

CEO pay has skyrocketed 1,322% since 1978

CEOs were paid 351 times as much as a typical worker in 2020

Report • By [Lawrence Mishel](#) and [Jori Kandra](#) • August 10, 2021

What this report finds: Corporate boards running America’s largest public firms are giving top executives outside compensation packages that have grown much faster than the stock market and the pay of typical workers, college graduates, and even the top 0.1%. In 2020, a CEO at one of the top 350 firms in the U.S. was paid \$24.2 million on average (using a “realized” measure of CEO pay that counts stock awards when vested and stock options when cashed in rather than when granted). This 18.9% increase from 2019 occurred because of rapid growth in vested stock awards and exercised stock options. Using a different “granted” measure of CEO pay, average top CEO compensation was \$13.9 million in 2020, slightly below its level in 2019. In 2020, the ratio of CEO-to-typical-worker compensation was 351-to-1 under the realized measure of CEO pay; that is up from 307-to-1 in 2019 and a big increase from 21-to-1 in 1965 and 61-to-1 in 1989. CEOs are even making a lot more than other very high earners (wage earners in the top 0.1%)—more than six times as much. From 1978 to 2020, CEO pay based on realized compensation grew by 1,322%, far outstripping S&P stock market growth (817%) and top 0.1% earnings growth (which was 341% between 1978 and 2019, the latest data available). In contrast, compensation of the typical worker grew by just 18.0% from 1978 to 2020.

Why it matters: Exorbitant CEO pay is a major contributor to rising inequality that we could safely do away with. CEOs are getting more because of their power to set pay and because so much of their pay (more than 80%) is stock-related, not because they are increasing their productivity or possess specific, high-demand skills. This escalation of CEO compensation, and of executive compensation more generally, has fueled the growth of top 1.0% and top 0.1% incomes, leaving less of the fruits of economic growth for ordinary workers and widening the gap between very high earners and the bottom 90%. The economy would suffer no harm if CEOs were paid less (or were taxed more).

How we can solve the problem: We need to enact policy solutions that would both reduce incentives for CEOs to extract economic concessions and limit their ability to do so. Such policies could include reinstating higher marginal income tax rates at the very top; setting corporate tax rates higher for firms that have higher ratios of CEO-to-worker

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compensation; use of antitrust enforcement and regulation to restrain firms’—and by extension, CEOs’—excessive market power; and allowing greater use of “say on pay,” which allows a firm’s shareholders to vote on top executives’ compensation.

Introduction

Chief executive officers (CEOs) of the largest firms in the U.S. earn far more today than they did in the mid-1990s and many times what they earned in the 1960s or 1970s. They also earn far more than the typical worker, and their pay—which relies heavily on stock-related compensation—has grown much more rapidly than a typical worker’s pay. Importantly, rising CEO pay does not reflect rising value of skills, but rather CEOs’ use of their power to set their own pay. In economic terms, this means that CEO compensation reflects substantial “rents” (income in excess of their actual productivity). This is problematic since this growing earning power of CEOs has been driving income growth at the very top, a key dynamic in the overall growth of inequality.

Key findings

- **Growth of CEO compensation (1978–2020).** Using the realized compensation measure, compensation of the top CEOs increased 1,322.2% from 1978 to 2020 (adjusting for inflation). Top CEO compensation grew roughly 60% faster than stock market growth during this period and far eclipsed the slow 18.0% growth in a typical worker’s annual compensation. CEO granted compensation rose 970.2% from 1978 to 2020.
- **Growth of CEO compensation during the pandemic (2019–2020).** The dramatic increase in CEO compensation during the pandemic is remarkable. While millions were out of work, CEOs’ realized compensation jumped 18.9% in just one year. Typical worker compensation, of those who remained employed, did rise 3.9% over that year—and even that wage growth is overstated: Perversely, high job loss among low-wage workers skewed the average wage higher.
- **Changes in the CEO-to-worker compensation ratio (1965–2020).** Using the realized compensation measure, the CEO-to-worker compensation ratio was 21-to-1 in 1965. It peaked at 366-to-1 in 2000. In 2020 the ratio was 351-to-1. Most important, the ratio was far higher than at any point in the 1960s, 1970s, 1980s, or 1990s. Using the CEO granted compensation measure, the CEO-to-worker compensation ratio rose to 203-to-1 in 2020, significantly lower than its peak of 386-to-1 in 2000 but still many times higher than the 45-to-1 ratio of 1989 or the 15-to-1 ratio of 1965.
- **Changes in the composition of CEO compensation.** The composition of CEO compensation is shifting away from the use of stock options and toward the use of stock awards. Vested stock awards and exercised stock options totaled \$20.1 million in 2020 and accounted for 83.1% of average realized CEO compensation.
- **Changes in the CEO-to-top-0.1% compensation ratio.** Over the last three decades,

compensation grew far faster for CEOs than it did for other very highly paid workers (the top 0.1%, or those earning more than 99.9% of wage earners). CEO compensation in 2019 (the latest year for which data on top wage earners are available) was 6.44 times as high as wages of the top 0.1% of wage earners, a ratio 3.26 points greater than the 3.18-to-1 average CEO-to-top-0.1% ratio over the 1947–1979 period.

