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# Wage Inequality, Earnings Inequality and Poverty in the U.S. Over the Last Quarter of the Twentieth Century[1]

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**Abstract**
This paper tracks distributional changes over the last quarter of the twentieth century. We focus on three conceptually distinct distributions: the distribution of wages, the distribution of annual earnings and the distribution of total family income adjusted for family size. We show that all three distributions became less equal during the last half of the 1970's and the 1980's. This was, however, not the case during the 1990's. Wage inequality stabilized, earnings inequality declined and family income inequality actually continued to rise. We decompose changes in family income inequality over the last quarter century and show that roughly half of the increase is accounted for by changes in the distribution of earnings. This suggests that further research on family income inequality should pay as much attention to changes in the distribution of other income sources as to factors affecting the labor market.

**Introduction**

The1990's in the United States was a prosperous period during which real earnings and real family incomes increased throughout the income distribution for the first time since the 1960s. While the 1950's and 1960's was an era during which a "rising tide lifted all boats," this kind of economic performance ended abruptly with the oil shock and recession of the early-1970s (Danziger and Gottschalk, 1995). What followed was a decade that saw three recessions, rapid inflation, slow economic growth, and rising inequality of earnings and family income, labeled by Frank Levy (1987) as "the quiet depression".

The early-1980s saw a dramatic change in government monetary and fiscal policy. Government social spending was reduced and monetary policy was tightened. These policy changes, a second oil shock and increased global competition for manufactured goods contributed to recessions in the early-1980's and the early-1990's. As a result, there was a dramatic reduction in the inflation rate, an increase in the unemployment rate, and declines in both real wages for less-educated workers and in real family income for those at the bottom of the income distribution.

The decline in inflation, however, helped set the stage for the economic recoveries of the 1980s and 1990s. For example, the consumer price index more than doubled in less than a decade, rising by 117 percent between 1973 and 1982. But, it then rose by only 80 percent over the next two decades, between 1982 and 2002. And, during the economic boom of the 1990s, inflation was less than 3 percent per year.

The employment experience of the 1990s was also very different from that of the 1950's and 1960's. The annual employment rate for men over the age of 20 was below 5 percent in 23 of the 25 years between 1950 and 1974, but below 5 percent in on only 4 of the 20 years between 1975 and 1994[2]. It then fell below 5 percent in 1995 and stayed below that level for the next 7 years. During the 1990s boom, the employment rate for all persons over 16 years of age increased from 62 percent in 1991 to 64 in 1999, due in part to increases in the labor force participation rate. By 2000 the male unemployment rate had fallen to 3.3 percent, the lowest rate since 1973.

In contrast, to the experience of the 1970's and 1980's, the recovery of the 1990s, like that of the 1960s, was one in which the real earnings and family incomes of those at the bottom of the distribution as well as those of the affluent increased. For example, the real average hourly earnings of

private sector production workers fell by about 15 percent between 1973 and 1993, but then increased by about 8 percent between 1993 and 1999. The official Census Bureau poverty rate declined from 15.1 percent in 1993 to 11.8 percent in 1999, only slightly higher than the historical low rate of 11.1 percent in 1973. However, the 1999 rate was higher than would be expected given the large increase in per capita income between 1973 and 1999. Poverty in the U. S. is also much higher than in most of Western and Northern Europe (see, Smeeding, Rainwater and Burtless, 2001).

The decline in poverty during the 1990s recovery more than offset the poverty-increasing impact of the recession that started in July 1990 and ended in Mach 1991. The employment rate dropped from 63.0 to 61.7 percent between 1989 and 1991 and the unemployment rate for all adults increased from 5.3 to 7.5 percent over those years. As a result, poverty rose from 13.5 to 15.1 percent between 1990 and 1993. Thus, about half of the 3.3 percentage point drop in poverty between 1993 and 1999 simply offset this 1.6 percentage point increase that occurred in the previous recession.

The 1990's provides a useful opportunity for re-examining the effects of economic growth on poverty and inequality. This period covers both a recession and a strong recovery. It also covers a period during which the distribution of wages became more equal, but family income inequality continued to increase. While family income inequality almost always increases during recessions, the increased inequality during periods of economic growth is a more recent phenomenon in the U.S. Prior to the mid-1970's expansions tended to both increase median income and to reduce inequality of family income. As a result, both factors led to poverty reductions during expansions. Since the mid-1970's, however, these factors have tended to be offsetting. Expansions increased the incomes of the average family, but those at the bottom experienced smaller increases than average and even actual decreases in family income.

participation rate. Data on labor market conditions and prices are available on the website of the U.S. Bureau of Labor Statistics (www.bls.gov).

We begin this paper by discussing measurement issues that guide our analyses. Then we place changes in poverty, growth and inequality in a historical context by contrasting changes during the 1990s to changes over the three previous decades. We then turn to a detailed examination of labor market developments during the 1990's. Our analysis of the level and distribution of wage rates and annual earnings is followed by an examination of the links between the distribution of individual earnings and the distribution of family income. The latter is affected not only be individual earnings, but also by the number of earners in the household, other sources of income, such as government transfer payments and property income, and the demographic composition of households.

**Measurement Issues**

We use both the 1 percent Public Use Microdata files (PUMS) from the decennial Censuses of Population for 1950 through 1990 and the annual March Current Population Surveys (CPS) from 1976 to 2002 to analyze changes in individual earnings and family income. The Census data allow us to cover a longer period (1959 to 1999) and to focus on more detailed demographic groups. Using only decennial data, however, masks important cyclical changes. We, therefore, use the CPS to track yearly changes over the period 1975 to 2001.[3]

We have devoted considerable attention to using comparable samples and definitions of income across these two data sets. However, there are differences between the quality of the earnings and income data--the Census primarily relies upon self-report, with most respondents mailing back their completed form, whereas the CPS data are gathered in-person by professional interviewers. The Census has much larger samples—the 1 percent file has information on more than 2.5 million persons, whereas the CPS is based on a sample of about 60,000 households. However, the CPS data are

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[3] The 1976 CPS, which reports income and earnings for 1975, is the first to provide a measure of hours worked per week, which we use to calculate hourly wages. The 2002 CPS is the most recent one that is available.

weighted to reflect both sample non-response and the sample design; there are no corrections for non-response in the Census.

Our analysis of family income is based on a sample that includes all individuals except those in the armed forces, living in group quarters and unrelated individuals less than 15 years old. Individuals are classified as poor on the basis of their family income divided by the poverty line, which varies by family size. The Census defines a family as "a group of two or more persons related by birth, marriage or adoption and residing together." We consider unrelated individuals to be a one-person family. Incomes of all family members who reside together are summed when we measure poverty and family income.[4]

The poverty thresholds used to construct the published poverty series cited above were set in the early 1960's and have been updated for price increases using the Consumer Price Index for All Urban Consumers (CPI-U) in every year.[5] According to the Bureau of Labor Statistics, however, the price index would have grown more slowly in the past 20 years if the most recent methods of constructing the price index were applied to the historical data. The BLS now produces the Consumer Price Index Research Series (CPI-U-RS) which it considers to have better adjustments for the aging of housing units, the prices of used cars, personal computers and television. This measure also accounts for some consumer substitution within CPI item categories (see Stewart and Reed, 1999). The BLS

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[4] Our measure does not sum income across unrelated persons. This is appropriate in many cases. For example, two young adults who happen to share an apartment are not likely to pool their incomes. However, if the two young adults are cohabiting, they would be more likely to pool their incomes. Because we can not distinguish roommates or boarders from cohabiters we use the Census definition of family. The Census also sums income over all related persons in a unit, even where there is a related subfamily in the unit. For example, if a middle-aged couple have living with them their married daughter and her husband, the Census Bureau pools all of their income and counts them as one family of four persons, not two couples. These Census Bureau procedures differ from those used in official statistics in many European countries.
[5] The official poverty thresholds and time series of poverty rates can be found in the Current Population Reports, series P-60 or on the Census Bureau website, www.census.gov.

reports that over the 21 year period from December 1977 to December 1998, the CPI-U-RS increased by 141.2 percent, whereas the CPI-U increased by 163.9 percent.[6].

We use the CPI-U-RS to adjust the poverty thresholds over the period since 1969. Thus, our poverty thresholds and our poverty rates are somewhat lower than the official series. For example, we classify 9.5 percent of all persons as poor in 1999 in contrast to the 11.8 percent in the official Census series.

Family income is defined as the sum of <u>money income</u> from all sources during the calendar year preceding the March CPS or the April Census. Money income includes wages and salaries, self-employment income, property income (such as interest, dividends, and net rental income), cash transfers from government income maintenance programs and other cash receipts. It does not include capital gains, imputed rents or government or private benefits provided in kind (such as food stamps, Medicare, or employer-provided health insurance), nor does it subtract taxes paid or tax credits received, even though all of these omissions affect a family's current standard of living. The Census Bureau does publish an experimental series for recent years 1979 that attempts to correct for many of these omissions (http://www.census.gov/hhes/poverty/povmeas/reports.html). Because we are examining a much longer time period, and because we do not have access to the Census microdata that include estimates of in-kind transfers and taxes, we use Census money income (post-cash transfer, pre-tax income).

When we examine trends in family income we divide by the poverty line. This measure of "income relative to needs" thus purges the trend in family income of changes in the average family size over time.

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[6] For more information on the CPI-U-RS, see the website of the Bureau of Labor Statistics, http://stats.bls.gov/cpi/cpirsdc.htm.

We use standard measures of inequality, including the Gini coefficient, the coefficient of variation, the standard deviation of log income and the ratio of the income at the 90th percentile to that at the 10th percentile. These relative income measures, however, do not give information on the proportion of persons with incomes below or above a fixed threshold. For example, if everyone's income increased by the same percentage then there would be no relative improvement for those at the bottom or the top of the distribution, even though fewer individuals had incomes below a fixed low-income threshold and more had incomes above a fixed high-income threshold. The poverty rate is such a measure for changes in absolute income at the bottom of the distribution. In order to have a corresponding measure for the top of the distribution, we calculate the proportion "rich", which we define as persons living in households with incomes greater than seven times the poverty line. For a family with two adults and two children this is equivalent to $118,265 in 1999 dollars. Any threshold for defining the rich or poor is arbitrary. However, in previous research, we experimented with setting the threshold for the rich at eight or nine times the poverty line and found little difference in trends in the proportion rich (Danziger and Gottschalk, 1995; Danziger, Gottschalk and Smolensky, 1989).

Our analysis of long term changes in the earnings distribution is constrained by the limited information on earnings and labor force status available in the PUMS. For this analysis, we use the weekly earnings of full-time workers, ages 22 to 62, who worked in at least 39 weeks of the year, and did not work part-year due to being in school, retired or in the military.[7] Persons who were self-employed or working without pay are also excluded.[8] The person sample weights are used throughout.

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[7]For the 1980, 1990 and 2000 PUMS, respondents are classified as full-time if they reported that usual weekly hours worked last year was 35or more. This variable about full-time status last year is not available in the 1960 and 1970 PUMS. For these two data sets we classify workers as full-time if they worked 35 or more hours in the week prior to the interview.
[8] The analysis of labor market changes using the PUMS data uses a sample similar to those used by Katz and Murphy (1992) and by Gottschalk (1997), with the exception that those studies required that sample members be in the labor force for 39 weeks and have worked at least one week. Because only the 1980 PUMS includes information on labor force participation last year, we restricted our PUMS samples to persons who were employed at least 39 weeks last year.

The March CPS includes a much richer set of questions which allow us to obtain estimates of the hourly wage for all workers.[9] This CPS sample includes all individuals between the ages of 22 and 64, who had positive weeks of work and positive wage and salary earnings in calendar year prior to the March interview.[10] CPS person weights are used.[11]

Because most measures of inequality are sensitive to outliers and to changes in top coding, we exclude observations in the top and bottom two percent of the hourly wage distribution and the distribution of family income-to-needs. Inequality measures which are based on the trimmed data should be interpreted as showing changes in the truncated distribution of wages.[12] When we analyze the 90/10 percentile ratios we use the full sample since these ratios are not affected by the value of outliers above the 90th percentile or below the 10th percentile.[13] For the family income analysis, we use this trimmed sampled (i.e., we exclude the top and bottom two percent of the income-to-needs distribution). Again, we use the full sample when we examine the 90/10 percentile ratios or the proportion rich or poor since these are also not affected by changes in the extremes of the distribution.[14]

### The Long View—Trends in Poverty and Inequality from the Decennial Census, 1959-1999

In this section, we use the PUMS to compare trends in poverty and the percent rich and changes in the level and distribution of male earnings and family income over the past four decades;

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[9] Hourly wage rates are calculated by dividing annual earnings by the product of weeks worked last year and usual hours worked per week last year. This information is first available in the 1976 CPS.

[10] Sample members were also required to have positive potential labor market experience (i.e., age- education -6 >0). These sample definitions are the same as in Card and DiNardo (2002), except that they include persons 16 to 64. We restrict the sample to those between the ages of 22 and 62 to focus on those whose attachment to the labor force is less likely to be affected by schooling and retirement decisions.

[11] Card and DiNardo (2002) weight by hours worked as well as by the CPS sample weights. We find that this difference in weighting makes very little difference and we prefer to use the distribution across persons rather than the distribution across hours.

[12] We depart from Card and DiNardo (2002) in this respect, as they exclude all observations whose hourly wage is less than one dollar or greater than $100 in 1979 dollars. Both methods give similar results

[13] The top threshold is high enough to exclude top-coded values in all the years.

this provides a long-term perspective. However, the Census years that mark the end of each decade are not always at the same point in the business cycle. These comparisons, therefore, mix secular changes with cyclical changes. Thus, in the following section we focus on annual data from the CPS which allow us to consider trends and changes between specific points in the business cycle.

Figure 1 shows the percentage point change in the proportion of persons classified as poor and rich. The decade with the largest decline in poverty was the 1960s. Poverty dropped by 9 percentage points, from 23.3 to 14.3 percent. Poverty then fell by about 3 points in the 1970s, did not change in the 1980s and then declined by 2.4 points in the 1990s.[15]  In contrast to the official Census Bureau series, our series, which uses the CPI-U-RS, has poverty at an historic low in 1999. Compared to the 1980s, there was more progress against poverty in the 1990s, but less than in the prior two decades. Poverty fell as much in the 1970's as in the 1990's, even though there were two recessions and two oil shocks in the 1970s.

Much attention has been paid to the increase in the percentage of the population that has moved into the upper tail of the income distribution. Our measure of the proportion rich shows that persons living in families with incomes more than seven times the poverty line increased from 1.9 percent in 1959 to 20.1 percent in 1999.  Most of this increase took place after 1979. The ranks of the rich increased by 3.3 percentage points in the 1960s and by 4.0 points in the 1970s.[16]  In the 1980s, the increase was 5.3 points and it was 5.6 percent in the 1990s.

Viewed in a longer perspective, there are substantial differences between the first two decades and the last two. Between 1959 and 1979, poverty declined by about 10 points and the percentage rich

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[14] For our decomposition of changes in the poverty rate, we use the full sample, except that the growth rate in the mean is computed from the trimmed sample. For our decomposition of inequality by income source, we also use the trimmed sample.

[15] Throughout we refer to decades as the period between decennial Censuses.  For example, change during the 1990's is defined as the change between 1989 and 1999, which are the calendar years covered by the 1990 and 2000 Census.

[16] While the discussion is usually in terms of relative position of those at the top, our measure of the proportion rich is an absolute measure.  We turn to relative measures of inequality later in this section.

increased by about 7 points—there was growth throughout the distribution and inequality of family income-to-needs was falling.  From 1979 to 1999, poverty fell by just 2.3 points, and the percentage rich increased by almost 11 points, as income inequality surged upwards. Thus, by these absolute measures of the poor and the rich, the 1990s differ from the 1980s primarily because those at the bottom gained in the 1990s but did not in the 1980s';  the gains at the top of the distribution during the 1990's are quite similar to those of the earlier decade.[17]

As we will show in a later section, the proportion poor and the proportion rich are both affected by changes in the mean of the income distribution and changes in inequality of family income.  These are in turn affected by changes in labor markets that affect mean earnings and inequality of earnings and the number of workers per family.

Figure 2 shows the percentage change in mean family income-to-needs (i.e., family income divided by the poverty line) and the percentage change in mean weekly earnings of full-time full-year male workers. Both of these series are in constant dollars using the CPI-U-RS.  The latter is used as an indicator of changes in the mean of the earnings distribution for a group whose hours do not change very much over time.[18]

Between 1959 and 1999, mean family income-to-needs more than doubled, from 2.07  to 4.72 times the poverty line.  The most rapid growth—37 percent—was in the 1960s. Income growth in the other decades was fairly similar—22 percent in the 1970s, 15 percent in the 1980s and 19 percent in the 1990s.  Thus, in terms of mean family income growth, the 1990s were somewhat better than the 1980s and somewhat worse than the 1970s.

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[17] As we will show later, this partially reflects the fact that our absolute threshold for the proportion rich occurs to the right of the mode. As a result, there are more people near the threshold in each successive decade as mean income increases. Equal shifts in the distribution therefore have an increasing impact on the proportion rich. The reverse is true of the poverty rate. Because the poverty line is to the left of the mode, increases in the mean of the distribution have a decreasing impact on the percentage poor.
[18] Including females would introduce additional factors, such as the changing composition of women who are becoming full-time full year workers.

Real weekly earnings of male full-time full-year workers grew substantially less than mean family income in every decade. One of the major factors contributing to the more rapid growth in family income than in male earnings was the increased labor supply of married women—by the end of the century, two-earner households were much more common than they had been 40 years earlier.. Over the 40 years, real earnings increased by 62 percent, or only by about half as much as family income divided by the poverty line.  The gaps between these two series were greatest in the 1970s and 1980s when the growth rate of earnings was only about one-third the growth rate of family income.  As with family income,  the 1960s were the fastest-growing decade for male earnings, with a 31 percent increase.  During the 1990's weekly earnings grew only by about 9 percent, which is somewhat higher than the 8 percent growth of the 1970s and almost twice the 5 percent growth of the 1980s.

While mean family income grew substantially between 1959 and 1999, this growth was not evenly distributed after 1979.  Figures 3 shows the changes across each decade in two commonly-used measures of inequality, the Gini coefficient and the ratio of the family income at the ninetieth percentile to that  at the tenth percentile.  The Gini coefficient of income-to-needs changed little between 1959 and 1979, dropping from .354 to .341 over the 1960s and remaining at .341 in 1979. But, then the Gini increased to .369 in 1989 and continued to increase to .399 in 1999—this represents an 8 percent increase in each decade.

