THE CHANGING U.S. INCOME DISTRIBUTION: FACTS, EXPLANATIONS, AND UNRESOLVED ISSUES

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The widening of income inequality in the United States over the last two decades has become cause for considerable concern. This is largely because, as documented in Gottschalk and Smeeding (1997), the United States currently has the least equal distribution of family income among the 22 advanced countries for which adequate data exist. Moreover, the differences between the U.S. and other countries are most pronounced at the low end of the distribution. Although average per capita income levels are relatively high in the U.S., persons in low income families may actually experience a lower standard of living than persons at the low end of the distribution in other countries. Moreover, while many (though not all) countries experienced rising inequality during the 1980s, few experienced increases of the same magnitude as the U.S.

In this article we focus on explanations for and implications of widening income inequality in the United States. The first section discusses the increase in inequality at the household or family level, which in part reflects shifts in family composition but is more fundamentally attributable to changes in the distribution of labor income. The second section documents these shifts and assesses the relative contribution of changes in within-group and between-group inequality, where groups are defined in terms of age, gender, and educational attainment. We provide new evidence that both wider inequality within groups as well as increases in the premium associated with a college degree have contributed in an important way to widening overall wage inequality. In the third section we review and update the available evidence on causes of widening earnings inequality and discuss the issue of mobility within the distribution. Although the presence of mobility can mitigate the consequences of an unequal

distribution, there is no convincing evidence that it has increased along with growing inequality. The final section offers conclusions along with an overview of policy options.

I. The Distribution of Household/Family Income: Empirical Regularities

A. The Facts

The increase in income inequality among households or families since the late 1970s is well-documented. Census Bureau figures indicate that one frequently-used inequality measure--the Gini coefficient for family income-- rose 17 percent between 1979 and 1993 before leveling off.[1] This followed a period of very little movement in this measure during the 1960s and 1970s. (Chart 1). Other measures of inequality--both descriptive and statistical--at the household or family level tell a similar story (Karoly, 1992).

Table 1 illustrates changes in the real income levels of families at the top, middle, and bottom of the distribution since 1973, as reported by the Census Bureau. Families in all parts of the distribution suffered modest declines during the 1973-75 recession but more than fully recovered by the next cyclical peak in 1979. Since then, families near the bottom of the distribution have fared quite poorly, with especially sharp losses during the two recession periods. Real incomes in the middle of the distribution have stagnated, while those near the top

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[1]Except as noted, all income figures cited in this section refer to money income before taxes excluding capital gains. Cash transfer payments (i.e. Social Security, AFDC, unemployment compensation) are included, while noncash transfers (i.e. Medicare, Medicaid, food stamps) are not.

have risen sharply especially during the expansion of the 1980s.[2]

Part of the increase in income inequality among families can be attributed to changes in family composition--in particular, the increase in the fraction of single-headed families from 10 percent in 1970 to 18 percent in 1995 (Bradbury, 1996; Lerman, 1996).[3] This has had an important impact on the observed distribution because 1) single-headed families will have only one adult earner, while many married-couple families have two or more; 2) the labor input of wives--especially those with high-earning husbands--has risen sharply; 3) most are headed by women, who still tend to earn less than men the same age with the same educational credentials; and 4) as a group female household heads tend to be younger (thus less experienced) and less-educated than employed married mothers. Nonetheless, the same patterns that we observed for families are evident for individuals treated as members of a family unit; those near the bottom of the distribution experienced significant losses relative to the relevant poverty line, while those near the top showed substantial gains (Karoly, 1996, 1997).

Finally, these developments appear to be largely a function of changes in the earnings distribution rather than in nonlabor income, taxes, or transfers. Gramlich, Kasten, and Sammartino (1993) show most of the changes in the pre-tax pre-transfer distribution during the

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[2]If, following the Boskin Commission's report, one assumed that inflation during this period was overstated by an average of 1 percent per year, then the real income figures shown in Table 1 would be correspondingly understated. Applying such an adjustment would lead to the conclusion that all quintiles have experienced at least small real income gains since 1979. However, statements regarding the distribution of income would be unaffected.

[3]A family here is defined as two or more persons related by blood, marriage, or adoption living in the same housing unit. Neither single-individual households nor those consisting of only unrelated individuals are considered to be families.

1980s are due to rising inequality in wages and salaries. Self-employment income played a modest contributing role early in the decade, while the distribution of capital income was essentially unchanged throughout the period. And while taxes and transfer payments clearly affect the degree of inequality at any point in time, changes in them likewise appear to have had only a minor impact on the income distribution. This can be seen in Table 2, which shows changes between 1980 and 1996 in the Gini coefficient for household income under several of the Census Bureau's alternative income definitions.[4] Taxes alone reduce inequality in any year by from 5 to 7 percent (Columns 3 and 4), while cash and noncash transfers together reduce inequality by 16 to 18 percent (Columns 4 and 5). It is worth noting that changes diminishing the progressivity of the Federal income tax contributed to widening inequality between 1980 and 1985, and that since 1985 changes in transfer payments have operated to reduce inequality somewhat. Nonetheless, it is clear that the bulk of long-term movements in the family income distribution can be attributed to changes in the wage distribution. This is the focus of the remainder of this article.

II. Earnings Inequality

A. Overview

The analysis of the earnings distribution in this section will be based on annual earnings data from the March Current Population Survey (CPS). Each year, the CPS provides annual earnings information along with a wealth of demographic data for persons in about 60,000

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[4]Unlike the measures for family income, these measures also include both single individuals living alone and households consisting only of unrelated persons.

households nationwide.[5] Due to conceptual problems with the treatment of self-employment income, it will be limited to annual wage and salary income for persons whose reported earnings come entirely from wages and salaries. Two different but substantially overlapping groups of wage earners will be examined; those employed year-round and full-time, and those aged 25-64 with nonzero wage and salary income.[6] The former is intended to approximate the effect of changes in hourly wage rates, though movements could also reflect shifts in hours worked among full-time workers. The latter case addresses total labor incomes of individuals of prime working age, excluding both the youngest workers who may be working part time or part year while attending school and the oldest, who are often retired from their main job but may retain an intermittent labor force attachment. Changes in the distribution among the all worker category can reflect either changes in hourly wage rates or in employment and hours.

In this section we examine changes in the earnings distribution since the late 1970s, focusing separately on men and women. The male distribution has shown a clear widening, as has that for women employed year-round and full-time. Because the differential between men and women has consistently narrowed, this conclusion does not necessarily hold when we

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[5]Most discussion in the literature of developments affecting the income and earnings distribution is based on CPS data. The decennial census contains similar information for a much larger sample, but only at 10-year intervals. Some researchers have relied on data from the Survey of Income and Program Participation (SIPP), but this has only been available since 1984. Both the Panel Study of Income Dynamics (PSID) and the various National Longitudinal Surveys (NLS) track the same individuals or households over a long period of time, and are thus useful for studies of earnings mobility, but small, and in the case of NLS unrepresentative samples, inhibit analysis involving the decomposition of the population into key groups.

[6]Year-round, full-time workers are those who worked at least 50 weeks (including vacations and other paid leave) during the previous year, with a usual work week of at least 35 hours.

combine all workers--both male and female--into a single distribution.[7] Nonetheless, in most of the existing literature discussing the wage distribution, women and men are treated separately, and we believe that this is appropriate given the continued existence of predominantly male and female jobs. Moreover, among married couples the correlation between husbands and wives' earnings has grown over the last several decades.[8] In other words, the combination of widening earnings distributions among men and women separately along with a growing tendency for high-earning men to marry high-earning women has important implications for the family distribution justifying a separate focus on the male and female distributions.

Two main measures are used to evaluate changes in the wage distribution. The first is the ratio between annual earnings levels at the 90th and 10th percentiles of the relevant distribution. This simple measure provides a shorthand indicator of the distance between persons near, though not at, the top and bottom of the distribution. In addition, we employ Theil's mean log deviation (MLD), a measure that encompasses the entire distribution (aside from that portion which is truncated due to top-coding or implausibly low implied hourly earnings rates), and that has useful decomposition properties.[9]

In principle, decomposing enables one to determine the extent to which changes in inequality reflect, on the one hand, changes in the reward associated with particular observed individual characteristics, or, on the other hand, changes in the degree of inequality among

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[7]See, for example, Lerman (1997).

[8]Karoly and Burtless (1995).

[9]Theil (1967). For details regarding these measures, top-coding, and other technical issues involved in working with CPS data, see the accompanying box.

individuals with similar attributes. Following Katz (1994), we can set up a simple model to describe an individual's earnings: (1) $w_{it} = p_t A_i + v_{it}$, where w_{it} is the log of annual earnings of person i in year t. A_i can be thought of as the characteristics (skills) of that person that are associated with earnings. Typically we think of these skills as having been obtained through a combination of education, formal training, experience, and, perhaps, innate ability, and consequently pre-determined and therefore time invariant. P_t refers to the reward associated with these characteristics, and can vary over time, while v_{it} represents that portion of earnings which is independent of these characteristics.

Here, we focus on two characteristics that we are able to observe in the CPS--educational attainment and age--where the latter, in combination with educational attainment, can be interpreted as a rough proxy for experience. Increases in between-group inequality can be readily interpreted as changes in the reward associated with these attributes (p_t); these can be either reinforced or offset by shifts in the mix of skills (A_i). Changes in within-group inequality (the v_{it} term) can be correlated with changes in either of the other terms to the extent that they reflect returns to unmeasured skills which are parallel to those attributes that are directly observed. At the same time, however, they could be due to a variety of other factors, including differences in the nonwage amenities associated with an occupation or a particular job, a number of employer characteristics (i.e. size, profitability), the influence of unions and other non-market institutions on the wage-setting process, cost-of-living differentials across regions, or even random luck generating year-to-year variation.

B. Changes in the Earnings Distribution: Basic Patterns

1. Men

The distribution of earnings among male workers has become more unequal since the late 1970s. This is true both for year-round, full-time workers, and in the broader all workers category, and is visible using both of our measures. As shown in the top panel of Chart 2, the ratio between the 90th and 10th percentiles of the male year-round, full-time annual wage and salary earnings distribution rose from 3.6 in 1979 to 5.0 in 1996, a 39 percent increase.[10] The MLD measure also showed a substantial rise in inequality over this period. In both cases, the increase in inequality was fairly smooth, with only a modest slowing in the trend during the 1990s. These developments reflect substantial real earnings declines in the lower half of the distribution, along with more modest gains near the top, at least when earnings are deflated using the official CPI-X. This can be seen in the bottom panel, where for the 90th percentile, median, and 10th percentiles of the distribution we plot real earnings indexed to their 1979 levels.[11]

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[10]This figure was evidently little changed in 1997. Figures released by the Bureau of Labor Statistics indicate that in 1997 among men aged 25 and over real usual weekly earnings of full-time workers rose 0.7% at the 90th percentile, 0.4% at the median, and 0.9% at the 10th percentile. Consequently, the 90th/10th percentile ratio for this closely-related measure edged down from 4.43 to 4.42.

