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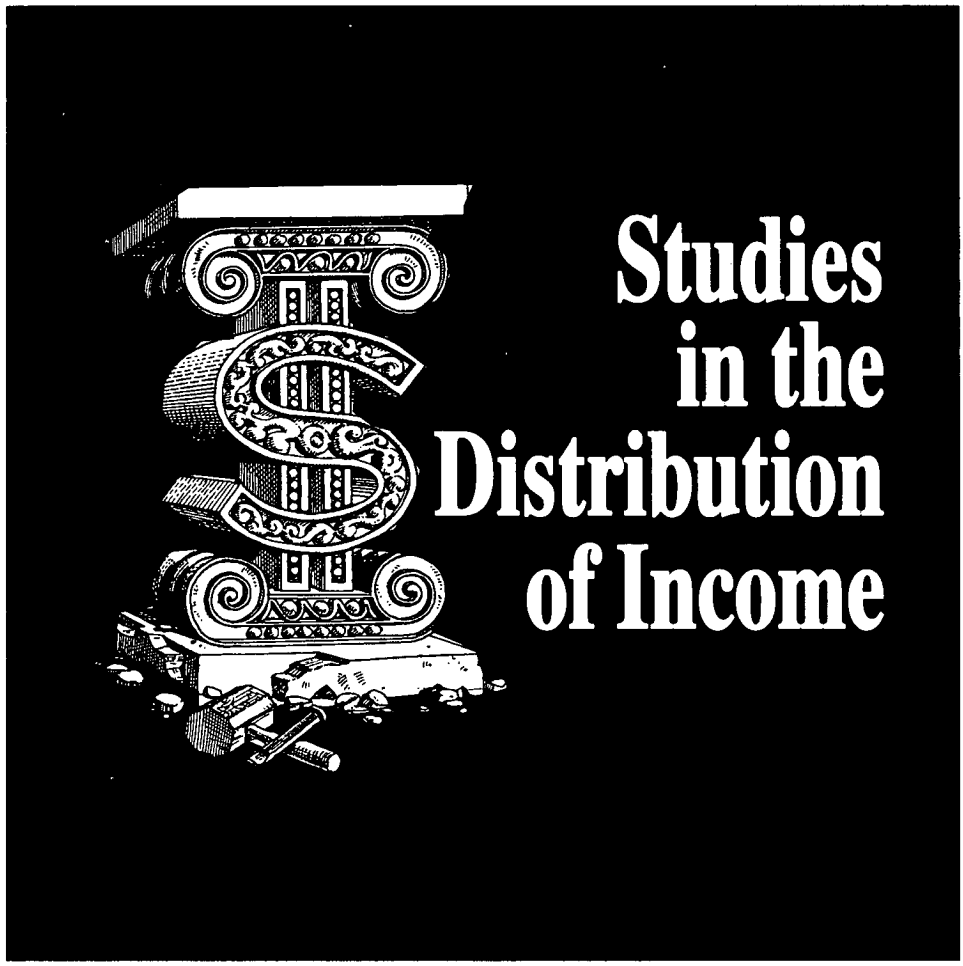

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AN OVERVIEW OF INCOME TRENDS AND GROWING INCOME INEQUALITY

INTRODUCTION

The following collection of papers contains analyses relating to the distribution of income. They were motivated by two long-run economic developments: the slowdown in the growth of family and household incomes in recent years and the growing inequality in the distribution of these incomes.

From the end of World War II until the early 1970's real incomes (incomes adjusted for changes in consumer prices) of most Americans rose rapidly. Moreover, the increases were spread fairly evenly across the income distribution, and income inequality changed very little. Between the early 1970's and 1990's, however, real income growth faltered, and the income gains that did occur were among those families and households at the upper end of the income distribution.[1] The result was a more dispersed and unequal distribution of income.

These developments, of course, were the cause of concern among many groups in the Nation. In the media, for example, news accounts of a declining and struggling middle class began to appear in the 1980's and they became more numerous when the economic slowdown of the early 1990's began. Politicians debated the economic problems confronting the Nation, while researchers tried to uncover the causes of slow income growth and growing income inequality.

Indeed, a significant amount of research has been conducted in this area over the years. The papers in this collection represent only a very small part of the total effort to understand the causes and implications of these economic developments.

The first study, "The Impact of Demographic, Social, and Economic Change on the Distribution of Income," by Paul Ryscavage, Gordon Green, and Edward Welniak, attempts to identify changes in the Nation's demography, society, and economy that may have been associated with income trends and rising income inequality. The second study, "Factors Affecting the Black-White Income Differential: A Decomposition," by Gordon Green, Paul Ryscavage, and Edward Welniak, examines the differential impact of the above mentioned changes on incomes and the income distribution of Black and White households. The third study, "International Comparisons of Earnings Inequality for Men in the 1980's," by Gordon Green, John Coder, and Paul Ryscavage, analyzes the rise in wage dispersion in the United States in the context of the experience of four other countries. And the fourth study, "Trends In Income and Wealth of the Elderly in the 1980's," by Paul Ryscavage focuses on the economic situation of the elderly in relation to the rest of the population during the 1980's. All authors are economists or statisticians of the Bureau of the Census.

Before turning to these studies, however, a brief overview of trends in income and income inequality during the last 20 years is presented which provides a useful framework for their reading.

LONG-RUN TRENDS IN MONEY INCOMES

Figure 1 shows the long-run trend in the real median money income (in 1990 dollars) of families between 1947 and 1990 and households between 1967 and 1990.[2] With respect to the trend for families, the two distinct periods of income growth alluded to earlier can be seen in the figure. Between 1947 and 1973, the median rose from $16,370 to $33,370, or by 2.7 percent a year; between 1973 and 1990, however, the median fluctuated with the swings in the business cycle and, at $35,353 in 1990, was only about $2,000 higher than it was 17 years earlier. [3] Clearly, the income growth of families over these two periods was distinctly different.

[1] Attention to this divergence in income growth was manifested in the early to mid-1980's in the debate over the declining middle class. For example, see Bob Kuttner, "The Declining Middle," *Atlantic*, July 1983, pp. 60-72.

[2] One of the major sources of data for studies of the income distribution is the Current Population Survey (CPS) conducted by the Bureau of the Census. Each March, income data relating to the previous calendar year are collected from a scientifically designed random sample of 60,000 households from around the country. The data relate to "money" incomes and data on noncash income, such as food stamps, health benefits, rent-free housing, and payments in-kind are excluded. For a description of the March CPS, see the appendices of U.S. Bureau of the Census, Current Population Reports, Consumer Income, Series P-60, No. 174, *Money Income of Households, Families, and Persons in the United States: 1990.*

[3] The Consumer Price Index for All Urban Consumers (CPI-U) of the Bureau of Labor Statistics (BLS) has typically been used to adjust nominal incomes for price inflation. Prior to 1983, however, the CPI-U's measurement of shelter costs included changes in the asset value of homes, thereby overstating inflation and understating changes in real incomes, especially in the late 1970's. To provide researchers with a consistent price deflator, the BLS created an experimental price deflator called the CPI-U-X1 which used a rental equivalence approach in the measurement of shelter costs. As a result, this deflator has been used to adjust nominal incomes for inflation in the 1967 to 1990 period; it was extrapolated backward to 1947 by the Census Bureau. The CPI-U-X1 is used throughout the remainder of this overview of income trends.

