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IN AMERICAN INCOME INEQUALITY

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Misperceptions About the Magnitude and Timing of Changes in American Income Inequality  
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### **ABSTRACT**

The rise in American inequality has been exaggerated both in magnitude and timing. Commentators lament the large gap between the growth rates of real median household income and of private sector productivity. This paper shows that a conceptually consistent measure of this growth gap over 1979 to 2007 is only one-tenth of the conventional measure. Further, the timing of the rise of inequality is often misunderstood. By some measures inequality stopped growing after 2000 and by others inequality has not grown since 1993. This cessation of inequality's secular rise in 2000 is evident from the growth of Census mean vs. median income, and in the income share of the top one percent of the income distribution. The income share of the 91st to 95th percentile has not increased since 1983, and the income ratio of the 90th to 10th percentile has barely increased since 1986. Further, despite a transient decline in labor's income share in 2000-06, by mid-2009 labor's share had returned virtually to the same value as in 1983, 1991, and 2001.

Recent contributions in the inequality literature have raised questions about previous research on skill-biased technical change and the managerial power of CEOs. Directly supporting our theme of prior exaggeration of the rise of inequality is new research showing that price indexes for the poor rise more slowly than for the rich, causing most empirical measures of inequality to overstate the growth of real income of the rich vs. the poor. Further, as much as two-thirds of the post-1980 increase in the college wage premium disappears when allowance is made for the faster rise in the cost of living in cities where the college educated congregate and for the lower quality of housing in those cities. A continuing tendency for life expectancy to increase faster among the rich than among the poor reflects the joint impact of education on both economic and health outcomes, some of which are driven by the behavioral choices of the less educated.

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## 1. Introduction

The evidence is incontrovertible that American income inequality has increased in the United States since the 1970s.<sup>1</sup> This paper shows that the rise in American inequality has been exaggerated in at least three senses. First, the conventional measure showing a large gap between growth of median real household income and of productivity greatly overstates the increase compared to a conceptually consistent alternative gap concept, which increases at only *one-tenth* the rate of the conventional gap between 1979 and 2007.

Second, the increase of inequality is not a steady ongoing process; after widening most rapidly between 1981 and 1993, the growth of inequality reversed itself and became negative during 2000-2007. For instance, a new study that integrates CPS and IRS data and corrects for top-coding using internal Census data, shows that there was no increase of inequality after 1993 in the bottom 99 percent of the population, and the remaining increase of inequality can be entirely explained by the behavior of incomes in the top 1 percent. This paper shows that by several measures, the increase of inequality had already ceased by the early 1990s and by others around 2000, even before the current major recession that has cut incomes at the top more than at the bottom (Leonhardt and Fabrikant, 2009). Because of the very different behavior of the top 1 percent and the bottom 99 percent, this paper treats as two separate topics the causes of

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1. Indeed Ian Dew-Becker and I developed the striking result that over the period 1966-2001 only the top 10 percent of the income distribution had a gain in real income equal to growth in labor productivity (Dew-Becker and Gordon, 2005).

changes of inequality at the very top and among the remaining 99 percent of the population.<sup>2</sup>

Third, an emerging literature documents an exaggeration of the rise of inequality due to the use of common price indexes across income groups. Several important recent articles document that prices paid by the rich have been increasing more rapidly than prices paid by the poor. The implication is that almost all studies that use a single common price index across all income groups overstate growth in real income at the top and understate real income growth at the bottom.

This paper begins in Part 2 by introducing an alternative concept of the gap between median income and productivity; it shows that over the three decades 1979-2007 the alternative gap measure grew at an annual rate barely one-tenth as fast as the conventional gap measure. The comparison between the conventional and alternative gap measures is also carried out for sub-periods of the past three decades with special attention to the sharp contrast in outcomes between the 1995-2000 and 2000-07 sub-periods. We show that the failure of median household income to grow in 2000-07 has little to do with inequality and a lot to do with measurement puzzles involving the slow realized growth of Census real income relative to real GDP.

The paper then turns in Part 3 to issues raised by other quantitative measures of inequality. The decline in labor's income share so evident in national accounts data for 2001-07 has now been almost fully reversed in quarterly data through 2009:Q2. Longer-

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2. Indeed until the two papers by Dew-Becker and Gordon (1995, 1997/98), most of the literature on inequality treated topics related to the bottom 90 percent (unions, minimum wage, immigration, technical change) *or* related to the top 1 percent (CEO pay), but not both in the same paper.

term moving averages show no decline in labor's income share over the last four decades following a marked increase in the previous three decades going back to 1938. We also focus on measures of top pay, including the income share of the top 1 and 0.1 percentiles and the pay premia of top CEOs, and these show no further increase of income shares between 2000 and 2006/07, prior to the 2007-08 stock market collapse that caused sharp declines in the top income shares.

Our examination of the data on income and productivity in Parts 2 and 3 is supplemented in Part 4 by a focused review of selected articles in the literature on inequality that have appeared since the previous surveys by Gordon and Dew-Becker (2007, 2008).<sup>3</sup> Are recent findings consistent with previous hypotheses? Which substantive findings in recent research support our theme that the rise of inequality has been exaggerated? The topics span new interpretations of skill-biased technical change, of executive compensation, of differences among the rich and poor in changes of life expectancy, and particularly of different growth rates of prices paid by the rich and the poor. The paper concludes by speculating on the implications of the current deep recession for the future evolution of income inequality.

## **2. Measuring the Gap between Income and Productivity Growth**

Previous commentators have noted the sharply slower growth of median real household incomes than in productivity. A typical comparison would lament that

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3. See Gordon and Dew-Becker (2007, 2008). The 2007 paper is a version, drastically shortened for publication, of the comprehensive longer 2008 paper. In addition to providing a more complete treatment of each topic in the shorter paper, the longer paper also covers several topics that are absent from the short version, including consumption and geographical inequality.

median real household income as reported by the Census Bureau grew between 1979 and 2007 at a mere 0.49 percent per year, while productivity in the nonfarm private business (NFPB) sector grew four times faster at 1.95 percent per year.<sup>4</sup> The implication is that the entire gap between the 0.49 and 1.95 percent growth rates can be explained by increased skewness in the income distribution.

### **Alternative Concepts of Median Income and Productivity**

However, this “conventional gap” compares apples with oranges, and then oranges with bananas. There are five key conceptual differences between median real household income and private sector productivity that are ignored in the typical comparison: (1) changes in the number of people per household, (2) top coding that causes Census total income to increase more slowly than the equivalent national accounts measure, (3) differences among price deflators, (4) changes in the number of hours worked per person, and (5) slower growth of productivity in the total economy than in the NFPB sector. In contrast to the total difference of 1.46 percentage points over 1979-2007 between the growth rates of NFPB productivity and median real household income implied by the typical apples-oranges-bananas comparison, there is a negligible 0.16 point gap in an apples-to-apples comparison of total economy productivity with median real income per capita deflated by the GDP deflator. The alternative gap is only 11 percent of the conventional gap.

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4. An example of this type of misleading comparison appears in Mishel *et al.* (2009, Figure 1G, p. 58). All data in this section of the text come from Table 1 and are identified below by column and line number; data sources for Table 1 and Figures 1-2 are current through August, 2009. Data sources for the table and figures are listed in the Data Appendix.

Table 1 provides detail on the growth rates of alternative concepts of income and of productivity over the three decades between 1979 and 2007, as shown in column (1), and also over selected subintervals. Columns (2) and (3) split up the full period into two subperiods divided at 1995, while columns (4) and (5) further split the 1995-2007 subperiod at the year 2000. This last distinction is designed to highlight important aspects of the slightly *negative* growth in median Census real income that has occurred since 2000.

Over the full period in column (1) Census median real household income grew at 0.49 percent per year versus 0.93 percent for mean real household income, implying a contribution of distributional skewness of 0.44 points (rows 1 through 3).<sup>5</sup> But this 0.49 median growth rate understates growth in the real income concept that is comparable to productivity growth. We must first switch from median income per household to median income per person, which is accomplished in rows 4 through 6.

Fortunately the Census publishes median and mean income on a per person basis, not just on a per-household basis, where only persons of working age (15+) are included on the assumptions that the income of people aged 0-14 is negligible. The growth of median income per person shown on line 4 was more than twice as fast as median income per household (1.15 percent per year), and mean income per person grew only slightly faster at 1.25 percent per year, for a contribution of distributional skewness of 0.09 percent per year.

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5. The Census concept of income includes all cash income before taxes but excludes in-kind income. Thus employee-financed health and pension benefits are included, while employer-financed benefits are excluded. See DeNavas-Walt (2008), p. 29.

Median and mean income per household and per person are deflated by the Census using the CPI-RS price index, where the "RS" stands for research series and corrects many of the sources of upward bias present in the standard CPI-U price index. The CPI-RS increases over 1979-2007 (line 7) at an annual rate of 3.50 percent, 0.25 points slower than the conventional CPI-U. Even slower growth of 3.27 and 3.15 percent is exhibited by the deflator for Personal Consumption Expenditures (PCE, line 8), and the GDP deflator (line 9). An investigator who took the Census nominal median income per person series and deflated it by the CPI-U would emerge with an annual growth rate over this period of 0.90 percent, whereas deflation by the GDP deflator yields a growth rate of 1.50 percent, two-thirds higher (line 10). To make median real income comparable to productivity growth, we must use the same GDP deflator that is used to create the economywide productivity series shown in line 11. Differences in the growth rates of the various deflators belong in papers on price index bias and differential price growth by spending sector, not in papers about inequality.

