, rising firm profitability, and rising pay in war-related industries.

The growing negative correlation between executive pay and industry unionization occurred gradually and suggests that the ability of labor unions to constrain the earnings of managers strengthened throughout the 1940s.[15] The interpretation of the reduction in the returns to firm size is less clear. 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 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—through at least 1955—suggesting that this correlation could be related to the persistence of low income inequality in the ensuing decades.

Although the non-regulatory determinants of pay explain most of the change in relative pay from 1940 to 1946, these factors cannot account for its continued decline from 1946 to 1949. Thus, other forces must have played a significant role in the drop in relative executive pay from

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[15] Indeed, prior 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 to its expansion later in the century (Goldin and Margo, "Great Compression"; Freeman "Deunionization"; and DiNardo, Fortin and Lemieux, "Labor Market")

1946 onwards. It is possible that war-related events had a prolonged indirect effect on the distribution of earnings by altering social norms towards inequality. Other unobserved factors, such as changes in the supply and demand for skill or differential responses by income group to the high rate of inflation, may have also played a more important role. Although we cannot fully explain the changes in the wage distribution in the post-war years, our analysis suggests that the compression in relative executive pay would not have been as severe had the returns to firm size remained at their 1940 level, had unions not exerted more downward pressure on executive pay, and had the government not frozen salaries during the war.

DATA DESCRIPTION

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.[16] Although the names of the firms and executives are not disclosed, the reports show compensation and net sales in both years for each firm. The report published in 1948 includes remuneration and sales for 1942 and 1946, while the report published in 1951 includes similar information for 1940 and 1949.[17]

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[16] 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, "Executive Compensation").

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

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.[18] However, the reports do not describe the sample selection methods used by the NICB. The raw data are not likely to present a representative view of changes in the distribution of earnings over time because the 1948 report contains a significantly larger sample (762 firms) than the 1951 report (545 firms).

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.[19] Then, we use *Moody's Manual of Investments* to identify the firms included in each report and create a balanced panel of 246 firms that appear in all four years—we refer to these data as the NICB sample.[20] For these corporations, we use several editions of the *Moody's* manuals to collect financial information and other firm characteristics.

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[18] Other research that has used corporate reports filed with the SEC to obtain data on executive pay includes Baker, "Fluctuation"; Lewellen, *Executive Compensation*; and Frydman and Saks, "Executive Compensation". Surveys conducted by the Federal Trade Commission and the Works Project Administration provide data on executive remuneration during the 1930s, but no sources other than corporate reports provide individual-level data on executive pay in the 1940s.

[19] 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.

[20] 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 report. We 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.

The final dataset appears to be representative of most manufacturing 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 Appendix 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 2).[21,22]

Since not all firms report the compensation of all three officers in every year, changes in the distribution of pay over time could be driven by changes in the number or rank of officers. Therefore, we drop observations where we do not observe an officer of the same pay-rank in the same firm in all four years.[23] The final sample covers 631 executives in each year. The evolution of compensation in the final sample appears to be representative of the salaries of top earners, as changes in NICB compensation relative to average earnings in the economy are similar to changes in the top shares of the aggregate distribution of wages and salaries from Thomas Piketty and Emmanuel Saez (see Appendix Table 3).[24] Thus, our findings are likely representative of the remuneration of top executives in all publicly-traded manufacturing firms in the economy.

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[21] Because the NICB reports do not provide industry codes, 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.

[22] As a further check, we obtain data on executive pay in 1942 and 1955 from two independent NICB reports. The firms in these reports are not required to have survived for any period of time, so the level of pay is more likely to be representative than our balanced panel. The changes in executive pay from 1942 to 1955 are similar to the balanced panel for the 1940 to 1949 period, suggesting that our results are not biased by the sample design.

[23] Imposing this restriction reduces our sample by 39 percent.

[24] Piketty and Saez, "Income Inequality."

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 also use the annual dataset on executive pay constructed by Frydman and Saks.[25] Collected from firms' proxy statements and other corporate reports, the Frydman-Saks sample contains annual information on the compensation of top executives in about 70 large publicly-traded manufacturing firms with an average of 6 officers per firm in each year.[26] These firms are substantially larger than in the NICB sample, so the decline in executive pay is more pronounced. Despite its many advantages, the Frydman-Saks sample is too small to study differences across industries.