Figure 1.
Real Median Family Income, Real Median Household Income, and Gini Indexes for Families and Households: 1947 to 1990

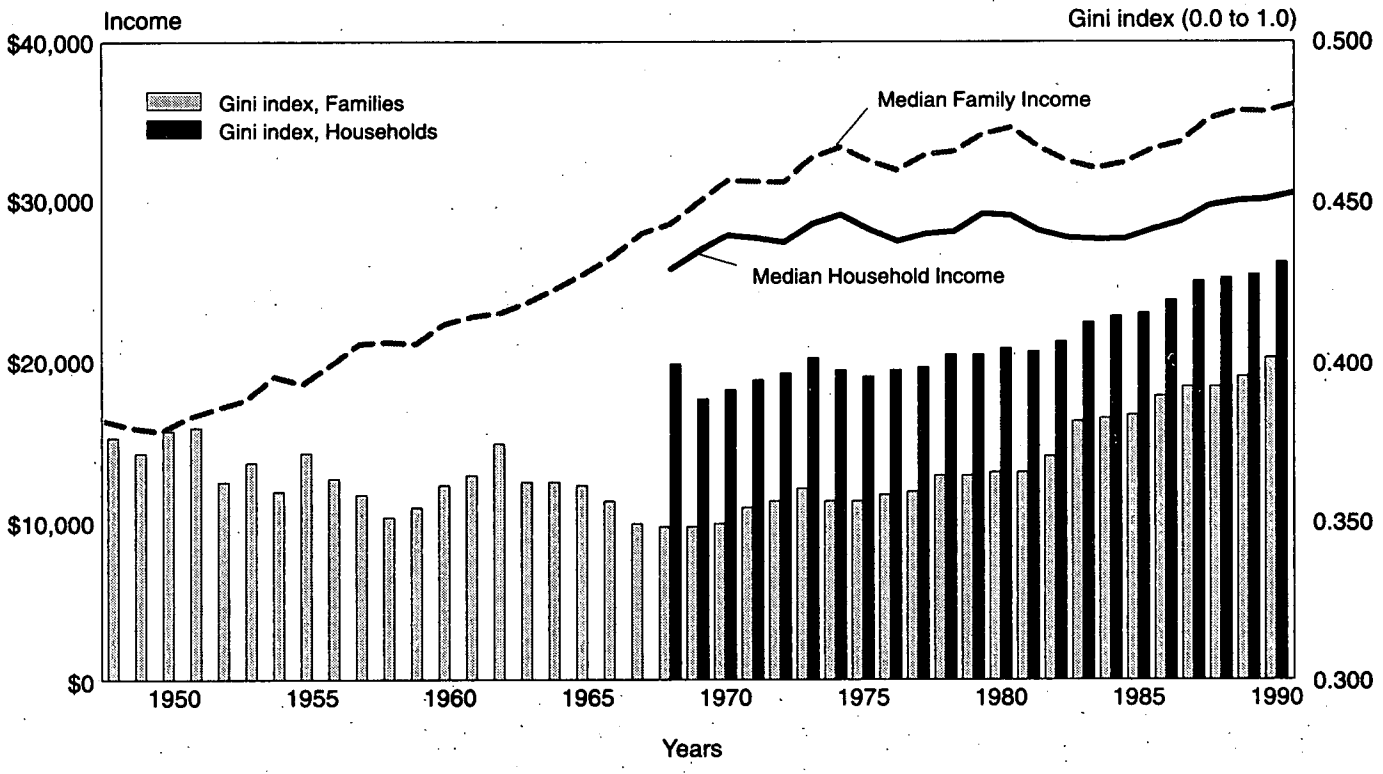
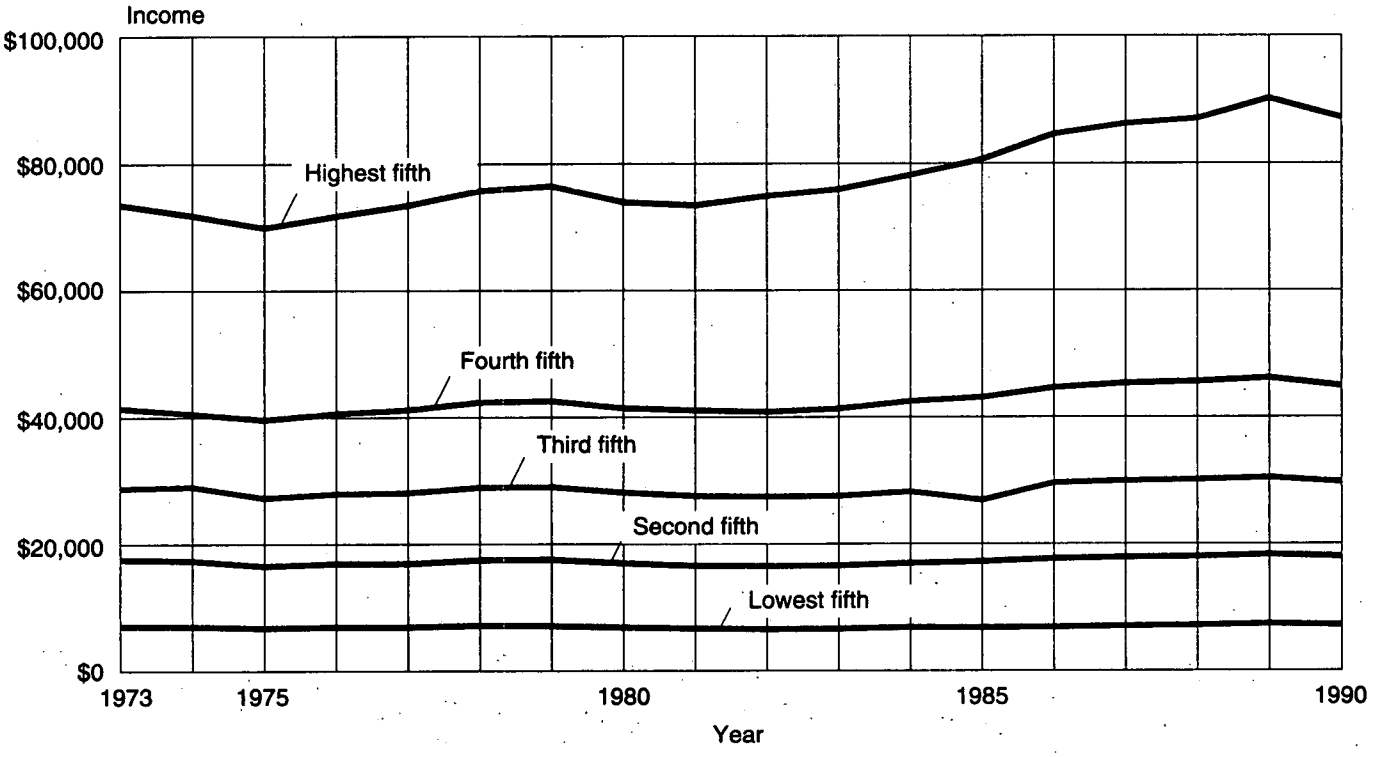


Figure 2.
Real Mean Income of Each Fifth of Households: 1973 to 1990



Real median household incomes also appear in figure 1. This statistical series begins in 1967, the first time household income data were available.[4] Median household income is considerably lower than the median for family households, for example, in 1990 the median for households was $29,943 and for families $35,353. This, of course, reflects the large proportion of individuals living alone or unrelated individuals living together that are counted as households. These individuals, on average, have lower incomes than family households, especially married-couple households.

Real median household income between 1973 and 1990 did not grow much and paralleled the trend in incomes of families. Indeed, the median for households increased by only $835 and stood at $29,943 in 1990. Between 1967 and 1973, on the other hand, it increased by almost $3,400—from $25,719 to $29,108. Consequently, the poor income performance observed for family households in the 1973-90 period was also evident among all households.

INCOME INEQUALITY

Several methods can be used to measure the amount of inequality in the income distribution. The Census Bureau uses two of the more common ones, the shares of aggregate income received by equal proportions of households and the Gini index of income concentration.[5] In the shares approach, incomes of households are ranked from lowest to highest and then divided into equal proportions. Typically, the income distribution is divided into fifths or quintiles, but other quantiles could be used such as quartiles (quarters), deciles (tenths), or even ventiles (twentieths).

Table 1 contains the shares of income received by each fifth of households in each year between 1967 and 1990. As is shown there, the share received by the highest fifth of households is nearly 12 times as large as that received by the lowest fifth of households.[6] Moreover, while the share received by the bottom fifth changed little between 1973 and 1990 (not a statistically significant change), the share received by the highest fifth rose from 43.6 to 46.6 percent. The middle three-fifths, often used to represent the "middle class," experienced a decline in its share from 52.2 to 49.5 percent. Consequently, it was the highest fifth of households that were experiencing the greatest income growth.