The key income concept on line 10, median income per person deflated by the GDP deflator, can now be compared with growth in productivity. Most commentators then point to the rapid growth of productivity in the nonfarm private business sector (NFPB, line 12), which is the standard version of productivity, published every quarter by the Bureau of Labor Statistics. However for comparisons with median income across the entire economy, the correct productivity concept should refer not to a part of the economy but rather to the total economy. Productivity in the total economy (line 11), which is unfortunately not published, consistently grows more slowly than productivity



in the NFPB sector, because the narrower concept excludes the government, households, and institutions where productivity growth is negligible.<sup>6</sup> When the preferred income concept on line 10 of Table 1 is compared with the appropriate productivity concept on line 11, the conceptually consistent gap between income and productivity growth is only 0.16 percent per year (line 14), barely one-tenth of the conventional gap of 1.46 percent (line 13).

One reason that the corrected gap is so small is that *mean* real income per capita grew at 1.60 percent (line 15), almost as fast as total-economy productivity. This 1.60 annual growth rate of Census mean income lagged behind the 1.86 growth rate of National Income and Product Accounts (hereafter NIPA) real GDP per person, a gap of 0.26 percentage points. While one might surmise that this reflects top coding that excludes the highest incomes, it can be almost completely explained by a reduction in the share of employee compensation in Gross Domestic Income (lines 19 through 21). The big surprises in the first column of Table 1 for the 1979-2007 period are not only that the alternative income-productivity gap of 0.16 points is so small compared to the conventional gap of 1.46 points, but also that the contribution of skewness to the difference between mean and median income growth in lines 4 through 6 is so small.

### **Income and Productivity Growth across Sub-periods**

The same conclusion that the conventional gap measure greatly exaggerates the alternative gap concept holds also for the 1979-95 and 1995-2007 subperiods in columns

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6. Output in the nonfarm private business sector in 2007 was 75.8 percent of GDP (NIPA Table 1.3.5).

(2) and (3) of Table 1. In fact the alternative gap measure is *negative*, i.e., median income per person grew *faster* than total economy productivity, in the initial 1979-1995 interval. Note that the contribution of distributional skewness as measured by the mean-to-median growth gap for income per person was 0.21 points during 1979-95, much less than is generally assumed. As shown below in Figure 3, inequality grew fastest during 1981 and 1986, with continued inequality growth through the mid-1990s.

The 1995-2007 subinterval is notable (column 3, line 6) in that mean income per person actually grew *more slowly* than median income per person. The alternative incomeo-productivity growth gap was 27 percent, somewhat higher than the 11 percent of the full period 1979-2007 and the negative -8 percent of 1979-95. Another difference is that the growth rate shortfall of Census mean income per person compared to real GDP per person is only partly explained by changes in the income share of employee compensation during 1995-2007 (column 3, lines 16-21), whereas it is overexplained during the first subinterval 1979-1995.

The most startling aspect of the 1995-2007 subinterval is the sharp difference between the first and second periods, 1995-2000 compared with 2000-2007, as shown in columns (4) and (5) of Table 1. The break at the year 2000 shows how little the income-productivity gap has to do with inequality. Median income performed exceptionally well during 1995-2000, with a large *negative* alternative gap between income and productivity growth, despite an increase of inequality (line 3) roughly similar as during 1981-95. Then after 2000 median income performed abysmally with an alternative gap of 1.62 percent, despite the fact that inequality actually *decreased*, with a

small decline in mean income per person relative to modest growth in median income per person (columns 4 and 5, lines 4 through 6).

The exceptionally large conventional and alternative gaps, together with the decline of inequality, raises puzzling questions about the 2000-07 period in column (5). The problem is that a lot of income seems to be missing. Census mean income per person with the GDP deflator did not grow at all during 2000-07 (line 16), whereas real GDP per person grew at 1.39 percent per year. Only 30 percent per year of this income growth shortfall can be explained by slower growth in employee compensation than in Gross Domestic Income. But this leaves a growth rate of -0.96 percent per year as an unexplained shortfall of income, or 7 percent when cumulated over the seven-year period 2000-07. Further research is needed into the sources of this missing income. We return to this puzzle below in the section on caveats and qualifications in relation to the top-coding problem in Census mean income growth rate measures.

Overall this exploration reinforces our initial theme, how little the gap between median real household income and business-sector productivity has to do with growth of inequality. Between 1979 and 1995 inequality as measured by the gap between mean and median income growth *per household* grew at 0.65 percent per year, even though the alternative income-productivity growth gap was slightly *negative*. Between 1995 and 2000 inequality grew rapidly but the alternative growth gap was strongly *negative*. Then the period of the largest alternative growth gap in 2000-07 witnessed a *decline of inequality*. How could the growth gap be near zero when inequality was rising before 2000? This occurred because by coincidence hours per person grew, allowing income

per person to grow faster than productivity, and this benefit of rising hours per person was offset by an increase of inequality that was in part related. To the extent that higher hours per person reflected higher labor force participation of women and teenagers prior to 1995, the labor-force entry of these inexperienced workers helped to hold down growth in median relative to mean income.

### **Caveats and Qualifications**

At least one issue has been suggested as a possible qualification to the interpretation provided above as based on Table 1.<sup>7</sup> Top coding in the Current Population Survey (CPS) data used by the Census Bureau to calculate median and mean incomes may understate the growth in mean incomes. Top coding means, for example, that all incomes above the 90<sup>th</sup> percentile are lumped together into one category such as “above \$100,000”, and growth in incomes in the 99<sup>th</sup> percentile as compared to the 90<sup>th</sup> percentile is ignored. An extensive set of studies has been produced by Burkhauser and co-authors (2008, 2009a, 2009b) who were given access to the internal Census data and thus could compute distributions based on the full range of incomes, including those above the top income limit (e.g., \$100,000 in the above example).

They show (2009a, Table 2 and Figure 6) that top-coding makes little difference in conclusions based on either 90-10 income ratios or on calculations of the Gini coefficient. They regard the Gini coefficient which is based on the complete distribution as superior to the 90-10 ratio which is based on two points in the distribution, and they add to the evidence reviewed in this paper showing that most of the increase of

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7. I am grateful to Rebecca Blank for raising the issue of top-coding.

inequality had occurred by 1993, with little further increase after that year. Their Gini coefficients (with a base of 1975 = 1.0) based both on public-use and internal CPS data show that the Gini coefficient rose from 1.0 in 1975 to 1.16 in 1993, and then little further to 1.19 in 2004. Burkhauser *et al.* (2008) conclude that, “at least for the poorest 99 percent of the income distribution,” the increase in inequality since 1993 has been significantly slower in the U. S. than in the previous two decades.

Burkhauser *et al.* (2009b) makes this finding more precise, finding that all of the increase of inequality after 1993 occurred in the top 1 percent group, and there was no increase of inequality in the bottom 99 percent of the population. Their new results are notable because they are able to reconcile findings from the CPS and IRS data by using internal Census data that is not top-coded to disguise differences of income among the top groups of earners.

Table 1 presents some indirect evidence on the role of top coding in the official published CPS data. The shortfall of growth in Census mean income per person as compared to real GDP per person for 1979-2007 (column 1, line 19) suggests a role for top coding, but virtually the entire shortfall can be explained by a slippage in labor’s income share from its high levels reached in the 1970s (see Figures 1 and 2 as discussed below). The conclusion of Burkhauser and co-authors that inequality has not increased further after 1993 is supported by line 6 of Table 1, which shows that there was no net increase in the growth rate of mean vs. median real income per person from 1995 to 2007 (the increase in 1995-2000 was more than offset by a decrease during 2000-07).

### 3. The Recent Behavior of Income Shares: Labor, Bottom, and Top

#### The Decline and Rebound of Labor's Income Share

The rise of American inequality is not about the income shares of labor versus capital, but recent commentary has pointed to the decline in labor's share since the year 2000 as one more symptom, along with stagnant median household income, of rising inequality. Is this an accurate implication? Figure 1 plots labor's share from the NIPA.<sup>8</sup> Labor's share has been remarkably stable over the past 50 years, in that the share of 73.7 percent in 2009 was almost identical to that in 1959 of 73.3 percent. Even if labor's share were observed to increase, this would not indicate that inequality has declined, because such an increase could reflect simultaneously a sharp increase of the labor income of the highest-paid workers together with a decline in the real income of the median worker.

The dynamics of labor's share reflect the cyclical timing of productivity growth rather than any fundamental tug-of-war between labor and capital; labor's share declines and the profit share increases during the early part of the recovery when productivity growth, which spills into profits, is most rapid (see Gordon, 2003). Thus the decline in labor's share in 2001-06 in large part reflects the rapid productivity growth of that interval, and the labor's share turnaround after mid-2006 is a normal response to the slowdown in productivity growth that occurred roughly at the same time.

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8. The numerator of labor's share is nominal employee compensation plus 40 percent of proprietor's income. The denominator is domestic net factor income (i.e., gross domestic income minus business taxes and depreciation). Data for both numerator and denominator are taken from NIPA Table 1.10, current through 2009:Q2 as of August 27, 2009. The data plotted for 2009 is the average of the first two quarters.

As a crude method to eliminate the cyclical fluctuations of labor's share, Figure 2 displays 10-year moving averages of the two series from Figure 1. Thus the first observation plotted in Figure 2 is the average for 1929-38, and the final observation is the average for 2000-09. This provides a more interesting history. Labor's share started relatively low in the 1950s and early 1960s and then increased sharply between 1965 and 1975. The increase during the late 1960s can be plausibly explained by some combination of tight labor markets and union power. The continued high level of labor's share in the 1970s and the subsequent decline after 1985 can be explained by the systematic inverse correlation of labor's share with an acceleration or deceleration of trend productivity growth (see Dew-Becker and Gordon, 2005, p. 96). Slowing trend productivity growth between 1965 and 1980 boosted labor's share and rising trend productivity growth after 1985 reduced labor's share. In Figure 2 the average share over the final ten years 2000-2009 (74.0 percent) is higher than 50 years earlier (1950-59 at 73.0) and indeed higher than any ten-year period ending prior to 1971.