Trends in executive pay

The 1940s represent a unique period of decline in the real value of top executive pay. 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. The combined drop in executive compensation from 1940 to 1949 was substantial; the average decreased 11 percent and the median decreased 8 percent.

Executive pay also fell sharply relative to the remuneration of other workers during this period. As shown in Table 1, average executive pay decreased 30 percent relative to average earnings in the economy, and it fell by a similar amount when compared to average earnings or

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[25] Frydman and Saks, "Executive Compensation."

[26] For the 25 firms that appear in both the NICB reports and the Frydman-Saks dataset, the correlation of reported remuneration is 0.93. This strong correlation strengthens the credibility of the NICB data since Frydman and Saks collected their data directly from corporate reports.

production worker wages in the officer's own industry.[27] This compression was relatively large

for most executives in the sample, as more than ¾ of the sample experienced a decline of at least

20 percent in pay relative to average earnings.   The distribution of pay across executives in the

NICB sample did not narrow as much, so we focus on explaining the contraction in pay between

executives and other workers, treating executives as a (relatively) homogeneous group.

EXPLAINING THE TRENDS IN EXECUTIVE PAY: GOVERNMENT REGULATIONS

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

restrictions on high salaries on October 2nd, 1942: a cap on top salaries, and a broader limit on

salary increases.[28] The salary cap limited labor earnings to an amount that would not exceed

$25,000 after federal income taxes were paid.[29] The restriction against salary increases

prohibited salaries in excess of $5,000 from rising above their level of September 15, 1942.

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[27] 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*.

[28] See Public Law 729, "An Act to Amend the Emergency Price Control Act of 1942, to Aid in Preventing Inflation, and for Other Purposes."

[29] This limit was equivalent to $54,428.57 in 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. It applied to labor income prior to any deductions, federal taxes other than income taxes, and state taxes. Gross salaries could exceed the cap to allow the fulfillment of prior commitments, such as insurance policies due, federal income taxes previously agreed upon, and other fixed

The salary cap was immediately controversial. It received wide support from labor unions, which perceived it as a way to ensure that wage earners did not unequally bear the burdens of the war and to limit firms from profiting from the war effort.[30] On the other hand, opponents argued that the cap would only affect a small number of individuals without keeping inflation at bay or improving the economy. Opponents also viewed the cap as an attack on enterprises and their executives, who were already subjected to "equality of sacrifice" through a progressive tax schedule. Congress repealed the cap only six months after the law was signed so, in the end, the cap had no direct impact on high incomes.

In contrast to the salary cap, the prohibition against salary changes was enforced until November 1946. However, 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 as determined by previously established salary agreements. To change salary and bonus payments outside of these provisions, a firm could request approval from the Salary Stabilization Unit.[31] High penalties were imposed to ensure that companies did not violate these regulations.[32] From 1942 to 1946, the Unit processed about 750,000 applications (equivalent to roughly 30 percent of covered individuals) for permission to increase salary or bonus payments, suggesting that firms took these regulations seriously.

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payments that would otherwise result in "undue hardship." Earnings from investments were not affected by the salary limitations.

[30] Leff, "Politics of Sacrifice."

[31] The Salary Stabilization Unit was created by Treasury decision in October 29, 1942 to administer the provisions of the regulations on salaries in excess of $5,000 per year.

[32] 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, an illegal salary payment could be disallowed as a deduction from taxable corporate income.

Prior work has found that restrictions prohibiting *wage* (i.e. wages and salaries lower than $5,000 per year) increases reduced income inequality because exceptions were granted more often to low-income workers.[33] Similarly, the prohibition against salary increases may have contributed to the compression at the top of the distribution if these restrictions were more binding than the limits on wages.

To assess the impact of the salary regulations on executive pay, we use 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 current bonus) in the pre-war and post-war periods.[34] By contrast, 27 percent of them received no pay increase from 1943 to 1945. Therefore, the regulation may have prevented some salary changes during the war. However, its influence was not strong, as about 25 percent of the executives in this sample still obtained large wage increases (i.e., larger than the average change in pay in non-war years) when the regulation was in place (dashed line in Figure 2).