This link between differential rates of income growth and rising inequality can be seen more clearly when mean incomes in each quintile are examined over the 1970's and 1980's. As is shown in figure 2, the real mean income of the highest fifth of households increased from $73,438 to $87,137 between 1973 and 1990, or by 19 percent. Real mean incomes grew much slower among the other fifths of households.

The second method for measuring income inequality used by the Census Bureau—the Gini index of income concentration—is related to the shares of income approach. The shares of income received by each fifth of households, or any quantile of households, can be displayed graphically in the form of a Lorenz curve, as is shown in figure 3. The vertical axis of the chart represents the cumulative percentage of aggregate income, while the horizontal axis represents the cumulative percentage of households ranked by income from lowest to highest. The Lorenz curve represents the relationship between the two. In other words, if all households received the same money incomes—perfect equality—the Lorenz curve would be represented by a diagonal emanating from the origin of the chart; if only one household received all the income—perfect inequality—the Lorenz curve would be represented by the horizontal axis and the right hand side of the chart.

Lorenz curves typically fall between the extremes of perfect equality and perfect inequality, as shown in figure 3. (The Lorenz curve depicted is based on the household income distribution existing in 1990 using deciles, or tenths of households.) The Gini index represents the area (A) between the diagonal, or line of perfect equality, and the Lorenz curve, as a percentage of the total area lying beneath the diagonal (A + B). In other words, the Gini index can vary between 0 and 1: therefore, when income inequality rises, the Lorenz curve bows further downward and the area (A) between it and the diagonal increases in size. The result is that the Gini index rises.

Table 1 and figure 1 show the Gini indexes for the household income distribution between the years of 1967 and 1990. Income inequality, as measured by the Gini index, stood at .399 in 1967 and .402 by 1977, a change that was not statistically significant. Thereafter, however, the index began to rise. By 1983, the index was .414, and by 1990 it was .428. Figure 1 also shows the trend in the Gini index for the family income distribution. Between 1947 and 1973, the period when family

[4]A household is defined as a person or group of persons occupying a housing unit. A family is defined as a group of two or more persons related by birth, marriage, or adoption, and residing together.

[5]In addition to those used by the Census Bureau, measures such as the coefficient of variation, variance of the natural logarithm of incomes, the interquartile range, Theil index, and Atkinson measures of inequality have been used in the literature as well. A recent Census Bureau study also used a "relative income" concept to measure inequality. See John McNeil, U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 177, *Trends in Relative Income: 1964 to 1989,* U.S. Government Printing Office, Washington, D.C., 1991.

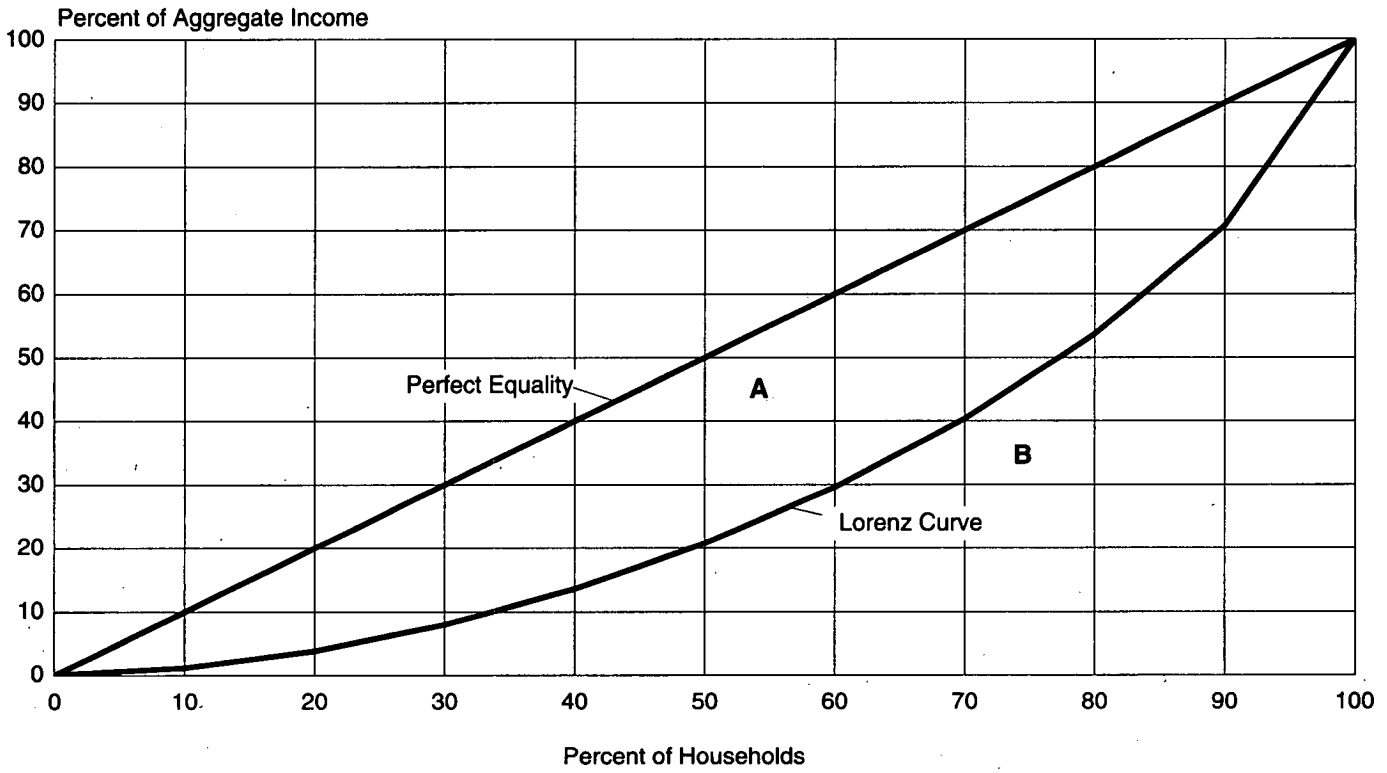
[6]As Edgar K. Browning has pointed out, the shares received by each quintile would be different if different definitions of income are used. See Edgar K. Browning, "Inequality and Poverty," *Southern Economic Journal,* Vol. 55, No. 4, April 1989, pp. 819-830. As an illustration of his point, see U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 176-RD, *Measuring the Effect of Benefits and Taxes on Income and Poverty: 1990,* U.S. Government Printing Office, Washington, D.C., 1991.

Table 1. **Share of Aggregate Income Received by Each Fifth of Households: 1967 to 1990**

Year	Number (thous.)	Percent distribution of aggregate income					Median (1990)	Gini ratio
		Lowest	Second	Third	Fourth	Fifth		
1990	94,312	3.9	9.6	15.9	24.0	46.6	$29,943	.428
1989	93,347	3.8	9.5	15.8	24.0	46.8	30,468	.431
1988	92,830	3.8	9.6	16.0	24.3	46.3	30,079	.427
1987	91,124	3.8	9.6	16.1	24.3	46.2	29,984	.426
1986	89,479	3.8	9.7	16.2	24.3	46.1	29,690	.425
1985	88,458	3.9	9.8	16.2	24.4	45.6	28,688	.419
1984	86,789	4.0	9.9	16.3	24.6	45.2	28,197	.415
1983	85,290	4.0	9.9	16.4	24.6	45.1	27,581	.414
1982	83,918	4.0	10.0	16.5	24.5	45.0	27,577	.412
1981	83,527	4.1	10.1	16.7	24.8	44.4	27,669	.406
1980	82,368	4.2	10.2	16.8	24.8	44.1	28,125	.403
1979	80,776	4.1	10.2	16.8	24.7	44.2	29,074	.404
1978	77,330	4.2	10.2	16.9	24.7	44.1	29,168	.402
1977	76,030	4.2	10.2	16.9	24.7	44.0	28,067	.402
1976	74,142	4.3	10.3	17.0	24.7	43.7	27,913	.398
1975	72,867	4.3	10.4	17.0	24.7	43.6	27,442	.397
1974	71,163	4.3	10.6	17.0	24.6	43.5	28,197	.395
1973	69,859	4.2	10.5	17.1	24.6	43.6	29,108	.397
1972	68,251	4.1	10.5	17.1	24.5	43.9	28,545	.401
1971	66,676	4.1	10.6	17.3	24.5	43.5	27,377	.396
1970	64,778	4.1	10.8	17.4	24.5	43.3	27,640	.394
1969	63,401	4.1	10.9	17.5	24.5	43.0	27,828	.391
1968	62,214	4.2	11.1	17.5	24.4	42.8	26,844	.388
1967	60,813	4.0	10.8	17.3	24.2	43.8	25,719	.399

NOTE: Median household income has been deflated by the CPI-U-X1. See footnote 3.