### **Inequality in the Bottom 90 Percent: Previous Explanations and Recent Data**

Previous research has tended to focus either on the bottom 90 percent or the top 10 percent but not both together, due to data limitations. The Current Population Survey (CPS) data, typically used to examine the evolution of incomes in the bottom 90 percent, is top-coded and provides little information on what is happening within the top 10 percent. Similarly most studies of top incomes are based on tax data that provide little insight on incomes below the median where many households do not file tax returns at all. Our 2005 paper was one of the first to use tax data uniformly across the

income distribution and showed a monotonic increase in the 1966-2001 growth rate of real income across the percentiles, from 0.48 percent per year at the 20<sup>th</sup> percentile to 5.63 percent per year at the 99.99<sup>th</sup> percentile.

Because of its greater coverage of the bottom half of the income distribution, CPS data are suitable for evaluating hypotheses regarding the evolution of the income distribution in the bottom 90 percent. While the 90-50 ratio for both men and women increased slowly and steadily from 1979 to 2005, the 50-10 ratio showed a sharp jump in 1979-86 that was twice as large for women as for men. To save space in this paper these ratios are displayed in Figure 3 only for both sexes combined.

The steady rise of the 90-50 log percent ratio (expressed as an index with 1979 = 0), from zero in 1979 to 14.6 percent in 2007, seems consistent with the hypothesis of skill-biased technical change (SBTC). However, the SBTC hypothesis has been criticized by Mishel *et al.* (2008), based on data from Goldin and Katz (2008), because the growth in the demand for college graduates was relatively steady in 1950-90 and declined in 1990-2005. Indeed, the increase in the 90-50 log percent ratio was not continuous but mainly concentrated in the period prior to 1995. The log percent ratio increased from 0 in 1979 to 12.2 in 1995, and then little further to 14.6 percent in 2007, supporting the Mishel *et al.* qualification.

Returning to the 90-10 ratio for both sexes plotted in Figure 3, the sharp rise between 1981 and 1987 was followed by a stable plateau, with the 2003 90-10 log percent ratio of 23.2 percent roughly equal to the 22.8 percent of 1987. However, the middle years of the current decade have witnessed a further increase in the 90-10 log percent



ratio to new high values of 27.7 percent in 2006 and 27.1 percent in 2007. This appears mainly to be related to a reversal in the 50-10 ratio, with a decline during 1987-2002 decline followed by a substantial increase from 7.2 to 12.5 percent between 2002 and 2007.

David Autor and co-authors (2006, 2008) have at least in part rescued the SBTC hypothesis from timing inconsistencies. Their key distinction is between interactive work at the top, whether lawyers in courtrooms or investment bankers making deals in person, and interactive work at the bottom, whether nursing home attendants, waiters, or bartenders. These jobs at the top and bottom cannot be outsourced. But jobs can be outsourced in the broad middle where people do routine, easily duplicated jobs such as airline reservations agents or, at a higher education level, radiologists reading electronic test results. This is consistent with the interpretation that Figure 3 shows mainly weakness in the middle relative to the top and bottom, in the sense that the 90-50 ratio rises throughout while the 50-10 ratio declines by half between 1987 and 2002 before partly recovering through 2007.

While the 1987-2002 decline in the relative income at the 50<sup>th</sup> percentile seems roughly consistent with the Autor *et al.* (2008) hypothesis of outsourcing in the middle tier of occupations, the post-2002 turnaround so far has not been explained. Indeed it is too soon for such an interpretation which may depend on how the 50-10 ratio emerges from the current severe 2007-09 recession.

### **Inequality Above the 90<sup>th</sup> Percentile: Previous Explanations and Recent Data**

SBTC is a major explanation of increased skewness of labor incomes at the top, where we distinguish three different types of top incomes. The first two groups include entertainment/sports superstars and top professionals (investment bankers, lawyers, management consultants, surgeons, textbook authors); in both groups incomes are driven by the market. The most contentious questions about top-bracket pay regards the third category, that is, the sources of the enormous increases in the ratio of top executive compensation to that of average workers, both over time and between the United States and other developed nations. While superstars and top professionals have their incomes chosen by the market, CEO compensation is chosen by their peers, a system that gives CEOs and their hand-picked boards of directors, rather than the market, control over top incomes.

This idea that the principal-agent control of stockholders has been reversed through managerial power helps to explain some of the outsized gains in CEO pay. However, the close correlation between stock market outcomes and CEO pay suggests that stock options created an automatic spillover from the stock market gains of the 1990s and mid-2000's into executive pay.

Our presentation of the data begins with updated graphs from Piketty-Saez (2003) on the evolution of top incomes over most of the twentieth century. Their work exploits the oversampling of high incomes in the IRS micro data files and tells a fascinating story of the U-shaped evolution of top incomes. Figure 4 plots the latest Piketty-Saez shares of wage income (including bonuses and stock option income but

excluding capital gains) extending from 1927 to 2006. The time series for the top 1 percent has become familiar, with its U-shaped trajectory that declines during World War II, maintains a plateau until the late 1970s, and then rises in 1980-2000 to over 12 percent, well above the 1927-40 average of 8.5 percent.

Less familiar in Figure 4 are the shares for the other percentiles that make up the top tenth of the income distribution, that is, percentiles 91-95 and 96-99. Perhaps the most surprising aspect of Figure 4 is that the share of the 91-95 group did not increase at all between 1983 and 2006, with an identical share of 10.6 percent in both years. In contrast the 96-99 group enjoyed a steady increase from 10.5 percent in 1967 to 13.1 percent in 2006. The time path for the 96-99 group appears to be roughly a weighted average of the 91-95 and 99+ groups. This result that income shares increased monotonically from the lowest to highest groups echoes the findings for 1966-2001 of Dew-Becker and Gordon (2005, Table 8).

An important development in the first half of this decade is the U-shaped pattern of the top-1 percent share, indicating a response to the decline in stock prices of 2000-02 and the post-2002 recovery. This continues the influence of soaring stock market prices between 1982 and 2000, when the annual average of the S&P 500 index rose from 120 to 1420. The 2000-02 decline in the top-1 percent share is only faintly echoed in the 96-99 share and is not visible at all in the 91-95 share. Not only do stock options provide a channel by which the stock market influences top incomes, but also stock options became much more important as a source of executive compensation in the 1990s

(increasing from roughly 40 to 70 percent of executive compensation between 1990 and 2000).

Figure 4 includes labor income only, including bonuses and stock option income but excludes income from business proprietorships, capital income, and capital gains. The impact of excluding the non-labor sources of income is shown in Figure 5 for the top 0.1 percent, in contrast to the top 1 percent share plotted in Figure 4. Whereas the top 1 percent wage income share more than doubled from 5.3 percent in 1966 to 12.3 percent in 2000, the top 0.1 percent wage income share rose by a factor of more than six from 0.6 percent in 1966 to 4.1 percent in 2000. This implies that the top tenth of one percent earned only 11 percent of the income of the top one percent in 1966 (this seems implausibly low) but fully one-third in 2000.

Piketty-Saez (2003) use their version of Figure 5 to emphasize how the source of income in the top 0.1 percent shifted from capital income in the 1920s to labor income after 1990. Indeed, we have already seen in Figure 1 that labor's income share for the total population was substantially lower in 1929 than in any postwar year and fully eight points below that in 2009.

In the final year of 2005 in Figure 5 the total share of 8.8 percent was divided up into 1.8 percent for capital gains, 1.4 percent for capital income, 2.6 for business income, and 3.0 percent for labor income. The U-shaped pattern during 2000-05 is exhibited not just by labor income (due to stock options) but also by capital gains. Business proprietor income increased steadily during this interval without exhibiting a single year of a declining share. An apparent puzzle is that capital gains income was positive during

2001 and 2002 when stock prices were declining; this must reflect the gains on shares sold during these years but bought before 1998 when stock prices were much lower.

In Figure 6 we turn from top-share pay to the pay of CEOs, who make up a sizeable proportion of top incomes.<sup>9</sup> The solid black line plots the ratio of average pay of the top 100 CEOs to average worker pay, and this exhibits an even more pronounced U-shape response to the stock market than do the top wage income shares of Figures 4 and 5; this top-100 ratio increased by a factor of five between 1990 and 2000 and then dropped by more than half between 2000 and 2002-03. The lower grey line displays the same ratio for the CEO whose income is ranked 100. This ratio is substantially lower, increased by 3.4 times from 1990 to 2000, and fell by somewhat less than half between 2000 and 2002-03. The relations between the lines plotted in Figures 4, 5, and 6 suggests that corporate CEOs, with their incomes dependent on stock options that fluctuate with the stock market, may make up as much as half of top incomes (including top officers of both “Main Street” and “Wall Street” firms in the language of Kaplan-Rauh, 2007).

The clear correlation of top income shares and the stock market, with a V-shaped pattern between 2000 and 2006, suggests that in 2007-09 the top income shares may have decline at least as much as in 2000-02. The peak value of the S&P 500 stock market index was 1525 in 2000, fell to a low of XXX in October, 2002, returned to a slightly higher index value than in the year 2000 to its all-time high of 1568 in October, 2007, and fell to a local minimum of 670 in March, 2009. Given that the decline from 2007 to 2009 was

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9. Kaplan-Rauh (2007) and Gordon and Dew-Becker (2008) debate the relative importance of CEO pay in the pay of all top income earners including superstars and high-paid lawyers and investment bankers.

even steeper than in 2000-02, it is a reasonable assumption that top income shares may have fallen by as much or more as in 2000-02/03.