[11]Note that the real wage figures presented here assume that inflation has been properly measured. In fact, the Advisory Commission to Study the Consumer Price Index, chaired by Prof. Michael Boskin of Stanford University, last year concluded that over the last two decades the CPI has overstated inflation by about 1.1 percent annually. Assuming that any bias in the CPI applies uniformly throughout the distribution--an issue that has not yet been studied--these findings would have no bearing on questions of distribution but would affect our assessment of real wage trends. For example, between 1979 and 1995 real median earnings of male year-round, full-time workers declined 11% using the official CPI-X, but allowing for the Commission's estimated inflation adjustment turns this into a 6% real gain. However, at the 10th percentile of the male year-round, full-time distribution real wages still would have

Workers at the 10th percentile experienced large losses during the recessions of the early 1980s and again between 1988 and 1992. By contrast, men at the 90th percentile show rapid gains during the 1980s expansion but little subsequent change.

Because inequality among all male workers reflects disparities in annual hours worked as well as in hourly wage rates, the level of inequality is higher than that of year-round, full-time workers. However, as shown in Chart 3, the long term trends in the distribution among all male workers and among year-round, full-time male workers are quite similar, suggesting that these trends are being primarily driven by wage rates and not by changes in employment patterns. The main difference between the all workers and year-round, full-time workers distribution measures concerns cyclical timing. Inequality in the all workers category rose sharply during the two recession periods, as earnings losses in the lower half of the distribution were magnified when a larger number of workers experienced spells of unemployment, non-participation, or involuntary part-time employment. What is somewhat more surprising is that inequality for this group did not decline even as employment expanded throughout the 1980s expansion. By contrast, it has diminished significantly since 1994, such that according to the 90th/10th percentile ratio it had by 1996 fallen back to its late 1980s level, reflecting healthy employment gains at the low end of the distribution.

2. Women

For men we saw that over the long period since the late 1970s trends in the distribution

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declined by 9% even with the inflation adjustment.

of annual wage and salary income have been dominated by developments among year-round, full-time workers. For women, by contrast, the most important long-run influence on the distribution of annual earnings among has been the tendency toward increased labor force attachment throughout the year. In fact, as shown in Chart 4, patterns in the distribution of earnings among female year-round, full-time workers have been quite similar to those observed for men. Throughout the period real earnings levels rose significantly for women at the 90th percentile and modestly at the median, but declined at the 10th percentile, with essentially the entire decline occurring between 1979 and 1982.[12] A comparison between the lower panels of Charts 2 and 4 reveals that at all 3 points of the year-round, full-time distribution shown women's earnings did indeed gain relative to men's.

When expanding the sample to include all workers aged 25-64, we find that the two inequality measures yield a mixed picture. According to the MLD measure inequality among women rose during the 1970s and early 1980s, and has since been roughly constant, while it has declined based on the 90th/10th percentile ratios (Chart 5). This suggests that at least since the mid-1980s the effect of womens' greater attachment to the labor force has offset the impact of widening inequality in wage rates on the distribution of women's total annual earnings. Nonetheless the level of inequality remains considerably higher among women than among men because women are still much more likely than men to be employed either part-time or for only part of the year.

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[12]As with men, there was apparently little change in the percentile ratio in 1997. Among women aged 25 and over, real usual weekly earnings of full-time workers rose 1.7% at both the 90th percentile and the median, and by 1.2% at the 10th percentile. Thus, in 1997, the 90th/10th percentile ratio for this measure rose from 3.97 to 3.99.

C. Accounting for Widening Wage Inequality

The deterioration in the relative and absolute status of individuals at the low end of the distribution is partly due to a sharp rise since the late 1970s in the premium associated with a college degree. Among year-round, full-time male workers, the median annual earnings premium for those with at least a 4-year college degree relative to those with only a high school diploma rose from 40 percent in 1979 to 74 percent in 1996, while the college premium relative to those who did not complete high school increased from 73 percent in 1979 to 157 percent in 1996 (Chart 6).[13] This reflects substantial real earnings declines among men with no more than a high school diploma, and modest gains for those with a college degree. Among fully-employed women these trends have also been present, though somewhat less dramatic, with the premium for a college degree relative to a high school diploma rising from 50 percent in 1979 to 72 percent in 1989, then leveling off.[14]

Another dimension where inequality has increased is by age group. The mean annual wage and salary income premium for male year-round, full-time workers aged 45-54 relative to those aged 25-34 rose from 1.15 in 1979 to 1.27 in 1989 and 1.35 in 1995. (Chart 7, top panel).

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[13]Through 1991 CPS-based measures of educational attainment were based on years of school attended, and a secondary question about whether the last year had been completed. Starting in 1992 (i.e. annual data pertaining to 1991), we have direct information on degrees attained. Under the old definition, we equate 12 years of completed schooling with a high school diploma, and 16 years completed with having a college degree. Median earnings figures obtained under the old definition have been adjusted based on estimates in Frazis and Stewart (1996).

[14]Moreover, as Houseman (1995) has shown, recent declines in the incidence of employer-financed health insurance and pension coverage have been most pronounced among less-educated men.

During the 1980s the male age premium rose even after controlling for educational attainment; in the 1990s the rate of increase has slowed for high school graduates and the increase that had occurred among college graduates has been mostly reversed. For women the picture is somewhat more complex, as no age premium at all existed during the 1970s and early 1980s (Chart 7, bottom panel). This can be attributed to the fact that during this period older women were considerably less likely than younger women to hold a college degree, and that many older women had previously interrupted their careers in order to bear and raise children and had paid an earnings penalty for doing so. With both of these factors diminishing in importance, a significant age premium has indeed begun to emerge among female year-round, full-time workers. This premium has continued to rise within educational attainment categories during the 1990s, though it remains considerably smaller than for men.

Although increases in the education and age premia represent an important component of widening wage inequality, there have also been considerable increases in inequality even among groups narrowly defined in terms of such characteristics as age, education, industry, and occupation. One example of this can be seen in Chart 8, which plots the within-group MLDs for male high school and college graduates aged 35-44 who were employed year-round and full-time. Inequality within both groups has risen steadily and significantly since the late 1970s; trends in within-group inequality are quite similar for women, and for both men and women in other age categories.[15]

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[15]This does not merely reflect generational shifts between cohorts. A plot showing the progression of the within-group MLDs for male high school and college graduates born between 1936 and 1945 (i.e. aged 30-39 in 1975 and 51-60 in 1996) and employed year-round and full-time closely parallels that of Chart 8.

To assess the relative importance of changes in the within-group and between-group components of wage inequality, for men and women we decompose the MLD measure by educational attainment, and by education and age together. The educational attainment decomposition represents four groups--did not complete high school, high school graduate with no college, some college but less than a 4-year degree, and at least a 4-year degree. For year-round, full-time workers the additional decomposition by age group consists of 5 categories: 18-24; 25-34, 35-44, 45-54, and 55 and over. For all workers the youngest age group is dropped, the oldest limited to persons aged 55-64.

In Table 3 we present the decompositions in each of the four worker categories for 1979, 1989, and 1996. These years represent approximately similar stages of the business cycle, thus enabling us to focus on long-term trends.[16] Clearly, among all groups, on both dimensions, and at all points in time, the bulk of the observed inequality occurs within groups (the v_{it} from Equation 1) rather than between groups. Both forms of inequality tend to be greater among all workers than among year-round, full-time workers, reflecting the additional dispersion arising from variation in hours worked. It is also notable that based on the year-round, full-time distribution, it appears that the wage rate structure is more widely dispersed for men and for women--both within and between age-educational attainment groups.

Turning to inequality trends, it is evident that in all cases **both** the within-group and between-group inequality components rose between 1979 and 1989. This was also true between

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[16]The proportion of wage inequality arising from within-group dispersion fluctuates modestly from year-to-year, but bears no systematic relationship to cyclical factors for any of the worker categories on any dimension. Among all workers (especially male), within and between-group inequality tend to rise roughly proportionally during recessions.

1989 and 1996, albeit at a generally slower pace, with the exception of the all female workers category, in which the within-group component declined slightly. It is also notable that virtually all of the difference in the trends between male year-round full-time workers as compared with all male workers aged 25-64 is in the within-group component.

Table 4 illustrates the sources of changes in wage inequality for year-round, full-time workers. For men, in both periods about two-thirds of the increase in inequality occurred within groups defined in terms of educational attainment, with the remaining third arising from the increase in the education premium. However, when age is added to the mix, about 45 percent of the increase in male wage inequality occurred between rather than within groups. The fraction of the increase in inequality attributable to the within-group component was somewhat larger for women than for men, most notably during the 1980s by education and age together.

Changes in within-group and between-group inequality were further decomposed into, on the one hand, the component arising directly assuming a constant population mix, and, on the other hand, that arising from shifts in the mix. The logic behind this step is that even there were no change in inequality within any of the groups, total within-group inequality could rise if groups with high levels of inequality grew more rapidly than the population as a whole. Similarly, even if the population mean and all individual group means were constant, between-group inequality could rise if groups whose mean income level is distant from the population mean were growing rapidly. In practice this effect turned out to be minor with respect to the within-group component, but quite important for between-group inequality. For both men and women, the relatively small increases in observed between-group inequality mask the effects of two offsetting forces--substantial rises in the premium associated with greater education and, to a

lesser extent, age (P_t), were largely negated by declines in the shares of groups whose incomes were furthest from the mean (A_t). For example, among men employed year-round, full-time the share of dropouts--by far the lowest-paid group--fell from 20% in 1979 to 12% in 1996.

III. Explanations for Widening Inequality

Over the past decade a large body of literature aimed at documenting and understanding the widening of income and wage inequality has arisen. Considerable progress has been achieved, yet a number of key questions remain. Much of the early work in this area, summarized in Levy and Murnane (1992), focused on documenting the increase in wage dispersion and especially the shift in demand favoring educated relative to less-educated or otherwise less-skilled workers. More recent work, much of which is reviewed in Kodrzycki (1996), has emphasized finding causes of widening wage inequality. Economists have examined a diverse set of purported explanations, including technological change, trade, immigration of unskilled workers, a decline in the influence of unions, and a lower real minimum wage. In the remainder of this section, we offer an updated assessment of the current state of the literature, examining the evidence for and against several of these explanations.

A. Technological Change

One major hypothesis suggests that skill-biased technological change, meaning changes in the production process that increase the demand for skilled relative to less-skilled workers, can account for a significant portion of the widening in earnings inequality. This explanation is theoretically appealing, based on a notion that at least initially the introduction of advanced

equipment requires that workers using it have the knowledge and adaptability necessary to take full advantage of its capabilities, thus raising the demand for skilled workers.[17] At the same time, by substituting for unskilled workers, it can reduce demand and consequently depress their earnings.[18]

There is a fair amount of evidence consistent with the view that technology has played an important part in the widening of the wage distribution. However, we lack a good understanding of precisely what is meant by technological change, and, consequently, of the exact mechanisms by which it may have affected the distribution. Some of the early work identifying technological change as an important factor was based on a residual analysis in which technology effectively represented everything that could not be directly measured (Bound and Johnson 1992; 1995). One difficulty with this approach is that this residual may reflect not only the adoption of advanced equipment, but also a full range of changes in workplace organization--changes which may or may not themselves be related to technological change.