Figure 3.
Lorenz Curve for U.S. Household Income: 1990



income was rising, inequality, as measured by the Gini index, was fairly stable or declining. In the 1973 to 1990 period, however, when family income grew very little, inequality began to rise.

INCOME INEQUALITY AMONG GROUPS

Growing income inequality in recent years has not been isolated among just one or a few groups. Rather, evidence of greater income differences has been observed among many groups in society to varying degrees. Special income tabulations that were developed for two of the income studies contained in this report, provide some evidence as to how income inequality changed among various groups between 1969, 1979, and 1989.

Figure 4 shows the Gini indexes for four groups of households classified on the basis of the age of the householder. As shown, increases in inequality were particularly sharp among those households in which the householder was under 45 years of age. While the number of households with a householder under 25 were not very numerous (5 million in 1989), the Gini index for this group rose from .316 to .396 between 1969 and 1989, or 25 percent. For those householders age 25 to 44, the Gini index increased from .302 to .374, or 24 percent. (Implied comparisons are not significant.) Inequality also increased among households in which the householder was age 45 to 64, but only by about 11 percent and most of this occurred in the 1980's. And for elderly households, those in which the householder was 65 or over, inequality actually fell between 1969 and 1989.

When inequality is examined by race, increases between 1969 and 1989 are also observed among White and Black households. Figure 5 indicates that the Gini index for White households was up by 10 percent and for Blacks 11 percent (statistical comparisons implied here are not statistically significant). For households of other races the change in the Gini index was not statistically significant.

Growing income inequality was also observed among married-couple households and single-parent households, especially during the 1980's. As shown in figure 6, the Gini index among the former rose from .331 to .368 between 1969 and 1989, or 11 percent, and for single parent families from .410 to .448, or 9 percent. The trend in inequality for nonfamily households reflected that of elderly households.

Gini indexes increased more among those households in which the householder had less than a college education than it did for householders with more education, as is shown in figure 7. The Gini index rose from .381 to .418 over the 20-year period, or by 10 percent, for those with less than a college education.

Among those with some college experience, the Gini index was up by only 6 percent (from .346 to .368) and for those householders with a college education or more, the Gini index rose by only 5 percent, or from .351 to .370. Both of these changes were not statistically significant.

As has been shown, inequality of incomes has increased across many different groups in society, but the amount, or degree, of increase has also varied. One of the sharper contrasts was found among married-couple households in which the householder was age 25 to 44, and had either a college education or a high school education or less. Figure 8 shows that income inequality in the 1969-89 period, as measured by the Gini index, rose dramatically for those households in which the householder had a high school education or less—from .244 to .298, or 22 percent. In contrast, for those with college educations or more, the Gini index increased by only 6 percent, or from .281 to .297, a change that was not statistically significant. (The comparisons implied here were also not statistically significant.)

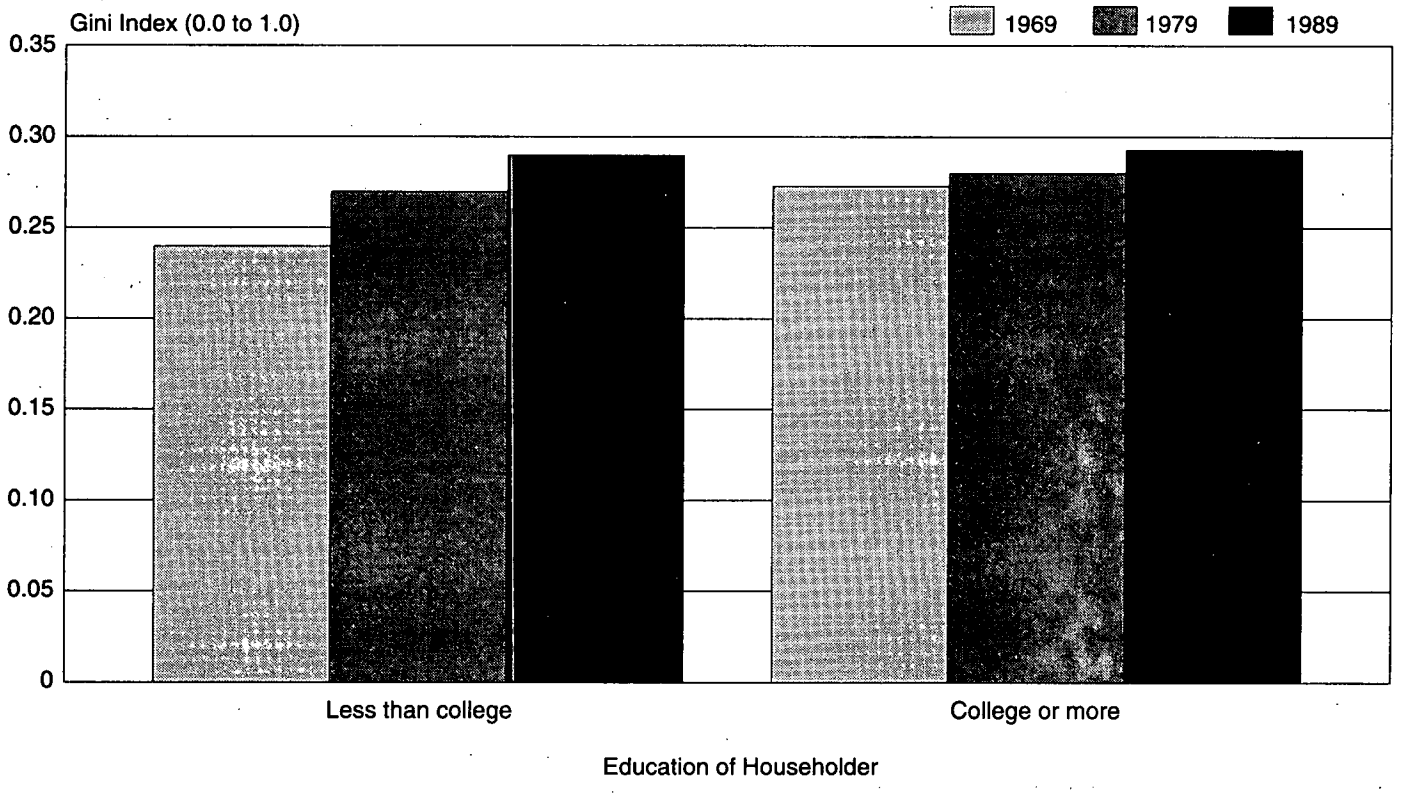
The composition of both groups were greatly affected by the maturing of the large baby boom cohort born between the years of 1946 and 1964. Indeed, in 1969 the "baby boomers" were only age 5 to 23 years of age but by 1989 they were age 25 to 43. As was pointed out, for those households in which the householders had high school educations or less, income inequality rose substantially, while for those with college educations the increase in inequality was less dramatic. Incomes also rose much faster for the college educated than for those with high school educations or less. For the college educated, median household incomes increased from $43,255 to $56,654 between 1969 and 1989, or 31 percent; for those with high school educations or less, household incomes rose from $30,560 to $33,026, or by about 8 percent. In other words, both the trend in income and income inequality were quite different and the major distinguishing characteristic between both groups was education.