 In 1959, a family at the 10$^{th}$ percentile had an income that was just about half of the poverty line; one at the 90$^{th}$ percentile had an income that was 4.2 times the poverty line, so the P90/P10 ratio was 8.2. This ratio declined to 7.3 in 1969 as incomes at the 10$^{th}$ percentile grew faster than did incomes at the top during the 1960s.  Income growth was similar at both tails of the distribution in the 1970s, but in the 1980s, income at the 10$^{th}$ percentile declined and the P90/P10 rose by 21 percent to 9.0.  The 1980's, therefore, stand out as a period of rapid increase in family income inequality, whether measured  by changes in the Gini coefficient or the P90/P10 ratio.  While inequality continued to

increase in the 1990s, increases were smaller than in the 1980's. The P90/P10 ratio increased by 10 percent to 10.0. However, unlike the 1980s, incomes at the 10th percentile rose in absolute terms by 13 percent in the 1990s; inequality increased because incomes at the 90th percentile increased by 24 percent during this decade[19]. Thus, the growth in family income inequality in the 1990's reflected the rich getting richer, rather than the poor falling behind.

The 1990s were, therefore, a period of faster growth in mean family income and slower growth in inequality than the 1980s. Nonetheless, the growth rate and distributional performance of these decades were poor compared to those of the earlier two decades, which had higher rates of growth of earnings and family income and declining or stable earnings and income inequality.

**Recessions and Recoveries—Annual Changes, 1975-2001**

While the Census data allow us to look at long-run changes, they do not allow us to distinguish between secular and cyclical changes. To do so, we analyze March CPS data on yearly changes in the distribution of individual earnings and the distribution of family income between 1975 and 2001, the earliest and most recent data that allow us to measure hourly wages.[20] This period covers a number of recessions and recoveries, including the long economic boom of the 1990s. At this time, it is not clear if the recession that began in March 2001 has ended. While we present data from 2001, we make no inferences about the distributional effects of this most recent recession.

The Census Bureau changed its data collection methods between the March 1993 and March 1994 surveys.[21] These changes had a large impact on measures of inequality. We, therefore, use a

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[19] From 1959 to 1999, mean family income-to-needs grew by 128 percent, income at the 10th percentile by 100 percent and income at the 90th percentile by 144 percent.

[20] Usual hours worked is only available starting in 1975. This variable is necessary to calculate wage rates, defined as annual earnings divided by usual weeks worked per year times usual hours worked per week.

[21] The 1994 CPS (which gathers information on 1993 earnings and family income) was the first to collect data via computer-assisted interviewing. The Census notes that "one should use caution when comparing estimates from data collected before 1994 with estimates from data collected in 1994 and later."

dotted line to connect the points between calendar years 1992 and 1993 to warn the reader that these changes reflect changes in measurement as well as real changes in economic values.

We start by examining changes in the distribution of wage rates and annual earnings as these reflect important changes in the labor market that have a large impact on the distribution of family income. However, as we will show, it is possible to have positive changes in the labor market that simply offset changes in other income sources that affect family income and poverty.

**Wage Inequality**

Figure 4 shows mean hourly wages in constant 1999 dollars for males and females between the ages of 22 and 62 in each year between 1975 and 2001. For men, the recovery of the 1990s clearly stands out as a break in the experience of the prior two decades. While there had been small growth of male wages during the economic recovery of the 1980s, a 3 percent increase between 1983 and 1989, all of those gains were lost during the recession of the early 1990s. The mean hourly wage (in constant 1999 dollars) was virtually the same in 1993 as it had been in 1975 ($15.62 and $15.64, respectively). In contrast, between 1993 and 2000, the mean male wage grew by 14 percent to $17.80. For the first time in nearly twenty years, male hourly wage rates started increasing.

The trend in mean real wages of females over this quarter century is dramatically different from that of men. First, the overall growth rate was much more rapid. Whereas male wages were 14 percent higher in 2001 than they had been in 1975, female wages were 44 percent higher. Second, while male wages stagnated for most of this period, female wages increased steadily. For example, female wages increased by 13 percent in the 1980s and by 15 percent in the 1990s.

This analysis of trends in mean wages masks different experiences across the distribution. Figure 5a illustrates this point by plotting the percentage change in real hourly wages for males and females between 1975 and 2001 at selected percentiles throughout the distribution. This figure clearly

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shows increased wage inequality for both men and women—the lines slope upward to the right, indicating that percentage changes in wages were higher for workers at the top of the distributions.

Males at the 10th percentile in 2001 had wages that were 4 percent lower than males at the same point in the distribution a quarter century earlier ($6.59 vs. $6.83 in 1999 dollars) and the median male had wages that were 3 percent higher ($15.31 vs. $14.97). Real wages declined at every point on the distribution up to the 35th percentile. At the top end of the distribution, males at the 95th percentile in 2001 had wages that were 42 percent higher than their counterparts in 2001 ($46.77 vs. $32.84). The relationship between percentile rank and growth in real earnings is nearly monotonic-- the lower the rank, the smaller the increase (or the larger the decrease) in earnings. Thus, for men, the increase in inequality over this quarter century reflected an absolute as well as a relative decline in the lower portion of the distribution.

For females, inequality also increased, although there were absolute increases in real hourly wages for women at all points in the distribution. The growth in earnings was highest at the higher deciles and lowest at the lower deciles, indicating growth in inequality of earnings among females as well as among males. For example, between 1975 and 2001, wages at the 95th percentile increased by 68 percent (from $20.25 to $33.95), by 36 percent at the median (from $8.78 to $11.95), and by 23 percent at the 10h percentile (from $4.42 to $5.43.)

The next two figures (5b and 5c) show exactly the same information for the changes in the wage distribution during the economic recoveries of the 1980s and the1990s—in each figure we look at changes from the trough to the peak of the business cycle. The patterns during the 1990s recovery are strikingly different from those in the 1980s. The first noticeable difference is that the curves for both males and females in figure 5c are above 9 percent at all points in the distribution during the 1990s boom. In contrast, real wage increases in figure 5b were below 6 percent for the 95th percentile of males in the 1980s recovery and they were negative or close to zero below the 70th percentile. For

women, there was growth for most of the distribution during the 1980s recovery, but the rate of wage increase was much higher for the bottom half of the distribution during the 1990s.

The second striking difference focuses on the differences in the slope of the two lines. The line is figure 5c is much flatter than the line in figure 5b. This indicates that wage growth during the recovery of the 1990s was spread much more evenly throughout the distribution than it was during the 1980's recovery. For females the line is nearly flat, with wage growth between 10 and 15 percent for every point between the 10$^{th}$ and 80$^{th}$ percentile. For males, wages rose most at the bottom and at the top of the distribution—by 21 percent at the 5$^{th}$ percentile, from \$4.23 to \$5.12, and by 27 percent at the 95$^{th}$ percentile, from \$36.41 to \$46.23. Wage growth was between 10 and 17 percent from the 10$^{th}$ through the 90$^{th}$ percentile.

To explore how recessions and recoveries differentially affect wage inequality, we show the time series for the P90/P10 ratio in Figure 6a and the standard deviation of log wages, another commonly used measure of inequality, in Figure 6b. The latter forms a natural bridge to the analysis in the following section that examines differences in mean log wages between demographic groups and the standard deviation of log wages within groups.

What is striking about these plots is that there is little cyclicality in the series—in most years from 1975 through 1994, the P90/P10 ratio increased in Figure 6a as did the standard deviation of log wages in Figure 6b. The P90/P10 ratio for men increased most rapidly during the recession of the early 1980s, rising from 4.1 in 1979 to 4.7 in 1983, but it did not decline during the subsequent recovery, remaining between 4.8 and 5.0 for the rest of the 1980s. The increase from 5.0 to 5.3 during the recession of the early 1990s does not differ much from the increase during the recovery of the 1980s, and part of this increase could be due to changes in the way the CPS was administered. There was a slight decline in the ratio during the later part of the recovery of the 1990s, but an increase to an historic peak at 5.5 as the economy went into recession in 2001. The series for women shows less

cyclicality than the series for men, as the ratio increased steadily from 3.8 to 4.9 between 1975 and 2001.  For women, almost all of this increase took place during the 1980s.

Another way of viewing the difference between cyclical and secular changes in wage inequality is to plot the coefficient of variation of male hourly wages against the employment rate for males over the age of 20, as shown in Figure 7.  Each point in the figure represents a year and we connect the points from one year to the next based on the employment rate. During a recession, the employment rate tends to fall, so a movement to the left indicates a recession; a movement to the right indicates the higher employment rates of recoveries.  If inequality of wage rates is cyclical, then decreases in employment rates are accompanied by increases in inequality—the line would be upward sloping as one moves to the left. Secular increases in wage inequality are reflected in upward shifts in the line at a constant employment rate.

Figure 7 highlights several time periods. From 1975 to 1979, the employment rate increased from 74.8 to 76.5 percent (the high point during this quarter century) and the coefficient of variation of male wages increased by 2.4 percent from .449 to .460.  This was a secular increase since employment rates rose.  The period from 1980 to 1983 was marked by two recessions. The employment rate fell by 5.1 points between 1979 and 1983 (the low point during this quarter century), and the coefficient of variation increased by 9.1 percent to .502.  The recovery of the 1980s was marked by a 3.1 point increase in the employment rate and another 4 percent increase in inequality to a value of .529—another secular increase.  During the recession of the early 1990s, the employment rate fell again, but the coefficient of variation did not increase by much between 1989 and 1992. There was a 4.6 percent increase in wage inequality between 1992 and 1993, but this coincides with the change in the method in which data were collected for the CPS, so one cannot tell how much of this was real and how much was a reflection of changes in measurement procedures.  By the end of the 1990's expansion, the employment rate had increased back to about the same level as at the end of the 1980s

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expansion. While this expansion did not yield falling wage inequality, the increase from .561 to .573 between 1993 and 2000 is small compared to the increased inequality of the 1980s expansion.

Over the entire quarter century, about half of the increased wage inequality occurred during the 1980s. Inequality increased most rapidly during the recession of the early 1980's, but did not decline in any of the subsequent expansions. We conclude that these increases in wage inequality were primarily secular, not cyclical.[22]

**Changes in Between Group Inequality**

The overall patterns in wage inequality shown above reflect changes in inequality both between groups and within groups. To explore these differences, we estimated a set of standard log wage equations, where the independent variables include a set of education dummies (less than high school, some college, college, more than college), a quadratic variable that captures experience levels, a gender dummy, dummies for race and ethnicity and three regional dummies (Midwest, South and West). These regressions were estimated for each year from 1975 to 2001. From these regressions we estimate gender and race differentials, holding education and experience constant, and returns to education and experience holding other factors constant. Within group inequality is the remaining variation in wages holding all factors constant, which is captured by the standard deviation of the residuals.

<u>Gender and Race Differentials</u>

To explore between group differences, we start by focusing on gender and race differentials. As shown earlier, the mean wages of females grew faster than the mean wages of males over the entire quarter century. As a result, the gap between the mean weekly earnings of women and men declined. This was partially a result of increases in human capital of working

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women, which would be reflected in their increased education and labor force experience, but it also reflects an increase in the relative earnings of women, holding these characteristics constant. The latter is captured by the coefficient on the female dummy variable which is plotted for each year in Figure 8a. The wage gap between men and women closed steadily from 47 percent in 1975 to 27 percent in 1993. Because females have lower average wages than males, this narrowing of the gender gap was one of the few bright spots during the 1980's, helping to stem the tide of greater inequality.

The steady reduction in the female/male differential came to an abrupt halt in the early 1990's. The gender gap stopped closing in 1993 and, as a result, the female wage gap was about the same in 2001, 25 percent, as it had been at the start of the expansion. This component of overall wage inequality, therefore, was neutral during the recovery of the 1990's. In part, this is a consequence of the fact that real male wages finally began to increase in this recovery after almost 20 years of stagnation.

The black/white wage gaps for men and women are shown in Figure 8b. Holding personal characteristics constant, there was not much change in these gaps over the quarter century. The black/white female gap had virtually closed by the 1970s, before increasing to about 7 percent in 1993. It then fell during the 1990s recovery to 4 percent at the end of the period. The black/white wage gap for males is much greater than the gap for females in every year. The male gap increased from 14 percent in 1975 to about 20 percent during the recession of the early 1980s; then it fell, reaching 13 percent in 1996 and 15 percent in 2001. Thus, over this quarter century there was no reduction in the racial wage gaps for men or for women. [23]

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[22] While it is too soon to draw conclusions, note the large rise in wage inequality during the first year of the recession that began in 2001. The slope of this one-year increase is even greater than the slope between 1979 and 1983.

[23] While we can not compute our series on hourly wage rates prior to 1975, Gottschalk (1997) reports that the black non-black gap in earnings for full-time workers declined by 2.1 percentage points per year. This is considerably higher than the

In summary, the near constancy of overall wage inequality in the 1990's was reflected in both the gender and race wage gaps which changed little over this period. The rise in the wages of females, which had been one of the few bright spots during the 1980's, ceased to continue to move against the tide and during the recovery the wages of blacks grew only marginally faster than the wages of whites with the same education and experience.

Returns to Education and Experience

It is well-documented that the increased inequality of wages during the 1980's reflected a substantial increase in the returns to education and to a lesser degree to an increase in the returns to experience among young college-educated males. Figures 9 and 10 confirm these findings and show that the stability in the distribution of wages during the 1990's was due in part to the fact that the college premium increased less than in the 1980s and the experience premium stopped increasing.

Figure 9 shows the returns to a college degree relative to a high school degree for all workers and for workers with 1 to 5 years of experience for males and for females. Since recent college graduates have acquired the most recent skills and have had the least time for their marketable skills to deteriorate, one would expect that their wages would be most responsive to changes in market pressures. We, therefore, focus on changes in returns for this group. The college premium actually fell slightly in the 1970s before rising dramatically in the 1980s. Between 1979 and 1989 the wages of recent college graduates relative to those of recent high school graduates increased from 26 to 48 percent for males and from 34 to 63 percent for females. These premia dropped in the early 1990s, especially for women and rose in the late 1990s. In 2001, the college premium was about 51 percent for both men and women. For workers (males and females combined) at all experience levels, the rise from 1979 to 2001 was from 25 to 46 percent, with 16 of the 21 point increase occurring in the

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.4 percentage points per year decline in the black white wage gap in our data. This is due to the greater cyclicality of black hours relative to white hours of work during the year. The black non-black gap in earnings for full-time workers declined

1980s. Thus, one important factor contributing to rising wage inequality during the 1980's, the college premium, was exerting less upward pressure during the 1990's.

Figure 10 shows the returns to experience, evaluated at 10 years of experience, for persons by gender and education level. The patterns are less pronounced—for men the premia in 1979 are quite similar to those in 1999, whereas for women they are higher. Most of the increase for women took place in the 1980s. For all groups, the premia reached a peak in the early 1990s and then fell until the end of the economic recovery. The premia are also smaller in every year for women than for men. For example, in 1999 a year of experience for a male college graduate increased his wage by about 2.8 percent; for a female college graduate the increase was 1.8 percent.

**Changes in Within-Group Inequality**

Inequality increased during the 1980's not only among those with different observable traits, such as gender, race, education and experience, but also within groups of workers with the same gender, race, education and experience. In terms of the regression framework, the growth in within-group inequality represents a change in the dispersion of the residuals, with a wider dispersion of the residuals showing greater inequality within groups.

Figure 11 plots the P10 and P90 of residual wages for males and females. Each is benchmarked to equal 1.00 in 1975 so that all changes are expressed relative to the 1975 value. The patterns are striking. For men and women at the bottom of the wage distribution, earnings fell continuously from 1975 through the late-1980's at which point a person at the 10th percentile of the distribution had earnings roughly 25 percent lower than a similar person at the 10th percentile in 1975. The P10 of the residuals then stabilized, remaining relatively constant for both men and women throughout the 1990's. For persons at the 90th percentile, earnings increase from 1975

from 40 percent in 1963 to less than 15 percent in 1975.

through the mid-1980's, at which time their wages were roughly 10 percent higher than those of their counterparts in 1975. Their relative position then stabilized, rising only between 1992 and 1993, which coincides with the change in the method of data collection in the CPS. This indicates that within-group inequality among people with the same characteristics stopped increasing during the 1990's

**Explanations for Changes in Wage Inequality**

The fact that wage inequality grew very rapidly during the 1980's and then stabalized at a high levels calls into question a set of explanations for the rise in inequality during the 1980's. For example, Card and DiNardo (2002) argue that this pattern is not consistent with the standard explanation of skill-biased technological change as the primary factory driving inequality higher. They find no evidence that technological change of this type changed abrubtly after the late 1980's. This suggests that the high correlation in the 1980's between inequality and their proxies for skill-biased technological change (computer usage and the share of information technology in GDP) may have been spurious. Alternative causal factors, such as changes in the industrial structure, the extent of international trade, or changes in social norms, have not been confronted with the most recent data on differences in wage inequality trends between the 1980's and 1990's. However, it seems just as unlikely that trends in industrial structure, international trade or social norms shifted dramatically during the 1980's, but then ceased to change during the 1990's. Delving into these structural explanations remains an important task for future research. At this point, we have simply described changes in the wage distribution and now ask why the leveling off of inequality in the wage distribution did not translate into a leveling of inequality of family income adjusted by family size.

**Changes in Annual Earnings Inequality**

Labor economists focus primarily on the distribution of wage rates, as these changes in prices reflect changes in demand, supply and/or institutional wage setting mechanisms. We are, however, also interested in changes in the distribution of annual earnings, as this is the link between the labor market and the distribution of family income. Because annual earnings make up about three-quarters of family income, changes in the distribution of annual earnings can have a potentially have a large effect on the proportion of families with incomes under the poverty line.

Annual earnings are equal to hourly wages times annual hours. Thus, changes in either component will affect the distribution of annual earnings. If hours increased the most for those with the highest wages, then the effects of hours would reinforce the effects of increased wage inequality . As a result, those with high wages would have experienced the largest increases in both wages and hours and earnings inequality would have increased more than wage inequality. If on the other hand, those with low wages, who experience wage declines or lower-than-average wage increases, wanted to increase their hours in order to maintain their living standards and if employers were willing to give them additional hours because they were now relatively cheaper than the hours of other workers, then hours would have increased the most for those at the bottom of the wage distribution. As a result annual earnings inequality would not have increased as much as wage inequality.