Others have found direct links between widening inequality and some specific aspect of technological change. Most notably, Krueger (1993) found using CPS data that workers who used computers on the job earned 8-15 percent more than non-users with the same observable characteristics; thus computer usage may help to explain widening within-group inequality. Computer users also are disproportionately college graduates, so this can also be a factor

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[17]Bartel and Lichtenberg (1987)

[18]For example, Greenwood and Yorukoglu (1996) present a model in which technological change is manifested through the closing of obsolete plants, with the resulting displacement of less-skilled workers yielding a substantial and persistent increase in income inequality.

explaining widening between-group inequality.[19] In addition, there is evidence linking widening earnings differentials to expenditures on research and development (Mincer, 1991; Allen, 1996).

Still, however, we lack comprehensive measures capturing all relevant aspects of technological change. Moreover, even if the findings regarding the effects of computer usage and research and development expenditures can be taken as representative, such that in an accounting sense technological change is an important contributor to widening inequality, serious questions of interpretation remain. For example, using German data it has been shown that on-the job use of pencils, pens and telephones, as well as working while seated yield wage premiums similar to those associated with computer usage (DiNardo and Pischke, 1997). One possible interpretation of these findings is that computer users are more likely than non-users to possess otherwise unobserved but valuable skills. Related to this is the notion that computers were first introduced into what were already high-paying jobs.[20] This does not necessarily mean that computer users are not directly rewarded for working with the technology, but does suggest that one ought to be cautious in ascribing a **causal** role for technological change in accounting for widening inequality.

B. Trade

A second major hypothesis is that globalization, especially in the form of increased

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[19]According to Autor, Katz, and Krueger (1997), the computer usage premium may have increased further during the 1990s, while overall the spread of computer technology can account for between 30 and 50 percent of the increase in skilled workers share of total labor income (i.e. capturing both wage rate and employment effects) since 1970.

[20]Doms, Dunne, and Troske (1997) provide evidence supporting this view.

exposure to competition from imported goods produced by less-skilled workers in low-wage countries, may have played an important role in widening wage inequality. This could occur through a decline in the relative price of imported and import-competing goods, which in turn results in lower wages for working producing these goods domestically.[21] The impact would fall largely on the wages of less-skilled workers employed in affected industries. Alternatively, one could treat a growing trade volume as effectively representing an increase in the supply of unskilled labor (Borjas, Freeman, and Katz, 1997). In this instance, competition from imports could displace workers employed in manufacturing, thereby forcing them to compete with other less-skilled workers for a limited number of job slots and consequently driving down wages. Either way, we would expect trade effects to occur primarily between groups defined in terms of educational attainment. However, some impact on within-group inequality is also possible to the extent that it reflects rewards for unmeasured skills, or if trade's effects vary across regions.

Regardless of the approach, the empirical evidence to date suggests that expanded trade has played a small to modest role in the increase in inequality.[22] For instance, Borjas and Ramey (1995) concluded that even though imports did indeed directly reduce wages and employment in some industries, this could only explain about 6-7 percent of the increase in overall earnings inequality, and about 10 percent of the rise in the education premium, between 1976 and 1990. It is possible that these and similar findings understate the impact of imports on wages by

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[21]In the simplest case, with two tradeable goods, two immobile factors of production, and no transport or transactions costs, factor prices will under the Stolper-Samuelson theorem tend to equalize globally. See Leamer (1996).

[22]Much of this evidence is summarized in Burtless (1995). In addition, see Richardson (1995), and Slaughter and Swagel (1997).

neglecting effects operating through displacement into depressed local labor markets. However, preliminary findings by Brauer (1998) suggest that this channel is probably of minor importance.

C. Supply Considerations

The widening of earnings differentials in general, and the increasing education premium in particular, clearly reflects demand rather than supply factors. This is evident from the fact that the fraction of the working-age population has steadily risen along with the increase in the education premium. However, the pace at which this occurred has slowed significantly since the 1970s. In that decade the population aged 25-54 with a college degree grew at an annual rate of 6.1 percent, while the population with no more than a high school diploma fell by 0.5 percent. In the 1980s the growth of the educated population slowed to a 4.4% annual rate, while the less-educated population rose by 1.1%. In other words, it appears that by the 1980s the supply of educated labor was no longer growing rapidly enough to negate demand shifts favoring skilled workers, as had been the case during the 1970s.[23]

One supply influence that has been cited as contributing to widening earnings inequality is the role of large-scale immigration of unskilled labor during the 1980s and 1990s. The evidence on how immigration has affected the earnings distribution is mixed, with some researchers finding that it had an adverse impact on the least-skilled native males but little effect elsewhere in the distribution.[24] On the other hand, Card (1997) finds that even though the large

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[23]For a more complete treatment of supply-side influences on earnings inequality, see Topel (1997).

[24]For example, see Borjas, Freeman, and Katz (1997).

immigrant inflows in the late 1980s were large enough to have reduced employment among unskilled natives in several cities--notably Los Angeles and Miami--by 5 to 10 percent, there is little evidence that they affected the wage structure among natives. The key question--as yet not fully resolved--is to what extent immigration induced shifts in domestic migration patterns such that its impact on the wage structure would be negated at the local level but visible nationally.

D. Institutional Factors

One major development that may have contributed to widening inequality is the weakening influence of unions on the wage-setting process; between 1970 and 1995 union membership as a percent of total employment was cut roughly in half. Unions tend to raise their members wages relative to other workers with similar attributes. Because union members as a group are less educated than non-members, diminishing their influence would likely result in greater between-group inequality. Unions also tend to compress wage differentials among workers with the same employer or in the same industry, so their weakening probably also contributed to widening within-group inequality. The effect is also most likely strongest for year-round, full-time workers, as unions in the process of raising wages may reduce employment; consequently among all workers the effect of their weakening on the distribution measured in terms of wage rates could be offset by reduced unemployment.

Besides weakening unions, the minimum wage was allowed to decline in real terms between 1981 and 1990, with effects in many ways similar to that of declining unionization. Fortin and Lemieux (1997) argue that about a third of the increase in inequality in the United States during the 1980s is attributable to these and other institutional factors. The most

compelling evidence in support of this hypothesis comes from comparisons between the United States and other OECD economies, all of which faced similar pressures from technological change and trade. Some, notably France and Germany, experienced little or no change in earnings inequality (though perhaps at the cost of much higher unemployment rates). At the same time, the United Kingdom, the only other OECD country where the rise in inequality was as pronounced as in the United States, also experienced major institutional reforms designed to weaken union influence. Nonetheless, one must be cautious in attributing widening inequality to institutional changes if those shifts themselves represented responses to changes in the underlying structure of the economy.

E. Earnings Variability and Mobility

All of the analysis of widening income and earnings inequality in this article has been based on snapshots of the distribution observed at specific points in time. However one might be interested not so much in the distribution within any one period, but rather with how income is distributed over the course of a number of years--or even over the course of a lifetime. In particular, we might be interested in knowing whether low earners at any point in time are likely to remain low earners or whether their incomes are only temporarily low, and especially how likely those with low incomes during one period are able to permanently improve their status. The CPS is of only limited value for examining such questions, as individuals and households are only tracked over two consecutive years, and then only if they remain in the same physical

housing unit.[25] Other data sets that have been used to address these issues have limitations of their own.

The available evidence suggests that there is indeed a considerable degree of mobility in the United States, but no more than in other OECD countries with less inequality at a point in time.[26] Moreover, there is little support for the notion that widening inequality has been offset by increased mobility. Studies based on data from the Panel Survey of Income Dynamics (PSID)--a survey that tracks households and individuals over a long period of time, but with a smaller sample than in the CPS--typically find considerable movement across deciles of either the family income or individual earnings distribution. However, such movements are typically small, and there is no evidence that the degree of mobility has expanded along with widening inequality.[27] In fact, Buchinsky and Hunt (1996), using National Longitudinal Study of Youth

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[25]Moreover, there are several pairs of years, including, most recently, 1985-86, where changes in sample selection or other survey procedures preclude any matching at all.

[26]Two articles offering such a perspective are Aaberge et. al. (1996), who compare the United States with Norway, Sweden, and Denmark, and Burkhauser et. al. (1997) who compare the U.S. with Germany during the 1980s.

[27]For example, see Gottschalk and Moffitt (1994), or Daly and Duncan (1997). Two studies that exaggerate the degree of mobility are U.S. Department of Treasury (1992), and Cox and Alm (1996). The Treasury study found, using tax return data, that individuals in the bottom quintile of the distribution (in terms of adjusted gross income) in 1979 were by 1988 more likely to be found in the top than in the bottom quintile. Similarly, Cox and Alm showed using PSID data on 3725 individuals aged 16 and over in 1975 that only 5 percent of those in the bottom income quintile initially remained there in 1991. However, the former study is flawed because the data set contains no information on age, meaning that we cannot distinguish true mobility from normal income movements throughout the life cycle. The latter compares incomes within its sample with the entire population both in 1975, when both the sample and population consisted of all persons 16 and over, and in 1991, when the population still included all persons 16 and over but the sample was restricted to those aged 32 and over. Thus, it was inevitable that the low end of the distribution, which included many young workers in 1975, would improve its

(NLSY) data, found declining mobility both on a year-to-year basis and over longer periods between 1979 and 1991. However, this study also presents an incomplete picture of mobility because the data sample is restricted to persons aged 15-25 in 1980.

A closely-related issue is the degree of year-to-year instability of earnings. Gottschalk and Moffitt (1994) found using PSID data that among white men aged 25-54 earnings were considerably more variable in the late 1980s than in the late 1970s, and that this increased variability can explain as much as one-third of the rise in overall inequality in this group. Although the authors did not address the distinction between within-group and between-group inequality as defined in the previous section, it seems plausible that this finding is especially relevant toward explaining increasing within-group inequality. And it would be most pronounced among all workers, because much of this variability reflects periods of non-employment. But unlike greater mobility, which would imply enhanced opportunities for persons at the bottom to improve their position, greater year-to-year variability is at best a mixed blessing especially for risk-averse or liquidity-constrained households.

IV. Conclusions and Policy Considerations

The basic conclusions of this article are straightforward. By any reasonable measure the distribution of income has widened since the mid-to-late 1970s. This is true at the household or family level, as well as for individuals as family members. At the family level, the increase in

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relative position, but this tells us nothing about true mobility within a sample that properly controls for age.

the fraction of single-headed (predominantly female) households is an important factor. Still, the changes in the income distribution primarily reflect increased earnings inequality among men and, separately, among women. Nonlabor income, taxes, and transfers together tend to reduce the degree of inequality observed at any point in time, but they have had little impact on inequality trends. Thus, an emphasis on shifts in the earnings distribution is justified.

The most striking development regarding the earnings distribution over the last two decades has been the deteriorating position of men with no more than a high school diploma. But the status of less-educated women has also declined relative to that of women with a college degree. Moreover, as documented here, there has also been a substantial increase in the degree of inequality within groups defined narrowly in terms of age, education, and sex. There is some evidence that the widening of inequality may have slowed down during the 1990s, but no sign that these trends have reversed.