POSSIBLE CAUSES OF GROWING INCOME INEQUALITY

Growing income inequality has been the subject of much research in recent years. Much of this research has focused on the changes taking place in the Nation's labor market and its wage distribution. This is a reasonable connection since the single largest component of household income is earnings derived from the labor market. According to this research, real earnings growth did indeed slowdown in the 1970's and 1980's relative to earlier decades, and greater dispersion in market earnings occurred.[7] One study showed that for men, the

[7]The literature in the area of earnings and wage inequality is voluminous. For a sampling of the earlier work in this area see Peter Henle and Paul Ryscavage, "The Distribution of Earned Income Among Men and Women, 1958-1977," *Monthly Labor Review,* April

Figure 8.
Gini Indexes for Married-Couple Households, by Education of Householder: Age 25 to 54



Education represents highest year of school completed.

Gini index rose from .351 to .405 between 1967 and 1987 indicating a 15 percent increase in the inequality of earnings derived from the labor market.[8]

One of the demand-side factors that researchers have thought to be causing greater wage dispersion has been the shift in economic activities away from goods-production to service-production.[9] Industries involved in the production of services typically have been paid lower wages and exhibited a larger amount of variation in their wage structure relative to those industries engaged in the production of goods. It would stand to reason as more and more workers entered the service-producing industries wage growth would have become slower and the structure of wages more dispersed.

Other researchers have pointed out, however, that greater wage inequality has also been observed over time in the goods-producing industries as well. For example, in manufacturing the Gini index for men who worked full time, year round increased from .247 to .286 between 1978 and 1987.[10] Consequently, additional explanations have emerged.

One of the more popular explanations has focused on the growing gap in the economic returns to well-educated and poorly-educated workers.[11] According to this explanation, during the 1980's employers became more willing to pay wage premiums for highly skilled workers as the supply of these workers began to grow more slowly in that decade. Wages for the less-skilled, on the other hand, changed very little or even declined. A decline in labor demand for these workers, particularly in manufacturing industries, resulted in fewer job opportunities for them at relatively high wages.

1980, pp. 3-10; Martin Dooley and Peter Gottschalk, "Earnings Inequality Among Males in the U.S.: Trends and the Effect of Labor Force Growth," *Journal of Political Economy,* Vol. 92, No. 1, 1984, pp. 59-89; and Barry Bluestone and Bennett Harrison, *The Great American Job Machine: The Proliferation of Low Wage Employment in the U.S. Economy,* Report to the Joint Economic Committee of the U.S. Congress, December 1986.

[8]See Gary Burtless, "Earnings Inequality Over the Business and Demographic Cycle," in Gary Burtless, ed., *A Future of Lousy Jobs?,* Washington, The Brookings Institution, 1990.

[9]See Barry Bluestone and Bennett Harrison in footnote 7. Goods producing industries have traditionally been defined as agriculture, mining, construction, and manufacturing. The service-producing industries have been defined as transportation, communication, and public utilities, wholesale and retail trade, finance, insurance and real estate, business and repair services, personal services, entertainment and recreation services, professional and related services, and public administration.

[10]See Paul Ryscavage and Peter Henle, "Earnings Inequality Accelerates in the 1980's," *Monthly Labor Review,* December 1990, pp. 3-16.

[11]See Chinhui Juhn, Kevin M. Murphy, and Brooks Pierce, "Wage Inequality and the Rise in the Returns to Skill, *The Journal of Political Economy,* (forthcoming).

Immigration patterns and the country's trade deficit of the 1980's may have been related to the growing gap in wages between educational classes of workers.[12] Recent immigrants have been poorly educated and have added to the pool of native born workers with low education levels thereby depressing wages. The trade deficit may have also added to the problem since the Nation's imports embodied a greater proportion of unskilled labor than our exports. In other words, the imports consisted of goods that could have been made by low-skilled workers in this country but instead were made abroad.

Declining unionization, according to some researchers, may have also exacerbated the income inequality picture in recent years.[13] With union influence on wage setting practices diminishing, especially in certain high-paying goods-producing industries, the economic prospects for many less-skilled workers darkened in the 1980's. Such workers have typically received the greatest economic benefits from union membership.

Outside the economic realm, certain social and demographic developments have been associated with rising income inequality. These perhaps represent the linkage between both greater income inequality and greater earnings inequality. While the trend in income inequality is related to the trend in earnings inequality, it is also linked to the number of earners in a household, the amounts of income derived from outside the labor market, and other factors associated with household formation.

Changes in the age structure of the population and changes in household composition have been two noneconomic factors mentioned as affecting growing income inequality. The maturing of the baby boom generation in the 1970's and 1980's, as was discussed earlier, coincided with the growth in inequality, so it has been a logical suspect. Indeed, there was evidence of a growing gap in the incomes between younger and older workers in the 1970's and early 1980's, as the baby boom cohort matured.[14] However, and has been pointed out by a number of researchers, by the mid-1980's the baby boom generation was well into their middle years and income inequality continued to rise. Furthermore, because the baby boom generation spanned so many years, there were offsetting effects associated with its aging, and by the 1990's its overall impact had been neutralized.[15]

The evidence with respect to changes in household composition are more clear cut. Between 1969 and 1989 the proportion of all households that were married-couple households plunged from 70 percent to 56 percent. Taking the place of this traditional type of living arrangement were single-parent family households and nonfamily households, groups in which inequality of incomes is greater than among married couples. Increases in divorce and separations, births out of wedlock, and alternative life-style choices were obviously related to the dramatic change in living arrangements that took place.

The consequences of these changes, when combined with the changes that took place in the labor market during the 1970's and 1980's (i.e., lackluster wage growth), had implications for growing income inequality. On the one hand, a larger and larger proportion of working wives moved into the work force, in many cases to prop up the stagnating earnings of husbands. On the other, a smaller proportion of households had available to them additional persons to enter the labor force. Incomes in single-parent families and nonfamily households are much lower, on average, than those of married couples in which the wife worked. Obviously, the reasons for the recent increases in income inequality in this country are not fully understood. Not only is more research needed in understanding the greater inequality in the distribution of earnings derived from the labor market, but also in understanding the linkages between it and rising income inequality among households. We hope the following studies shed some light on growing earnings and income inequality in the United States.

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[12]See Frank Levy and Richard J. Murnane, "Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations," *Journal of Economic Literature* (forthcoming).

[13]See McKinley Blackburn, David E. Bloom, and Richard B. Freeman, "The Declining Economic Position of Less Skilled American Men," in *A Future of Lousy Jobs?,* Gary Burtless, ed., Washington, The Brookings Institution, 1990.

[14]See Frank Levy, *Dollars and Dreams: The Changing American Income Distribution,* New York, Russell Sage Foundation, 1987.

[15]See Paul Ryscavage, Gordon Green, and Edward Welniak, "The Impact of Demographic, Social, and Economic Change on the Distribution of Income," in this report.

THE IMPACT OF DEMOGRAPHIC, SOCIAL, AND ECONOMIC CHANGE ON THE DISTRIBUTION OF INCOME

by Paul Ryscavage, Gordon Green, and Edward Welniak

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I. INTRODUCTION

One of the more striking economic developments over the past 20 years has been the growth in income inequality among American households. During this period the percentage of households with incomes below the Federal government's poverty thresholds has also been persistently high. Both developments took place during a time when household incomes, on average, grew very slowly. Between 1969 and 1989, real median household income grew by a meager 2 percent, or from $28,344 to $28,906.[1]

These developments, of course, were in sharp contrast to the trends during the 1950's and 1960's. Incomes rose strongly in the immediate post-World War II era and the increases were spread more evenly throughout the income distribution. Income inequality changed very little, and poverty was dramatically reduced. It is for this reason, therefore, that the income trends over the last two decades have attracted so much attention from so many quarters of society.