Figures12a and 12b plot the change in annual hours worked by wage quintile for male and female workers for the quarter century between 1975 and 2001 and for the recoveries of the 1980s and 1990s.[24] Over the entire period for men, hours increased most for those at the top of the wage distribution. Hours declined slightly for the bottom quintile, increased by about 100 hours for those in the next two quintiles and then increased by about 150 and 190 hours respectively, for those in the top two wage quintiles. This is consistent with a sharp increase in the relative demand for the most-skilled

men.  For men, then over the quarter century, increases in hours reinforced increasing inequality of wages.   For women, increased hours of work over the long run were inequality-reducing. Women in the bottom two wage quintiles increased their hours of work by 346 and 320, respectively, which was more than the 190 and 250 increases in the top two quintiles.

The expansions of the 1980's and 1990's, however, show very different patterns.  During the economic recovery of the 1980s, men at all wage quintiles increased their work by similar amounts—around 140 hours.  There were also few differences in hours by wage quintile for women—hours increased by about 100 for women across the distribution.  This implies that earnings inequality would largely mirror the rapid rise in wage inequality during this period.

In contrast, the expansion of the 1990s was marked by a rapid increase in the hours worked by those at the bottom of the wage distribution.  The largest increase in hours for men was for those in the lowest wage quintile, 127 hours; there were smaller increases in other quintiles, ranging from 39 to 55 hours.  For women, there was a larger work increase than for men, but the pattern was also one in which the lowest quintile increased work the most. Women in the lowest wage quintile increased their work by 156 hours, whereas those in the highest two quintiles increased their work by 33 and 45hours, respectively.[25]  These greater-than-average increases in hours worked for those at the bottom of the wage distribution would lead to a decline in annual earnings inequality even during a period when hourly wage inequality did not decline.

Figures 13a and 13b compare the resulting trends from 1975 to 2000 in the coefficient of variation of annual earnings and the coefficient of variation of wage rates for males and females, respectively.  Both inequality measures are indexed at 1.0 in 1975.  For men, the largest difference in the upward trend in these two series occurs during the expansion of the 1990s—after 1993, wage

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[24] Annual hours are defined as the product of weeks worked last year and usual weekly hours.
[25] This was the period in which welfare reform required single mothers to work more.

inequality increased somewhat, but annual earnings inequality declined because the hours of the lowest-wage men were increasing more rapidly than those of men with higher wages.

For women, the divergence between the two series begins in the early 1980s. After that time, wage inequality increased, but annual earnings inequality did not.  In 2000, the coefficient of variation of hourly wages was 19 percent higher than in 1975, but the coefficient of variation of annual earnings was the same as it had been a quarter century earlier. This reflects the fact that the largest increase in hours was among women with the lowest wage rates.

Part of the changes in hours, and hence in annual earnings inequality, is due to the business cycle.  If recessions affect the hours worked by low wage workers disproportionately, then annual earnings inequality will have a cyclical component, even if hourly wage inequality does not (see Figure 7).  The cyclicality of the coefficient of variation of annual earnings for males is shown in Figure 14 which plots the male employment rate by year against the coefficient of variation of . The fact that the lines slope upwards to the right indicates that when employment rates decline, earnings inequality increases.

In, contrast to Figure 7 which shows wage inequality either constant or rising during expansions (i.e. relatively flat lines that shift up secularly), Figure 14 shows considerably more cyclical sensitivity.  Earnings inequality rose during the recessions of the early 1980's and early 1990's.  And while earning inequality did not fall during the expansion of the 1980's, there was a decline in earnings inequality during the expansion of the 1990s.  Between 1993 and 2000, the coefficient of variation of annual earnings decreased from .68 to .65; in contrast, Figure 7 shows an increase in the coefficient of variation of hourly wage rates during this expansion.

**Changes in Family Income Inequality**

Figure 15 shows the time series patterns in the coefficient of variation of family income adjusted by the poverty line[26]. This series shows that the increased inequality of adjusted family income for decennial years, shown in Figure 3, is not just an artifact of the years chosen or the measure of inequality. Figure 15 shows that the coefficient of variation was much higher in 1999 than it was in 1969. This is consistent with Figure 3 that showed a sharp increase in the Gini coefficient and the P90/P10 ratio.[27]

The coefficient of variation of adjusted family income was about the same in 1979 as it had been in 1969, but it then increased by 7.3 percent (from .588 to .631) during the recession of the early 1980's and grew moderately (by 4.0 percent) during the 1982-1989 expansion. Inequality then increased by 3.7 percent during the recession of the early 1990s, and then by another 6.9 percent between 1993 and 2000 to .737. Thus, inequality increased less during the recession of the 1990s than during that of the 1980s, but more during the 1990s recovery than in the 1980s recovery. The rapid rise in family income inequality during the early 1980's is consistent with the cyclical increase in inequality of male annual earnings during that recession (see Figure 14). What is surprising, however, is that income inequality increased so much in the recovery of the 1990s at the same time that inequality of male annual earnings was declining. While male earnings are the largest component of family income, other income sources, such as property income, government transfers, and the earnings of other household members also affect the distribution of family income. We now turn to these other income sources and decompose changes in family income into its component parts.

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[26] We show this measure of inequality because it is used in the following section to decompose changes in inequality by income source. Other measures of inequality show similar patterns, though the changes in the P90/P10 ratio are much larger.

[27] However, when inequality is measured with the coefficient of variation or the Gini, the increase in the 1990s is as large as that of the 1980s, whereas according to the P90/P10 ratio the increase was larger in the 1980s.

**Inequality of Total Family Income: A Decomposition by Sources of Income**

It is beyond the scope of this paper to model the causal mechanisms that led to the increased family income inequality. However, we provide a descriptive decomposition that shows the relative importance of various sources of family income. The decomposition shows that even large increases in inequality of a source of income, such as earnings, need not translate into large increases in inequality of total income. Therefore, the rise in inequality in the labor market, documented in the preceding sections, can be reinforced or muted by other factors, such as changes in other income sources or the number of earners per household that can have large effects.

There are many ways of decomposing changes in inequality according to the source of income; in fact, different decomposition rules can give quite different results. However, Shorrocks (1983) shows that only one decomposition rule satisfies two reasonable axioms.[28] In addition, his method is general in the sense that it does not depend on the choice of a particular inequality measure.[29] We apply Shorrock's decomposition to analyze changes in the coefficient of variation of total family income divided by the poverty line. The coefficient of variation decomposes into a weighted sum of the coefficient of variation of each income source, $cv_s$, where the weights depend on the relative

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[28] The two axioms are that (1) if an income source is equally distributed across recipients that this source should make no contribution to overall inequality and (2) if one income source is a permutation of another income source the two sources should make equal contributions to overall inequality.

[29] Shorrocks shows that this decomposition is general in the sense that the contribution of factor s, $c_s$ can be written as

$c_s = \rho_s \dfrac{\sigma_s}{\sigma}$ for *any* inequality measure, where $\rho_s$ is the correlation of source s with total income. Since

$c_s = \rho_s \dfrac{\sigma_s/\mu_s}{\sigma/\mu} = \rho_s \dfrac{\mu_s}{\mu}\dfrac{cv_s}{cv}$ the contribution of factor s can be written in terms of the coefficient of variation of each

source, $cv_s$, and the coefficient of variation of total income, $cv$. Summing over all sources and multiplying by $cv$ leads to

the natural decomposition that we use: $cv = \sum_s \rho_s \dfrac{\mu_s}{\mu} cv_s$

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importance of each source in total income, $\dfrac{\mu_s}{\mu}$, and the correlation of the income source with total

income, $\rho_s$.[30]

$$cv = \sum_s \rho_s \frac{\mu_s}{\mu} cv_s$$

Thus, inequality of total income will increase if the source specific coefficient of variation, $cv_s$,

increases or if more weight is put on sources that have above-average levels of inequality (i.e., more

weight is put on a source for which $cv_s > cv$). The latter will occur if the source becomes a larger

proportion of income ( i.e., $\dfrac{\mu_s}{\mu}$ increases) or if an income source varies more closely with total income

(i.e., $\rho_s$ increases). The latter will occur if high income people start receiving more of this source of

income.

The results of this decomposition are shown in Table 1 for the period 1975 to 2001. Over this

period, the coefficient of variation of family income (adjusted by the poverty line) increased from .588

to .737. The decomposition apportions this .148 point change in the coefficient of variation into

sources due to changes in the earnings of heads, changes in the earning of other family members,

changes in government transfer payments and changes in all other sources of income, which includes

income from dividends, interest, and rents and other income sources.

While inequality of earnings of males declined during the expansion of the 1990's, this decline

was small and not sufficient to offset the large increase in earnings inequality during the 1980's ( see

Figure 13a). This resulted in a substantial increase in the coefficient of variation of head's earnings

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[30] It is straightforward to show that the covariance terms all disappear, as their contributions are apportioned to the different sources by the weights.

(column 2), which increased from .837 to 1.028 between 1975 and 2001[31]. This increase in heads' earnings inequality was reinforced by a large increase in the coefficient of variation of government transfers (from 1.706 to 1.984) and a modest increase in inequality for the residual source of income (column 5). The only source of income to become more equally distributed was the earnings of non-heads. This mostly reflects the change in the distribution of earnings of married women.

The bottom panel shows the results of using Shorrock's method to decompose the change in inequality of total income into these four components. Changes in heads' earnings account for .025 of the .148 increase in the coefficient of variation of total income between 1975 and 2001. In 1975 heads earnings accounted for 69 percent of total inequality (.407 out of .588). While heads' earnings became more unequal equal between 1975 and 2001, inequality of total income increased even more. As a result, heads' earnings accounts for only 59 percent of the coefficient of variation of total income in 2001 (.443 out of .737). This indicates that changes in other income sources were also important. The relatively small impact of heads' earnings reflects the fact that this source became a smaller

fraction of total income (i.e., $\frac{\mu_s}{\mu}$ declined from .641 to .565) and became less correlated with total

income (the correlation coefficient declined from .760 to .744).

Each of the other sources of income had at least as large an inequality-increasing impact on family income inequality as did heads' earnings. This is largely due to the fact that the coefficient of variation for each of these sources is higher than the coefficient of variation of both heads' earnings and total income. Since the coefficient of variation of total income is a weighted sum of the coefficient of variation of each source, the increasing importance of these sources pulled up the weighed sum. In addition, the correlation of each of these sources with total income also grew, which also increased the weight on the sources of income with the highest coefficients of variation.

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[31] The distribution of heads' earnings is a mixture of the earnings distribution of males and females. Since most heads are

Because changes in wage rate and earnings inequality affect both the earnings of heads and the earnings of others, it is useful to combine these two sources of income. Using this combined measure, indicates that changes in the distribution of earnings of all household members accounts for roughly half of the increase in the coefficient of variation of total income between 1975 and 2001 (.025 + .051/.148).

This section has illustrated that there are other important factors beyond changes in the distribution of earnings that affect the distribution of total family income. The fact that the most unequally distributed sources of income were the ones that grew the most turns out to have had an important impact. Likewise, increasing correlations that put more weight on sources of income that are highly unequal also contributed to increasing family income inequality. None of these conclusions should come as a surprise, as the distribution of total family income reflects changes in all aspects of the joint distribution of income sources. Knowing that one marginal distribution has changed gives information only about one aspect of the joint distribution.

**The Distribution of Family Income, Demographic Changes and the Trend in Poverty**

The previous section has described the factors that contributed to the rise in family income inequality over the past quarter century. We now analyze the between changes in the distribution of family income, changes in the demographic composition of the population and changes in the poverty rate. Danziger and Gottschalk (1995) have shown that the poverty rate will increase if the mean of the income distribution declines, if income inequality increases or if the demographic composition of the population shifts toward groups with above-average rates of poverty. To distinguish the contributions of these three factors to trends in the overall poverty rate, shown in Figure 1, we carry out the following calculations.

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males, the distribution of head's earnings mirrors that of males more closely.

First, in order to see what the impact of growth in the mean of the distribution of family income (adjusted by the poverty line) would have been had there been no change in inequality or change in the demographic composition of the population, we calculate what the poverty rate for all persons would have been if adjusted family income had grown at the same rate for all families and if the demographic composition of the population had remained constant. We then contrast this simulated poverty rate with a second simulated rate that incorporates the actual demographic changes. The difference between these two simulated poverty rates is the percentage-point change in the poverty rate that is accounted for by demographic changes. By using these two simulated poverty rates and the actual poverty rates in the two years, we can compute three mutually exclusive components that represent the effects of changes in mean income, demographic changes, and changes in income inequality.

We perform this computation for the change in the overall poverty rate between 1975 and 2001. We divide all families into one for 12 mutually exclusive groups based on the interaction of the race/ethnicity of the head (white non-Hispanic, black non-Hispanic, Hispanic, other) and the age/gender of the head (nonelderly male, nonelderly female, elderly)[32].

We begin with the actual 1975 micro data for each family, then calculate a simulated income distribution for 2001 in which every unit's income is increased by the actual growth in adjusted family income over this quarter century. Because this simulation is done on the 1975 data, there is by definition, no demographic change. However, the simulated data have a different poverty rate—one that will be lower whenever there is real growth in adjusted income. The difference between this simulated poverty rate and the actual 1975 rate equals the change in the poverty rate that is attributable to income growth between 1975 and 2001.

Using the simulated micro data that have the 2001 mean income, we then compute the group-specific poverty rates for the 12 demographic groups—i.e., these would have been the 2001 rates for

each group if only the mean had changed since 1975. We then re-weight these group-specific poverty rates by the observed 2001 demographic composition of the population. This second simulation of the overall poverty rate for 2001 is based on the 1975 inequality level, but the demographic composition of the population and the mean income at observed 2001 levels. The difference between the poverty rates from the two simulations equals the percentage-point change in poverty that is accounted for by demographic changes.

The difference between this second simulated poverty rate for all persons and the actual 2001 poverty rate is equal to the change in poverty that is accounted for by changes in inequality of incomes. By construction, the sum of these three components--the changes attributable to changes in mean income, to demographic changes, and to changes in income inequality--will equal the observed percentage-point change in the poverty rate.

The results in Table 1 show that poverty rates fell by 2.7 percentage points between 1975 and 2001. If economic growth had been equally shared across all families and individuals and if there had been no demographic change, the poverty would have fallen by twice as much—5.4 points. Changes in income inequality added 0.9 points to the poverty rate and demographic change added 1.8 points. We have documented above the rising inequality of this period. Demographic change was poverty-increasing because a larger percentage of the population now lives in units whose heads have higher-than-average poverty rate (e.g. Hispanics, mother-only families) and a smaller percentage lives in units headed by white-nonHispanic married couples.

**Conclusions**

This paper has documented distributional changes over the last quarter of the twentieth century. We have focused on three conceptually distinct distributions: the distribution of wage rates, the distribution of annual earnings and the distribution of total family income adjusted for family size.

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[32] Recall that we treat unrelated individuals as one-person families.

Changes in the distribution of wage rates reflect changes in market demand for different types of workers or changes in institutional constraints on wages, such as minimum wage laws and wage-setting norms. The distribution of annual earnings, our second concept, incorporates changes in the distribution of hours as well as changes in the distribution of wage rates. If workers compensate for wage cuts by increasing their hours, then earnings inequality will not increase as much as wage rate inequality. If, on the other hand, low wage workers respond to a cut in real wages by working less, then the increase in earnings inequality will be larger than the increase in wage inequality. Finally, the distribution of family income, adjusted for family size, incorporates changes in the distribution of other sources of income, such as interest, dividends, rents and government payments, as well as changes in the distribution of earnings and the number of earners per family.

Given these links it is clear that changes in the distribution of wage rates need not translate into similar changes in the distribution of family income. Changes in hours worked and changes in other sources of income can compensate for or reinforce changes in the distribution of wages.

Our primary focus has been on changes in the distribution of wages, because these changes have received the most attention in the academic literature. We showed that the 1990's were very different from the 1970's and 1980's. The 1980's were marked by substantial increases in the wage premia paid to more-educated and more-experienced workers. The resulting increase in between-group inequality was reinforced by even larger increases in within-group inequality. All factors contributed to increases in wage inequality. The 1990's saw a sharp reversal in this pattern. Returns to education and experience stabilized and within group inequality stopped growing. Thus, while wage inequality was as high as it had been in the last half of the twentieth century, it stopped growing as the economy emerged from the recession of the early 1990's.

Changes in the distribution of hours worked can offset or reinforce the rise in wage inequality. During the 1970's and 1980's, changes in the distribution of earnings closely mirrored changes in the

distribution of wage rates.  The 1990's, however, saw a modest decline in the inequality of male annual earnings, while wage inequality stayed roughly constant.  However, the decline in earnings inequality due to a relative increase in the hours worked by low-wage workers was small compared to the previous increases.  Thus, inequality of earnings remained substantially higher at the end of the century than it had been in 1975.

The increased earnings inequality between 1975 and 2001 accounted for roughly half of the increase in family income inequality over the same period.  The other major factor accounting for the increase in family income inequality is the changing composition of income.  Heads' earnings, the most-equally distributed source of income, became a smaller fraction of total income.  As the more unequal sources became more important, overall income inequality increased..

The increase in family income inequality would have led to higher poverty rates.  But this increase in the dispersion of family income was offset by increases in the mean of the income-to-needs distribution.  Our calculations indicate that poverty would have declined by 3.6 points between 1975 and 2001 had there been no increase in family inequality.  Instead, poverty rates declined by 2.7 points.

Our analysis suggests that further research on family income inequality and poverty should look beyond changes in the labor markets.  While changes in the distribution of wages, earnings and family income all moved in the same direction during the 1980's, this was not the case during the 1990's.  Wage inequality stabilized, earnings inequality fell, but family income inequality actually continued to rise.  This suggests that further work on family income inequality should pay more attention other factors, such as changes in other income sources and to demographic changes.