We also 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), which was in charge of regulating wages lower than $5,000 per year, was more likely to grant exceptions in low-wage industries.[35] If wage restrictions were influential, we would expect more compression between executive and workers 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:

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[33] Goldin and Margo, "Great Compression"; and Rockoff, *Drastic Measures*.

[34] 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, "Executive Compensation") and the restriction applied to all forms of labor income.

[35] Goldin and Margo, "Great Compression"; and Rockoff, *Drastic Measures.*

lumber, textiles, tobacco, apparel, and leather products.[36] The median of average pay in these

industries was $15,000 in 1940, compared with $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 2). 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 war-related wage policies

boosting workers' pay (and reducing relative executive 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 Unit may have also granted

exceptions to salary restrictions for top executives in these industries, so there is no clear

prediction for the net effect on executive pay relative to other workers. Empirically, salary

regulations appear to have affected executives differently in war-related industries.[37] In the

Frydman-Saks sample, executives in non-war-related industries were more likely to experience

no change in remuneration during the war than managers in war-related industries. However, the

lower incidence of salary freezes 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. Nevertheless, when we compare

median executive earnings to average industry earnings, we find that relative executive pay

declined less in war-related than in other industries during the war period.

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[36] 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).

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

In summary, wage and salary policies might have had some effect on reducing executive pay relative to the earnings of other workers from 1942 to 1946. However, this effect appears relatively modest and did not persist after the regulations were lifted.

Effect of tax policy

Another way in which the government might affect the distribution of income is through tax policy. Specifically, the reduction in relative executive pay could be the result of an increase in top marginal tax rates on labor income or a reduction in tax rates on low incomes. An extensive literature in public finance has found that only high-income earners respond to changes in tax rates, so we focus on the effect of tax rates on the level of executive pay.[38] A priori, the effect of taxes on pay may have been substantial since the difference between pre-tax and after-tax remuneration widened dramatically during the 1940s.[39]

The literature concerned with how taxable income responds to taxes usually expresses an individual's income as a function of his or her "net-of-tax rate" on labor income:[40]

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

The parameter of interest is β, the "elasticity of taxable income." Mostly based on data from the last thirty years, the current consensus is that β is between 0.1 to 0.4.[41] Estimates using data prior to the 1980s suggest that β was smaller or even negative in earlier decades.[42] To estimate β in the 1940s, we follow the literature and regress changes in executive pay on changes

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[38] Saez, "Reported Incomes"; Goolsbee, "Evidence"; and Slemrod, "Economics."

[39] Frydman and Saks, "Executive Compensation."

[40] See Gruber and Saez ("Elasticity") for a theoretical derivation of this relationship.

[41] Saez, Slemrod and Giertz, "Elasticity".

[42] Goolsbee, "Evidence"; and Frydman and Molloy, "Does Tax Policy."

in the net-of-tax rate. 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 taxes from 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 income had remained at the level in real terms as it was in the previous year.[43]

We cannot follow specific individuals over time in the NICB data, so we use the Frydman-Saks sample for this analysis.[44] Among the covariates, we include the logarithm of lagged real remuneration to account for mean-reversion in income, which may cause higher-income executives to experience larger reductions in pay.[45] 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.

We start by analyzing annual changes in pay and in the net-of-tax rate from 1941 to 1949. As shown by the first column of Table 3, changes in tax rates are unrelated to annual changes in remuneration. 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. One possible reason for a small estimate of β is that compensation may adjust slowly to changes in tax policy. To assess the delayed response to taxes, the remaining columns of Table 3 report the regressions results for 3-year changes, 5-

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[43] See Gruber and Saez ("Elasticity") for a description of this instrumental variable approach.

[44] 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.

[45] Gruber and Saez, "Elasticity."

year changes and 10-year changes in pay and net-of-tax rates. 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 to include changes in remuneration through the 1949-1959 period. 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.[46]

In sum, we do not find a strong positive relationship between changes in pay and changes in the net-of-tax rate. The lack of response of compensation to the rise in tax rates means that after-tax pay fell by even more than pre-tax pay during this period. Average real after-tax compensation dropped 24 percent from 1940 to 1949, more than double the 11 percent decrease in average real pre-tax pay. Thus, the disposable incomes of corporate executives contracted considerably during this period.