Skill-biased technological change appears to be the single most important factor accounting for widening earnings inequality, but exactly how remains poorly understood. A variety of other influences appear to have contributed to some aspect of widening inequality, but it is very difficult to assign precise shares. Finally, while mobility is indeed present and helps to mitigate the effect of inequality as measured at a point in time, there is no evidence that it has increased along with the increase in inequality.

Given these developments, the potential policy responses range from doing nothing, to increasing investment in skills, to what Freeman (1997) terms "circling the wagons" by restricting trade, immigration, and the spread of new technologies. In some sense, the case against intervention reflects a view that widening earnings inequality per se is a byproduct of

changes which make society as a whole better off; a circling the wagons approach would sacrifice these gains for what would likely be at best modest distributional effects. However, the fact that individuals near the bottom of the distribution probably experienced an absolute decline in their well-being suggests that some form of intervention may be appropriate.

One broad set of policy responses is to allow the full set of market forces to run their course, but to mitigate their effects through taxes, transfers, and the provision of government services targeted toward the least well-off. To some extent this is already done through institutions like the progressive income tax, and the recent expansion of the Earned Income Tax Credit (EITC) appears to have improved the status of the working poor.

A second set of options is to seek to upgrade the skill level of the work force by devoting more resources to education and training. There are indeed indications that even without such explicit interventions the supply side is already operating to moderate the widening of earnings differentials. College enrollment rates among persons aged 18-24 have risen sharply since the mid-1980s, quite likely as a direct consequence of the rising education premium, and for the last several years this has been reflected in renewed rapid growth in the relative size of the educated working-age population. Still, interventions--especially those targeted toward low-wage workers and children in low-income households--could help to speed the process. Even so, while upgrading skills would in the long run at least allow the supply of skilled labor to keep up with what is likely to be a continued increase in demand, its impact on the distribution is likely to be limited in the short run.

A third set of alternatives comes under the heading of institutional changes. In particular this could involve reversing the decline in union influence over wage-setting and/or allowing the

minimum wage to increase, either of which would likely bring about some reduction in inequality among full-time workers. If taken too far, however, this could come at the expense of employment losses, with adverse implications for the distribution among the labor force as a whole. The European experience, with a range of social, political, and economic institutions designed to minimize inequality, provides a cautionary tale. While nearly all European countries in fact exhibit significantly less inequality than the United States, this has been accompanied by higher unemployment and lower rates of economic growth.

Finally, in light of the fact that low-income households and low-wage workers tended to lose substantial ground during recession periods, it is important to avoid unnecessary increases in unemployment. This means that macroeconomic policy must be designed to achieve maximum sustainable (i.e. non-inflationary) growth while minimizing fluctuations around this growth path. Favorable macroeconomic conditions can create an environment in which a combination of market forces, relatively modest redistribution toward low-wage workers, and well-targeted investments in education and training can be effective in at least slowing the growth of inequality while mitigating its most negative consequences.

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Table 1
Mean Family Income by Quintile, Selected Years
(1996 Dollars)

	Bottom Quintile	Middle Quintile	Top Quintile[1]	Top 5 Percent[1]
1973	12,472	39,694	93,073	140,462
1979	12,717	41,466	97,918	144,942
1983	11,007	38,963	96,286	138,825
1989	11,975	43,282	117,249	187,822
1992	10,720	40,849	110,492	173,962
1993	10,575	40,247	120,544	208,055
1996	11,388	42,467	125,627	217,355
Real Percent Change				
1973 - 1979	2.0	4.5	5.2	3.2
1979 - 1989	-5.8	4.4	19.7	29.6
1989 - 1996	-4.9	-1.9	7.1	15.7
1979 - 1996	-10.5	2.4	28.3	50.0
Expansions				
1975 - 1979	4.3	8.1	10.7	11.7
1983 - 1989	8.8	11.1	21.8	35.3
1993 - 1996	7.7	5.5	4.2	4.5
Recessions				
1973 - 1975	-2.3	-3.5	-5.0	-7.7
1979 - 1983	-13.5	-6.0	-1.7	-4.2
1989 - 1992	-10.5	-5.6	-5.8	-7.4

Source: US Bureau of the Census, Current Population Reports, Series P60.

[1] Increases in the top quintile and top 5 percent between 1992 and 1993 may be substantially overstated due to changes in data collection and top-coding procedures.

Table 2
Inequality using Alternative Income Measures, 1980 - 1996
(Gini Coefficients, Household Income)

	Pre-Tax, Pre-Transfer[1]	Pre-Tax, Including Cash Transfers[1]	Pre-Tax, Pre-Transfer[2]	After-Tax, Excluding Transfers[2]	After All Taxes and Transfers[2]
1980	0.454	0.401	0.462	0.430	0.354
1985	0.471	0.418	0.486	0.460	0.385
1990	0.480	0.426	0.487	0.461	0.382
1996	0.505	0.447	0.511	0.483	0.398
Change					
1985 - 1990	0.009	0.008	0.001	0.001	-0.003
1990 - 1996	0.025	0.021	0.024	0.022	0.016
1980 - 1996	0.051	0.046	0.049	0.053	0.044
Percent Change					
1980 - 1985	3.7	4.2	5.2	7.0	8.8
1985 - 1990	1.9	1.9	0.2	0.2	-0.8
1990 - 1996	5.2	4.9	4.9	4.8	4.2
1980 - 1996	11.2	11.5	10.6	12.3	12.4

Source: US Census Bureau

[1] Excludes capital gains.

[2] Includes capital gains plus health insurance supplements to wage and salary income.

Table 3
Wage and Salary Income Inequality: Within-Group and Between-Group
Mean Log Deviation

		By Education		By Age and Education	
	Total	Within-Group	Between-Group	Within-Group	Between-Group
a. Male, Year-Round, Full-Time Workers					
1979	0.091	0.083	0.008	0.071	0.020
1989	0.131	0.110	0.021	0.093	0.038
1996	0.151	0.123	0.028	0.107	0.043
b. Male, All Workers Aged 25-64					
1979	0.155	0.145	0.010	0.139	0.016
1989	0.218	0.193	0.025	0.184	0.034
1996	0.233	0.204	0.029	0.196	0.038
c. Female, Year-Round, Full-Time Workers					
1979	0.069	0.060	0.009	0.055	0.013
1989	0.112	0.091	0.021	0.085	0.027
1996	0.131	0.105	0.026	0.097	0.034
d. Female, All Workers Aged 25-64					
1979	0.308	0.294	0.015	0.292	0.016
1989	0.331	0.299	0.032	0.297	0.035
1996	0.324	0.288	0.036	0.284	0.040

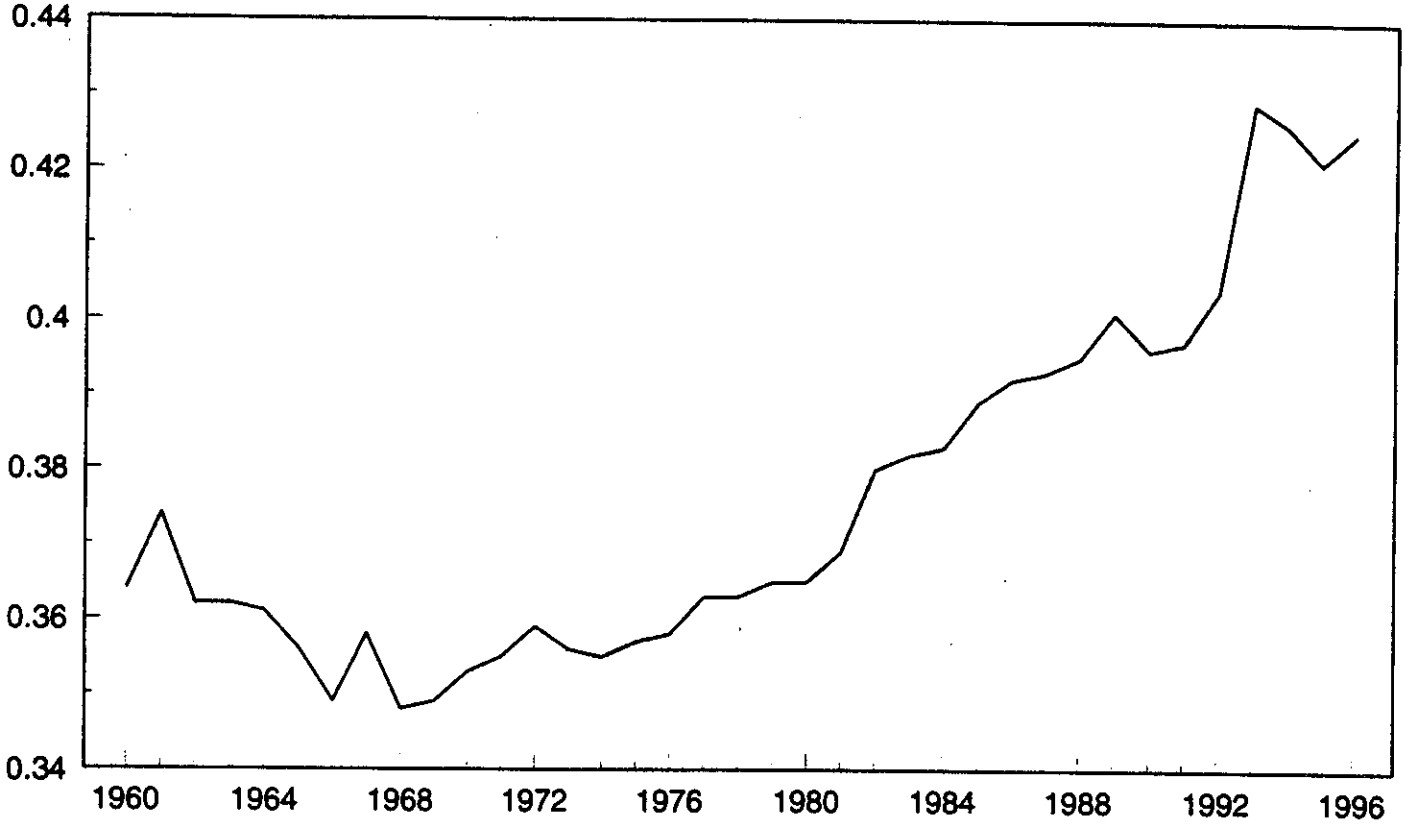
Source: Author's calculations using March CPS data.
Notes: The top 3 percent of the male distribution, and the top 1 percent of the female distribution among all workers of all ages are excluded, as are individuals whose computed hourly earnings were less than half the legal minimum wage then in effect. Numbers may not add up due to rounding.