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**Figure 1: Percentage Point Change in Percent Poor and Percent Rich, By Decade, 1959-1999**
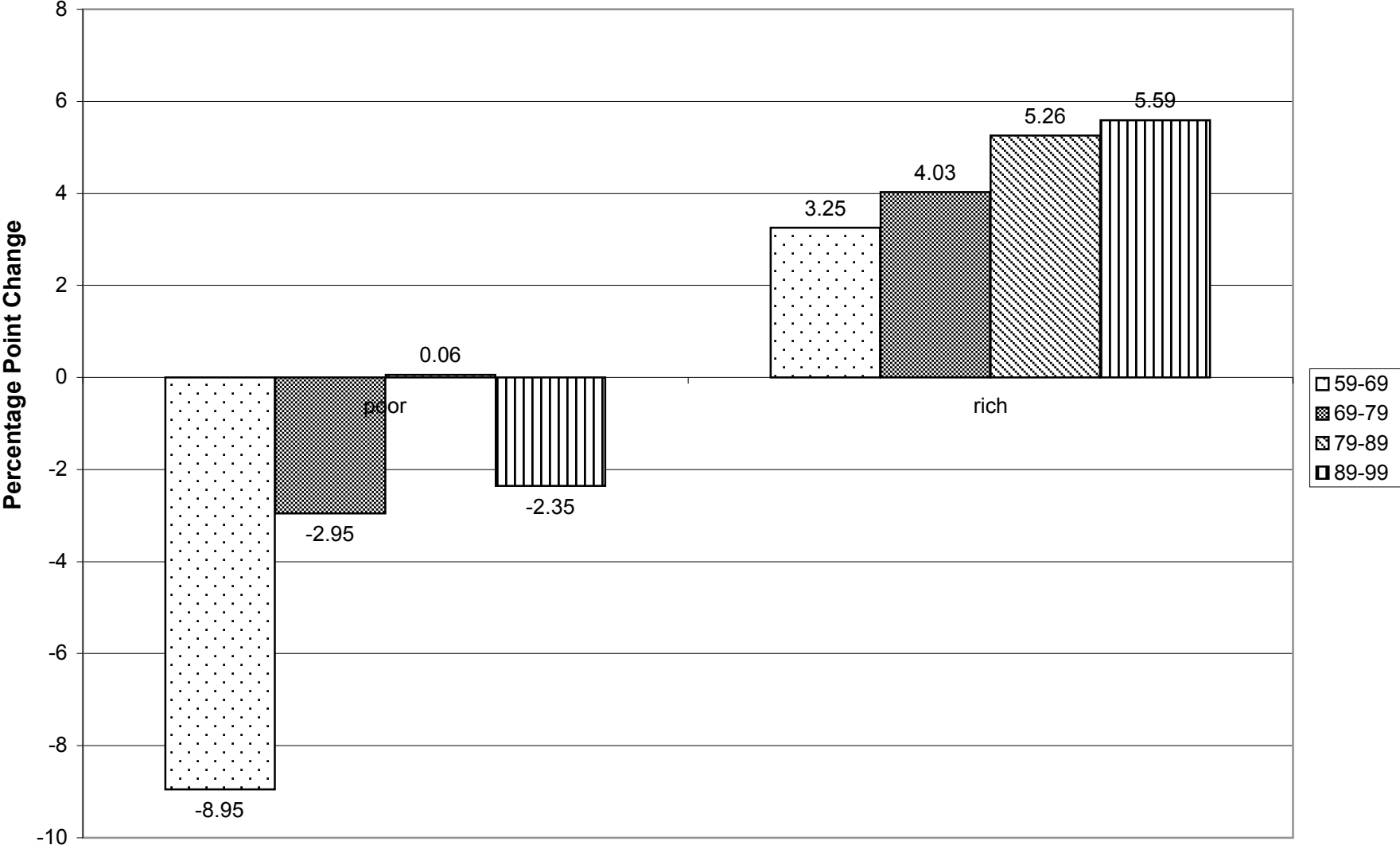
**Figure 2: Percentage Change in Mean Family Income and Mean Male Earnings, By Decade, 1959-1999**
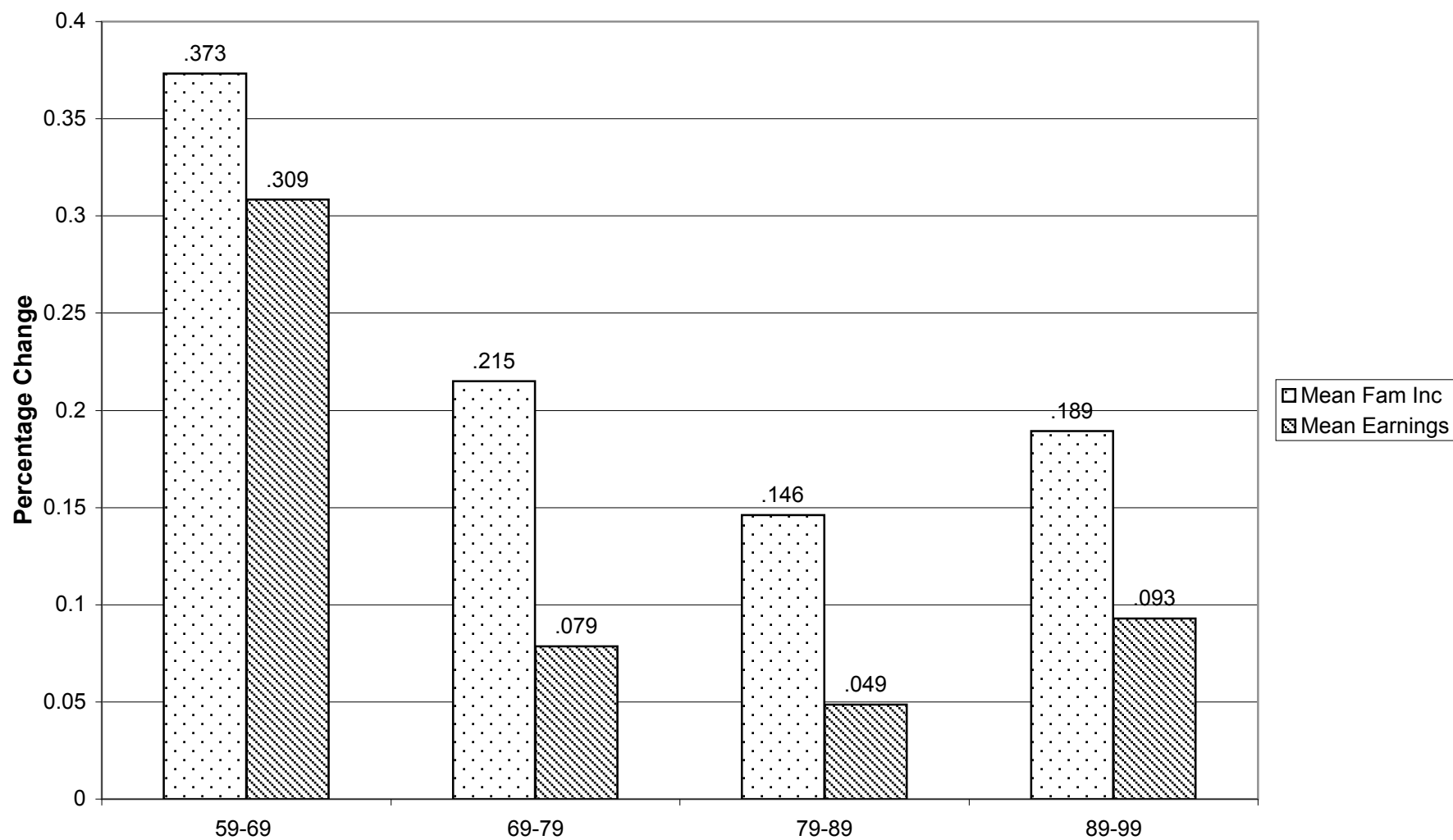
**Figure 3: Percentage Change in Family Income Inequality, By Decade, 1959-1999**
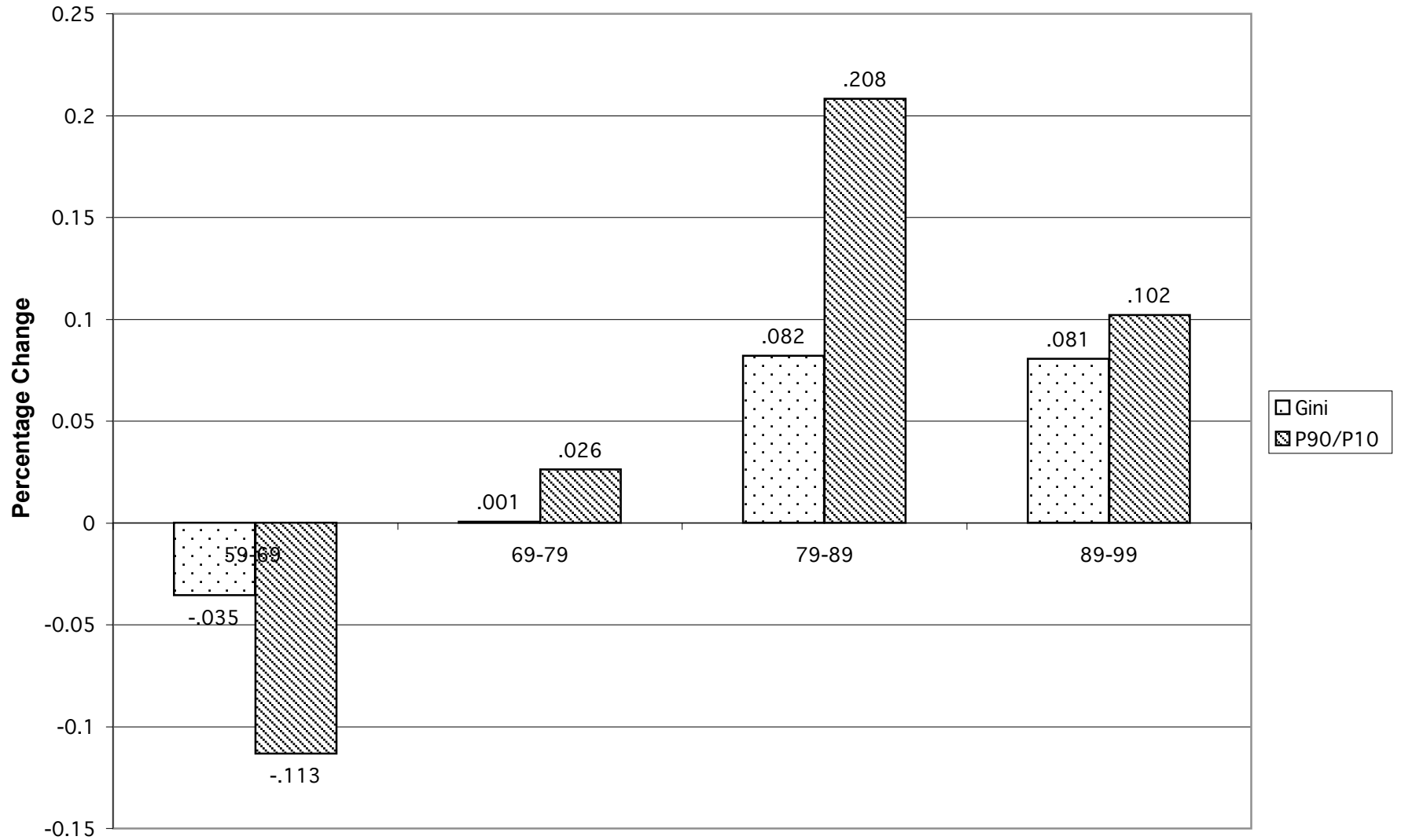
**Figure 4 : Mean Real Hourly Wage Rate, Males and Females, 1975-2001**
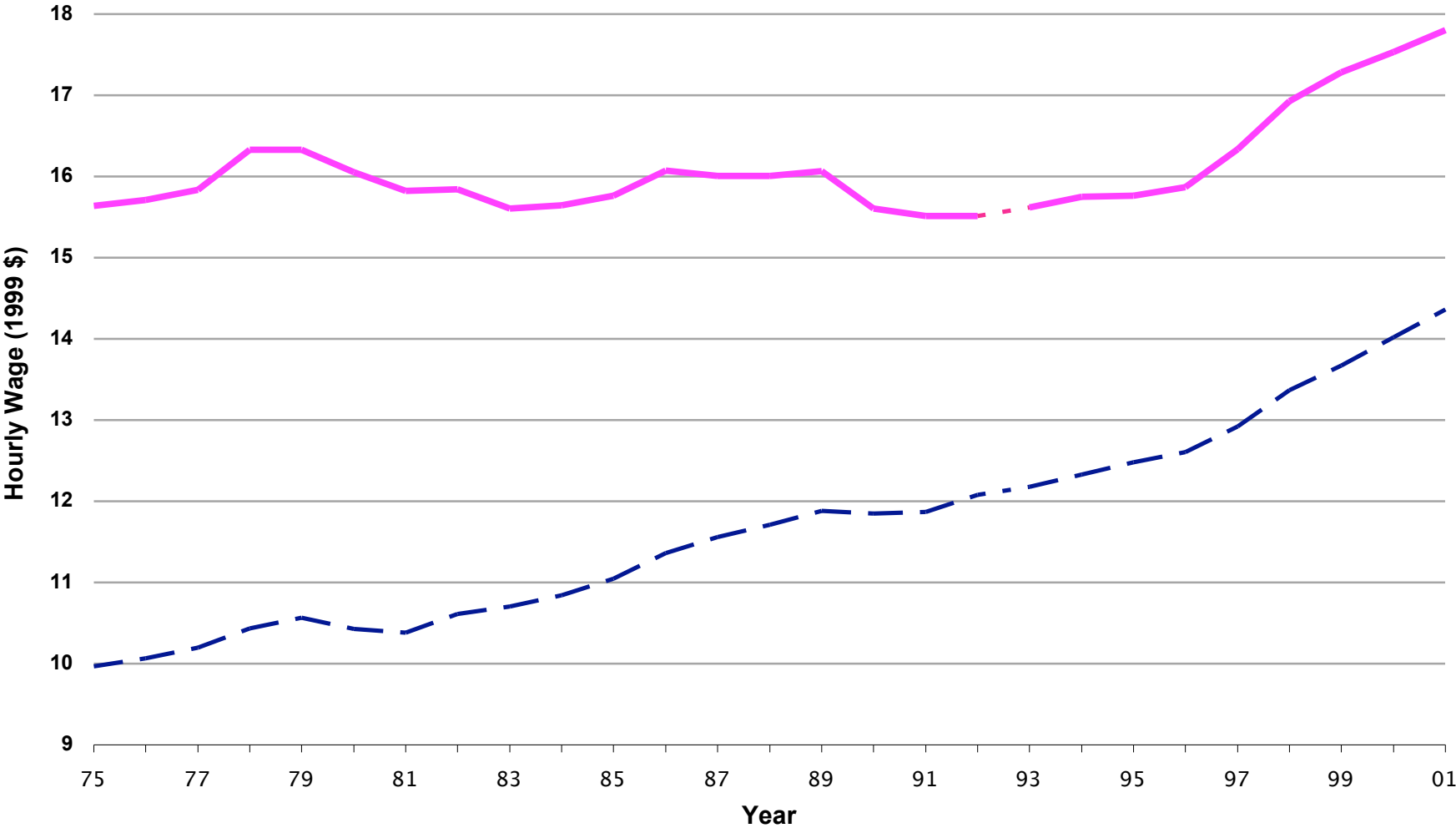
Figure 5a: Percentage Change in Real Hourly Wages by Percentile, 1975-2001
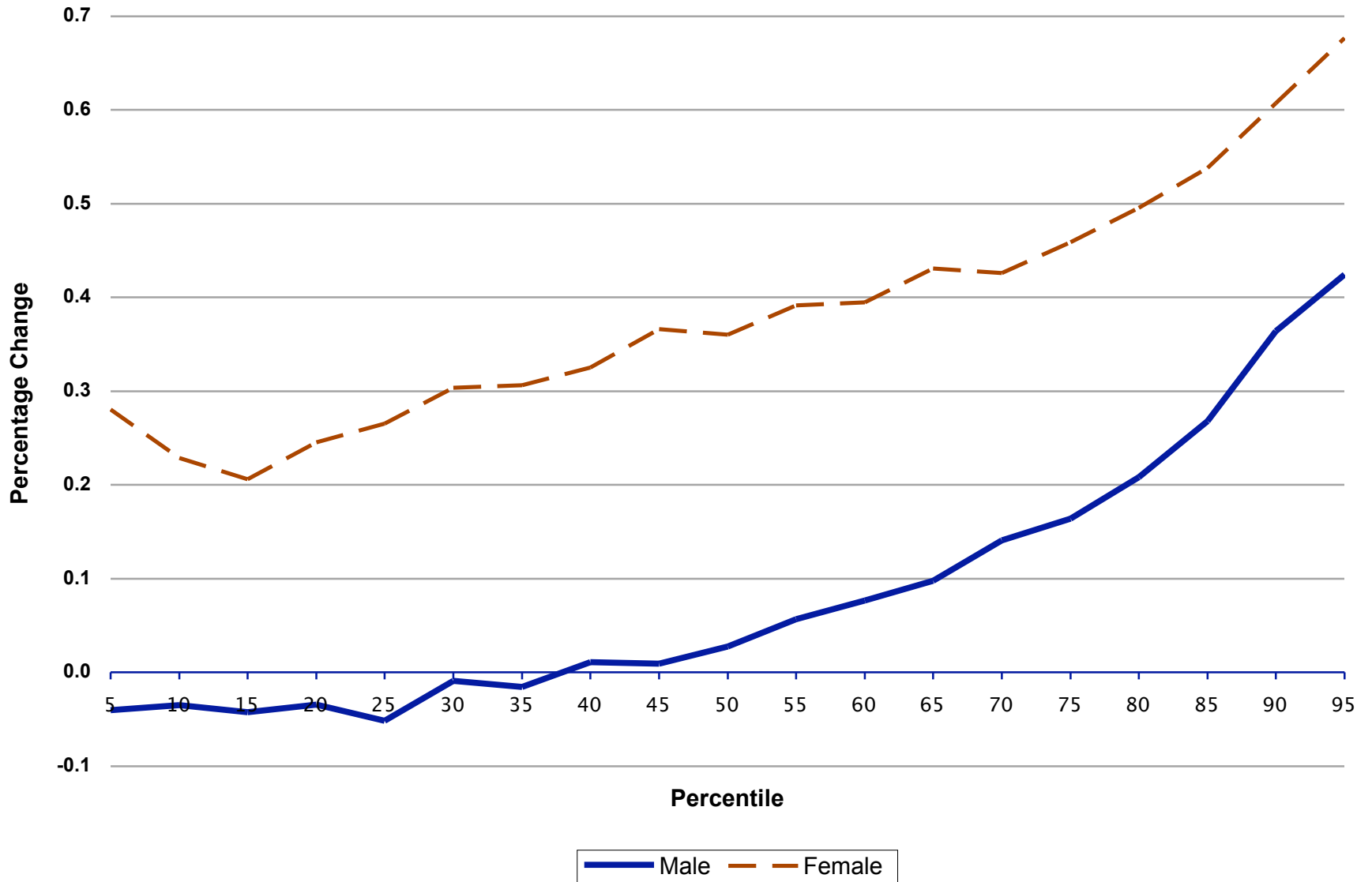
Figure 5b: Percentage Change in Real Hourly Wages by Percentile, 1982-1989
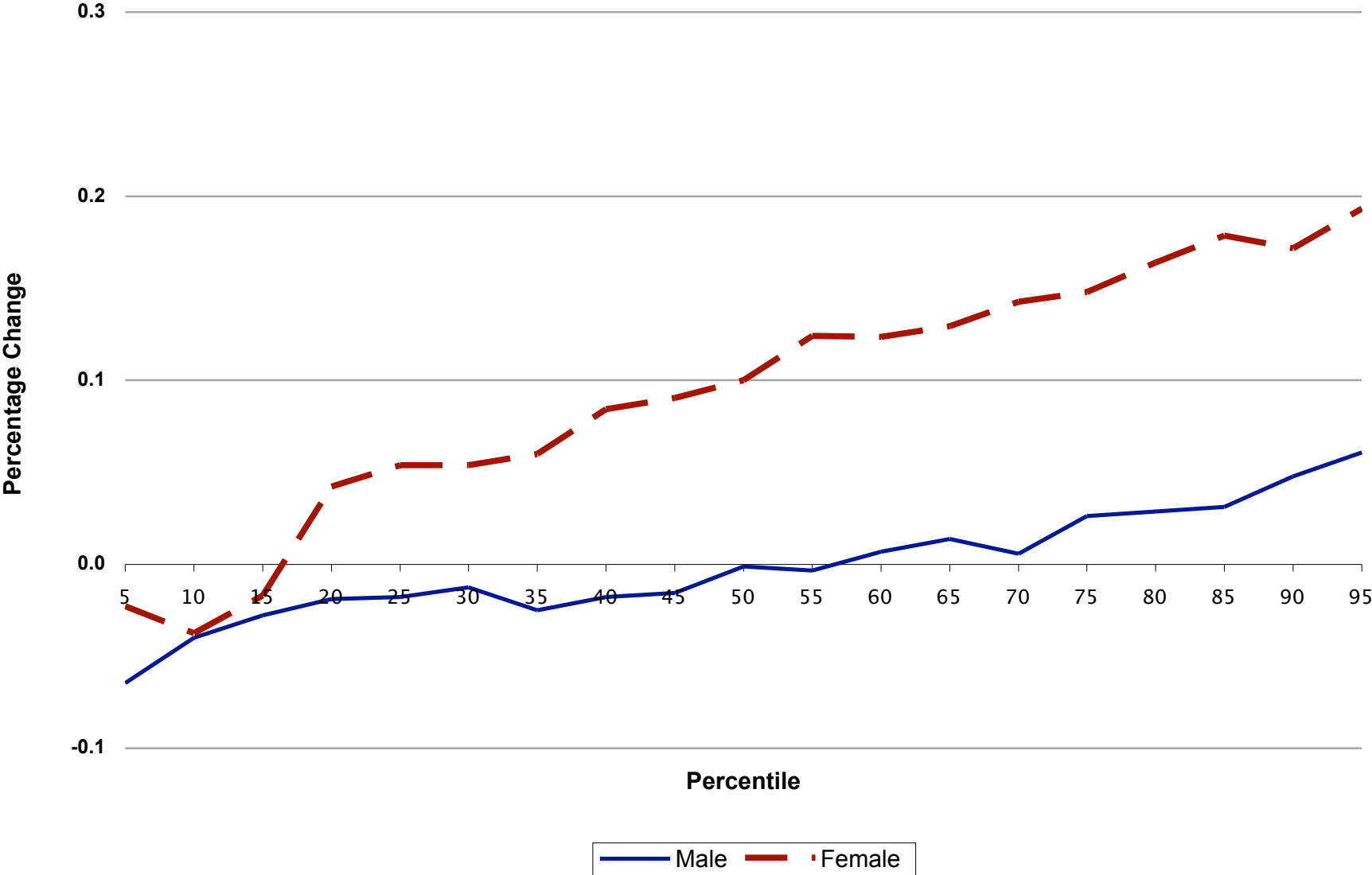
Figure 5c: Percentage Change in Real Hourly Wages by Percentile, 1993-2000
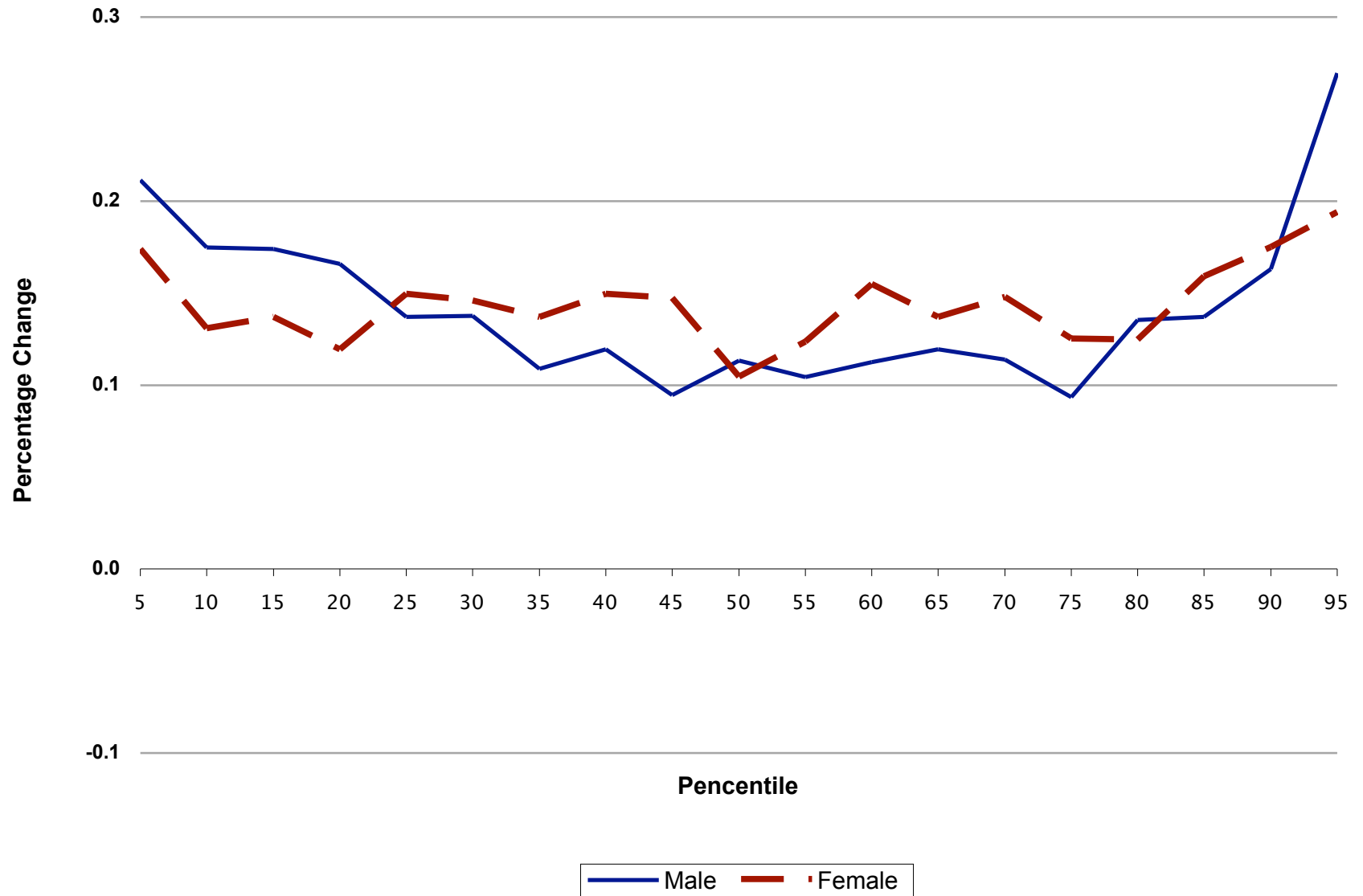
**Figure 6a: Ratio of Hourly Wage Rate at 90th Percentile to Wage at 10th Percentile, 1975-2001**
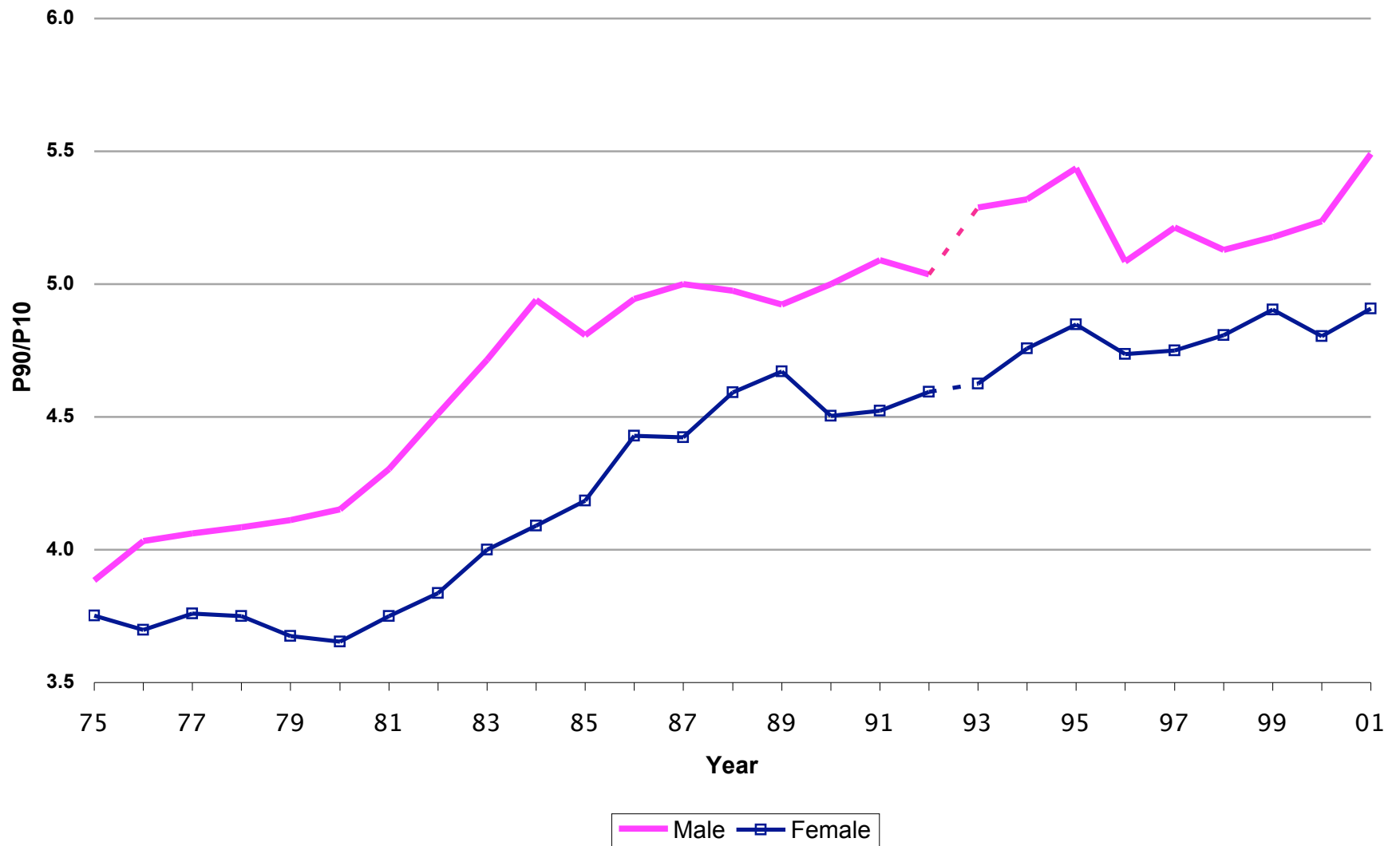
Figure 6b: Standard Deviation of Log Hourly wage, 1975-2001