- **Implications of the growth of CEO-to-top-0.1% compensation ratio.** The fact that CEO compensation has grown far faster than the pay of the top 0.1% of wage earners indicates that CEO compensation growth does not simply reflect a competitive race for skills (the “market for talent”) that also increased the value of highly paid professionals: Rather, the growing pay differential between CEOs and top 0.1% earners suggests the growth of substantial economic rents (income not related to a corresponding growth of productivity) in CEO compensation. CEO compensation appears to reflect not greater productivity of executives but the power of CEOs to extract concessions. Consequently, if CEOs earned less or were taxed more, there would be no adverse impact on the economy’s output or on employment.
- **Growth of top 0.1% compensation (1978–2019).** Even though CEO compensation grew much faster than the earnings of the top 0.1% of wage earners, that doesn’t mean the top 0.1% did not fare well. Quite the contrary. The inflation-adjusted annual earnings of the top 0.1% grew 341% from 1978 to 2019. CEO compensation, however, grew three times as fast!
- **CEO pay growth compared with growth in the college wage premium.** Over the last three decades, CEO compensation increased more relative to the pay of other very-high-wage earners than did the wages of college graduates relative to the wages of high school graduates. This finding indicates that the escalation of CEO pay does not simply reflect a more general rise in the returns to education.

Measuring CEO compensation

We focus on the average compensation of CEOs at the 350 largest publicly owned U.S. firms (i.e., firms that sell stock on the open market) by revenue. Our source of data is the S&P ExecuComp database for the years 1992 to 2020 and survey data published by the *Wall Street Journal* for selected years back to 1965. We maintain the sample size of 350 firms each year when using the ExecuComp data.¹

We use two measures of CEO compensation, one based on compensation as “realized” and the other based on compensation as “granted.” Both measures include the same measures of salary, bonuses, and long-term incentive payouts. The difference is how each measure treats stock awards and stock options, major components of CEO compensation that change value from when they are first provided, or granted, to when they are realized.

The realized measure of compensation includes the value of stock options as realized (i.e., exercised), capturing the change from when the options were granted to when the CEO invokes the options, usually after the stock price has risen and the options values have increased. The realized compensation measure also values stock awards at their value

when vested (usually three years after being granted), capturing any change in the stock price as well as additional stock awards provided as part of a performance award.

The granted measure of compensation values stock options and restricted stock awards by their “fair value” when granted (Compustat estimates of the fair value of options and stock awards as granted determined using the Black Scholes model). For details on the construction of these measures and benchmarking to other studies, see Sabadish and Mishel 2013.

Analysis

Trends in CEO compensation growth

This section examines several decades of available data to identify historical trends in CEO compensation.

Composition of CEO compensation

Stock-related components of CEO compensation constitute a large and increasing share of total compensation: Realized stock awards and stock options were 73.1% of total compensation in 2016 (\$12.6 million out of \$17.2 million) and were 83.1% of total compensation (\$20.1 million out of \$24.2 million) in our sample for 2020. The growth of these stock-related components from 2016 to 2020 was the sole reason total CEO realized compensation grew by \$7.0 million from \$17.2 million to \$24.2 million, up 40.5%. Of the stock-related components of compensation, stock awards make up a growing share while the share of stock options in CEO compensation packages has decreased over time.

There is a simple logic behind companies’ decisions to shift from stock options to stock awards in CEO compensation packages, as Clifford (2017) explains. With stock options, CEOs can only make gains: They realize a gain if the stock price rises beyond the price of the initial options granted and they lose nothing if the stock price falls. The fact that they have nothing to lose—but potentially a lot to gain—might lead options-holding CEOs to take excessive risks to bump up the stock price.

Stock awards, on the other hand, promote better alignment of a CEO’s goals with shareholders’ goals. A stock award has the value when given, or vested, and can increase or decrease in value as the firm’s stock price changes. If stock awards have a lengthy vesting period, say three to five years, then the CEO has an interest in lifting the firm’s stock price over that period while being mindful to avoid any implosion in the stock price—to maintain the value of what they have.

Growth in 2020

Realized CEO compensation (reported in **Table 1**) rose by \$3.8 million, up 18.9%, to \$24.2 million from 2019 to 2020, almost entirely due to the increased value of exercised stock

options (we report executive compensation in millions, but dollar and percent changes are calculated using unrounded data). The granted measure of CEO compensation, which values stock options granted in 2020 (not those exercised), actually fell by \$30,000, or 0.2%, to 13.9 million. Thus, it seems the large growth of CEO compensation in 2020 was driven by executives cashing out their options at a time of high stock prices.

These results are in sync with the preliminary analyses (Mishel and Kandra 2021) previously reported. Mishel and Kandra (2021) analyzed the firms from the 2019 sample that had reported their executive compensation by the end of April 2021. CEO realized compensation, including realized stock options and vested stock awards, rose 15.9% from 2019 to 2020 among the 281 early reporting firms.

Long-term trends

Table 1 also presents the longer-term trends in CEO compensation for selected years from 1965 to 2020.² Our discussion of longer-term trends focuses mostly on the realized compensation measure of CEO compensation preferred in most economic analyses.

For comparison, the average annual compensation (wages and benefits of a full-time, full-year worker) of private-sector production/nonsupervisory workers (a group covering more than 80% of payroll employment; see Gould 2020) is shown in Table 1, allowing us to compare CEO compensation with that of a typical worker.

From 1995 onward, the table also identifies the average annual compensation of production/nonsupervisory workers in the key industry of the firms included in the sample. We take this compensation as a proxy for the pay of typical workers in these particular firms and use it to calculate the CEO-to-worker compensation ratio for each firm.

Finally, the table shows inflation-adjusted changes in the stock market, as measured by the Dow Jones Industrial Average and S&P 500 Index.

CEO compensation (our realized measure) has, in general, risen and fallen along with the S&P 500 Index over the last five and a half decades. The period from 1965 to 1978 is an exception: Although the stock market fell by roughly half between 1965 and 1978, realized CEO compensation increased by 78.9%.

Typical worker compensation saw relatively strong growth over that period—that is, strong relative to subsequent periods, not relative to CEO pay or the pay of other earners at the top of the wage distribution: Annual worker compensation grew by 20.0% from 1965 to 1978, about a fourth as fast as CEO compensation growth.