At issue, of course, is whether the U.S. economy in recent years has been so transformed by world competition and other developments that it can no longer assure the ever increasing standard of living American households have become accustomed to. This theme has been popularized by a number of writers and economists during the 1980's. For example, Barry Bluestone and Bennett Harrison (1982) argued that "deindustrialization" was impeding the growth of the middle class. Robert Kuttner (1983) and Lester Thurow (1984) speculated about whether the Nation was becoming one of "haves and have nots." And Frank Levy (1987) warned that the increasingly unequal distribution of incomes was creating "an inequality of prospects" for the attainment of the American middle class life style.

One of the common threads running through all of their arguments was the belief that the source of the greater income polarization was the labor market. Economic forces, whether they be low productivity and wage growth, the soaring trade and fiscal deficits, the decline in union membership, and so forth, were all taking their toll on the traditional jobs of the middle class. On the other hand, demographic changes, such as the maturing of the baby boom generation, and social changes, such as changes in living arrangements, were usually given lower importance in the explanation for the growth in income inequality among households.

We believe that the developments occurring in the income distribution, whether they involve income levels, income inequality, or poverty, are the outcomes of a complex assortment of demographic, social, and economic factors. Furthermore, attempting to weight their relative importance suggests some preconception of the complex interrelationships going on among these factors. As is well known, this country's demography, society, and economy underwent profound changes during the 1970's and 1980's. In this paper, therefore, we examine trends in various demographic, social, and economic factors and investigate how they may have both separately and collectively affected our income and poverty measures between 1969 and 1989.

We begin in Section II by discussing some of the more important demographic, social, and economic trends during the last twenty years and their possible effects on income levels, inequality, and poverty. In Section III we present a standardization methodology—a tool of analysis more common among demographers—which allows us to quantify the impact of these factors on income measures. Section IV presents the results of this standardization technique when 1989 incomes of households are standardized for demographic, social, and economic changes taking place over the 1969-89 period and then standardized for demographic, social, and economic changes taking place over the 1979-89 period. The last section of the paper, Section V, outlines the implications of our results for further research into growing income inequality.

[1]This increase in nominal incomes between 1969 and 1989 was adjusted for inflation by the Consumer Price Index for All Urban Consumers (CPI-U). If it had been adjusted with the experimental Consumer Price Index for All Urban Consumers (CPI-U-X1), the median would have increased by 9.5 percent. All other changes in incomes cited in this paper have been adjusted by the CPI-U-X1.

Figure 5.
Percentage of Married-Couple Households in Which Wife Was in Paid Labor Force: 1969 to 1989

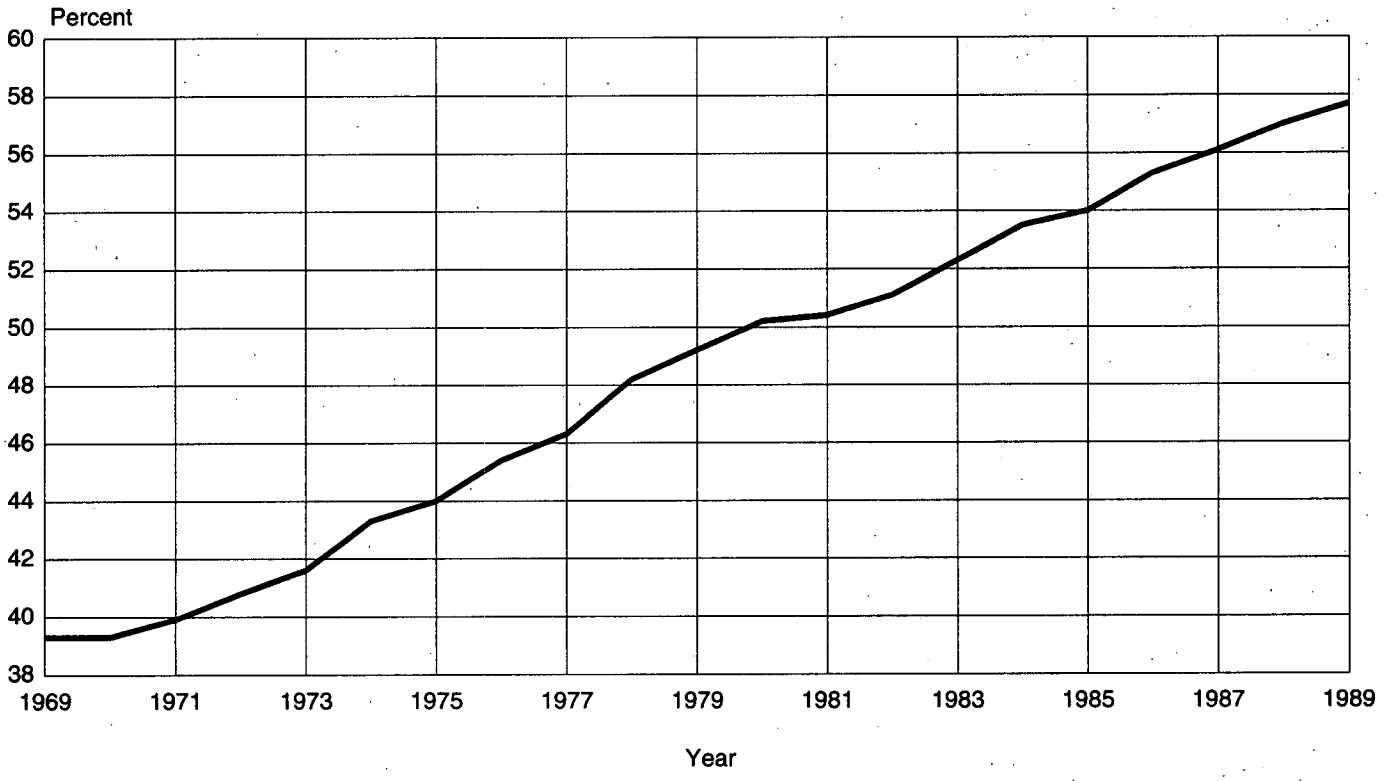
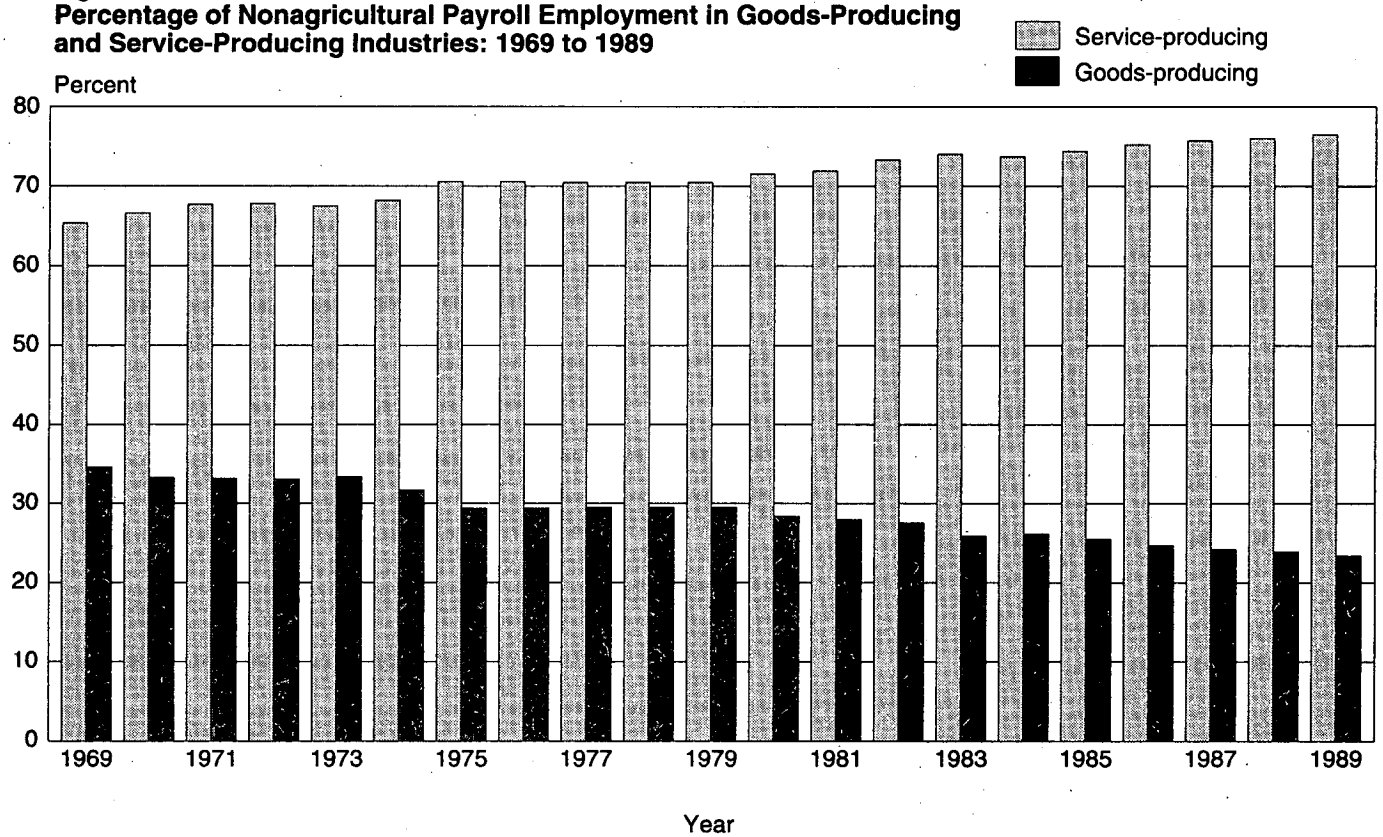