Legend: sd(lnwage)-Card Dinardo — Sd(lnwage)---Final Sample
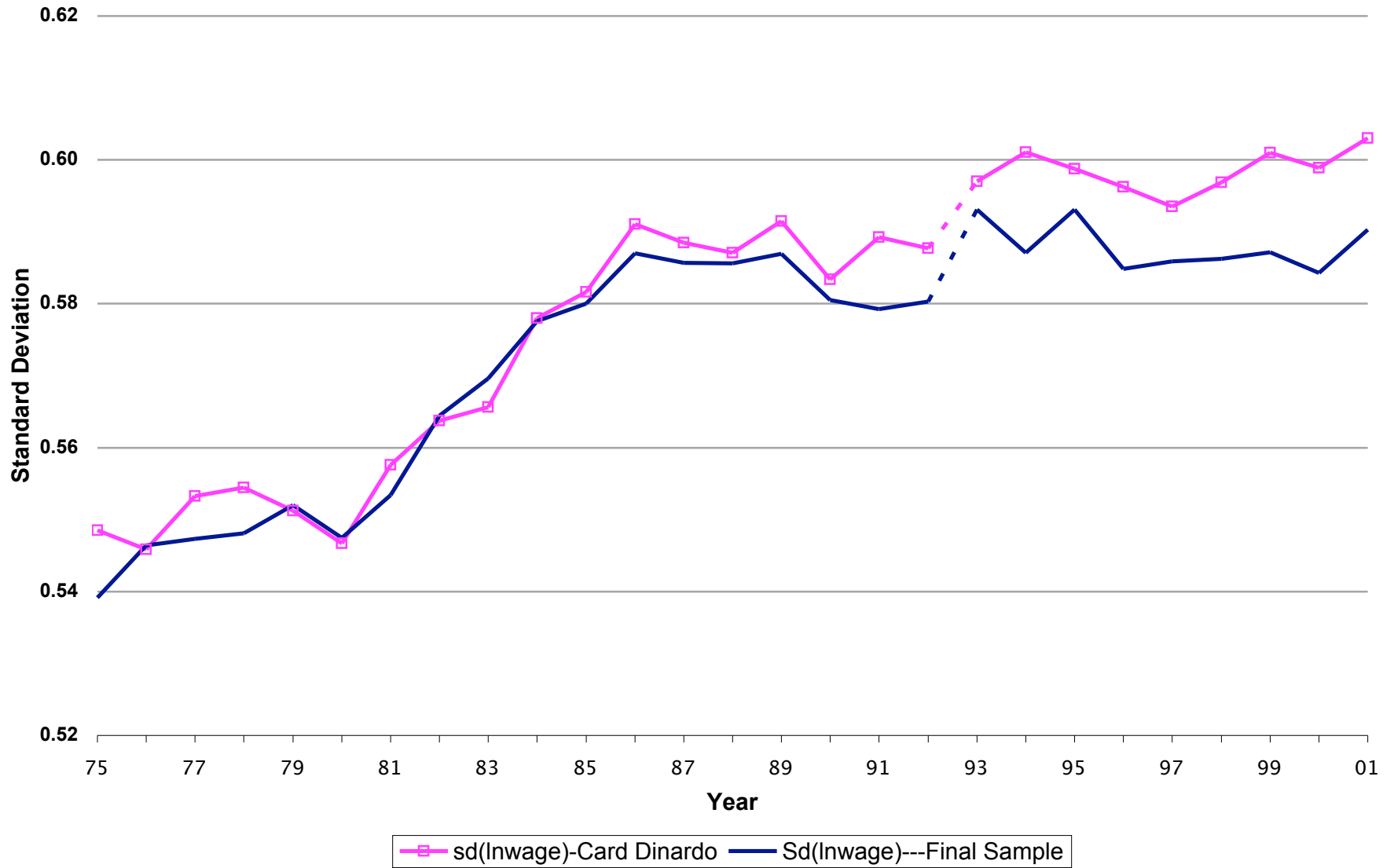
Figure 7: Employment Rate and Coefficient of Variation of Hourly Wage Rate -- Males , 1975-2001
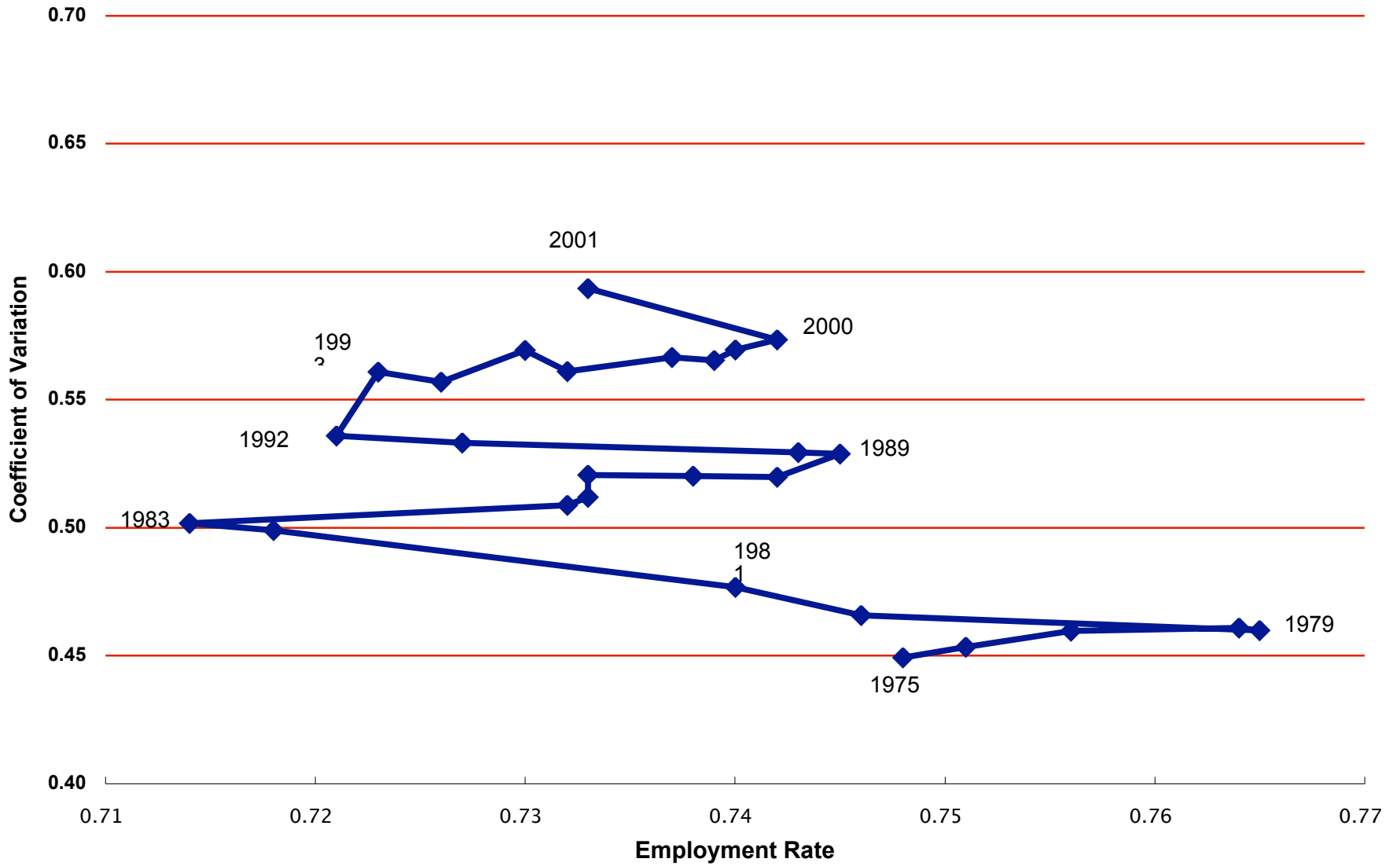
Figure 8a: Gender Differential in Hourly Wage Rate, 1975-2001
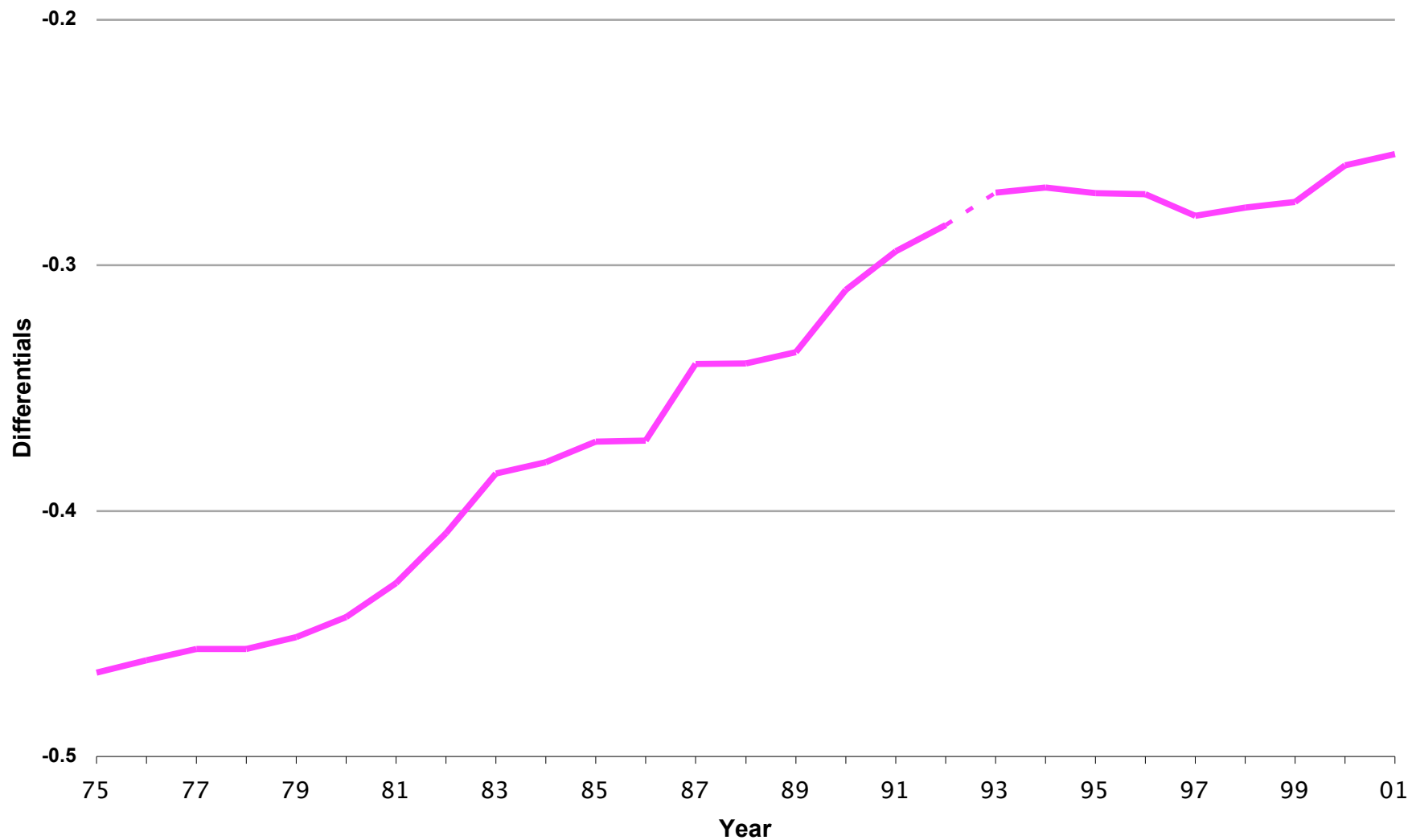
Figure 8b: Black-White Differential in Hourly Wage Rate, 1975-2001
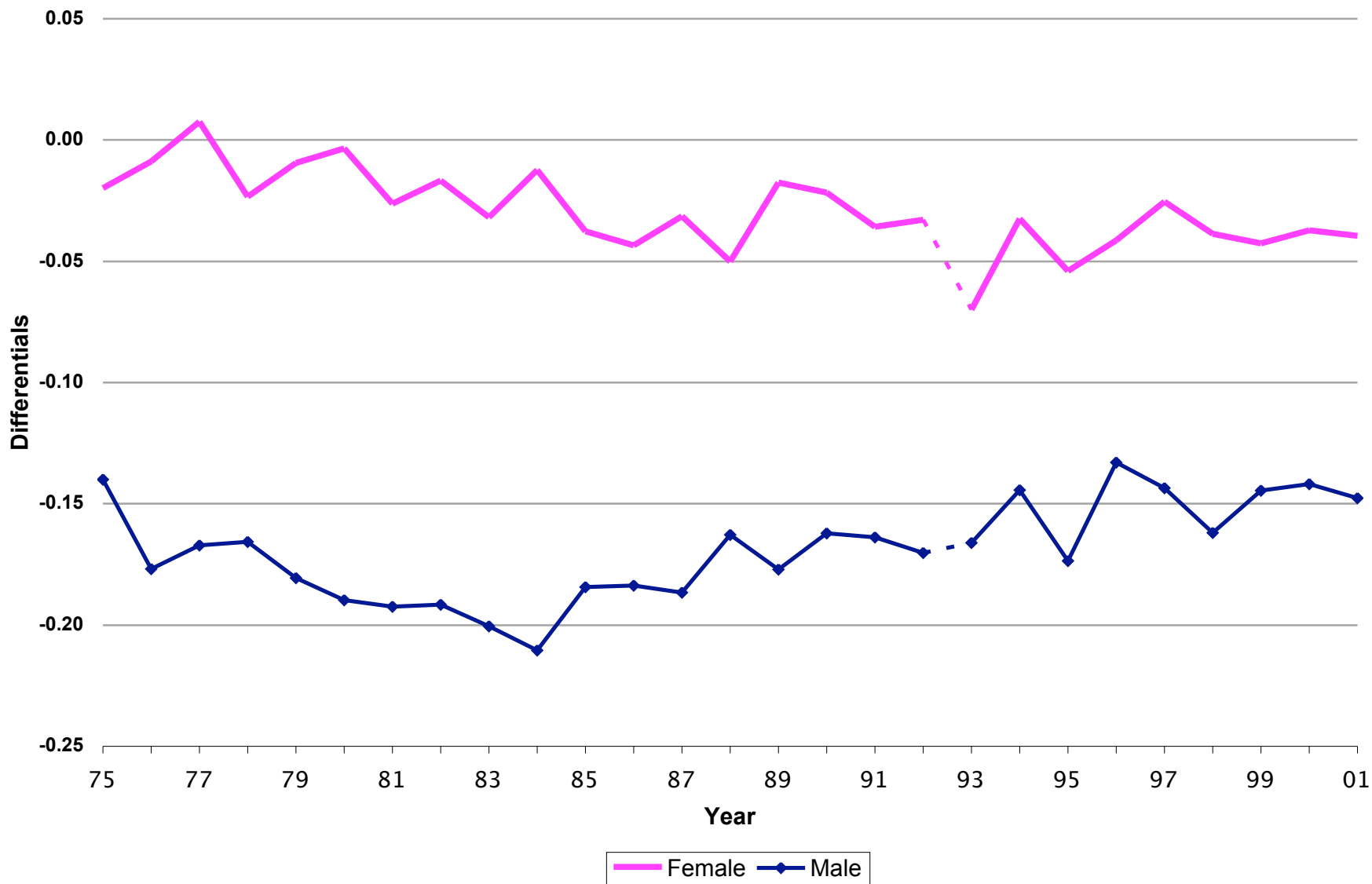
**Figure 9a: College Graduate-High School Graduate Differential in Hourly Wage Rate, All Workers, 1975-2001**
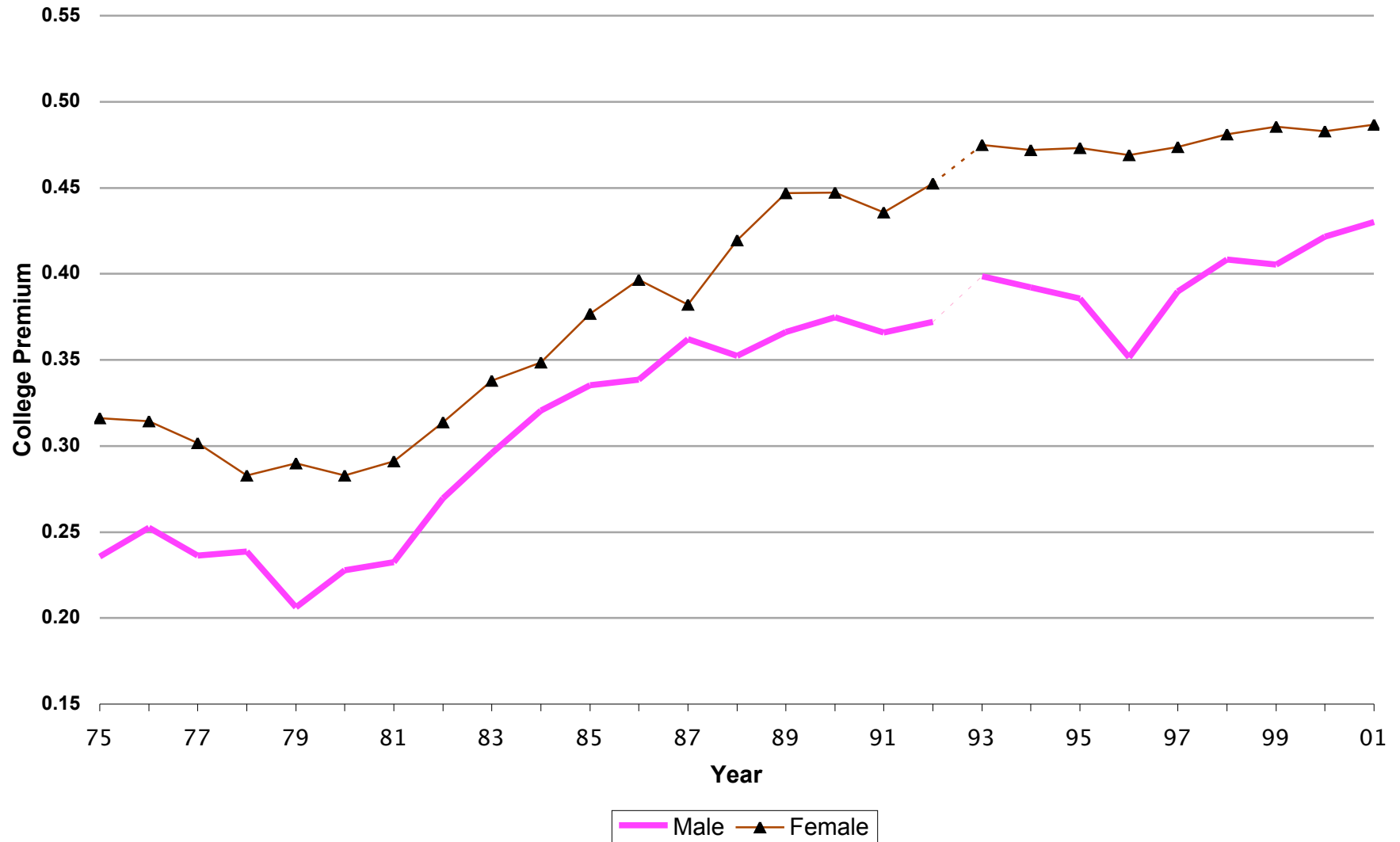