EXPLAINING THE TRENDS: NON-REGULATORY DETERMINANTS

A large literature in corporate finance has found various individual, firm, and industry characteristics to be important determinants of executive pay in recent decades.[47] Studies of income inequality also relate disparities in top incomes to other factors, such as the power of

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[46] We obtain similarly small estimates when we estimate the elasticity from the level of pay in the NICB sample. Specifically, 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.

[47] See Rosen, "Contracts"; Murphy, "Executive Compensation"; and Frydman and Jenter, "CEO Compensation" for detailed literature reviews.

unions and the returns to skills.[48] Following these two literatures, we study the role of non-regulatory determinants of relative executive pay.

Determinants of the level of executive pay and earnings 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 4).[49] Consistent with prior findings in the literature, we find positive returns to being the president or chairman of the corporation.[50] This return did not change appreciably from 1940 to 1949, making it an unlikely candidate to explain the drop in relative executive pay.

Turning to firm characteristics, 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 using the firm's market value or total assets instead. This positive correlation is consistent with prior studies, which find firm size to be one of the main correlates with executive pay.[51] 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. Other observable firm characteristics, including capital structure (proxied by the book leverage

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[48] DiNardo, Fortin and Lemieux, "Labor"; and Autor, Katz and Kearney, "Trends."

[49] We cluster the standard errors by firm. In general, standard errors are smaller if we cluster by industry or year.

[50] 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. Our results are robust to restricting the sample to executives of the same rank (for example, the highest-paid in each firm).

[51] Huntsman and Lewellen, "Managerial Pay"; Rosen, "Contracts"; and Graham, Li and Qiu, "Managerial Attributes."

17

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 directors, and the fraction of insiders (i.e., current managers of the firm) on the board, had little impact on the level of pay.[52]

We turn next to industry characteristics. Executive pay was slightly higher in more unionized industries in 1940, but the correlation had become negative by 1949.[53] The decline in relative executive pay in highly unionized industries relative to other industries may be due to the growing power of unions over the 1940s.[54] In the 1930s, large corporations were mostly able to defend against unions even though unions' organization and membership was strengthening.[55] Union membership expanded markedly during WWII (from 26 percent of nonagricultural employment in 1940 to 34 percent in 1945) and remained high for the rest of the decade.[56] Two plausible factors contributing to this expansion are a reduction in employer opposition due to the war-time economic growth, and government actions aimed at minimizing labor disputes to facilitate the war effort.[57] Strike activity was also elevated, likely causing managers to take unions' concerns seriously. The growing negative correlation between

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

[53] The difference in the coefficients on unionization across years is statistically significant with a p-value of 0.007.

[54] As described in the data appendix, we measure unionization using 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.

[55] Harris, *Right*.

[56] Freeman, "Spurts."

[57] Freeman, "Spurts"; Millis and Brown, *From the Wagner Act*; and Taft, *Organized Labor*.

18

unionization and executive pay during the 1940s suggests that executives were able to reap a smaller share of profits as the bargaining power shifted towards organized labor.[58]

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. Finally, we allow compensation to be affected by the size of the typical firm in their industry. 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.[59] However, we do not find any correlation between executive pay and the number of production workers per establishment in the industry.

To understand the changes in inequality between executives and workers, 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 allow us to net out many unobservable factors that are correlated with firm and industry characteristics. We lack information on workers' wages at the firm level, so we use workers' wages at the industry level—in this case, the average wage of production workers in the 2-digit SIC industry. Columns (3) and (4) of Table 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

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[58] Kerr, "Employer Policies"; and Harris, *Right*. Although many studies have found labor unions to be an important factor in determining workers' wages (Freeman, "Deunionization"; Card, "Effects"; DiNardo, Fortin, and Lemieux, "Labor Market"; and Firpo, Fortin and Lemieux, "Decomposing"), evidence on the effect of unionization on executive pay has been mixed (DiNardo, Hallock, and Pischke, "Unions"; and DeAngelo and DeAngelo, "Union").

[59] Gabaix and Landier, "Why Has CEO Pay".

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. Also, relative executive pay rose more in war-related industries.

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 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).