Figure 6.
Percentage of Nonagricultural Payroll Employment in Goods-Producing and Service-Producing Industries: 1969 to 1989



III. A STANDARDIZATION TECHNIQUE

While it is possible to speculate about the possible effects of these demographic, social, and economic trends on income, poverty, and income inequality during the past two decades, a more rigorous approach is required to measure their quantitative importance. A standardization methodology, therefore, has been employed to do just that.[4] Moreover, because some of these trends did not continue at constant rates over the 1970's and 1980's, the methodology has been applied, first, to the entire period from 1969 to 1989 and, second, to just the 1979 to 1989 period. The standardization technique used here, therefore, allows us to address the hypothetical question: What would happen to 1989's income, poverty, and income inequality measures if households had the same set of demographic, social, and economic characteristics that existed in 1969 and in 1979?

The methodology discussed below is presented in the context of the 1969 to 1989 period, but it is identical to that used in the 1979 to 1989 period. Mean household income in 1989 is defined as a weighted average

$$\bar{Y}_{89} = \sum_{i=1}^{n} p_{i89}\,\bar{y}_{i89}$$

where $\bar{Y}_{89}$ is the overall mean income in 1989, p_{i89} is the proportional weight of the ith group in 1989, and $\bar{y}_{i89}$ is its mean income in 1989. Alternatively, we could write the formula for standardized mean income as

$$\bar{Y}^{*}_{89} = \sum_{i=1}^{n} p_{i69}\,\bar{y}_{i89}$$

where p_{i69} is the ith group's proportion of all households in 1969. An equivalent way to write this equation is

$$\bar{Y}^{*}_{89} = \bar{Y}_{69} + \sum_{i=1}^{n} p_{i69}\,\Delta\bar{y}_{i}$$

where $\bar{Y}_{69}$ is the overall mean income in 1969 and $\Delta\bar{y}_i$ is the change in mean income for the ith group between 1969 and 1989. This is a useful formulation for a later discussion on changes in income between 1969 (or 1979) and 1989. Our standardized mean income, $\bar{Y}^{*}_{89}$, therefore, is similar to a fixed-weighted price index where base period weights, or quantities of goods, are used to weight the current prices of the goods.

[4]Regression analysis, of course, would also allow one to quantify the effects of these demographic, social, and economic factors on these broad income measures. The advantage with the particular standardization approach we use (as will be seen), however, is that an entirely new data file is created which can then be tabulated by any set of characteristics and distributional measures.

Using data files from the March 1970 Current Population Survey (CPS) and March 1990 CPS (and March 1980 CPS for the 1979-89 standardization), sample members who were householders and wives have been categorized into a matrix of demographic, social, and economic characteristics of their households.[5] A matrix of over 5,000 cells was produced (as indicated in appendix A, sparse cells were collapsed). The proportion of persons in each cell for 1970 (and 1980) was divided by the proportion for 1990 thus producing a ratio for each cell in the matrix. In effect, these ratios, or "adjustment factors," reflect the compositional shifts in the characteristics that have taken place over time. The adjustment factors were then multiplied by the sample weight of each sample member falling into a particular cell in the 1990 March CPS. In other words, the 1990 March CPS was reweighted according to the adjustment factors. Consequently, a variety of income measures, such as the mean and median household income, shares of aggregate income by quintile, Gini indexes, and poverty rates could then be derived from the reweighted file.

The sets of demographic, social, and economic household characteristics used to create the matrices are indicated below:

Demographic	Social	Economic
Age	Education	Work Experience, Hhldr.
Under 25	12 years or less	Did not work
25 to 44	1 to 3 yrs., col.	Wkd., FTYR[1]
45 to 64	16 yrs. or more	Less than FTYR[1]
65 and over		
Race	Household Type	Work Experience, Wife
White	Married Couple	Not married couple
Black	Not married couple	Did not work
Other	Nonfamily household	Wkd. FTYR[1]
		Less than FTYR[1]
		Industry
		Did not work
		Goods-producing
		Serv.-producing (1)
		Serv.-producing (2)

[1]Full-time (35 hours or more week), year-round (50 to 52 weeks a year) employment.

Although most of these variables are self-explanatory, the categories of goods-producing and service-producing industries require explanation. The goods-producing industries are composed of agriculture, mining, construction, and manufacturing. Service-producing industries (1) are composed of transportation, communication, and public utilities, wholesale trade, finance, insurance

[5] Characteristics from the March CPS are as of the survey date, but income statistics refer to amounts received in the previous calendar year. A standardization technique of this kind was used by Green and Welniak (1982) to examine the effects of changing family composition on income differentials. Standardization techniques have also been popular for examining the effects of population changes on the Nation's unemployment rate. For an example of this work see Flaim (1990).

Table 1. **Various Measures of the Household Income Distribution, 1969, 1979, and 1989**

(Incomes in 1989 dollars)

Measure	1989	1979	1969
Total households (in thous.)	93,347	80,776	63,401
Median household income	$28,906	$28,115	$28,344
Share of income received by (in percent):			
Lowest fifth	3.8	4.1	4.1
Second fifth	9.6	10.2	10.9
Third fifth	15.9	16.8	17.5
Fourth fifth	24.0	24.7	24.5
Highest fifth	46.7	44.2	43.0
Gini index	.429	.404	.391
Poverty rate (in percent)	12.2	12.0	14.1

Table 2. **Effect on 1989 Median Household Income of Standardizing for Demographic, Social, and Economic Changes Between 1969 and 1989**

(1989 incomes standardized to 1970 composition, in 1989 dollars)

Standardizing variable	1989 median income		Absolute difference (actual-standardized)
	Actual	Standardized	
ALL VARIABLES	$28,906	$29,146	-$240
Age	28,906	29,170	−264
Race	28,906	29,100	−194
Type of household	28,906	32,132	−3,226
Education	28,906	25,896	3,010
Work experience of household head	28,906	30.469	−1,563
Work experience of wife	28,906	30,124	−1,218
Industry shifts	28,906	30,669	−1,763

Table 3. **Effect on Shares of Income (in percent) Received by Each Fifth of Households in 1989 of Standardizing for Demographic, Social, and Economic Changes Between 1969 and 1989**

(1989 incomes standardized to 1970 composition)

Standardizing variable	Total fifth	Lowest fifth	Second fifth	Third fifth	Fourth fifth	Highest fifth
Actual 1989 shares	100.0	3.8	9.6	15.9	24.0	46.7
After standardizing:						
ALL VARIABLES	100.0	4.3	10.2	16.3	23.8	45.3
Age	100.0	3.8	9.5	15.8	23.9	47.0
Race	100.0	3.9	9.6	15.9	24.0	46.6
Type of household	100.0	4.2	10.2	16.3	23.9	45.4
Education	100.0	3.8	9.4	15.9	24.2	46.7
Work exper. of head	100.0	4.1	9.9	16.1	23.9	46.0
Work exper. of wife	100.0	4.2	9.9	15.9	23.6	46.3
Industry of head	100.0	4.1	10.1	16.2	23.9	45.6

poverty rate higher in 1989 than it would have been (12.2 vs. 11.8 percent). Black households, of course, are disproportionately represented among all poor households.