Realized CEO compensation grew strongly throughout the 1980s but exploded in the 1990s. It peaked at the end of the stock market bubble, in 2000, at about \$22.2 million, a 261% increase over just five years earlier in 1995 and a 1,204% increase over 1978. This latter increase exceeded even the growth of the booming stock market (513% for the S&P 500 and 439% for the Dow) between 1978 and 2000. In stark contrast to both the stock market and CEO compensation, private-sector worker compensation increased just 0.6% from 1978 to 2000.

Table 1

CEO compensation, CEO-to-worker compensation ratio, and stock prices (2020\$), selected years, 1965–2020

Year(s)	CEO annual compensation (thousands)		Private-sector production/nonsupervisory workers annual compensation (thousands)		Stock market (indexed to 2020\$)		CEO-to-worker compensation ratio	
	Realized	Granted	All private-sector workers	Workers in the firms' industries*	S&P 500	Dow Jones	Realized	Granted
1965	\$951	\$724	\$43.2	NA	634	6,550	21.1	15.4
1973	\$1,242	\$946	\$50.7	NA	561	4,825	23.4	17.2
1978	\$1,701	\$1,295	\$51.8	NA	351	2,998	31.4	23.0
1989	\$3,169	\$2,413	\$49.4	NA	653	5,074	61.4	45.0
1995	\$6,148	\$6,830	\$49.4	\$55.7	917	7,613	117.6	131.0
2000	\$22,183	\$22,205	\$52.1	\$58.2	2,151	16,164	365.7	386.1
2007	\$19,670	\$14,533	\$54.3	\$60.6	1,849	16,492	330.9	242.0
2009	\$10,505	\$10,809	\$56.4	\$62.9	1,147	10,746	177.6	178.3
2019	\$20,351	\$13,891	\$58.9	\$67.0	2,950	26,709	306.9	211.9
Projected 2020	\$24,194	\$13,861	\$61.2	\$69.7	3,218	26,891	351.1	202.7
2019 FH	\$20,129	\$13,677	\$58.9	\$67.4	2,950	26,709	302.6	207.7
2020 FH	\$23,930	\$13,648	\$61.2	\$69.7	3,218	26,891	346.7	198.5
Percent change		Change in ratio						
1965–1978	78.9%	78.9%	20.0%	NA	-44.6%	-54.2%	10.3	7.6
1978–2000	1,204.0%	1,614.5%	0.6%	NA	513.0%	439.1%	334.3	363.1
2000–2007	-11.3%	-34.6%	4.1%	4.1%	-14.1%	2.0%	-34.8	-144.1
2007–2009	-46.6%	-25.6%	3.9%	3.8%	-38.0%	-34.8%	-153.3	-63.7
2009–2020	130.3%	28.2%	8.5%	10.7%	180.7%	150.2%	173.5	24.3
2007–2020	23.0%	-4.6%	12.7%	14.9%	74.1%	63.1%	20.2	-39.4
1978–2020	1,322.2%	970.2%	18.0%	NA	817.0%	796.9%	319.7	179.7
2019–2020	18.9%	-0.2%	3.9%	3.9%	9.1%	0.7%	44.2	-9.2

* Average annual compensation of the workers in the key industry of the firms in the sample.

Notes: Average annual compensation for CEOs at the top 350 U.S. firms ranked by sales is measured in two ways. Both include salary, bonus, and long-term incentive payouts, but the “granted” measure includes the value of stock options and stock awards when they were granted, whereas the “realized” measure captures the value of stock-related components that accrues after options or stock awards are granted by including “stock options exercised” and “vested stock awards.” FH = First half. CEO-to-worker compensation ratios are based on averaging specific firm ratios in samples and not the ratio of averages of CEO and worker compensation. Ratios prior to 1992 are constructed as described in the CEO pay series [methodology](#) (Sabadish and Mishel 2013).

Source: Authors' analysis of data from Compustat's ExecuComp database, the Federal Reserve Economic Data (FRED) database from the Federal Reserve Bank of St. Louis, the Bureau of Labor Statistics' Current Employment Statistics data series, and the Bureau of Economic Analysis NIPA tables.

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When the stock market bubble burst in the early 2000s there was a substantial paring back of CEO compensation. By 2007, however, when the stock market had mostly recovered, realized CEO compensation reached \$19.7 million, just \$2.5 million below its 2000 level. However, granted CEO compensation remained down, at \$14.5 million in 2007, a substantial \$7.7 million fall from the 2000 level.

The stock market decline during the 2008 financial crisis also sent CEO compensation

tumbling, as it had in the early 2000s, as realized CEO compensation dropped 46.6% from 2007 to 2009. After 2009, realized CEO compensation resumed an upward trajectory, growing 130.3% from 2009 to 2020 so that CEO compensation exceeded its previous level from 2007 by 23.0%. In fact, the fast growth of CEO compensation in 2020 brought realized CEO compensation \$2 million above its prior peak level in 2000 at the height of the stock market bubble.

To assess the role of CEO compensation in the overall increase in income and wage inequality of the last four decades it is best to gauge growth since 1978.³ For the period from 1978 to 2020, realized CEO compensation increased 1,322.2%—more than 60% faster than stock market growth (depending on the market index used) and substantially faster than the slow 18.0% growth in the typical worker’s compensation over the same period (there was a large 3.9% jump in worker compensation in 2020, much of it likely from a composition effect—low-wage workers missing from employment due to the COVID crisis). CEO granted compensation grew 970.2% over this period.