Table 4
Wage and Salary Income Inequality Trends: Within-Group and Between-Group
Mean Log Deviation, Year-Round, Full-Time Workers

Change in Inequality	Male		Female	
	1979 - 1989	1989 - 1996	1979 - 1989	1989 - 1996
Total	0.040	0.020	0.044	0.019
By Education				
Within-Group	0.027	0.013	0.032	0.014
Direct Effect	0.030	0.013	0.033	0.014
Mix Shift	-0.002	-0.000	-0.002	0.000
Between-Group	0.013	0.007	0.012	0.005
Direct Effect	0.048	0.017	0.057	0.031
Mix Shift	-0.035	-0.010	-0.045	-0.026
By Age and Education				
Within-Group	0.022	0.014	0.030	0.012
Direct Effect	0.026	0.014	0.031	0.012
Mix Shift	-0.003	0.000	-0.001	0.000
Between-Group	0.018	0.006	0.014	0.007
Direct Effect	0.060	0.040	0.081	0.054
Mix Shift	-0.043	-0.033	-0.068	-0.046

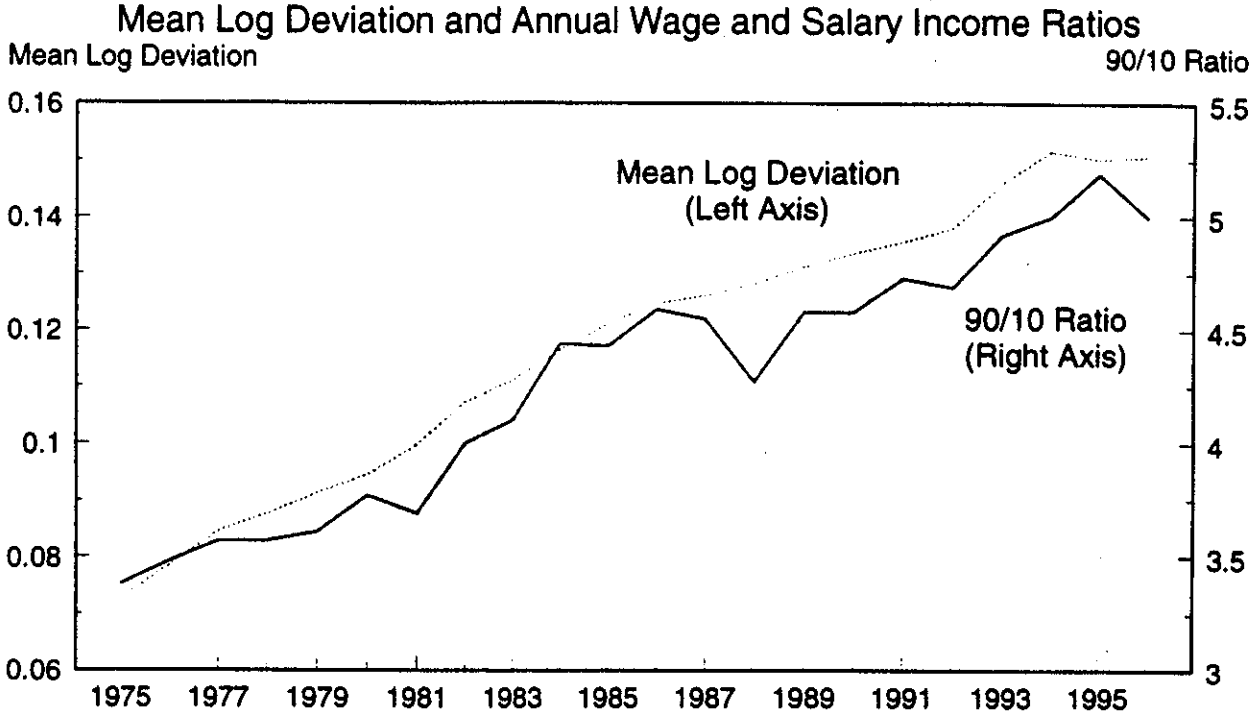
Notes: See table 3.

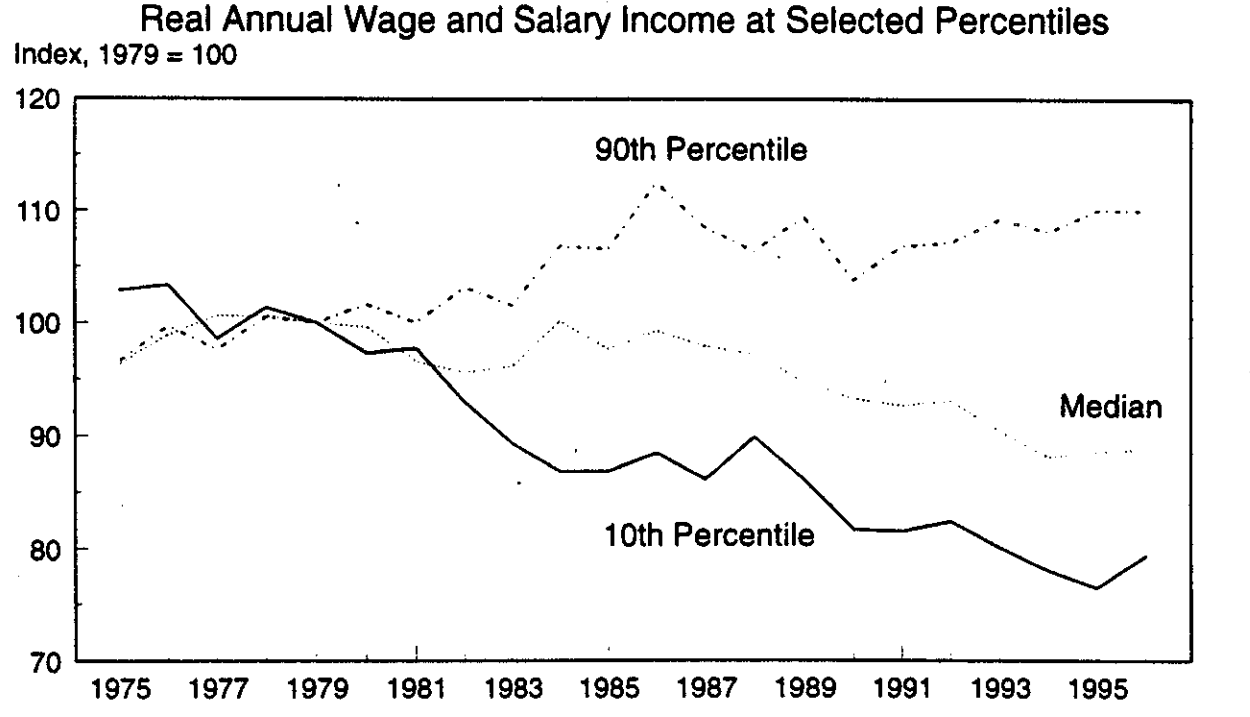
Chart 1: Gini Ratios for Families, All Races



Source: U.S. Census Bureau
Note: Shading denotes recession years. The increase in inequality between 1992 and 1993 may be overstated due to changes in data collection and top-coding procedures.

Chart 2: Annual Wage and Salary Income Inequality
Male Year-Round, Full-Time Workers

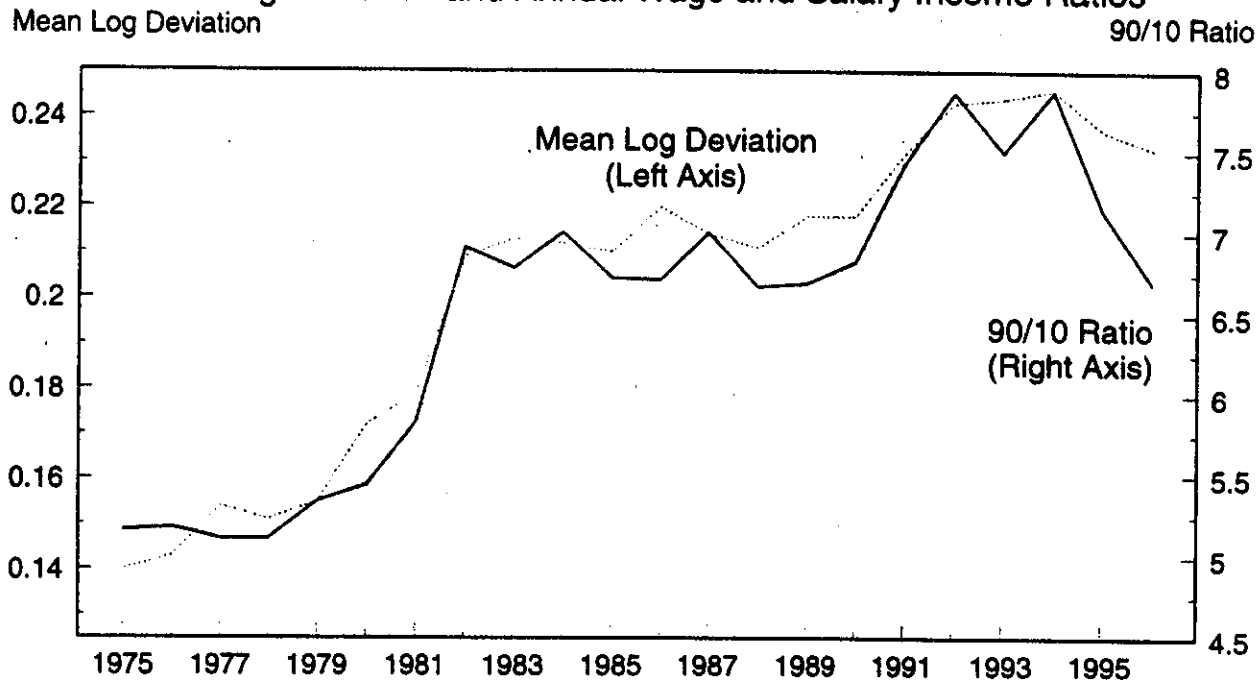




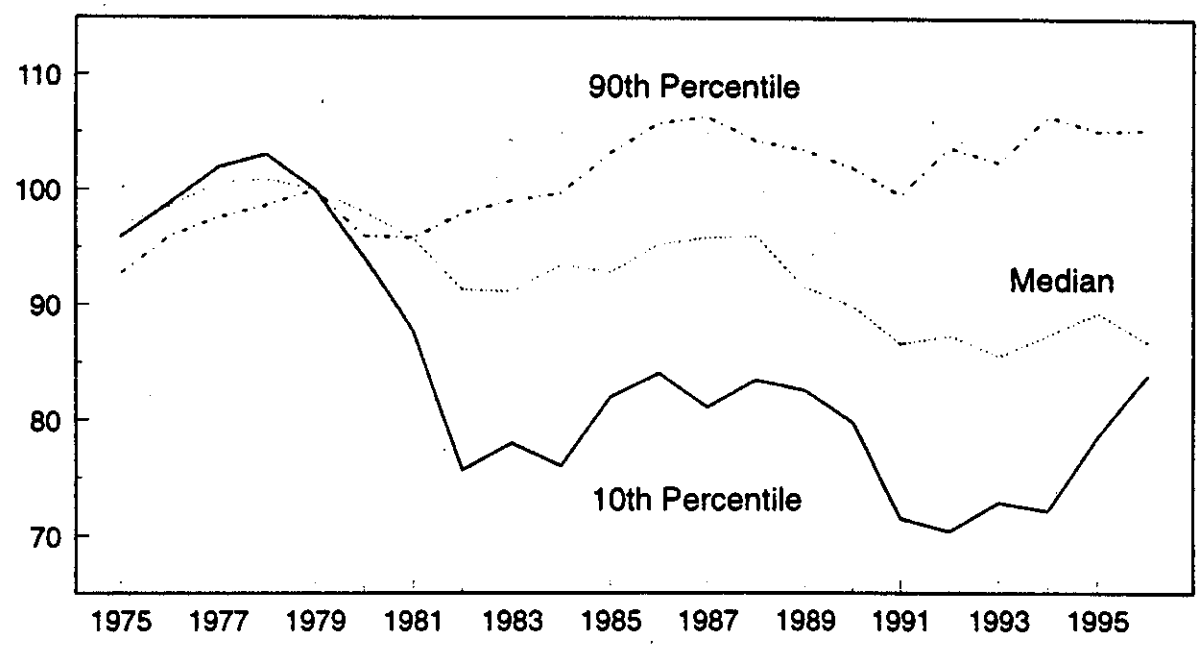
Source: Author's calculations using March CPS data.
Note: Shading denotes recession years. Income figures are deflated using the CPI-U-X.