### **International Differences**

Some of the most interesting remaining issues in the area of increased inequality involve cross-country differences. The post-1970 upsurge in American inequality, particularly in top incomes, is much greater than in continental Europe or Japan, with the U. K. and Canada somewhere in between. Figure 7 provides the latest available figures for the income share of the top 0.1 percent in the U. S., U. K., and France. The data are similar to those displayed above in Figure 5 and include all sources of income except for capital gains. Compared to the sharp 1980-2006 ratio for the U. S., the stability of the French ratio all the way back to 1945 is quite remarkable. The U. K. share was roughly equal to the U. S. and France shares between 1953 and 1970, then fell below France until a recovery began around 1980 that boosted the share through 2000 by about half the increase observed in the U. S.

We have proposed a mix of institutional and market-driven explanations to explain the divergence in Figure 7. An important institutional difference is the earlier and more pervasive introduction of stock options in the U. S. and prohibitions on the use of stock options until relatively recently in some countries, e.g., Japan. In Germany and Scandinavia a tradition of corporatism and cooperative bargaining constrains management compensation excess. Other institutional factors include the larger role of unions and a higher real minimum wage in some European countries. But the market matters also; gains in profits and price-earnings ratios in the U. S. stock market in the

1990s and again in 2003-07 spilled over to executive compensation, interacting with the large increase in the share of executive compensation taking the form of stock options.

#### **4. New Research Insights Related to the Inequality Debates**

We now turn to a brief review of some of the recent research literature that is related to the explanation of rising American inequality. To what extent do recent contributions reinforce the theme of this paper that the growth of inequality has been exaggerated and has largely ceased? This section is divided into research that is relevant to the bottom 90 percent, relevant to top incomes, and relevant to other topics including health and geographical inequality.

##### **The Bottom 90 Percent**

An interesting feature of the data discussed above is that the 90-10 ratio from the CPS data displayed in Figure 3 exhibits almost all of its increase between 1980 and 1993, whereas the Piketty-Saez data on the top income classes displayed in Figures 4 and 5 continues to increase from 1993 to 2000 and then exhibits a U-shaped pattern after 2000 that is not evident at all in the CPS data. In Figure 4 above based on Piketty-Saez data, we noticed that there is no increase at all in the 91-95 percentile share after 1987, and the 96-99 share exhibits most of its increase between 1970 and 1989. Overall, the time path of the top one percent is unique and justifies the methodology in this and our past papers of treating the sources of rising inequality in the bottom 90 percent (or perhaps better stated as the bottom 99 percent) and the top one percent as separate topics with separate explanations.

Autor and Dorn (2008) have produced new research that supports the earlier polarization hypothesis of Autor, Katz, and Kearney (2006, 2008). As we have seen, the polarization hypothesis creates at least three segments in the labor force, with skilled interaction in the top group, unskilled interaction in the bottom group, and a middle group doing routine repetitive work that can be replaced by computers and/or outsourced. In their new paper, Autor-Dorn focus on the apparent paradox that in a world of widening earnings inequality between high and low-skilled workers, both employment and relative wages have grown in manual service jobs. In their view the computerization of routine white-collar jobs has pushed relatively unskilled workers into routine but interactive manual jobs, and this occurs to a greater extent in geographical areas which initially had a larger share of employment in routine repetitive occupations.

### **The Top One Percent**

We have seen that the timing and interpretation of increases in top incomes at the top 1.0 and 0.1 percent levels is very different than that in the bottom 99 percent. Much of the within-group increase in inequality in the bottom 99 percent occurred before 1993, whereas between 1993 and 2000 there continued to be an increase in the income share of the top one percent, and a continuing shift toward the top 0.1 and 0.01 percent groups within the top one percent segment. We have previously suggested that the timing of the increased shares in the top groups appears consistent with an important role for stock options as a major source of CEO pay and the gyrations of its share in response to stock market price fluctuations. Between 1989 and 2007, the share



of total CEO compensation taking the form of stock option gains and other compensation beyond salary and bonus pay has jumped from 34 to 74 percent (Jarque, Figure 1, p. 269).

In turn the increased role of stock options in executive compensation has been traced by Jarque (2009) to changes in tax regulations that took place in 1993, an ironic finding given the current demands in the popular press for government regulation of CEO pay. The 1993 regulation was a limitation on the tax deductability for any compensation above \$1 million taking the form of standard salary and bonus pay but not for equity-based compensation. Empirical studies cited by Jarque have found that this regulatory change was a direct cause of a shift of CEO compensation away from salary and toward stocks and options. Tax advantages for pay in the form of stock options antedates the 1993 regulations and goes back to the tax reform legislation of 1986. Hall and Liebman (2000) show that the tax advantage of options reached a maximum of 7 percentage points in 1988-90. Not only are capital gains tax rates lower than top-bracket personal income tax rates, but also there are no capital gains tax charges on the increase in value of a stock from the grant date to the exercise date. If the executive holds the stock after the date of exercise and there are capital gains, tax is charged only on gains from the exercise date to the date of sale, not from the original grant date.

Recently Frydman and Saks (2008) have extended their previous research on executive compensation that extends back to the 1930s. They call attention to the sharp change in behavior before and after the mid-1970s. In the three previous decades the

median real value of compensation was surprisingly flat and seemed unresponsive both to macroeconomic fluctuations and growth of individual firms. Then in the three subsequent decades median real compensation has increased sharply as is evident in Figures 4, 5, and 6 above. Among the results based on their micro evidence is, while the cross-sectional relationship between executive pay and firm size has remained stable over the last 70 years, there has been a sharp increase in the correlation between the level of pay and the average market value of firms in the past 30 years to roughly 1.0 (the Gabaix-Landier 2008 result) from a previous 0.1 to 0.3 before 1980. This increased elasticity can be traced directly to the 1986 and 1993 changes in tax law and tax regulation that created a sharp increase in the share of CEO compensation taking the form of stock options, creating a more direct link than previously between CEO pay and market capitalization.

Frydman-Saks apply their results to several theories of executive pay. The small response of executive pay to the economy and to firm size before the 1970s is inconsistent with “theories of managerial rent-seeking, a competitive labor market for executives, and increases in managerial incentives.” Their explanation for the post-1970s shift include changes in social norms, which we have previously invoked to explain part of the differing evolution of inequality at the top in the U. S. as compared with some foreign countries. For instance, the presence of strong unions in Germany and other corporatist nations appears to have limited CEO pay through a form of moral suasion, and the same may have been true in the U. S. before the 1970s when unions were strong.

The closer alignment of CEO pay to stock market performance reviewed here is placed in a broader context of performance pay by Lemieux *et al.* (2009). These authors document using micro data that performance-based pay (bonus p[ay, commissions, and piece-rate contracts) are more closely aligned with observed and unobserved productivity characteristics of individual workers than non-performance types of pay. They argue that SBTC creates an incentive of performance-based pay which then becomes a conduit in the chain of causation between SBTC and inequality. They conclude that this is an important source of rising inequality above the 80<sup>th</sup> percentile level of income over the past three decades. Their findings put the CEO pay controversy into context as part of the movement toward performance-based pay, of which CEO stock options are one particular form that stands out sharply in the data on top-bracket incomes as in Figures 4 and 5 above.

Philippon and Reshef provide an even longer historical perspective than Frydman and Saks, studying the period 1909-2006 not for CEO pay but rather for the separately interesting issue of pay in the financial services industry. Their unique new data set documents a U-shaped pattern of skill intensity and job complexity in the financial sector relative to the nonfarm private sector, which has almost the same timing pattern as the U-shaped Piketty-Saez (2003) pattern of top-bracket pay reviewed above in Figures 4 and 7. They attribute the rise in skills in the financial sector since the late 1970s to the financial deregulation that occurred at that time and introduced more complex financial products such as initial public offerings and a more sophisticated set of tools for evaluation of credit risk. However, controlling for skills, education, the risk

of job loss, and numerous other variables, the authors find a substantial earnings premium in the finance industry. “We find that rents account for 30 percent to 50 percent of the wage differentials observed since the late 1990s. In that sense, financiers are overpaid.” However, these authors do not explore the stock option or market capitalization channel that could explain some of these apparent rents as they also explain a large part of CEO pay. They need to assess their conclusions in the context of the Kaplan-Rauh argument that top-bracket pay on “Wall Street vs. Main Street” is part of the same phenomenon.

### **Price Indexes and Geographic Inequality**

An important part of the case that the rise of inequality has been exaggerated rests on recent research regarding price indexes, both comparisons of inflation for the rich vs. poor and also aspects of differential price index movements across geographical regions. Broda and Romalis document both the inflation differential in favor of the poor and secondarily attempt to calculate the role of Chinese exports in contributing to the differential. Here we are not concerned with China but rather with their basic finding about the inflation differential, which results from three factors, (a) a higher consumption share of non-durables consumed by the poor than the rich in conjunction with slower overall inflation rates of non-durables than of non-housing services, and (b) based on bar-code scanner data for individual items, the prices of the particular set of non-durables consumed by the poor has increased slower than the set consumed by the rich. Their headline result is that over the period 1994-2005 the inflation rate for non-durables consumed by the poor increased at an annual rate of 1.9 percent as compared

to 2.6 percent for the rich. By their measure this inflation differential completely offsets their measure of the increase in rich-poor inequality over the same period.

Unfortunately their data and results do not extend before 1994 into the period of the 1980s when so much of the increase in the 90-10 ratio occurred, but it is plausible that the differential they find extends well before 1994. However, their finding that there was no further increase of inequality in the inflation-adjusted 90-10 ratio after 1994 provides strong support for the basic argument of this paper is that inequality stopped increasing 15 or more years ago except in the very top income brackets. Further, the Broda-Romalis methods do not take explicit account of the stunning Hausman-Leibtag (2005) result showing that the arrival of a new Wal-Mart store reduces food prices by 25 percent. While there is no firm evidence on the income distribution of Wal-Mart shoppers, it is reasonable to assume that poor households take more advantage of low Wal-Mart prices than rich households, except perhaps in inner-city areas in some places like Chicago and New York that Wal-Mart has not yet been allowed to enter due to political opposition of local labor unions.