Trends in the CEO-to-worker compensation ratio

Table 1 also presents trends in the ratio of CEO-to-worker compensation, using both measures of CEO compensation. We compute this ratio, which illustrates the increased divergence between CEO and worker pay over time, in two steps:

- The first step is to construct, for each of the 350 largest U.S. firms, the ratio of the CEO’s compensation to the annual average compensation of production and nonsupervisory workers in the key industry of the firm (data on the pay of workers at individual firms are not available).⁴
- The second step is to average that ratio across all 350 firms. Note, however, that trends before 1995 are based on the changes in average top-company CEO and economywide private-sector production/nonsupervisory worker compensation.

The last two columns in Table 1 show the resulting ratio for both measures of CEO pay. The trends are depicted in **Figure A**.

How our metric differs from firm-reported metrics

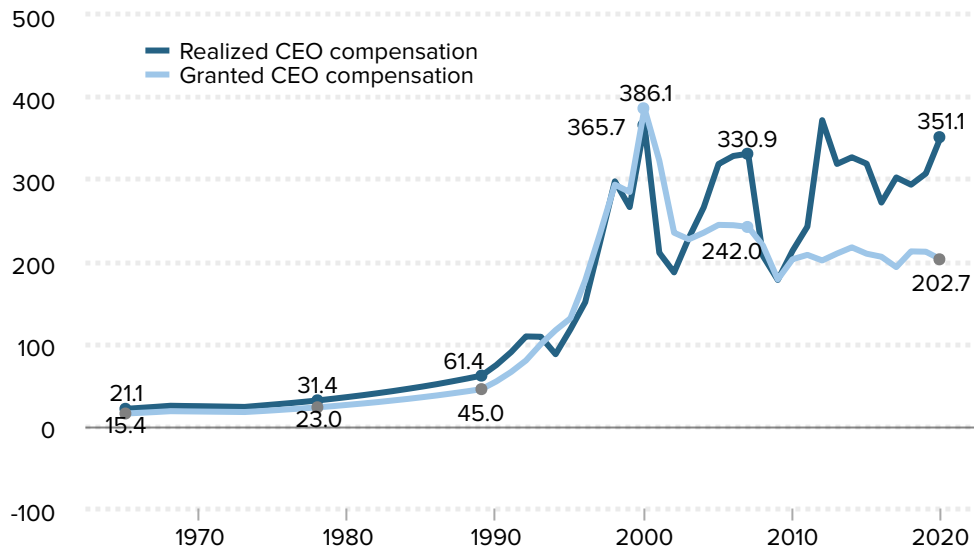
The Securities and Exchange Commission (SEC) now requires publicly owned firms to provide a metric for the ratio of CEO compensation to that of the median worker in a firm, as mandated by the Dodd-Frank financial reform bill of 2010 (SEC 2015). Those ratios differ from those in this report in several ways:

- First, because of limitations in data availability, the measure of worker compensation in our ratios reflects workers in a firm’s key industry, not workers actually working for the firm. The ratios reported to the SEC will

Figure A

CEOs make 351 times as much as typical workers

CEO-to-worker compensation ratio, 1965–2020



Notes: Average annual compensation for CEOs at the top 350 U.S. firms ranked by sales is measured in two ways. Both include salary, bonus, and long-term incentive payouts, but the “granted” measure includes the value of stock options and stock awards when they were granted, whereas the “realized” measure captures the value of stock-related components that accrues after options or stock awards are granted by including “stock options exercised” and “vested stock awards.” Projected value for 2020 is based on the percent change in CEO pay in the samples available in June 2019 and in June 2020 applied to the full-year 2019 value. “Typical worker” compensation is the average annual compensation (wages and benefits of a full-time, full-year worker) of production/nonsupervisory workers in the industries that the top 350 firms operate in.

Source: Authors’ analysis of data from Compustat’s ExecuComp database, the Bureau of Labor Statistics’ Current Employment Statistics data series, and the Bureau of Economic Analysis NIPA tables.

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reflect compensation of workers in the specific firm.

- Second, our measure reflects an exclusively domestic workforce; it excludes the compensation of workers in other countries who work for the firm. The ratios reported to the SEC may include workers in other countries.
- Third, our metric is based on hourly compensation annualized to reflect a full-time, full-year worker (i.e., multiplying the hourly compensation rate by 2,080 hours). In contrast, the measures firms provide to the SEC can be and are sometimes based on the actual annual (not annualized) wages of part-year (seasonal) or part-time workers. As a result, comparisons across firms may reflect not only hourly pay differences but also differences in annual or weekly hours worked.
- Fourth, our metric includes both wages and benefits, whereas the SEC

metric focuses solely on wages.

- Finally, we use consistent data and methodology to construct our ratios; our ratios are thus comparable across firms and from year to year. The SEC allows firms flexibility in how they construct the CEO-to-typical worker pay comparison; this means there is not comparability across firms—and ratios may not even be comparable from year to year for any given firm, if the firm changes the metrics it uses.

There is certainly value in the new metrics being provided to the SEC, but the measures we rely on allow us to make appropriate comparisons between firms and across time. More information on the SEC CEO-to-worker compensation ratio and our comparable measure can be found in Mishel and Kandra 2020.

As Table 1 and Figure A show, using the realized measure of CEO compensation, CEOs of major U.S. companies earned 21 times more than the typical worker in 1965. This ratio grew to 31-to-1 in 1978 and 61-to-1 by 1989. It surged in the 1990s, hitting 366-to-1 in 2000, at the end of the 1990s recovery and at the height of the stock market bubble.⁵

The fall in the stock market after 2000 reduced CEO stock-related pay, such as realized stock options, and caused CEO compensation to tumble in 2002 before beginning to rise again in 2003. Realized CEO compensation recovered to a level of 331 times worker pay by 2007, still below its 2000 level. The financial crisis of 2008 and accompanying stock market decline reduced CEO compensation between 2007 and 2009, as discussed above, and the CEO-to-worker compensation ratio fell in tandem.