Decomposing changes in executive pay

To understand how each variable has affected relative executive pay over time, the left-hand panel of Table 5 presents an Oaxaca decomposition based on the OLS regression results. This analysis divides the change in average relative compensation from 1940 to 1949 into a portion attributable to the change in the quantity of each independent variable, a portion attributable to the change in the price (i.e. estimated coefficient) of each independent variable, and a portion attributable to the interaction between quantities and prices. Specifically, we calculate:

$$\overline{Y_{49}} - \overline{Y_{40}} = \left(\overline{X_{49}} - \overline{X_{40}} \right)\widehat{\beta}_{40} + \left(\widehat{\beta}_{49} - \widehat{\beta}_{40} \right)\overline{X_{40}} + \left(\overline{X_{49}} - \overline{X_{40}} \right)\left(\widehat{\beta}_{49} - \widehat{\beta}_{40} \right) \qquad [2]$$

where $\overline{Y}$ is the average of the dependent variable, $\overline{X}$ is the average of the independent variables, and $\widehat{\beta}$ is the vector of estimated coefficients. An extensive literature has used Oaxaca

decompositions to analyze the determinants of changes in earnings distributions.[60] 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.[61] The economic magnitudes of these effects are substantial and statistically significant. 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 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. The relative increase in pay in war-related industries also boosted relative executive compensation by 0.07 log points, although this effect is imprecisely estimated.

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 for the typical executive. Focusing on the average in the 1940s may not be too problematic because changes in the mean and median

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[60] See, e.g., Oaxaca, "Male-Female Wage"; Blinder, "Wage"; and Firpo, Frtin and Lemieux, "Unconditional Quantile."

[61] Two drawbacks of Oaxaca decompositions are that they can be sensitive to the base period and that the contribution of each factor depends on the order in which the contributions are computed. Our results are robust to using different base years and to ordering the variables differently.

during this period were fairly similar (see Table 1). For robustness, we examine the effect of

non-regulatory factors on the median by estimating a Recentered Influence Function, which

provides an unbiased estimate of the unconditional moments of a distribution.[62] This

methodology produces similar results as the Oaxaca decomposition. Our results are also robust

to using other techniques including those used by José Antonio Ferreira Machado and José Mata

and John DiNardo, Nicole Fortin and Thomas Lemieux (results available upon request).[63]

Persistence and timing of the reduction in relative executive pay

To gain insight into whether the factors that reduced relative executive pay from 1940 to

1949 had a long-lasting impact on the distribution of income, 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 details the salaries and bonuses awarded 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 this sample to the firms in the 1940-1949 balanced panel.[64] Similar to the

previous results, an Oaxaca decomposition reveals that average relative executive pay was also

reduced from 1940 to 1955 by declines in the coefficients on firm size and unionization, while

increases in average firm size boosted pay. The lack of recovery for so long after the end of

WWII indicates that the war is unlikely to be the sole explanation for the drop in relative pay and

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[62] Firpo, Fortin and Lemieux "Decomposing" and "Unconditional Quantile."

[63] Machado and Mata, "Counterfactual"; and DiNardo, Fortin and Lemieux, "Labor Market."

[64] Despite the smaller sample and the omission of some variables due to lack of data availability, the regression

coefficients for these 126 firms in 1940 and 1949 are similar to those estimated in the full sample.

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.[65]

An advantage of our data is that we can analyze changes in pay within the decade. 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 6).[66] The higher-frequency data reveal that the drop in the return to firm size occurred mostly between 1940 and 1942, and it remained low throughout the rest of the decade. Thus, the change in the relation between relative pay and firm size was rather sudden and persistent. When using these coefficients in an Oaxaca decomposition (not shown), the drag on relative pay due to the change in the return to firm size was much larger than the actual decrease in relative pay from 1940 to 1942, as this negative effect was partly offset by other factors. The coefficient on unionization became gradually more negative throughout the decade, suggesting that the power of labor unions strengthened steadily over time. Not surprisingly, the narrowing of the pay gap between war-related and other industries occurred mainly between 1942 and 1946.

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[65] Using the Frydman-Saks sample to obtain a longer run view, 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.

[66] For this analysis, we use 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 reported 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 change the results for 1940 or 1949. We use the same value of unionization in 1946 and 1949 because data for 1949 are not available.

INTERPRETATION AND CONCLUSION

Using a new dataset on the compensation of top corporate executives, we examine the reduction in top incomes relative to the rest 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. 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 may have played a modest role in the first half of the 1940s, but their direct effects seem to be small and they cannot account for the persistently low level of relative pay after the end of the war. We find larger and more prolonged 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 officers' remuneration strengthened gradually over the decade. Second, the return to firm size declined from 1940 to 1942 and remained relatively low until 1949.