**Figure 9b: College-High School Wage Differential for New Labor Force Entrants, Males and Females, 1975-2001**
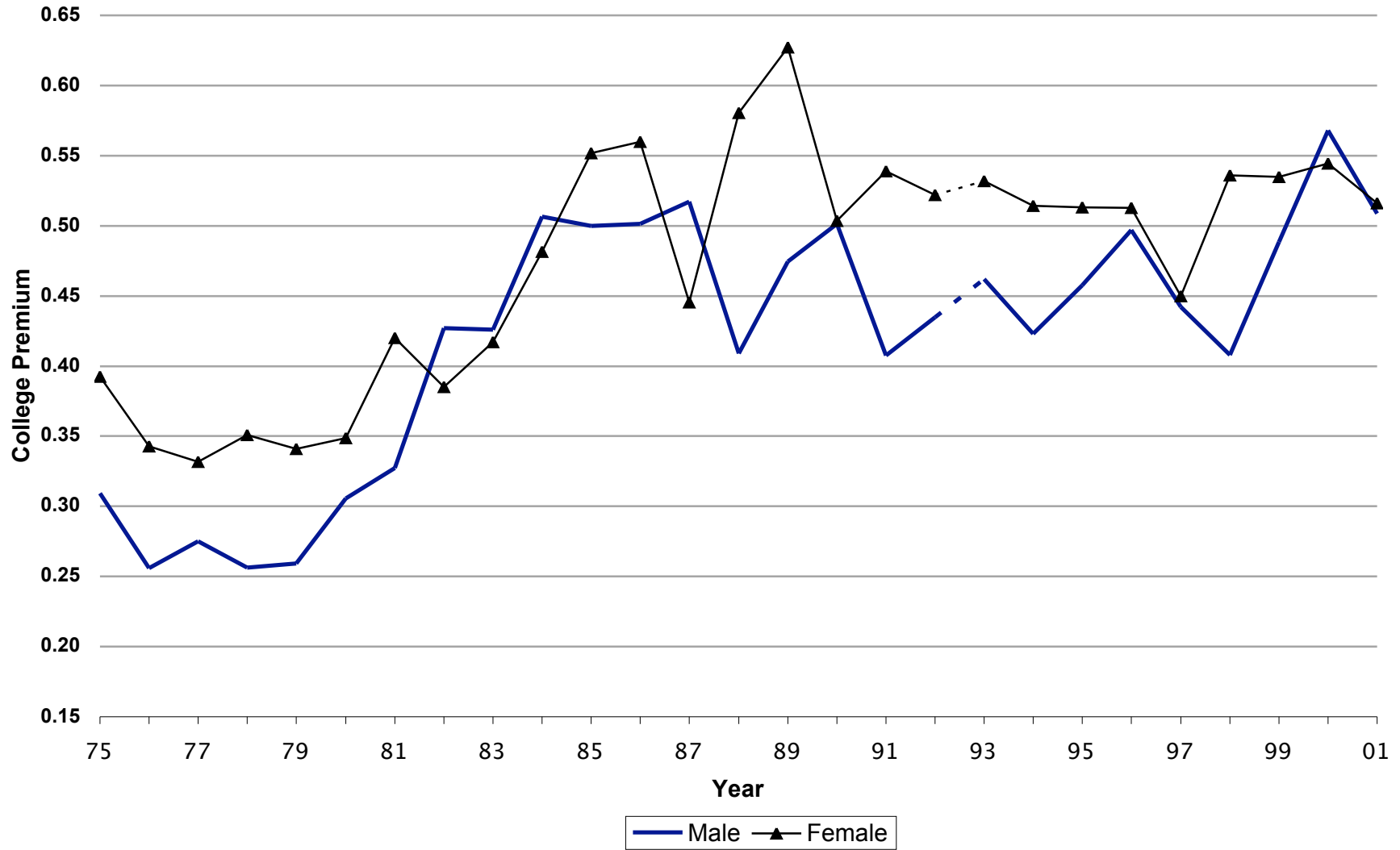
**Figure 10: Returns to Experience by Gender and Education**
(Evaluated at Ten Years Experience)
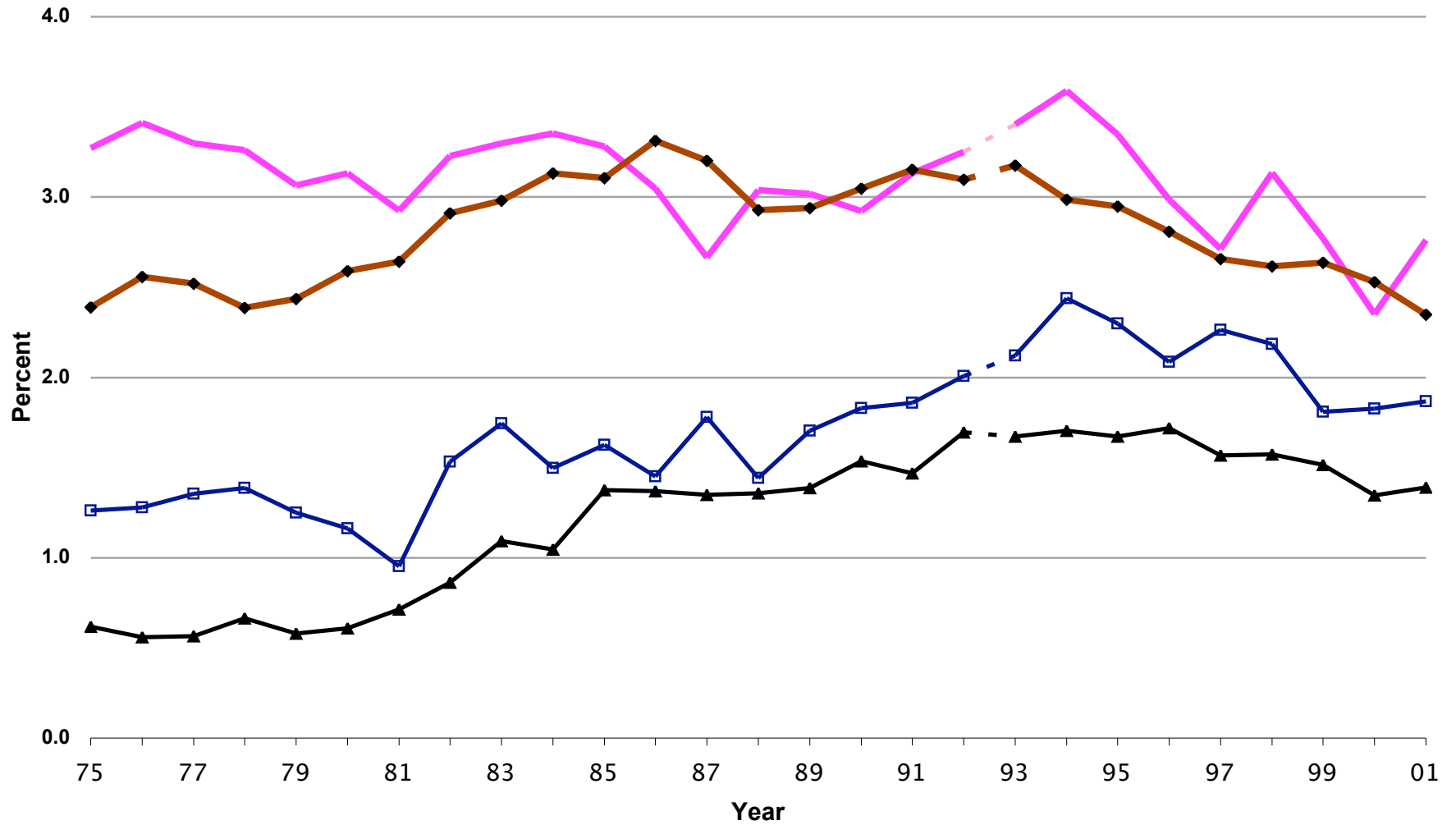
Figure 11: Residual Wage Inequality: 90th and 10th percentiles in Hourly Wages, Holding Other Factors Constant (1975=1)
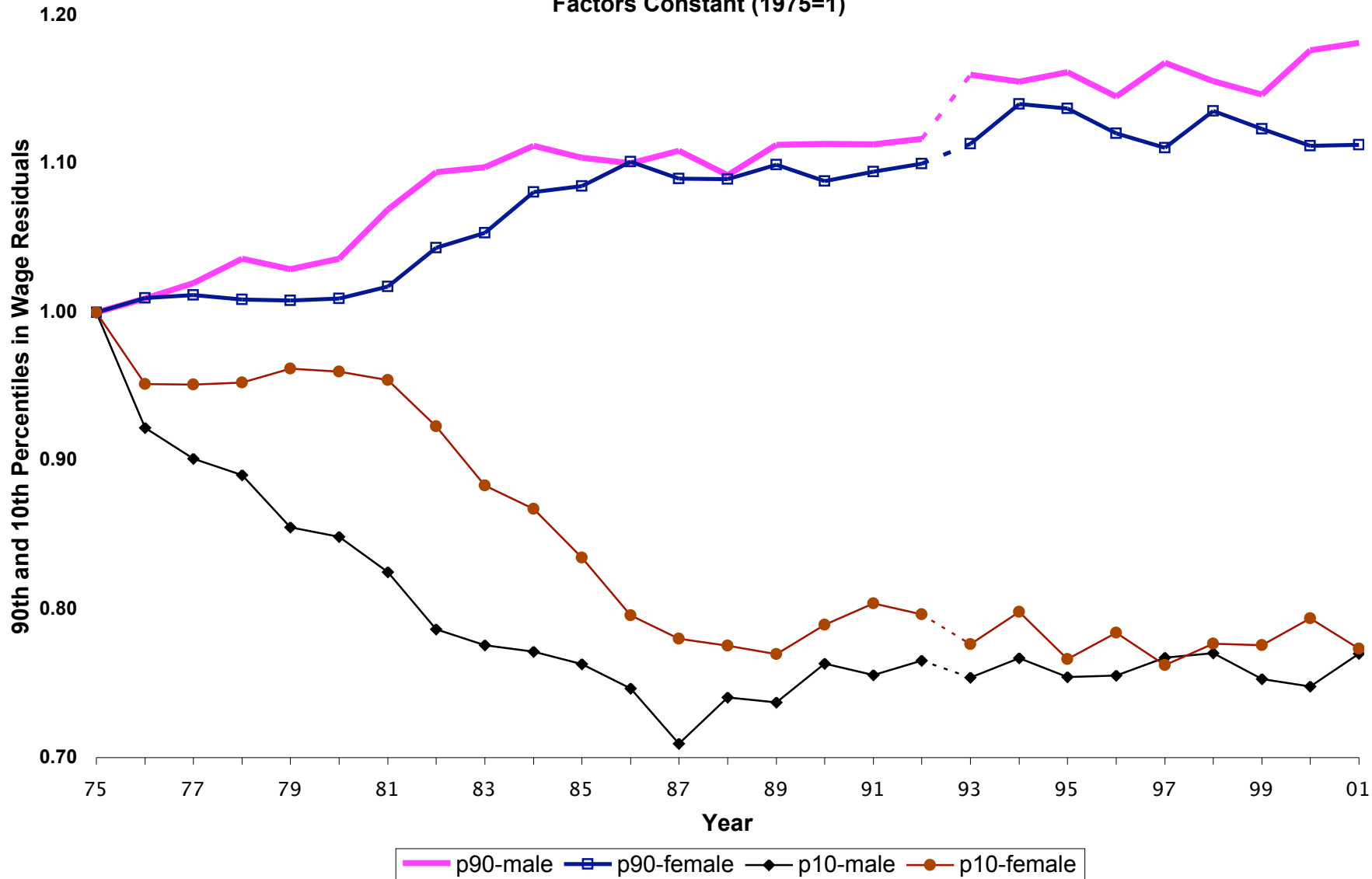
**Figure 12a: Change in Hours by Wage Quintile--Males**
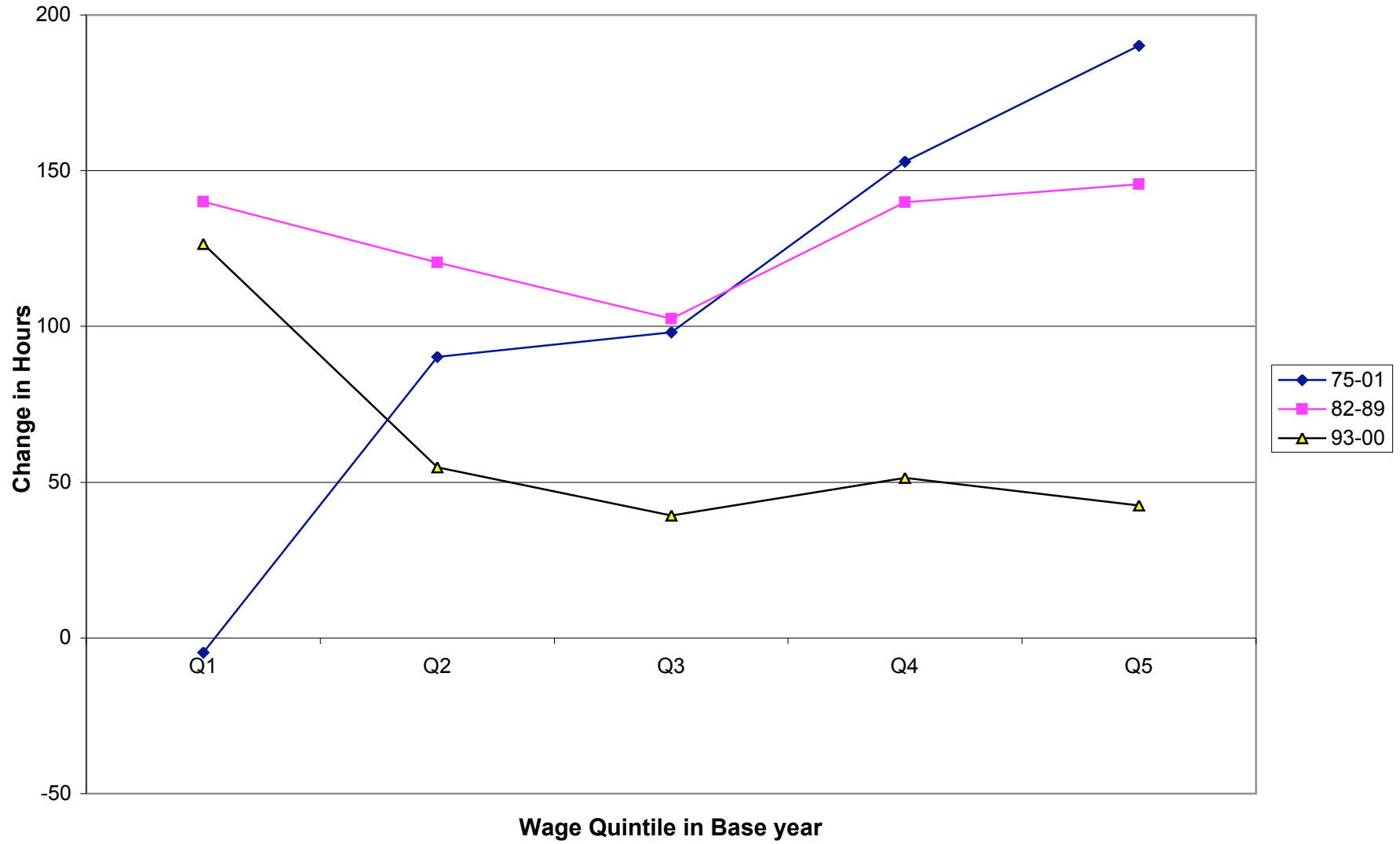
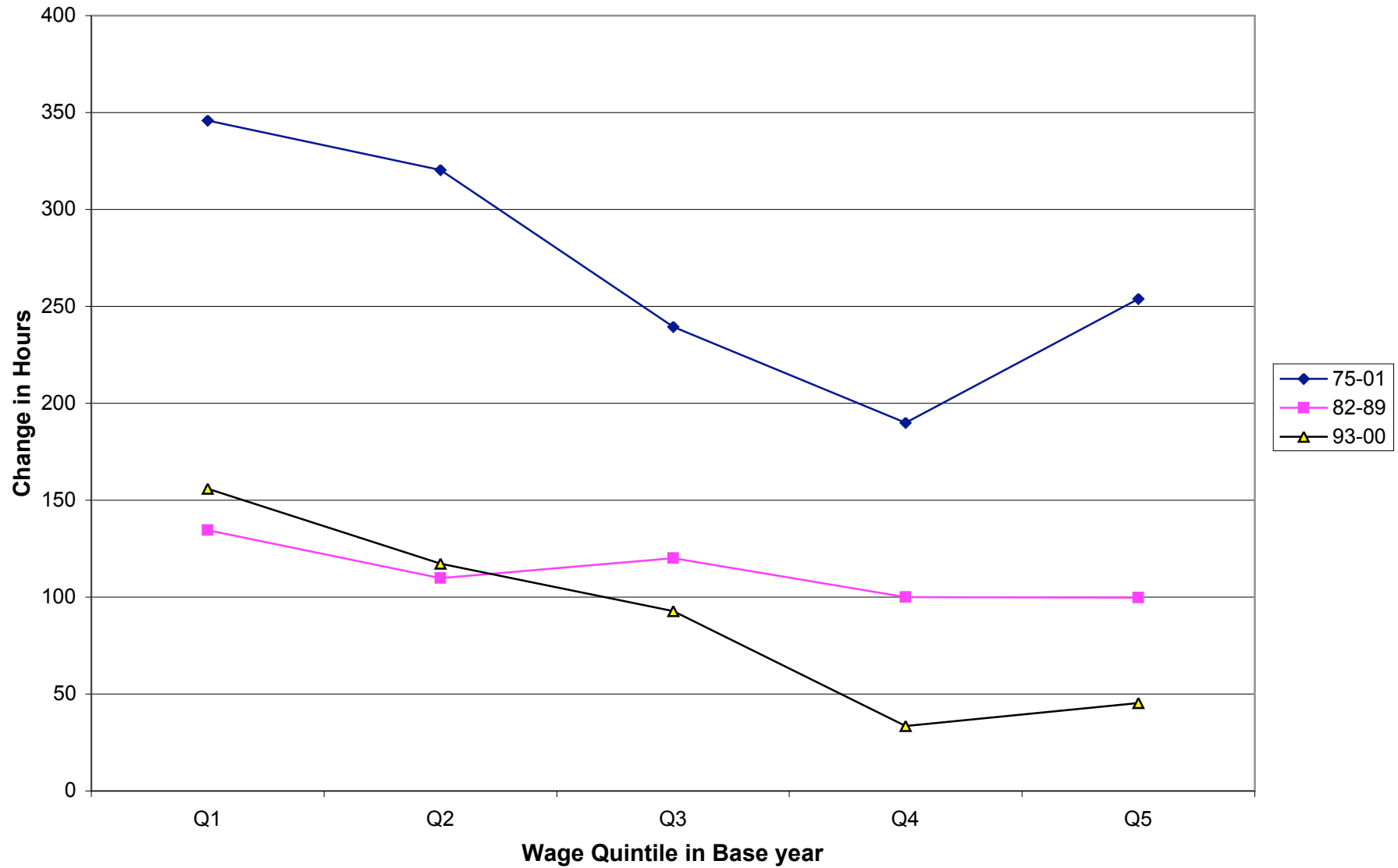Figure 12b: Change in Hours by Wage Quintile--Females