Over the 2009–2020 period CEO pay resumed its upward trajectory and the 130.3% surge in realized CEO compensation brought the ratio to 351-to-1, above its 2007 level. Though the realized CEO-to-worker compensation ratio remains below the value achieved in 2000 at the peak of a stock market bubble, it is far higher than it was in the 1960s, 1970s, 1980s, and most of the 1990s.

The pattern using the granted measure of CEO compensation is similar. The CEO-to-worker pay ratio peaked in 2000, at 386-to-1, even higher than the ratio with the realized compensation measure. The fall from 2000 to 2007 was steeper than for the other measure, hitting 242-to-1 in 2007. The stock market decline during the financial crisis drove the ratio down to 178-to-1 in 2009. The growth in granted CEO compensation over the 2009–2020 period, at just 28.2%, was far less than for realized compensation, so the CEO-to-worker pay ratio recovered to only 203-to-1. This level is far lower than its peak in 2000 but still far greater than the 1995 ratio of 131-to-1, the 1989 ratio of 45-to-1, or the 1965 ratio of 15-to-1.

The exponential growth in the CEO-to-worker compensation ratio reflects the strikingly different trajectory of CEO pay compared with typical worker pay. On the one hand, there has been very little growth in the compensation of a typical worker since the late 1970s: It has grown just 19.5% over the 40 years from 1979 to 2020, despite a corresponding

growth of net economywide productivity of 59.7% (Mishel and Bivens 2021). The 1,322.2% growth in realized CEO compensation from 1978 (there are no data for 1979) to 2020 far exceeded the growth in productivity, profits, or stock market values in that period.

Dramatically high CEO pay does not simply reflect the market for skills

This section reviews competing explanations for the extraordinary rise in CEO compensation over the past several decades. CEO compensation has grown a great deal since 1965, but so has the pay of other high-wage earners. To some analysts, this suggests that the dramatic rise in CEO compensation has been driven largely by the demand for the skills of CEOs and other highly paid professionals. In this interpretation, CEO compensation is being set by the market for “skills” or “talent,” not by managerial power or rent-seeking behavior.⁶ This explanation lies in contrast to that offered by Bebchuk and Fried (2004) and Clifford (2017), who claim that the long-term increase in CEO pay is a result of managerial power.

The “market for talent” argument is based on the premise that “it is other professionals, too,” not just CEOs, who are seeing a generous rise in pay. The most prominent example of this argument comes from Kaplan (2012a, 2012b). In the prestigious 2012 Martin Feldstein Lecture at the National Bureau of Economic Research, he claims:

Over the last 20 years, then, public company CEO pay relative to the top 0.1% has remained relatively constant or declined. These patterns are consistent with a competitive market for talent. They are less consistent with managerial power. Other top income groups, not subject to managerial power forces, have seen similar growth in pay. (Kaplan 2012a, 4)

In a follow-up paper for the Cato Institute, published as a National Bureau of Economic Research working paper, Kaplan expands this point:

The point of these comparisons is to confirm that while public company CEOs earn a great deal, they are not unique. Other groups with similar backgrounds—private company executives, corporate lawyers, hedge fund investors, private equity investors and others—have seen significant pay increases where there is a competitive market for talent and managerial power problems are absent. Again, if one uses evidence of higher CEO pay as evidence of managerial power or capture, one must also explain why these professional groups have had a similar or even higher growth in pay. It seems more likely that a meaningful portion of the increase in CEO pay has been driven by market forces as well. (Kaplan 2012b, 21)

However, the argument that CEO compensation is being set by the market for “skills” does not square with the available data corresponding to what Kaplan employed. Bivens and Mishel (2013) address the larger issue of the role of CEO compensation in generating income gains at the very top and conclude that substantial rents are embedded in

executive pay. According to Bivens and Mishel, CEO pay gains are not the result of a competitive market for talent but rather reflect the power of CEOs to extract concessions.

Here we draw on and update Bivens and Mishel's 2013 analysis to show that the evidence does not support Kaplan's claim that "professional groups have had a similar or even higher growth in pay" than CEOs (Kaplan 2012b). Not even close. CEO compensation grew far faster than compensation of very highly paid workers over the last few decades, which suggests that the market for skills was not responsible for the rapid growth of CEO compensation.

Trends in the CEO-to-top-1% compensation ratio

To reach this finding, we use Kaplan's series (Kaplan 2012b) on CEO compensation (through 2010 and updated forward using CEO realized compensation) and compare it with the wages of the very highest wage earners in the top 0.1% (reflecting W-2 annual earnings, which includes exercised stock options and vested stock awards). We use top wage earners rather than top 0.1% household incomes, as Kaplan did, in order to make the comparisons across earners.⁷ The wage benchmark seems the most appropriate one because it avoids issues of changing household demographics (e.g., increases in the number of two-earner households over time) and limits the income to labor income (i.e., it excludes capital income, which is included in household income measures).

The data presented in **Table 2** show the result of our analysis: We find that, contrary to Kaplan's findings, the compensation of CEOs has far outpaced that of the top 0.1% of earners. We present the ratio of the average compensation of CEOs of large firms (the series developed by Kaplan, incorporating stock options realized) to the average annual earnings of the top 0.1% of wage earners (based on a series developed by Kopczuk, Saez, and Song [2010] and updated by Mishel and Kandra [2020]) as a simple ratio and as a logged ratio (to convert it to a "premium," defined as the relative pay differential between two groups) for selected years from 1979 to 2019.