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. Two forces that may have changed sharply in this period, thereby possibly accounting for the decline in the return to firm size, are corporate governance and social norms.

24

Improvements in corporate governance may have disproportionately diminished the ability of

managers to extract rents in larger firms between 1940 and 1942. For example, the SEC's

regulations concerning disclosure of executive pay became stricter in 1942. The mandated

disclosure of top executive compensation in proxy statements, which are mailed to shareholders,

probably brought heightened scrutiny of the remuneration of executives in the largest

corporations. The wider availability of information on remuneration in other firms of similar

characteristics may have reduced differences in pay across firms of different sizes. Another

possibility is that social norms might have changed rapidly at the start of the war. For instance,

the war popularized ideas of "equality of sacrifice" and may have altered the public's perception

of fairness. 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. Of course, assessing this explanation is extremely challenging

because of the difficulty in quantifying such a vague concept as social norms.[67]

  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. Alternatively, war-related events may have had a prolonged indirect effect on

the distribution of earnings by altering social norms towards income inequality. Rapid price

inflation may have also caused workers' earnings to rise more than top executives'

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[67] While a few studies have found suggestive evidence that the evolution of income inequality at least partly reflects

changes in social norms, their results are far from conclusive. See, for example, Alesina, Di Tella and MacCulloch,

"Inequality"; and Core, Guay and Larcker, "The Power") .

remuneration.[68] 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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[68] Routh (*Occupation*) finds that inflationary periods in Great Britain from 1913 to 1960 were associated with a

narrowing of wage differentials. However, many other inflationary periods have coincided with an increase in

income inequality (Hewlett, "Inflation").

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Table 1
Summary Statistics on Executive Pay

	1940	1942	1946	1949	% Change 1940 to 1949
Number of firms	246	246	246	246	
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
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 2
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 3
Correlation of Changes in Tax Rates and Changes in Real Executive Pay

	1-year	3-year	5-year	10-year	10-year
$\Delta \ln(1\text{-tax rate})$	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)
# 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. Each regression also controls for log of the firm's market value, the rate of return, job title dummies for chairman, president, executive vice president and vice president, an indicator for director of the board, an indicator for whether the executive changed jobs during the year, and a dummy to capture changes in director status. Based on 1 to 11 of the highest-paid executives in 77 large firms. The data are described in Frydman and Saks (2010).

Table 4
Determinants of Executive Pay in 1940 and 1949

	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 5
Oaxaca Decomposition of Changes in
Average Relative Executive Pay 1940 to 1949

|	Quantity	Mean Price	Interaction
Total	0.239**	-0.354**	-0.128**
	(0.053)	(0.048)	(0.046)
Ln(real sales)	0.201**	-0.360	-0.036
	(0.053)	(0.165)	(0.019)
Chairman	0.020**	-0.003	-0.002
	(0.008)	(0.007)	(0.004)
President	0.011*	-0.016	-0.001
	(0.006)	(0.014)	(0.001)
Profitability	0.025**	0.041	-0.008
	(0.011)	(0.047)	(0.010)
Unionization	-0.017	-0.232**	-0.082**
	(0.026)	(0.110)	(0.040)
War industry	-0.000	0.067	0.000
	(0.006)	(0.041)	(0.007)
Constant	--	0.231	--
	--	(0.229)	--

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 6
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.