A stunning new data set undermines our previous conclusion (2008) that real income per capita has increased significantly in superstar bi-coastal metropolitan areas. Very recently the Bureau of Economic Analysis has released data on price level differences across states, and this is the first time that a systematic set of *level* differences has been published (as contrasted to long-available measures of differences in CPI *growth rates* across cities). Without adjustment for price level differences, per-capita incomes in Massachusetts and New York are respectively 26.1 percent and 20.0

percent above the national average. With correction for regional price disparities, these percentages drop to 10.7 and -0.2 percent respectively.

In an important and related piece of research, Moretti (2008) notes that college graduates disproportionately cluster in metropolitan areas that have a high cost of housing. He finds that *fully two-thirds* of the previously documented increase in the return to college between 1980 and 2000 vanishes when he corrects for differences in the cost of living across metropolitan areas. His cross-area price measures are comprehensive and ingenious and take account of differences in housing costs, housing quality (i.e., smaller apartment sizes in New York than St. Louis), and price differences of non-housing goods and services (pizza and haircuts are more expensive in New York).<sup>10</sup>

Moretti then asks why college graduates sort into expensive cities. He carries out an empirical analysis that distinguishes between supply and demand factors and concludes that college graduates move to expensive cities because jobs for college graduates are increasingly located in those cities, not because they particularly like living in those cities. His results are tempered by the likelihood that the agglomeration of college graduates, even though initially driven by demand rather than a shift of supply, carries with it a set of externalities such as the opening of new restaurants and shops that cater to people with college-educated tastes. Further, the amenities of cities with high shares of college graduates are not just created by the newly arriving

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10. The rental cost of an apartment with a given number of bedrooms and bathrooms is obtained from survey evidence, as are the quality attributes of these apartments. Non-housing costs are estimated from a regression of non-housing costs on housing costs for a small number of metro areas that have CPI indexes on the level of the cost of living.

graduates, but were already present throughout history as a lure to highly educated people. Cities like Chicago, New York, and San Francisco have had top-ranked symphony orchestras, opera companies, and jazz clubs going back decades, even a century.

A methodological critique is that Moretti's methodology falls prey to Laspeyres index number bias by neglecting substitution between goods. College graduates earn higher salaries and react to high apartment prices by substituting away from square feet of living space toward culture, good restaurants, and organized activities with their peers. As a result, the Moretti analysis inevitably overstates the extent to which the increase in the college wage premium is offset by cost of living differences among cities. His estimate is a two-thirds offset, but substitution could easily reduce this to one-third.

However, strengthening his basic result is the fact that the Federal tax system is based on nominal income and thus penalizes those who move to high-priced locations. Further several of the popular bicoastal states (New York, Massachusetts, and California) have relatively high progressive state income tax rates. Another factor strengthening Moretti's result is that when college-educated couples marry and have children, they tend to move to the suburbs and face long commutes to their highly-paid jobs. This disamenity tends to cancel out many of the urban amenities they enjoy when younger and childless. Qualifications to these arguments include the tax deductibility of mortgage interest, which benefits high income families, and the top-bracket tax cuts achieved by Presidents Reagan and Bush II.

### Health Outcomes and Inequality

One of the most surprising discoveries of our previous search through the inequality literature was the quantitative importance of differences in health outcomes by education and income group. An important research result of Singh and Siahpush (2006) revealed that life expectancy in the “least deprived” top-decile group increased between 1980 and 2000 by 3.4 years, fully double the 1.7 year increase in life expectancy of the “most deprived” bottom-decile group.

Meara, Richards, and Cutler (2008) go further and show that over the same 1980-2000 period life expectancy at age 25 grew by 1.6 years for high-education people and 0.5 years, less than one-third as much, for low-education people. They attribute a substantial part of their findings to differential trends in smoking use among high- and low-educated groups, with much greater declines in tobacco use among the highly educated. A second factor that differentiates the high and low education groups is a growing tendency toward obesity among the low-education groups.

A more comprehensive study that pulls together much of the previous evidence has been released recently by Cutler *et al.* (2008). There is no implication in this research that increased income inequality causes the disparity of health outcomes, but rather that differences in educational attainment have separate impacts on relative incomes and relative life expectancy that go in the same direction. The major influence of socioeconomic (SES) status on health occurs in childhood, and “once childhood health is set, the effect of economic resources on health diminishes” (p. 35).



As in the two studies summarized above, education is a powerful determinant of health but mainly because of its effect on behaviors like smoking and obesity rather than its association with access to medical care. An important direction of causation works in the opposite direction from health to socioeconomic status. “Unhealthy adults earn less, spend less time in the labor force, and retire earlier” (p. 36). Overall, to the extent that income inequality rises relative to educational attainment, there is no implication for health outcomes. Reversing the rise of inequality and reducing the incomes of the rich would not cause the less educated groups to smoke less and weigh less.

## **5.. Conclusions**

### **Quantitative Evidence**

The rise of American inequality has been exaggerated in magnitude, and its impact is now largely in the past. Standard commentary laments the slow growth of median real household income and concludes that over the past three decades (1979-2007) the gap between growth of income and productivity has been 1.46 percent per year. But this “conventional” gap measure is riddled with measurement and conceptual inconsistencies. Our “alternative” gap measure grows at only 0.16 percent over the same period, only one-tenth as rapidly as the conventional gap, and it does not grow at all during the 1979-1995 period when inequality was growing fastest. In fact, we show that income-productivity gaps have virtually nothing to do with inequality. The alternative growth gap is zero when inequality grew fastest before 1995, became

negative when inequality grew further during 1995-2000, and was strongly positive in 2000-07 when inequality *decreased*.

Previous writers have lamented the absence of any growth in median household income after 2000. Indeed our preferred measure of median income per person deflated with the GDP deflator rises at only 0.46 percent per year after 2000 and lags far behind the robust growth of productivity during this period. But this is not a byproduct of rising inequality, because mean income actually grew *slower* than median income after 2000. What happened is that Census measures of real income grew much more slowly than real GDP after 2000, even though they track real GDP quite closely before 2000. Why this happened is a measurement puzzle that needs to be investigated further. If the measurement shortfall of Census income relative to GDP was due to top coding in the Census data, then the shortfall should have occurred equally before and after the year 2000.

Not only has the increase of inequality been exaggerated, but it has ceased. The excess growth of mean relative to median income reversed itself after 2000. The income shares of the top one percent and of CEOs, which had exploded before 2000, went down and back up with stock market gyrations between 2000 and 2006 but did not rise on balance. The decline in the U. S. stock market since mid-2007 is now more severe than in 2000-02 and has doubtless already reduced the income share of the top one percent and of CEOs by more than occurred then. To the extent that shifting social norms fostered the rise in top incomes in the past three decades, as argued by Frydman and Saks (2008), the attack on executive bonuses and perks by the Obama Administration may lead to a

decline in top income shares even more than would be expected in light of the stock market decline.

Other measures suggest that the rise of inequality ceased well before the year 2000. Our examination of labor's income share shows virtually no change over the past two decades once an allowance is made for the business cycle. Labor's share in the first half of 2009 was virtually the same as in 1983, 1991, and 2001. The 50-10 ratio in CPS data is lower now than in 1986, while the 90-50 ratio has barely budged from a plateau reached in 1993. The income share of the 90-95 percentile group has been stable since 1988.

### **Recent Research Results**

The paper provides a mini-survey of very recent papers that have emerged since our major survey (Gordon and Dew-Becker, 2008); these either question long-standing hypotheses in the inequality literature, support our theme that the rise of inequality had been exaggerated, or both. The hypothesis of skill-biased technical change (SBTC) as an explanation of rising inequality has a hard time coping with the data when expressed in terms of two dimensions of skill. Autor and co-authors (2006, 2008) have provided a convincing three-way polarization hypothesis that explains a hollowing-out of wages and employment opportunities in a middle occupational group where skills can be outsourced to machines and to foreign workers. This seems consistent with the erosion of incomes in the middle relative to the top and bottom; the 90-50 ratio has increased steadily while the 50-10 ratio has declined since the late 1980s.

To explain the rise in the income share of the top one percent, two hypotheses seem essential, even though at first glance they appear to be in conflict. CEO pay is determined by peers, not by the market, giving support to the managerial power hypothesis. But the clear correlation of CEO pay premia with the stock market, together with separate evidence on the higher share of stock options in CEO pay, support a market-driven view that CEO pay responds to market capitalization. However the work of Frydman and Saks (2008) cautions that this connection only exists in the period since the mid-1970s and was mysteriously absent between 1936 and 1976. They argue that this profound change in behavior reflects a shift in social norms. This emphasis on social norms seems consistent with the differences in CEO pay multiples between the U. S. and Europe. It also heralds a possible future decline in CEO pay multiples not only as a result of the 2007-09 stock market collapse but also due to newly intense scrutiny of executive compensation practices emerging from Washington.

The theme of previous exaggeration of the rise of inequality is supported by the recent research of Moretti (2008), who shows that the increase in the wage premium of college over high school has been overstated by half to two-thirds due to higher housing price inflation in metropolitan areas where college graduates congregate, although his work needs to be qualified to take account of the ability of college graduates living in high-price cities to substitute away from square feet of living space to urban amenities like free concerts and opportunities to socialize with like-minded highly educated people. Moretti's work is further supported by the fact that progressive taxes, particularly in bicoastal states, hit the high nominal incomes of college graduates over

and above the bite they pay in a higher cost of living. Newly released cross-state cost of living data yield the complementary conclusion that the excess of per-capita income in New York state over the national average vanishes when translated from nominal to real terms and that in Massachusetts falls by half.