**Figure 13a: Coefficient of Variation of Annual Earnings & Hourly Wage for Male (1975=1)**
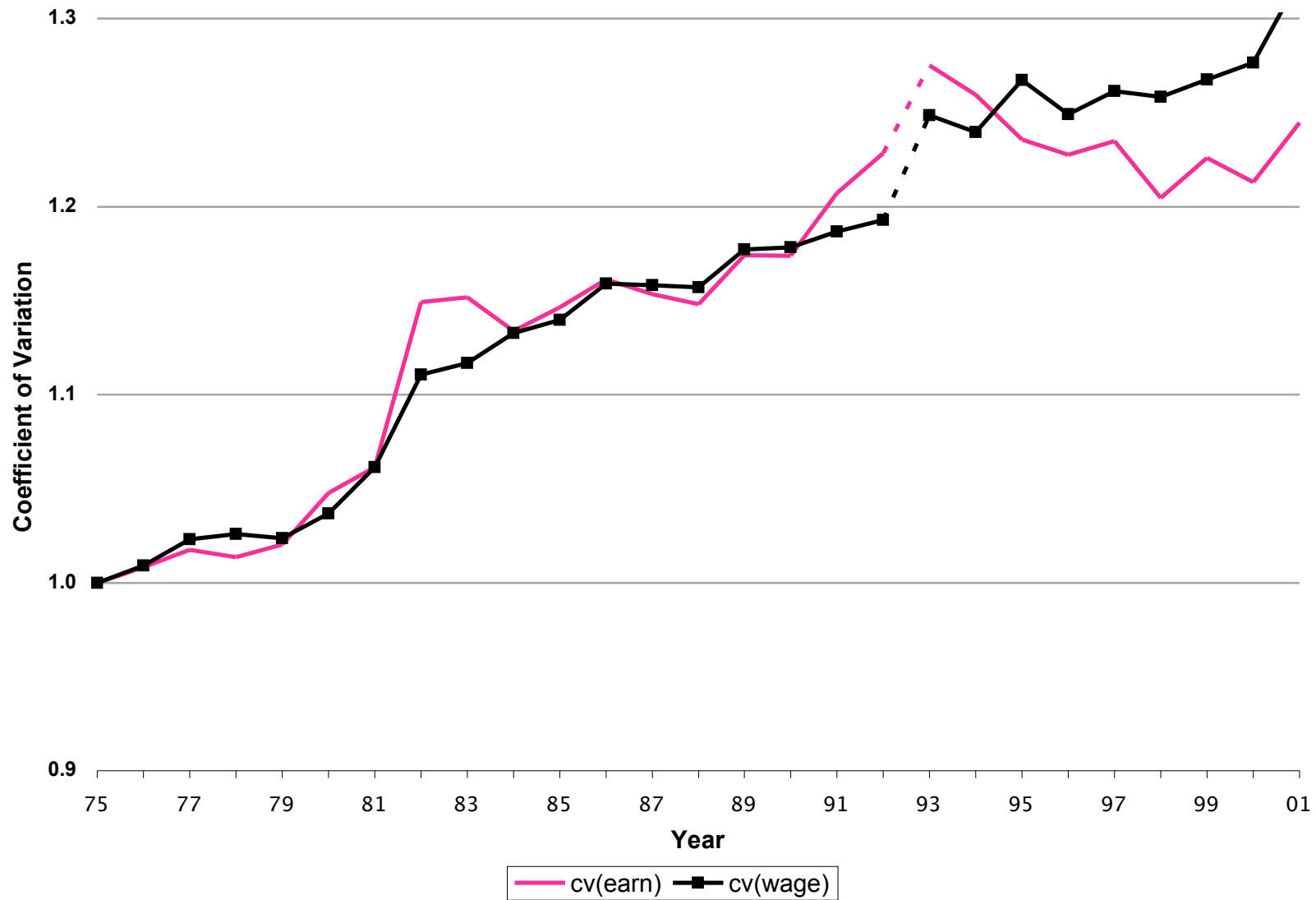
**Figure 13b: Coefficient of Variation of Annual Earnings & Hourly Wage for Female (1975=1)**
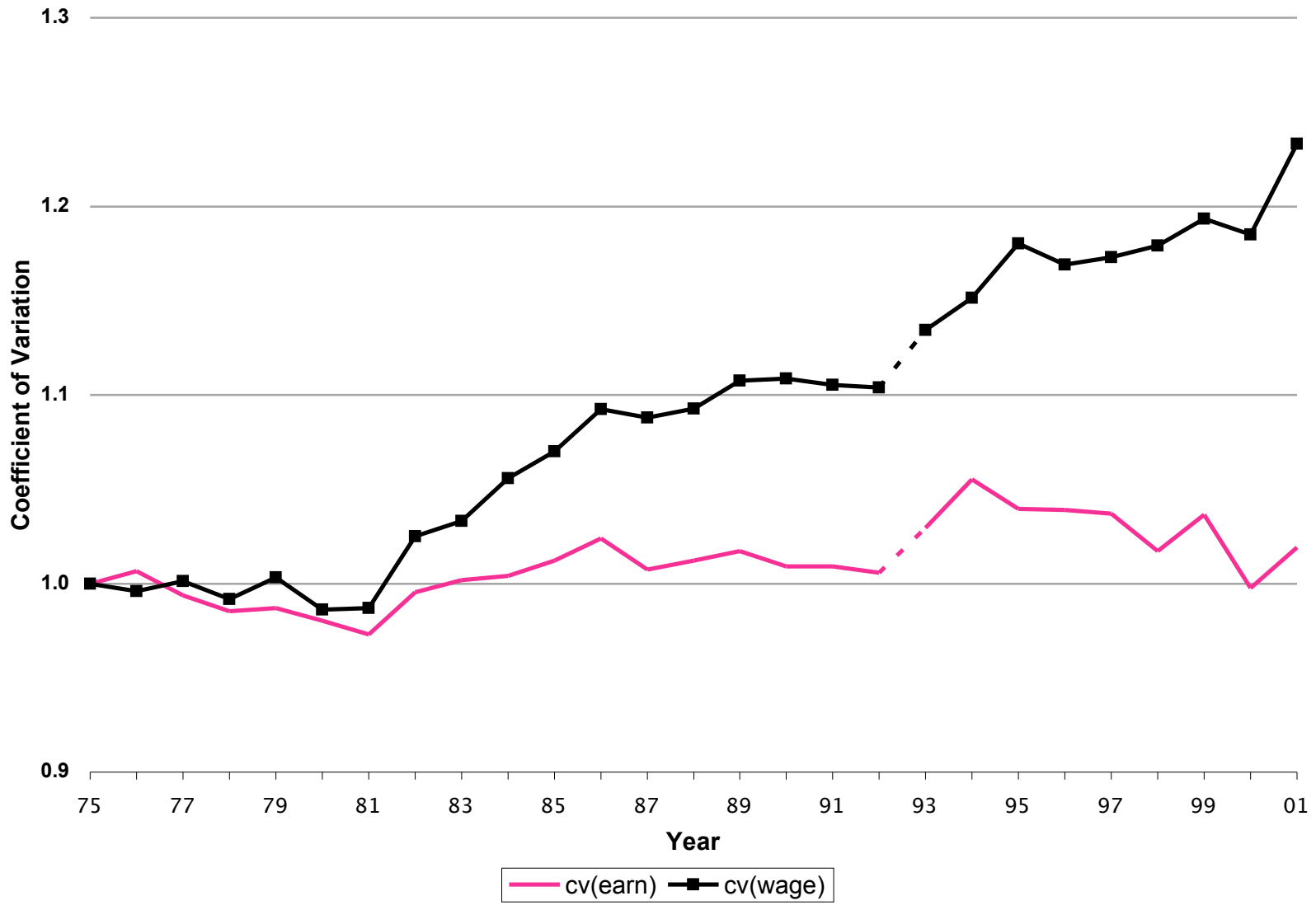
Figure 14: Employment Rate and Coefficient of Variation of Annual Earnings--Males, 1975-2001
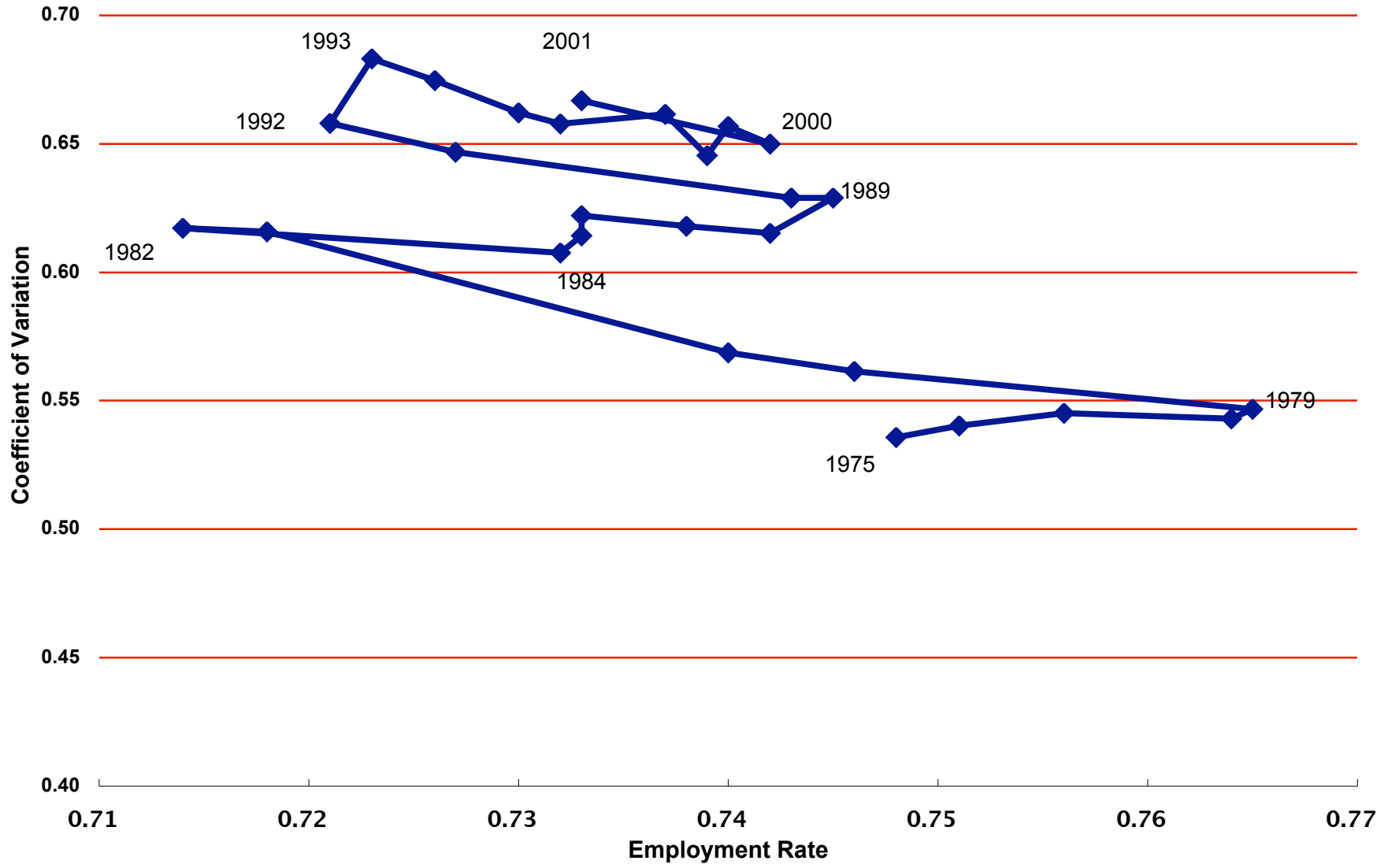
**Figure 15: Coefficient of Variation of Adjusted Family Income, 1969-2001**
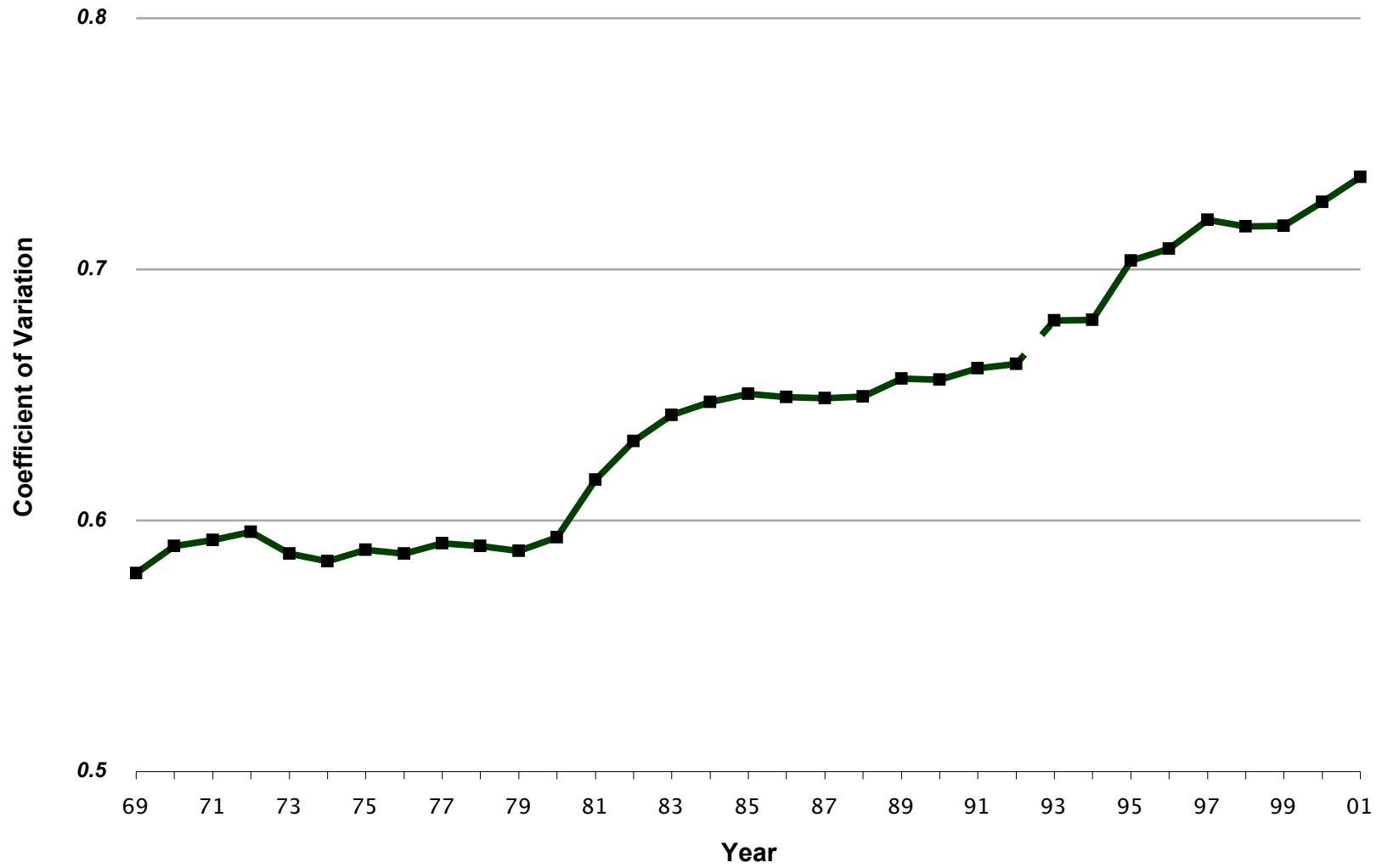
**Figure 16: Coefficient of Variation of Hourly Wage, Annual Earnings and Adjusted Family Income, 1969-2001 (1975=1)**
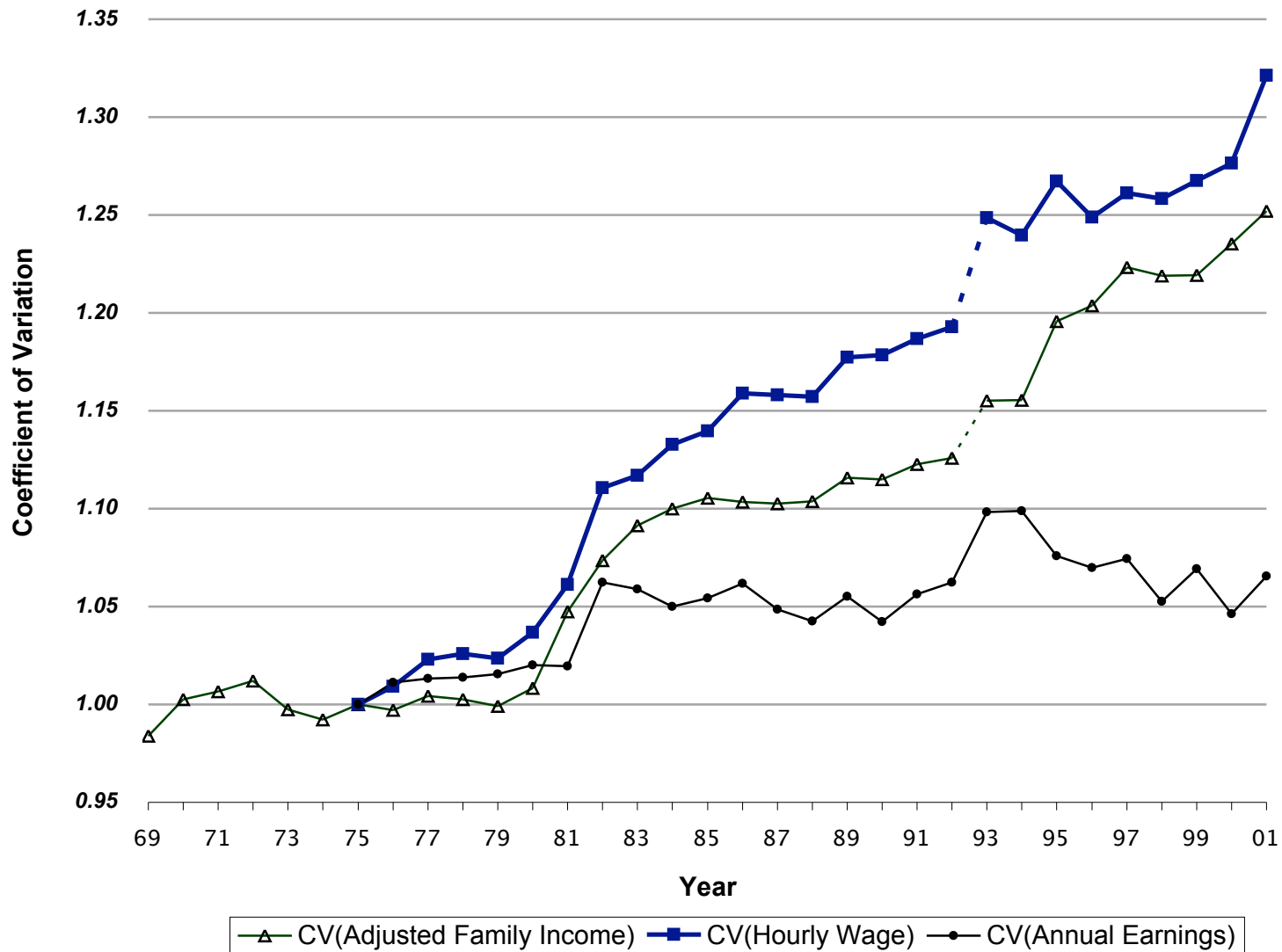
**Table 1**