Chart 3: Annual Wage and Salary Income Inequality
All Male Wage Earners Aged 25-64

Mean Log Deviation and Annual Wage and Salary Income Ratios

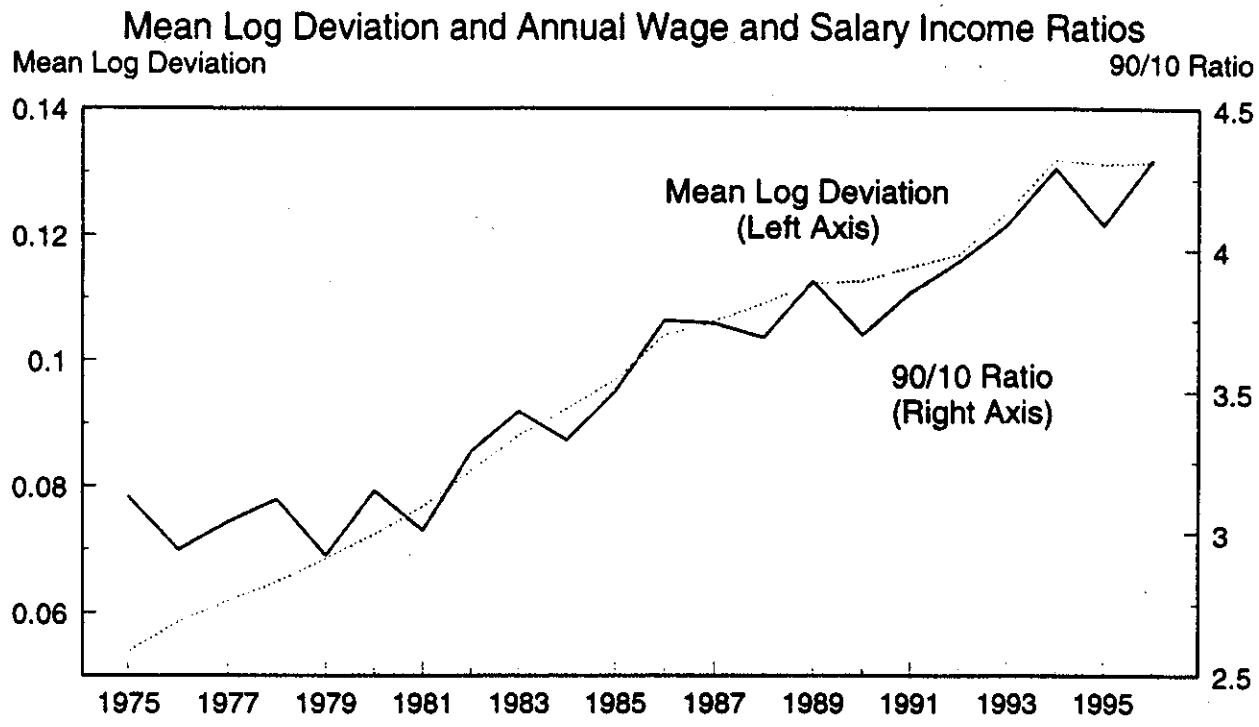


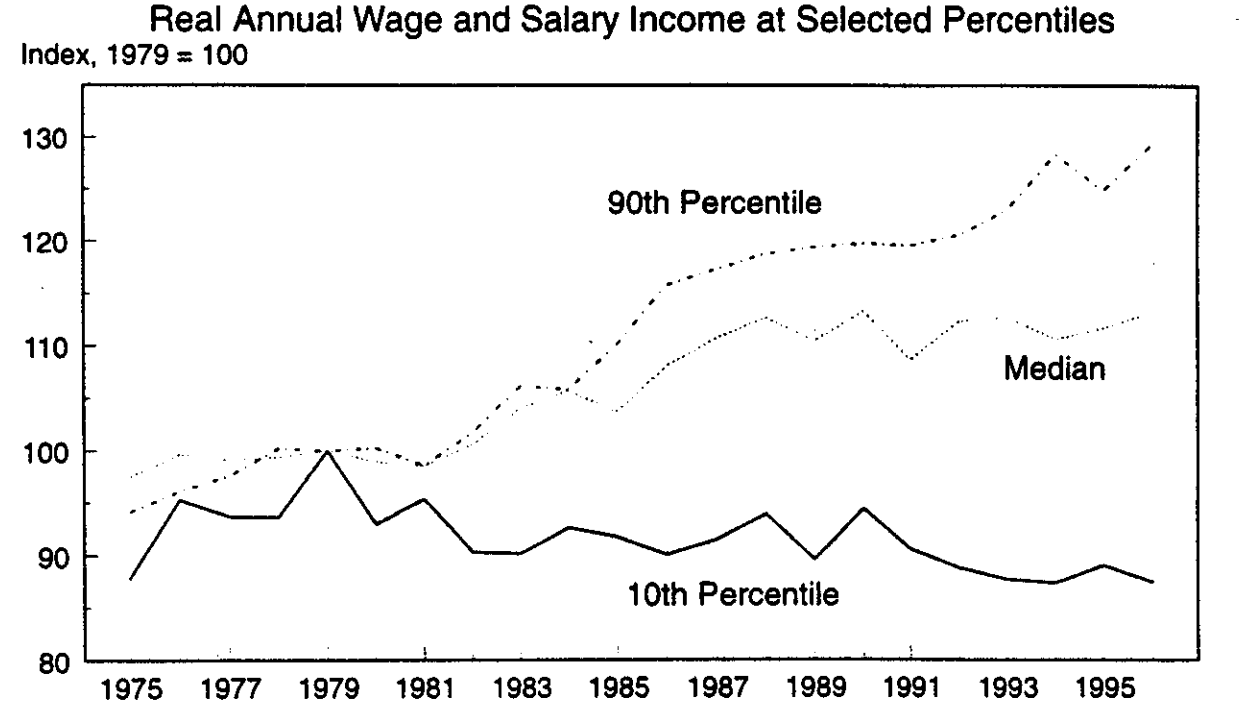
Real Annual Wage and Salary Income at Selected Percentiles



Source: Author's calculations using March CPS data.
Note: Shading denotes recession years. Income figures are deflated using the CPI-U-X.

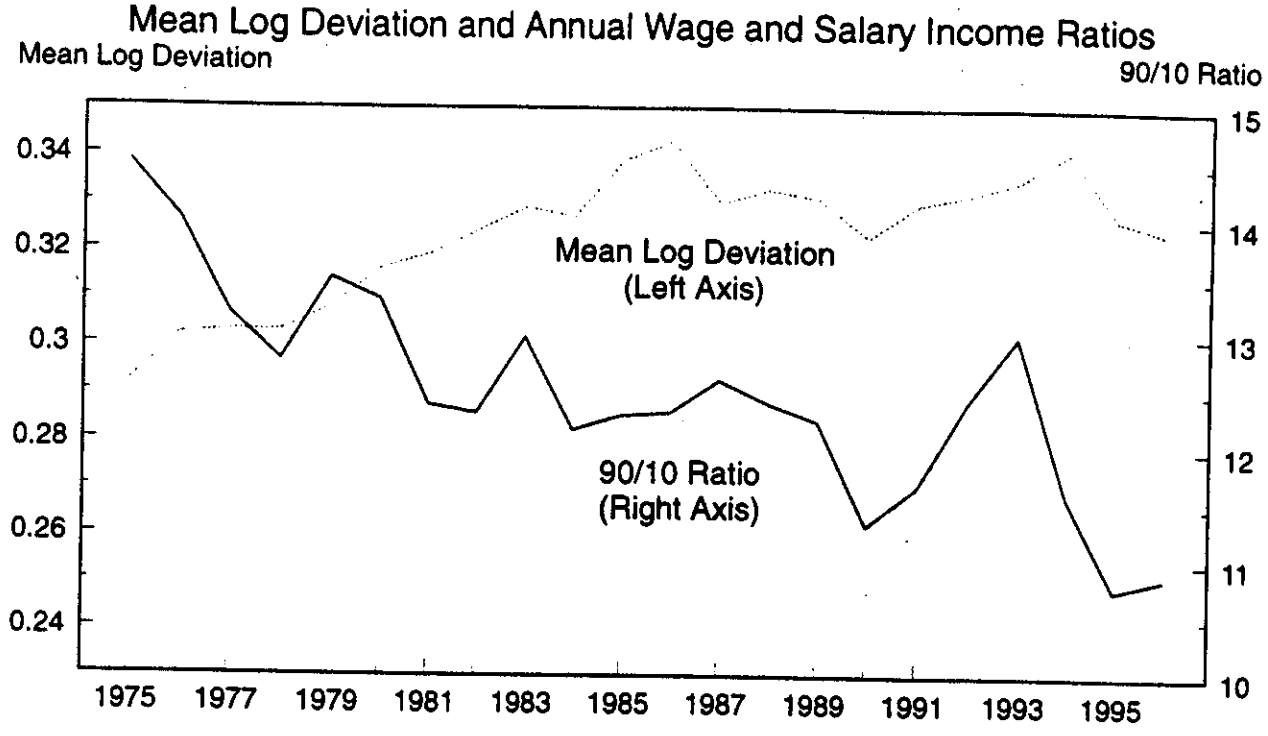
Chart 4: Annual Wage and Salary Income Inequality
Female Year-Round, Full-Time Workers