Both the simple ratios and the log ratios understate the relative pay of CEOs, because CEO pay is a nontrivial share of the denominator, a bias that has probably grown over time as CEO relative pay has grown. If we were able to remove top CEOs' pay from the top 0.1% category, it would reduce the average for the broader group.⁸

But even with this inherent bias, these ratios tell a striking story of excessive growth in CEO pay in recent decades: CEO compensation was 6.44 times the pay of the top 0.1% of wage earners in 2019, substantially higher than the 4.36 ratio in 2007. CEO compensation grew far faster than that of the top 0.1% of earners over the recovery from 2009 to 2019, as the ratio spiked from 4.61 to 6.44. CEO compensation relative to the wages of the top 0.1% of wage earners in 2019 far exceeded the ratio of 2.63 in 1989, a rise (+3.81) equal to the pay of nearly four very-high-wage earners.⁹

The log ratio of CEO relative pay grew 90 log points from 1989 to 2019 with respect to wage earners in the top 0.1%. CEO compensation grew more slowly than top 0.1% earnings over the 1979–1989 period, so longer-term comparisons back to 1979 show a lesser, but

Table 2

CEO-to-top-0.1% and college-to-high-school wage ratios, selected years, 1979–2019

	Ratio		Log ratio	
	CEO compensation to top 0.1% wage earners	College-to-high school wages	CEO compensation to top 0.1% wage earners	College-to-high school wages
1979	3.26	1.41	1.18	0.35
1989	2.63	1.59	0.97	0.46
1993	3.05	1.64	1.11	0.49
2000	7.77	1.75	2.05	0.56
2007	4.36	1.77	1.47	0.57
2009	4.61	1.74	1.53	0.55
2019	6.44	1.83	1.86	0.60
Change				
1979–2007	1.10	0.35	0.29	0.22
1979–2019	3.17	0.42	0.68	0.26
1989–2019	3.81	0.24	0.90	0.14

Notes: Wages of top 0.1% of wage earners reflect W-2 annual earnings, which includes the value of exercised stock options and vested stock awards. The college-to-high-school wage ratios compare hourly wages of workers who have a college degree with hourly wages of workers who have only a high school education.

Source: Authors' analysis of EPI State of Working America Data Library data on top 0.1% wages in Mishel and Kandra 2020; data on wages by educational attainment from the EPI State of Working America Data Library; and data on CEO compensation from an extrapolation of Kaplan's (2012b) CEO compensation series.

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still substantial, rise in CEO compensation relative to other top earners.

Figure B compares the CEO compensation to top 0.1% earnings ratios back to 1947. In 2019 this ratio was 6.44, 3.26 points higher than the historical average of 3.18 over the 1947–1979 period (a relative gain in wages earned by the equivalent of three very-high-wage earners).

That CEO compensation grew much faster than the earnings of the top 0.1% of wage earners is not because the top 0.1% did not fare well. The very highest earners—those in the top 0.1% of all earners—saw their annual earnings (including realized stock options and vested stock awards) grow fantastically, though far less than the compensation of the CEOs of large firms: Top 0.1% annual earnings grew a healthy 341% from 1978 to 2019, though that was only a third as much as the 1,096% growth of our measure of realized CEO compensation (see data in Table 1).

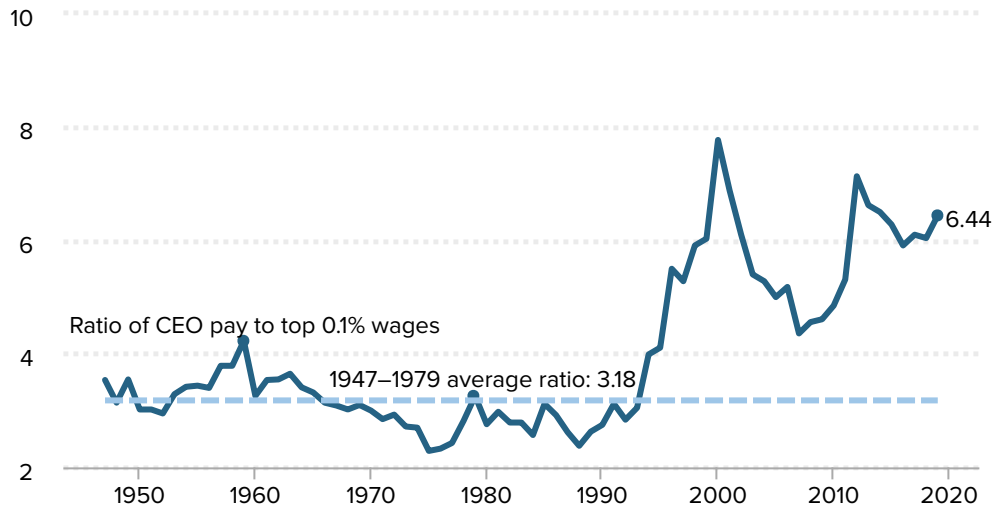
If CEO pay growing far faster than that of other high earners is evidence of the presence of rents, as Kaplan suggests, one would conclude that today's top executives are collecting substantial rents, *meaning that if they were paid less there would be no loss of productivity or output in the economy.*

The large discrepancy between the pay of CEOs and other very-high-wage earners also casts doubt on the claim that CEOs are being paid these extraordinary amounts because

Figure B

CEO compensation relative to top 0.1% earners is much higher than it was in the 1947–1979 period

Ratio of CEO compensation to top 0.1% wages, 1947–2019



Note: Wages of top 0.1% of wage earners reflect W-2 annual earnings, which includes the value of exercised stock options and vested stock awards.

Source: Authors' analysis of EPI State of Working America Data Library data on top 0.1% wages in Mishel and Kandra 2020 and data on CEO compensation from an extrapolation of Kaplan's (2012b) CEO compensation series.