The most significant ongoing increase of American inequality takes the form of faster growth in life expectancy for the top 20 percent of the income distribution than for the bottom 20 percent. Yet even here the interpretation of Cutler *et al.* shifts the emphasis from unfair gains by the rich at the expense of the poor, to the role of low educational attainment in causing both poor economic outcomes and poor health outcomes at the bottom of the distribution. The toll taken by smoking and obesity among the low-income quantiles reflects behavioral choices tied to low education and is in a different category than most other causes of rising inequality, just as behavior drives divorce as a factor that reduces income per household relative to income per person.

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*Data Appendix: Source Notes for Tables and Figures*

**Table 1, by row number**

- 1, 2 Denavas-Walt *et al.* (2008), Table A-1, p. 31.
- 4, 5 U. S. Census Bureau, *Income / Historical Income Tables – People*, Table P-4, found at <http://www.census.gov/hhes/www/income/histinc/incpertoc.html>
- 7 Denavas-Walt *et al.* (2008), unnumbered table on p. 30.
- 8,9 [www.bea.gov](http://www.bea.gov), NIPA table 1.1.9, lines 1 and 2.
- 11 Real GDP divided by total-economy hours of work, an unpublished series obtained from the BLS.
- 12 [www.bls.gov](http://www.bls.gov).
- 17 Total Economy Hours: Same source as line 10. Population: Population. *Statistical Abstract of the U. S. 2009*, Table 2, p. 7
- 20 [www.bea.gov](http://www.bea.gov), NIPA table 1.10.

**Figures, by Figure number**

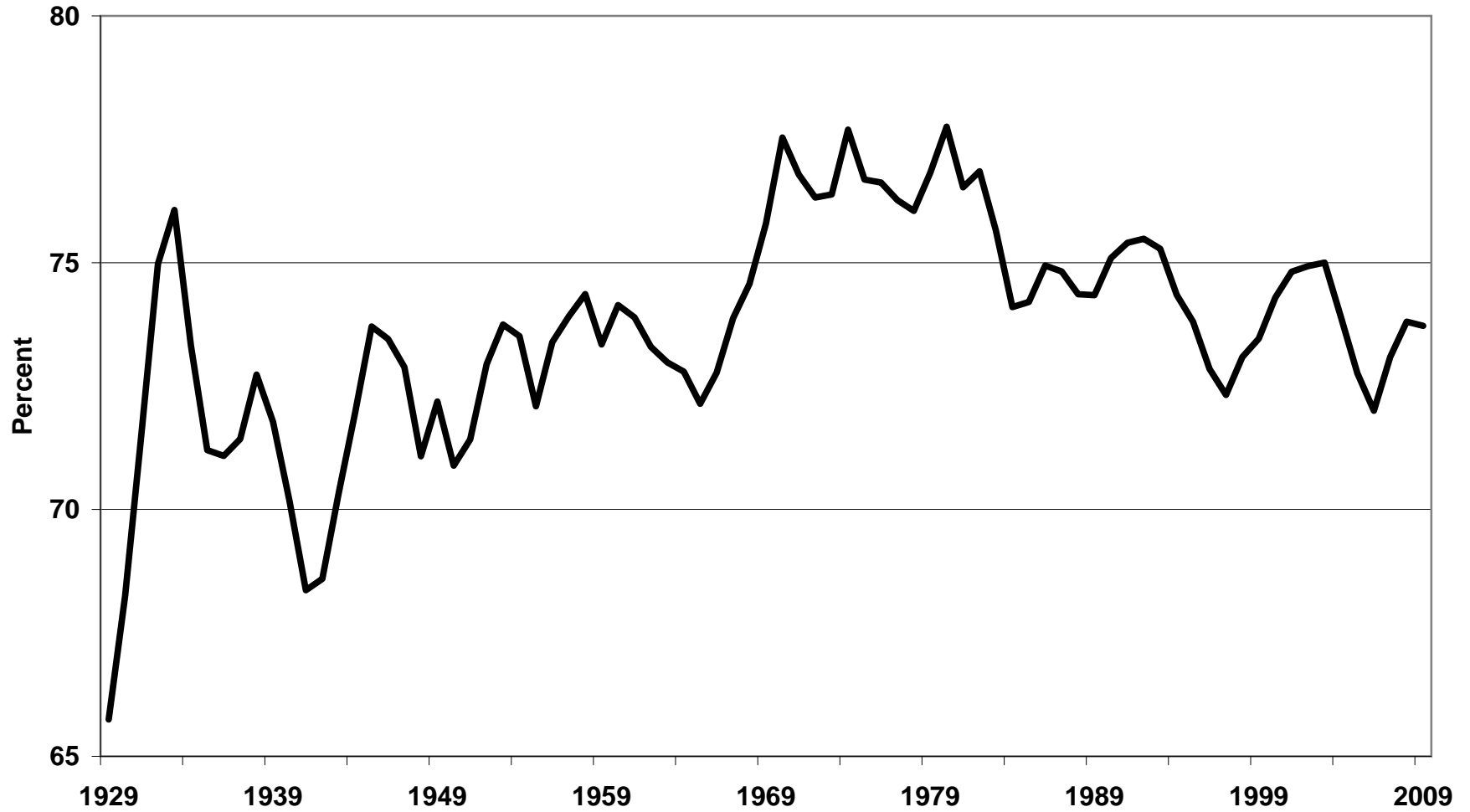
- 1. NIPA Table 1.10, where the denominator is net domestic factor income, which is equal to employee compensation plus operating surplus. The labor share of proprietor’s income is the average value of the share shown in Mishel, Bernstein, and Allegretto (2005, table 1.24, p. 95). The raw values of the line plotted in Figure 1 exhibit a one-quarter spike in 2005:Q3 due to the depressing effect of the Katrina disaster on the denominator; this spike is eliminated by substituting for the actual value of 2005:Q3 an interpolation between the values of 2005:Q2 and 2005:Q4.
- 2. A ten-year trailing moving average of the two series plotted in Figure 1.
- 3. Author’s calculations from data provided by Economic Policy Institute, updated for 2006-07 from charts 3K, 3L, and 3M in Mishel *et al.* (2009).
- 4. Piketty-Saez (2003), data updated to 2006, downloaded from <http://elsa.berkeley.edu/~saez/>. This is a replotted and relabelled version of Figure 9 from the Saez web site. Wage income includes bonuses as well as profits from exercised stock options.

5. Same source as Figure 4, this is "Figure 4 – new" from the Saez web site.
6. Same source as Figure 4, new calculations of CEO ratios from the sheet "data-Fig11" that gives the raw income numbers rather than the ratios.
7. Same source as Figure 4, this is "Figure 12" from the Saez web site. Sources of data for France and the U. K. are given in the notes to that figure. In all three countries, income is defined as before individual taxes and excludes capital gains.

**Table 1**  
**Annual Growth Rates, Median and Mean Income and Productivity, Selected Intervals, 1979-2007**

	1979- 2007 (1)	1979- 1995 (2)	1995- 2007 (3)	1995- 2000 (4)	2000- 2007 (5)
1. Census Median Household Income	0.49	0.31	0.73	1.87	-0.09
2. Census Mean Household Income	0.93	0.96	0.90	2.50	-0.25
3. Mean minus Median (line 2 minus line 1)	0.44	0.65	0.17	0.63	-0.16
4. Census Median Income per Person (15+)	1.15	1.00	1.34	2.68	0.39
5. Census Mean Income per Person (15+)	1.25	1.21	1.29	2.90	-0.05
6. Mean minus Median (line 5 minus line 4)	0.09	0.21	-0.05	0.22	-0.44
7. Deflator Used by Census (CPI-RS)	3.50	4.24	2.51	2.30	2.65
8. PCE Deflator	3.27	4.16	2.09	1.76	2.32
9. GDP Deflator	3.15	3.87	2.19	1.64	2.58
10. Median Income per Person (15+) with GDP deflator	1.50	1.37	1.65	3.34	0.46
11. Total Economy Output per Hour	1.66	1.28	2.17	2.30	2.08
12. Nonfarm Private Business Sector Output per Hour	1.95	1.43	2.64	2.71	2.59
13. Conventional Income-Productivity Gap (line 12 minus line 1)	1.46	1.12	1.91	0.84	2.52
14. Alternative Income-Productivity Gap (line 11 minus line 10)	0.16	-0.09	0.52	-1.04	1.62
15. Alternative Gap as percent of Conventional Gap (line 13 / line 12)	11.0	-8.0	26.9	-123.8	76.0
<b>Memo Items:</b>					
16. Mean Income per Person with GDP Deflator	1.60	1.58	1.60	3.56	0.02
17. Hours per Person	0.20	0.41	-0.08	0.76	-0.69
18. Output per Person (line 11 plus line 17)	1.86	1.69	2.09	3.06	1.39
19. Gap of Income Growth minus Output Growth (line 16 minus line 18)	-0.26	-0.11	-0.49	0.50	-1.37
20. Employee Compensation minus GDI Growth	-0.23	-0.27	-0.18	0.14	-0.41
21. Share of Income Gap Explained by Change in Labor's Share	88.5	245.5	37.1	28.0	29.9

**Figure 1. Income Share of Employee Compensation  
and 40 Percent of Proprietor's Income in Net Domestic Factor Income,  
1929-2009**



**Figure 2. Ten-Year Moving Average of Income Share of Employee Compensation and 40 Percent of Proprietor's Income in Net Domestic Factor Income, 1938-2009**