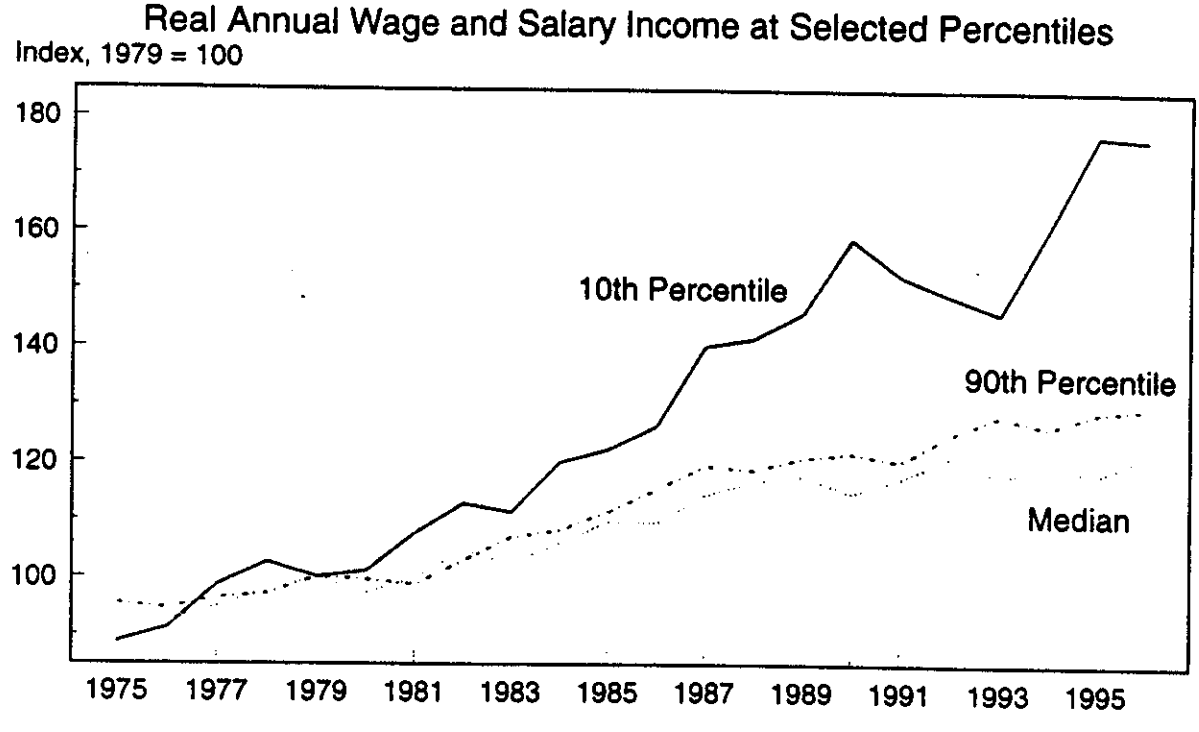




Source: Author's calculations using March CPS data.
Note: Shading denotes recession years. Income figures are deflated using the CPI-U-X.

Chart 5: Annual Wage and Salary Income Inequality
All Female Wage Earners Aged 25-64

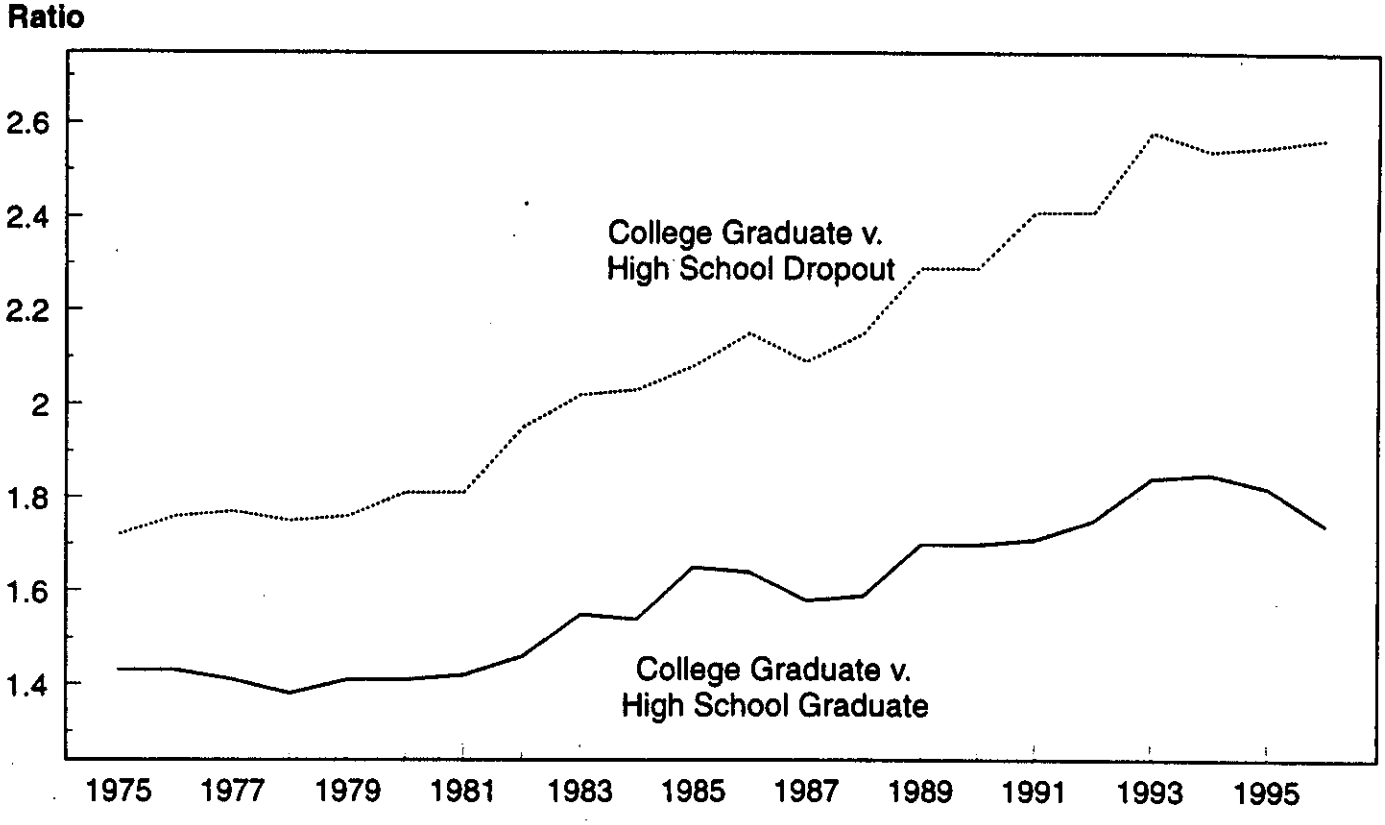




Source: Author's calculations using March CPS data.
Note: Shading denotes recession years. Income figures are deflated using the CPI-U-X.

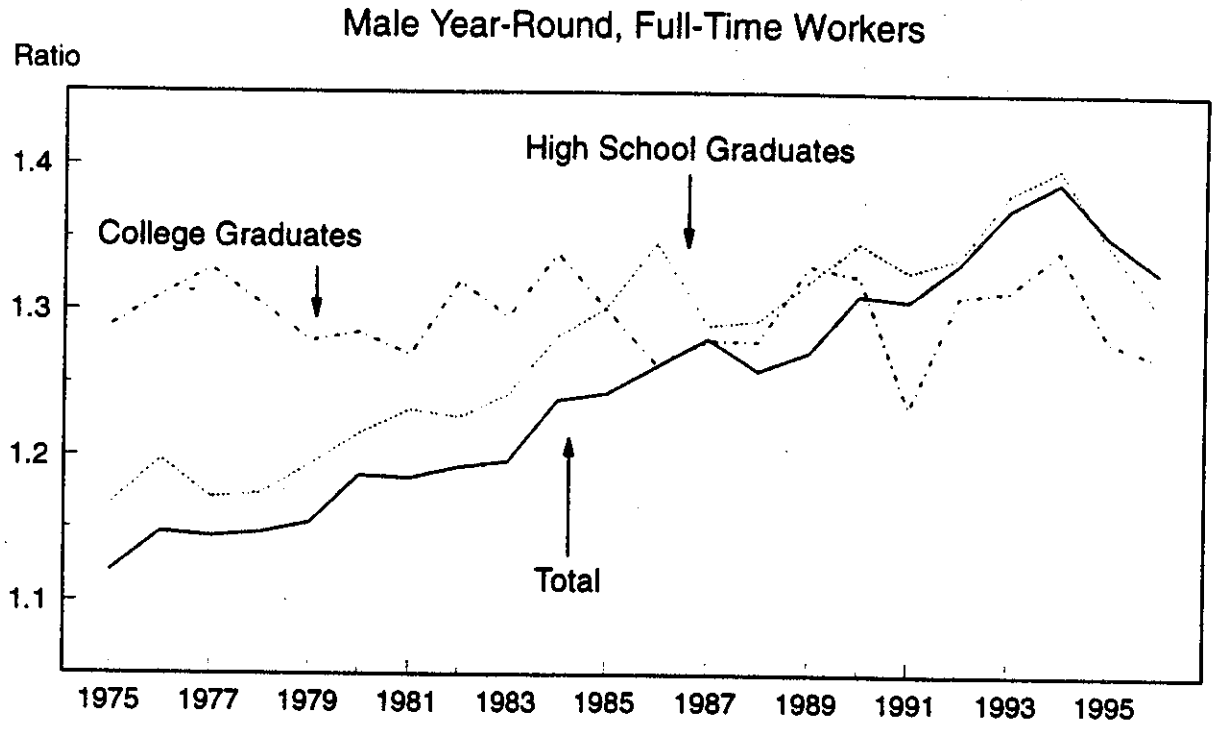
Chart 6: Median Annual Wage and Salary Income Ratios by Educational Attainment

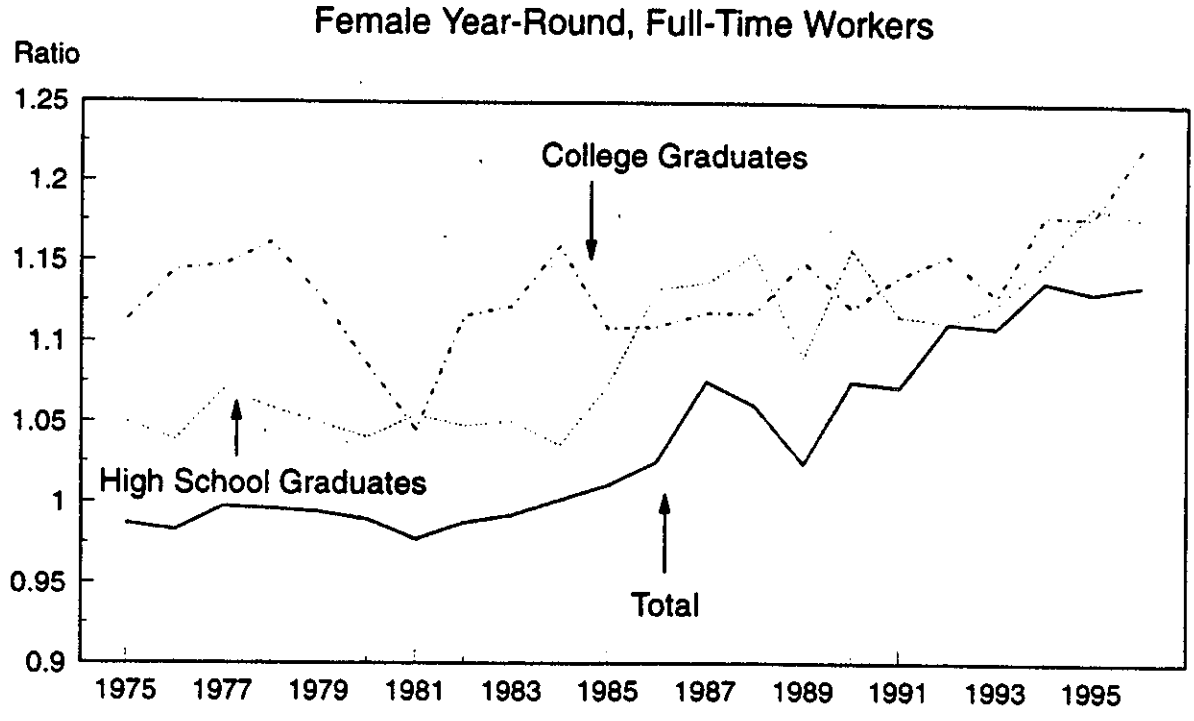
Male Year-Round, Full-Time Workers



Source: Author's calculations using March CPS data.
Note: Shading denotes recession years. Before 1991, college graduates are defines as persons with at least 16 years of schooling completed. High school graduates are persons with exactly 12 years of schooling completed, and dropouts are persons with fewer than 12 years completed.