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of their special skills and the market for those skills. It is unlikely that the skills of CEOs of very large firms are so outsized and disconnected from the skills of other high earners that they propel CEOs past most of their cohort in the top one-tenth of 1%. For everyone else, the distribution of skills, as reflected in the overall wage distribution, tends to be much more continuous, so this discontinuity is evidence that factors beyond skills drive the compensation levels of CEOs.

Trends in the growth of returns to education

For comparison purposes, Table 2 also shows the changes in the gross (not regression-adjusted) college-to-high-school wage premium. This premium is simply how much higher the hourly wages of workers with a (four-year) college degree are relative to hourly wages of workers with only a high school diploma. This premium is a useful data point to examine because some commentators, such as Mankiw (2013), assert that the wage and income growth of the top 1% reflects the general rise in the return to skills, as reflected in higher college wage premiums.

Since 1979, and particularly since 1989, the increase in the logged CEO pay premium relative to other high-wage earners far exceeded the rise in the logged college-to-high-school wage premium, which is widely and appropriately considered to have had

substantial growth: The logged college wage premium grew from 0.46 in 1989 to 0.61 in 2019, a far smaller rise than the logged ratio of CEO-to-top-0.1% earnings, a rise from 0.97 to 1.83.

Mankiw's claim that top 1% pay or top executive pay simply corresponds to the rise in the college-to-high-school wage premium is unfounded (Mishel 2013a, 2013b). Moreover, the data we present here would show even faster growth of CEO relative pay if Kaplan's historical CEO compensation series (which we use as the basis for the ratios in Table 2) had been built using the Frydman and Saks (2010) series for the 1980–1994 period rather than the Hall and Liebman (1997) data.¹⁰

The stock market and CEO pay

There is normally a tight relationship between overall stock prices and CEO compensation. Some commentators draw on this regularity to claim that CEOs are being paid for their performance since, in their view, CEOs' goal is to raise stock prices.

However, the stock–CEO compensation relationship does not necessarily imply that CEOs are enjoying high and rising pay because their individual productivity is increasing (e.g., because they head larger firms, have adopted new technology, or for other reasons). CEO compensation often grows strongly when the overall stock market rises and individual firms' stock values rise along with it. This is a marketwide phenomenon, not one based in improved performance of individual firms.

Most CEO pay packages allow pay to rise whenever the firm's stock value rises; that is, they permit CEOs to cash out stock options regardless of whether the rise in the firm's stock value was exceptional relative to comparable firms in the same industry. Similarly, vested stock awards increase in value when the firm's stock price rises in simple correspondence to a marketwide escalation of stock prices. If corporate taxes are reduced and profits rise, leading to higher stock prices, is it accurate to say that CEOs have made their firms perform better?

The connection between CEO pay and overall inequality

Some observers argue that exorbitant CEO compensation is merely a symbolic issue, with no consequences for the vast majority of workers. However, the escalation of CEO compensation, and of executive compensation more generally, has fueled the growth of top 1.0% and top 0.1% incomes, generating widespread inequality.

In their studies of tax returns from 1979 to 2005, Bakija, Cole, and Heim (2010, 2012) establish that the increases in income among the top 1% and top 0.1% of households were disproportionately driven by households headed by someone who was either a nonfinancial-sector "executive" (including managers and supervisors, hereafter referred to as "nonfinance executives") or a financial-sector worker (executive or otherwise). Forty-

four percent of the growth of the top 0.1%'s income share and 36% of the top 1%'s income share accrued to households headed by nonfinance executives; another 23% for each group accrued to households headed by financial-sector workers (some portion of which were executives).

Together, finance workers (including some who are executives) and nonfinance executives accounted for 58% of the expansion of income for the top 1% of households and 67% of the income growth of the top 0.1%. The income growth of executives is the largest factor that led top 0.1% and top 1.0% incomes to greatly increase over the last four decades.

Our data applies to the CEOs of the very largest firms. We presume that these CEOs set the pay standards followed by other executives—of the largest publicly owned firms, of smaller publicly owned firms, of privately owned firms, and of major nonprofit firms (hospitals, universities, charities, etc.). If so, then CEO compensation is the largest driver of top incomes.

Relative to others in the top 1%, households headed by nonfinance executives had roughly average income growth; those headed by someone in the financial sector had above-average income growth; and the remaining top-1% households (nonexecutive, nonfinance) had slower-than-average income growth. These shares may actually understate the role of nonfinance executives and the financial sector, because they do not account for increased spousal income from these sources in those cases where the head of household is *not* an executive or in finance.¹¹

High CEO pay reflects economic rents—concessions CEOs can draw from the economy not by virtue of their contribution to economic output but by virtue of their position of power. Alluding to the fictional town in the radio program *A Prairie Home Companion*, Clifford (2017) describes the Lake Wobegon world of setting CEO compensation that fuels its growth: Every firm wants to believe its CEO is above average and therefore needs to be correspondingly remunerated. But, in fact, CEO compensation could be reduced across the board and the economy would not suffer any loss of output.

Another implication of rising pay for CEOs and other executives is that it reflects income that would otherwise have accrued to others: What these executives earned was not available for broader-based wage growth for other workers. (Bivens and Mishel [2013] explore this issue in depth.) It is useful, in this context, to note that wage growth for the bottom 90% would have been more than 70% faster over the 1979–2019 period had wage inequality not grown.¹² Most of the rise of inequality took the form of redistributing wages from the bottom 90%—whose share of wages fell from 69.8% to 60.9%—to the top 1.0%—whose wage share nearly doubled, rising from 7.3% to 13.2%, with most of the increase accruing to the top 0.1%, whose share of all wages grew from 1.6% to 5.0% (Mishel and Kandra 2020).