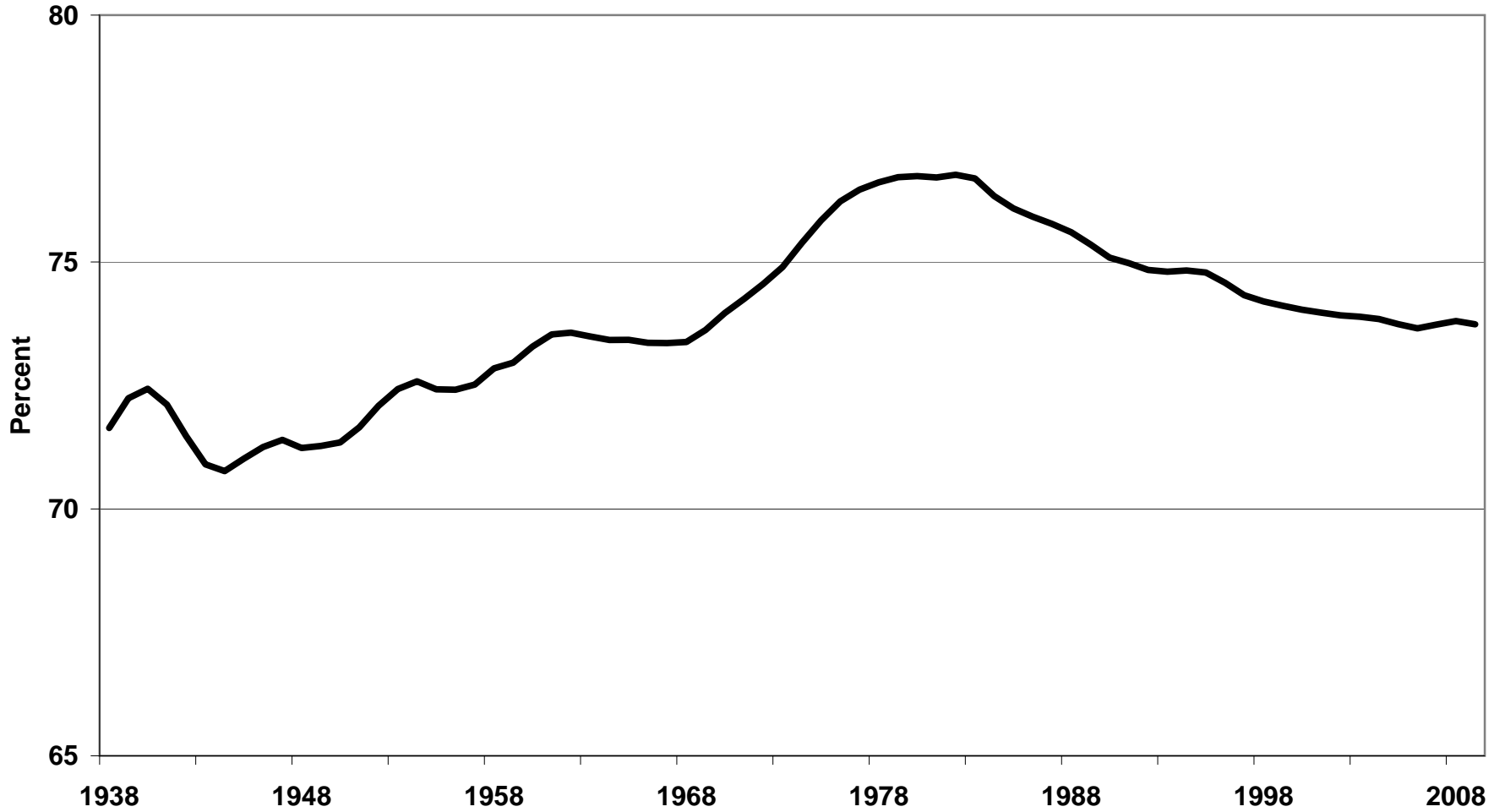
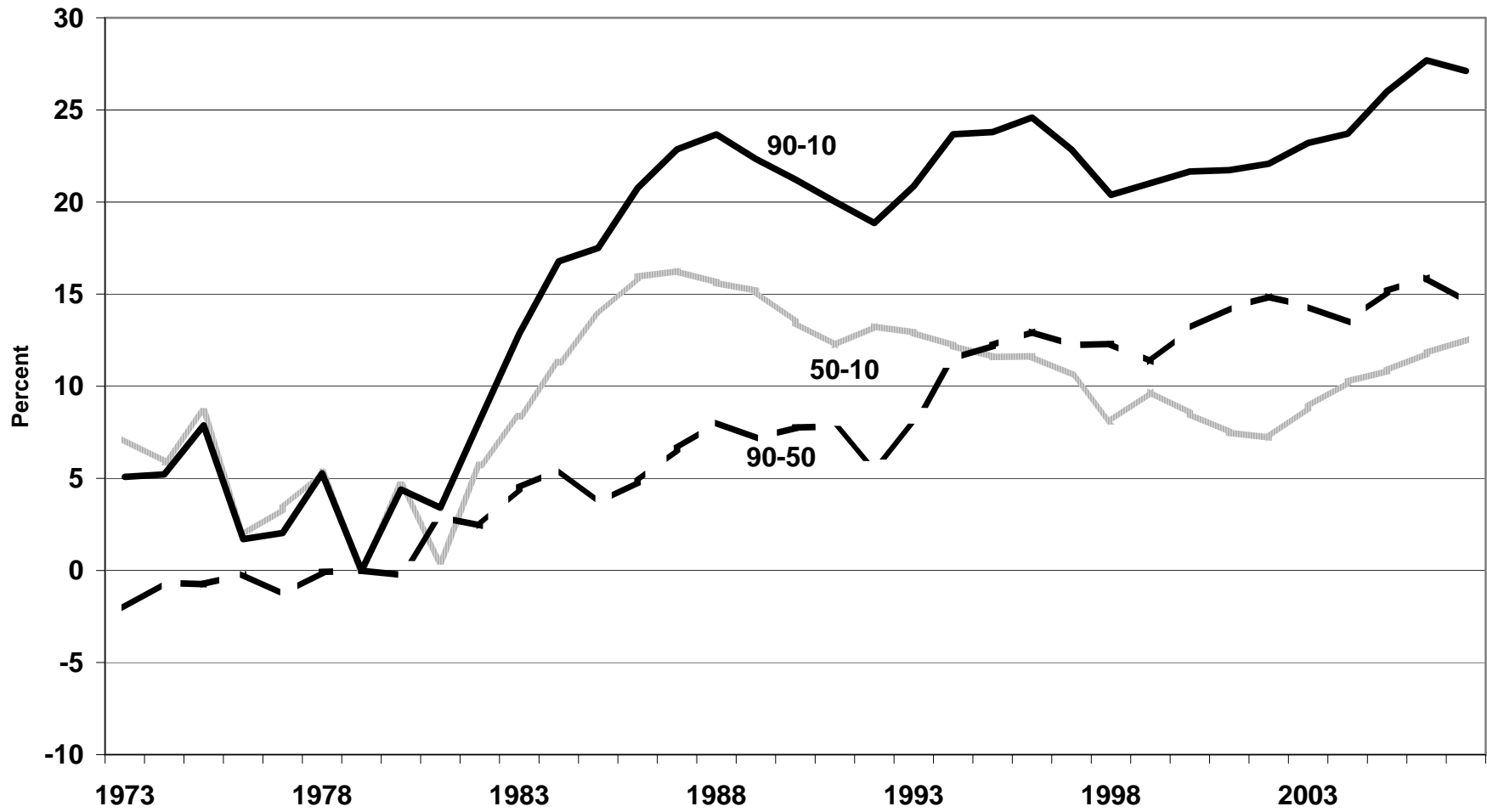


Figure 3. CPS Percentile Income Ratios for Both Men and Women,  
Log Percent Ratio, 1979 = 0, 1973-2007