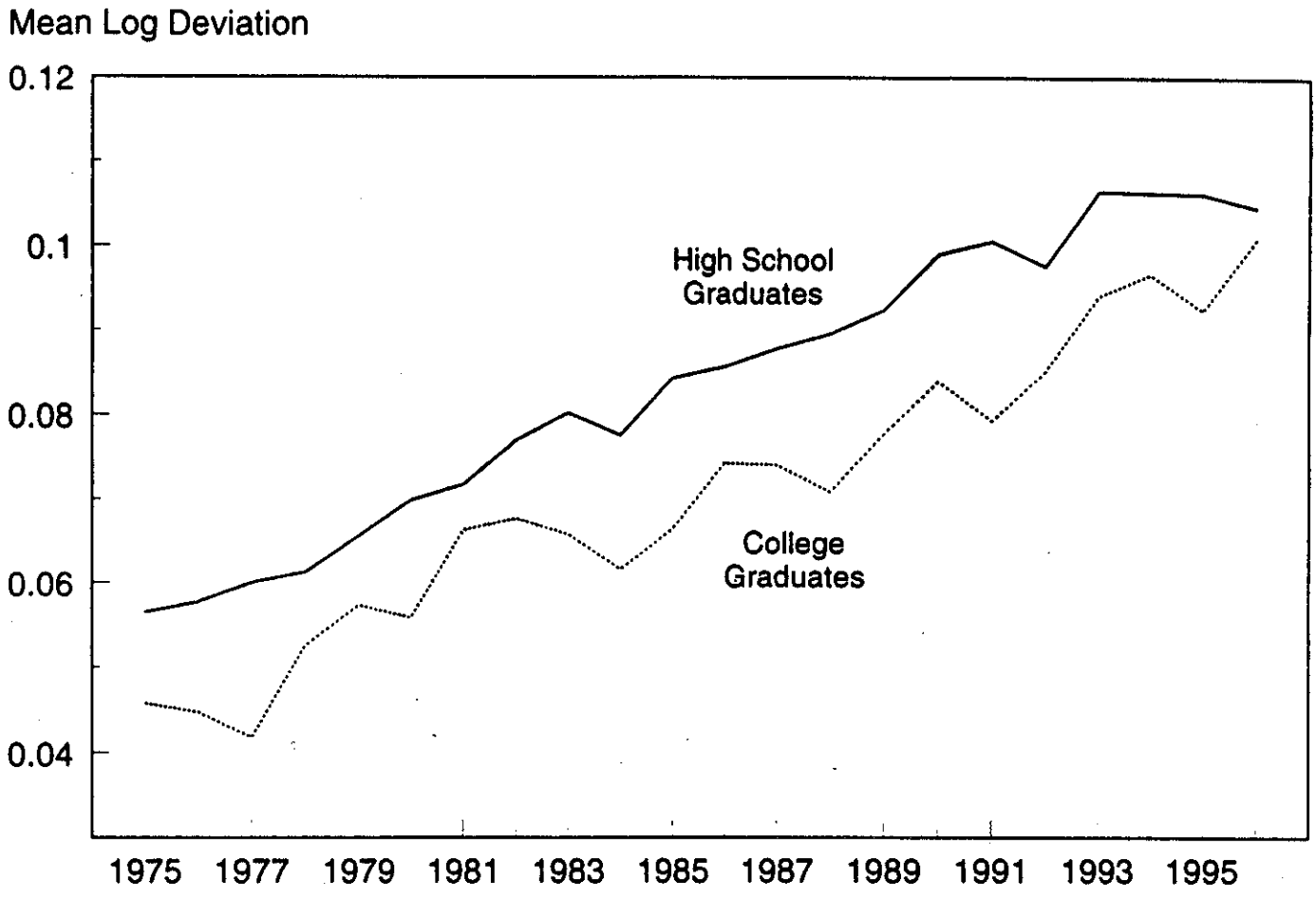
Chart 7: Mean Annual Wage and Salary Income Ratios
Year-Round, Full-Time Workers Aged 45-54 v. 25-34





Source: Author's calculations using March CPS data.
Note: Shading denotes recession years.

Chart 8: Within-Group Wage and Salary Income Inequality
Male Year-Round, Full-Time Workers Aged 35-44



Source: Author's calculations using March CPS data.
Note: Shading denotes recession years.

Box: Data and Measurement Issues

The analysis in this section is based on information on annual wage and salary earnings compiled from the March Current Population Survey (CPS). We apply two main measures to the overall wage distribution. The first is the ratio between the 90th and 10th percentile, a measure which provides an easy-to-understand indicator of the position of persons near the top relative to those near the bottom, and which is not affected by top-coding (see below). These ratios are, however, limited in the sense that they focus on particular points of the distribution rather than on the entire distribution. Another limitation is the strong tendency for bunching of reported annual earnings figures in the CPS at multiples of $1000 (Schweitzer and Severance-Lossin, 1996). This means that small shifts in the distribution, especially at the low end or when sample sizes are small, can exaggerate shifts in percentile ratios--an important concern in comparing year-to-year changes in the ratios, though relatively less important in examining long-run shifts in the distribution.

The other main measure employed in the analysis, which unlike percentile ratios uses the entire distribution, is Theil's mean log deviation (MLD).[1] Following Jenkins (1995) we define the MLD measure for the entire population as

$$(1) \qquad T_0 = (1/n) * \sum_{I=1}^{n} \log (\mu/y_i),$$

where n is the number of individuals, μ the mean income of the population, and y_i the income of individual I. Taking account of the fact that in the CPS different individuals receive different weights relative to the underlying population, this expression can be rewritten as

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[1]Theil (1967).

$$(2) \qquad T_0 = \log \mu - \sum_{i=1}^{n} w_i \log y_i,$$

where w_i is person i's CPS weight, $\mu = \sum_{i=1}^{n} (w_i * y_i)/N$, and $N = \sum_{i=1}^{n} w_i$.

The MLD measure has very useful decomposition properties enabling us to distinguish between within-group and between-group inequality. If the population can be completely described by K mutually-exclusive subgroups, equation (2) can be rewritten as:

$$(3) \qquad T_0 = \sum_{k=1}^{K} s_k T_{0k} + \sum_{k=1}^{K} s_k \log (\mu/\mu_k),$$

where s_k is group k's share of the population, T_{0k} the MLD statistic calculated only for persons in sub-group k, and μ_k the mean income level for group k. The first term is therefore an average, weighted by group size, of that portion of inequality that occurs within groups. The latter term reflects the degree of inequality arising from differences between group and overall population means. Because the decomposition is additive, any increase in either the within-group or the between-group component of inequality translates directly into a change in inequality for the entire population.

Several practical difficulties arise in working with CPS data. The most serious is that in any year incomes above a certain level are top-coded in order to protect respondents' privacy, with the top-code values having been adjusted only intermittently. Failing to account for top-coding, which in several years affected more than 2 percent of the observations on male earnings, could result in a spurious increase in measured inequality in years when top-codes

were raised. As long as average nominal incomes are rising, it can also lead to a spurious downward drift throughout periods when nominal top codes were held constant. In fact, wage and salary incomes were top-coded at $50,000 from 1975-1980, $75,000 from 1981-83, and $99,999 from 1984-94. Between 1988 and 1994 the limit was applied to income from any one job: persons who held more than one job during the year could have recorded incomes as high as $199,998. Beginning in 1995, individuals with earnings exceeding $150,000 were assigned earnings values equal to the mean actual value among individuals with earnings above that amount with similar characteristics. As a result of this change, aggregate tabulations from the CPS public use files match those published by the Census Bureau.

One way to circumvent top-coding is through percentile ratios, as long as incomes at the particular percentiles chosen are unaffected. Alternatively, in applying measures such as MLD that are intended to capture the entire distribution, we circumvent top-coding by truncating the sample. Specifically, for the sake of historical consistency, in all years we exclude the top 3 percent of the male wage distribution and the top 1 percent among women.[2] The importance of top-coding restrictions can be seen from Table B1, in which we compare MLDs calculated for

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[2]We also eliminate some implausibly low earnings estimates near the bottom of the distribution by computing hourly earnings (annual earnings divided by the product of usual weekly hours and weeks worked), excluding those whose hourly earnings were less than half the legal minimum wage then in effect. This is based on a judgement that very low annual earnings figures relative to reported weeks worked and usual weekly hours in could in most cases be attributed to some combination of underreported income, overstated labor input, and/or misclassification of unpaid work. The minimum wage for nonfarm workers was $2.10 in 1975, $2.30 in 1976-77, $2.65 in 1978, $2.90 in 1979, $3.10 in 1980, $3.35 from 1981 through March 1990, $3.80 from April 1990 through March 1991, $4.25 from April 1991 through 1995, and $4.75 beginning in October 1996. The threshold for exclusion was prorated in 1990, 1991, and 1996.

1996 with the sample exclusion with those obtained without truncating the sample. It is clear from the table that truncation necessitated by top-coding results in a substantial understatement of the degree of measured inequality at any point in time. We can treat the 1996 figures using the full distribution as being essentially accurate. Unfortunately, however, we are unable to compare them with figures from earlier years.

In addition to top-coding concerns, over the years there have been several changes in basic CPS gathering and processing procedures. In March 1989 new processing procedures were introduced, following which the March 1988 data set (covering 1987) was re-released using the new procedures. Comparing the two versions revealed minor differences in both distributional measures. Figures reported for 1987 in this article are based on the new procedures, with earlier income levels and percentile ratios adjusted proportionately, and earlier MLD's adjusted additively, based on the observed differences between the old and new procedures in 1987. In 1994 the entire questionnaire was overhauled in order to improve the accuracy of current employment and unemployment statistics. This overhaul may have also affected annual earnings estimates, but their impact on either earnings levels or distributional measures is unknown. Unusually large increases were observed within the top quintile--and especially the top 5 percent--of the income distribution between 1992 and 1993. However, Ryscavage (1995) argues that the observed increase in inequality between those years is consistent with changes in employment patterns, though he acknowledges the possibility that changes in the survey may have played a part.

Table B1
Effects of Top-Coding on Wage Inequality, 1996
Mean Log Deviation

	Excluding Top of Distribution[1]	Including Top of Distribution[1]	Difference
Male, Year-Round, Full-Time Workers	0.151	0.253	0.103
Male, All Workers Aged 25-64	0.233	0.335	0.102
Female, Year-Round, Full-Time Workers	0.131	0.178	0.047
Female, All Workers Aged 25-64	0.324	0.368	0.044

[1] Top 3 percent of male distribution, top 1 percent of female distribution, among all workers of all ages.

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