Policy recommendations: Reversing the trend

Several policy options could reverse the trend of excessive executive pay and broaden wage growth. Some involve taxes:

- Implementing higher marginal income tax rates at the very top would limit rent-seeking behavior and reduce the incentives for executives to push for such high pay.
- Another option is to set corporate tax rates higher for firms that have higher ratios of CEO-to-worker compensation. Clifford (2017) recommends setting a cap on compensation and taxing companies on any amount over the cap, similar to the way baseball team payrolls are taxed when salaries exceed a cap.

Other policies that could potentially limit executive pay growth are changes in corporate governance, such as greater use of “say on pay,” which allows a firm’s shareholders to vote on top executives’ compensation.

Baker, Bivens, and Schieder (2019) review policies to restrain CEO compensation and explain how tax policy and corporate governance reform can work in tandem: “Tax policy that penalizes corporations for excess CEO-to-worker pay ratios can boost incentives for shareholders to restrain excess pay,” but, “to boost the power of shareholders [to restrain pay], fundamental changes to corporate governance have to be made. One key example of such a fundamental change would be to provide worker representation on corporate boards.”

The CEOs examined in this report head large firms. These large firms, almost by definition, enjoy a degree of market power that some studies suggest has grown in recent decades. It seems that CEOs and other executives may have been prime beneficiaries of these firms’ greater market power. This suggests it could be beneficial to use the tools of antitrust enforcement and regulation to restrain these firms’ market power. This would not only promote economic efficiency and competition, but might help restrain executive pay as well.

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Notes

1. In earlier reports our sample each year was sometimes fewer than 350 firms to the extent that these large firms did not have the same CEO for most of or all of the year or the compensation data were not yet available. In order to not let changes in sample size affect annual trends, we examine the top 350 firms with the largest revenues each year for which there are data.
2. We chose which years to present in the table in part based on data availability. Where possible, we chose cyclical peaks (years of low unemployment).
3. A better comparison would be to the low-unemployment year of 1979, but those data are not available.
4. There are a limited number of firms, which existed only for certain years between 1992 and 1996, for which a North American Industry Classification System (NAICS) value is unassigned. This makes it impossible to identify the pay of the workers in the firm's key industry. These firms are therefore not included in the calculation of the CEO-to-worker compensation ratio.
5. As noted earlier, it may seem counterintuitive that the two ratios for 2000 are different from each other when the average CEO compensation is the same. It is important to understand that (as we describe later in this report) we do not create the ratio from the averages; rather we construct a ratio for each firm and then average the ratios across firms.
6. The managerial power view asserts that CEOs have excessive, noncompetitive influence over the compensation packages they receive. Rent-seeking behavior is the practice of manipulating systems to obtain more than one's fair share of wealth—that is, finding ways to increase one's own gains without actually increasing the productive value one contributes to an organization or to the economy.
7. We thank Steve Kaplan for sharing his CEO compensation series with us (Kaplan 2012b). The series on the income of the top 0.1% of households that Kaplan used is no longer available. Moreover, as we discuss, the appropriate comparison is to other earners, not to households, which could have multiple earners and shifts in the number of earners over time.
8. Temple University professor Steve Balsam provided tabulations from the Capital IQ database of annual wages of executives exceeding the wage thresholds (provided to him based on the Social

Security Administration data used in Mishel and Kandra 2020) that place them in the top 0.1% of wage earners. There were 38,824 executives in publicly held firms in 2007; of those, 9,692 executives were in the top 0.1% of wage earners. These 9,692 executives had average annual earnings of \$4.4 million. Using Mishel et al.'s (2012) estimates of top 0.1% wages, we find that executive wages make up 13.3% of total top 0.1% wages. One can gauge the bias of including executive wages in the denominator by noting that the ratio of executive wages to all top 0.1% wages in 2007 was 2.14 but the ratio of executive wages to nonexecutive wages was 2.32. We do not have data that would permit an assessment of the bias in 1979 or 1989. We also lack information on the number and wages of executives in privately held firms: to the extent that their CEO compensation exceeds that of publicly held firms, their inclusion would indicate an even larger bias. The Internal Revenue Service Statistics of Income (SOI) Bulletin reports that there were nearly 15,000 corporate tax returns in 2007 of firms with assets exceeding \$250 million (IRS 2019). Given that the total number of publicly held firms in the United States was roughly 5,000 in 2007 (Bloomberg 2018), the majority of these 15,000 tax returns had to have come from privately held companies, meaning there is a much larger number of executives of large firms than we are able to capture through data on publicly held firms.

9. A one-point rise in the ratio is the equivalent of the average CEO earning an additional amount equal to that of the average earnings of someone in the top 0.1%.
10. Kaplan (2012b, 14) notes that the Frydman and Saks series grew 289% whereas the Hall and Liebman series grew 209%. He also notes that the Frydman and Saks series grew faster than the series reported by Murphy (2012).
11. The tax data analyzed categorizes a household's income according to the occupation and industry of the head of household. It is possible that a "secondary earner," or spouse, has income earned as an executive or as a financial-sector worker. If the household is in the top 1.0% or top 0.1%, but the head of household is not an executive or in finance, then the spouse's contribution to income growth will not be identified as being connected to executive pay or financial-sector pay. The discussion in this paragraph draws on Bivens and Mishel 2013.
12. This follows from the fact that over 1979–2019 annual earnings for the bottom 90% rose by 26.0%, while the average growth across all earners was 44.6% (Mishel and Kandra 2020). That means that the bottom 90% would have seen their earnings grow 18.6 percentage points more over the 1979–2019 period if they had enjoyed average growth (i.e., no increase in inequality, 44.6 less 26.0).

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