**Figure 4. Wage Income Shares of Top 1 Percent, Percentiles 96-99, and Percentiles 91-95, 1927-2006**

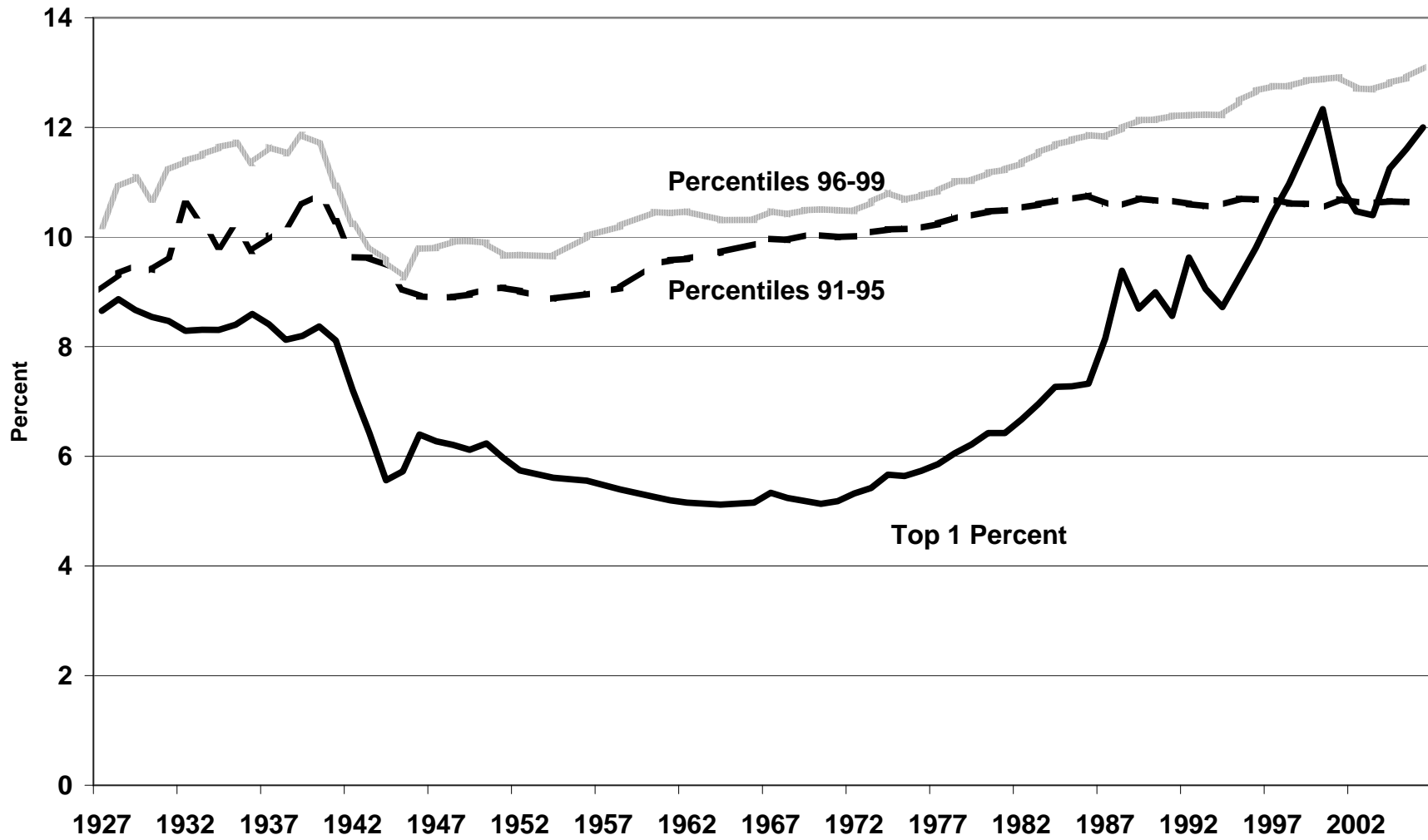
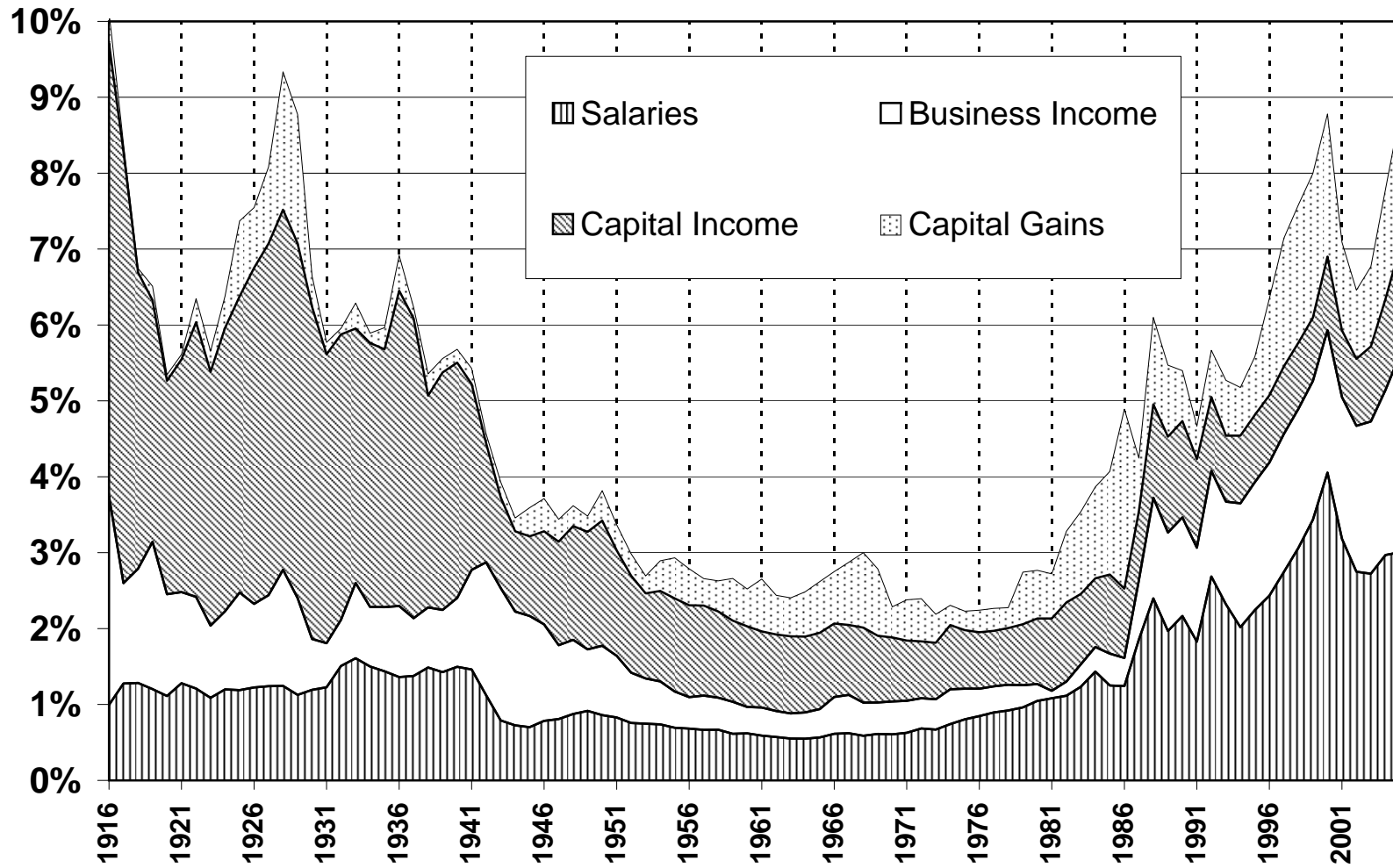


Figure 5. The Top 0.1 Percent Income Share and its Composition, 1916-2005





**Figure 6. Average Pay of Top 100 CEOs and of Rank 100 CEO  
Relative to Average Pay for All Employees, 1970-2006**

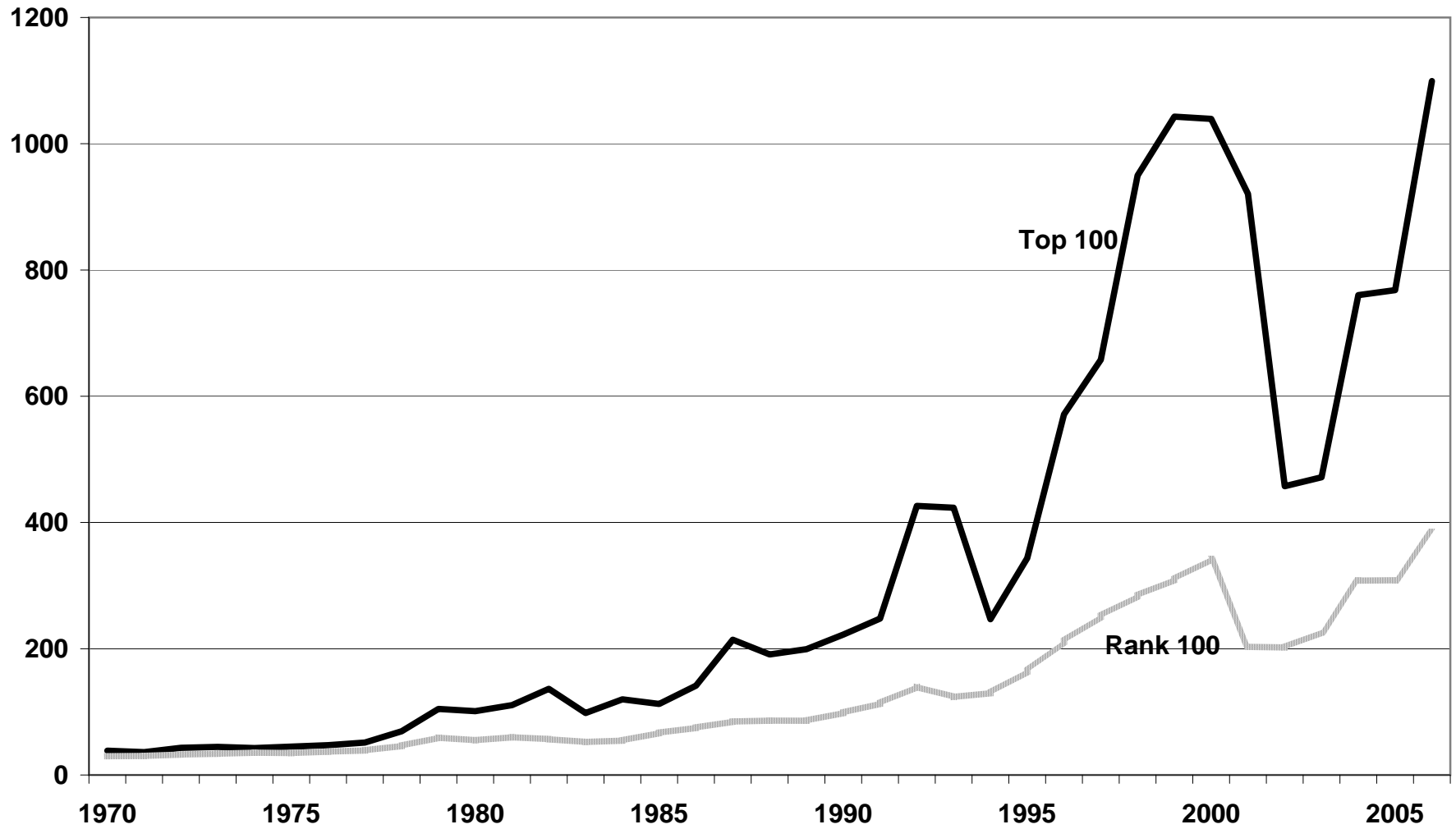


Figure 7. Top 0.1% Income Shares in the U.S., France, and the U.K., 1913-2006