Figure 1
Distribution of Ln(Real Remuneration)
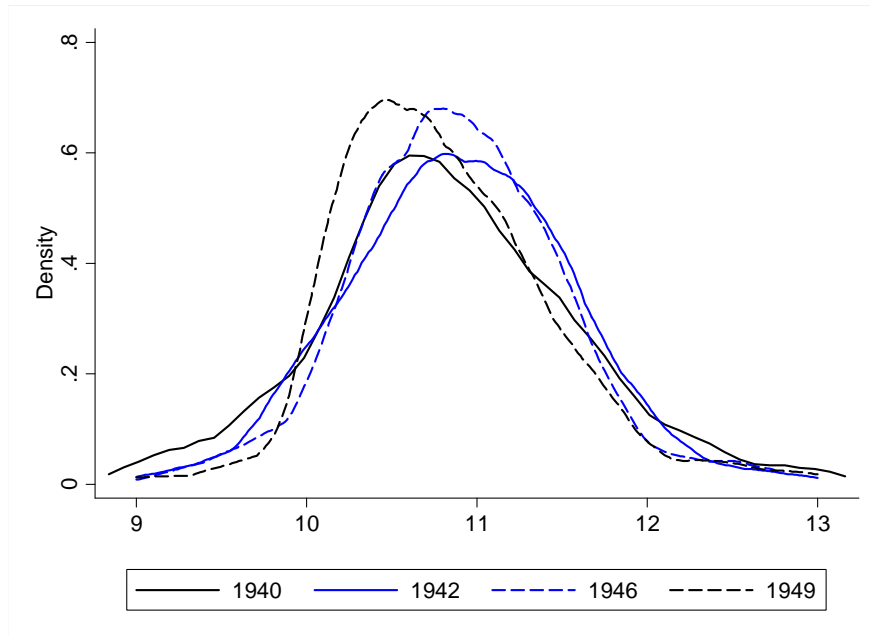
Note. Based on the three highest-paid executives in the 246 manufacturing firms in the NICB sample. Real remuneration is the ratio of nominal salary+bonus to the chain price index for personal consumption expenditures (base year = 2008).

Figure 2
Annual Changes in Remuneration
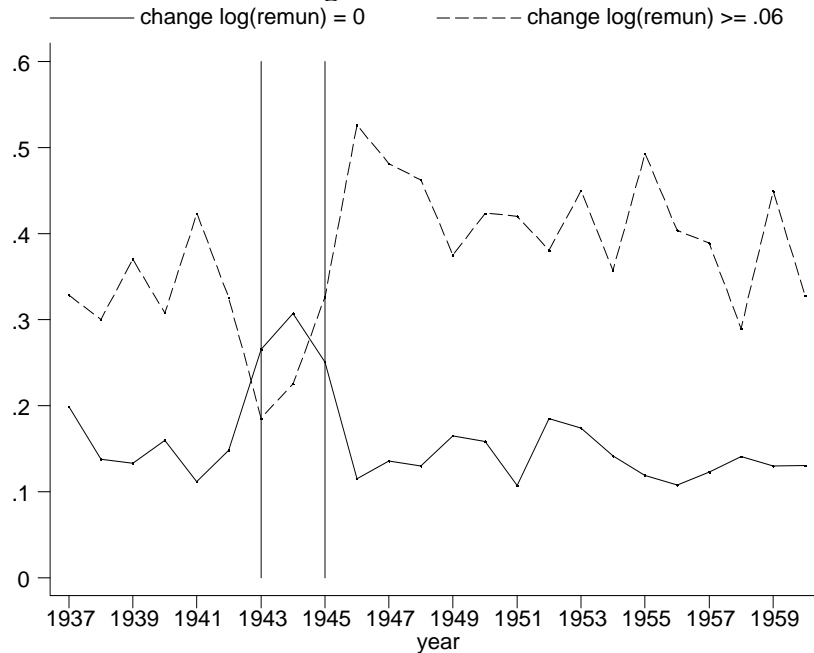
Note. Sample based on all executives reported in proxy statements for the 50 largest publicly traded firms in 1940, 1960, and 1990 as described in Frydman and Saks (2010). Remuneration is defined as salary and bonus. The solid line shows the percent of executives in each year with no change in remuneration. The dashed-line shows the fraction of executives receiving an increase in ln(remuneration) larger than 0.06, which was the average change in remuneration during the pre-war and post-war period.

Appendix Table 1 – Not for publication
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).

Appendix Table 2– Not for publication
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).

Appendix Table 3– Not for publication
Comparison of Relative Executive Compensation to the
Aggregate Distribution of Wages and Salaries

Percentile of aggregate distribution	Time Period	# of Executives	Δ ln(mean relative comp.)	Δ ln(median relative remun.)	Δ ln(share of aggregate wages)
(1)	(2)	(3)	(4)	(5)	(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).

Data Appendix – Not For Publication

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.[69] 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.[70] By contrast, the non-manufacturing firms in the NICB data do not appear to be representative of the non-manufacturing economy more broadly.

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[69] 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.

[70] 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.