**Decompositon of Changes in Coefficient of Variation by Source, 1975-2001**

| | Family Inc | Head Earn | Earn Others | Government |
|---|---|---|---|---|
| **Coeff of Var** | | | | |
| 1975 | 0.588 | 0.837 | 1.517 | 1.706 |
| 2001 | 0.737 | 1.028 | 1.442 | 1.984 |
| Change | 0.148 | 0.191 | -0.076 | 0.278 |
| | | | | |
| **Relative Importance** | | | | |
| **mean(s)/mean(total)** | | | | |
| 1975 | | 0.641 | 0.200 | 0.092 |
| 2001 | | 0.565 | 0.257 | 0.087 |
| Change | | -0.075 | 0.057 | -0.004 |
| | | | | |
| **Correlation with** | | | | |
| **total income** | | | | |
| 1975 | | 0.760 | 0.517 | -0.159 |
| 2001 | | 0.744 | 0.561 | 0.000 |
| Change | | -0.016 | 0.044 | 0.159 |
| | | | | |
| **Contribution** | | | | |
| 1975 | 0.588 | 0.407 | 0.157 | -0.025 |
| 2001 | 0.737 | 0.433 | 0.208 | 0.000 |
| Change | 0.148 | 0.025 | 0.051 | 0.025 |

| Other Income |
| --- |
| |
| 2.901 |
| 2.989 |
| 0.088 |
| |
| |
| 0.068 |
| 0.090 |
| 0.022 |
| |
| |
| 0.249 |
| 0.358 |
| 0.108 |
| |
| 0.049 |
| 0.096 |
| 0.047 |

**Table 2**

**Decomposition of Percentage-Point Change in the Poverty Rate for all Persons, 1975-2001**

|  | 1975-2001 | |
|---|---|---|
| **(1) Actual change in poverty rate** | -2.7 | |
| % point change owing to : | | |
| **(2) Economic changes** | -4.5 | |
| (a) Growth in mean adjusted income | | -5.4 |
| (b) Change in income inequality | | 0.9 |
| **(3) Demographic changes** | 1.8 | |
| (a) Race/ethnic composition | | 1.0 |
| (b) Family structure composition | | 1.1 |
| (c)Interaction | | -0.3 |