The mixed effects of household compositional shifts and educational shifts are clearly seen in the data. With respect to the influence of changing living arrangements, Tables 3 and 4 show that income inequality would have been much lower had not these shifts taken place. The lowest fifth of households would have received a bigger part of aggregate income and the highest fifth would have received much less. The Gini index would have only risen to .411 instead of the .429 that it actually did reach. In addition, table 5 indicates that the poverty rate would have risen much less over the 20 year period—it would have reached only 10.1 percent instead of 12.2 percent.

As was indicated above, the increase in education among householders, on the other hand, had a very strong positive effect on income growth. With respect to

income inequality, as reflected by the income shares and the Gini index, it appears that the trend had very little impact. The same level of inequality would prevail if the education distribution of householders were the same in 1989 as it was in 1969. In terms, of poverty, however, the education effect is very apparent as it was in terms of income levels. As shown in table 5, the poverty rate, standardized for educational changes, would have been 14.2 instead of the actual 12.2 percent.

All three economic variables tended to exacerbate the trend toward greater income inequality. In each instance—the work experience of the householder, the work experience of the wife, and the industrial attachment of the householder—the share of income received by the lowest quintile of households would have been higher and the share received by the highest quintile would have been lower had not these shifts taken place (table 3). Moreover, the Gini index, instead of .429 in 1989, would have been .419 if there had been no change in the work experience of householders, .420 if there had been no change in the work experience of working wives, and .415 if there had been no change in the industrial attachment of the householders (table 4). (It should be pointed out, however, that in the context of married couples only, the effect of the work experience of working wives did have an "equalizing effect" on the married couples' income distribution, as others have shown (Cancian, Danziger, and Gottschalk, 1991). The Gini index for married couple families would have risen to .384 instead of the .368 level that it actually reached.) Table 5 also shows that these three economic variables also had a fairly strong impact on the poverty rates, in that, in each case, the incidence of poverty would not have risen to the extent that it did in 1989.

When all of these demographic, social, and economic factors are combined, it can be shown that over this 20 year period they had a profound impact on the income distribution. As shown in table 3, the share of income received by the lowest fifth of households would have been 4.3 percent compared to the 3.8 percent that was actually received; the share received by the highest fifth would have only been 45.3 percent compared to the actual 46.7 percent. The Gini index would have increased only half as much as it did—from .391 to .410, instead of .429 (table 4). And the poverty rate would have fallen to 11.7 percent instead of 12.2 percent (table 5).

B. The 1979 to 1989 Period

As was mentioned earlier, some of the demographic, social, and economic trends between 1969 and 1989 did not occur at constant rates over this period. The rise in the proportion of householders age 45 or younger began to slow down or level off in the 1980's, the decline in the proportion of households that were married couple households appeared to ease in the 1980's, and the increase in the proportion of working wives in married couple households was a little slower in the 1980's relative to the 1970's. Such slowdowns in the "rates of change" of these trends suggest that the standardization exercise be applied to the decade of the 1980's.

Table 6 shows that, indeed, the effects of the trends on income were different in the 1980's then over the entire 20 year period. Indeed, the effect of the changing age distribution in the 1980's now had a positive influence on real median household income. In other words, a significant proportion of the baby boom generation had now moved well into their middle years, years in which household incomes begin to rise. Median household income would have been nearly $300 less than it actually was had not the age distribution changed. On the other hand, the effect of race continued to exert a small negative effect on income in the 1980's as it had in the 1969-89 period.

The impact of changing living arrangements continued to have a negative influence on median household income in the 1980's, but not to the same extent it did over the 20-year period. Median income would have been nearly $1,200 higher if the shifts away from married couple households had come to a halt. Education continued to have a strong positive influence on the income trend—the median income level would have been almost $1,500 lower had not this trend continued in the 1980's. In fact, while changing household composition had the largest effect of all seven factors studied in the 1969-89 period, education had the largest single impact in the 1979-89 period.

Among the economic factors, both changes in the work experience of the householder and changes in the work experience of the wife were much less important influences on the overall trend in household income. However, of continuing importance was the shift in the industrial attachment of the householder. It continued to have a negative influence and the median household income level would have been $744 higher than it actually was had householders remained in the same industries they were employed in 1979.

On balance then, the positive influences of education and age were sufficient to offset the continued negative influences of changes in living arrangements and industrial attachment of householders. Overall, the changes in demography, society, and the economy in the 1980's, as reflected in the trends under examination, were operating in a favorable direction as far as the median household income level was concerned. Real median household income would have been $881 lower in 1989 had not these changes occurred.

Examination of the income shares and Gini indexes in Tables 7 and 8, respectively, shows what impact the demographic, social, and economic trends had on income

Table 7. Effect on Shares of Income (in percent) Received by Each Fifth of Households in 1989 of Standardizing for Demographic, Social, and Economic Changes Between 1979 and 1989

(1989 incomes standardized to 1980 composition)

Standardizing variable	Total fifth	Lowest fifth	Second fifth	Third fifth	Fourth fifth	Highest fifth
Actual 1989 shares	100.0	3.8	9.6	15.9	24.0	46.7
After standradizing:						
ALL VARIABLES	100.0	3.9	9.7	15.9	23.9	46.5
Age	100.0	3.8	9.5	15.8	24.0	46.9
Race	100.0	3.9	9.6	15.9	24.0	46.7
Type of household	100.0	4.0	9.8	16.0	24.0	46.3
Education	100.0	3.8	9.5	15.9	24.1	46.7
Work exper. of householder	100.0	3.9	9.6	15.9	24.0	46.7
Work exper. of wife	100.0	4.0	9.7	15.9	23.8	46.7
Industry of householder	100.0	3.9	9.8	16.0	24.0	46.3

Table 8. Effect on 1989 Gini Index of Standardizing for Demographic, Social, and Economic Changes Between 1979 and 1989

(1989 incomes standardized to 1980 composition)

Standardizing variable	1989 Gini index		Absolute difference (actual - standardized)
	Actual	Standardized	
ALL VARIABLES	.429	.426	.003
Age	.429	.431	-.002
Race	.429	.428	.001
Type of household	.429	.424	.005
Education	.429	.430	-.001
Work exper. of householder	.429	.429	-
Work exper. of wife	.429	.427	.002
Industry of householder	.429	.424	.005

Table 9. Effect on 1989 Poverty Rate (in percent) of Standardizing for Demographic, Social, and Economic Changes Between 1979 and 1989

(1989 incomes standardized to 1980 composition)

Standardizing variable	1989 poverty rate		Absolute difference (actual - standardized)
	Actual	Standardized	
ALL VARIABLES	12.2	12.7	-0.5
Age	12.2	12.5	-0.3
Race	12.2	12.0	0.2
Type of household	12.2	11.4	0.8
Education	12.2	13.0	-0.8
Work exper. of householder	12.2	12.2	-
Work exper. of wife	12.2	11.9	0.3
Industry of householder	12.2	11.7	0.5

the methodology. The methodology may not be sufficiently sensitive to the interaction of compositional and noncompositional shifts. For example, other changes taking place in the country, such as, changes in computer technology, international trade, and employment in trade-sensitive industries, are not easily accommodated in a standardization methodology. More rigorous procedures are required for refining these first approximations and uncovering the causes of growing income inequality. Such procedures permit a more detailed specification of economic behavior (which would include those captured in the interaction term of a standardization). Decomposing a Theil or Atkinson inequality index into various behavioral characteristics might be a useful next step in untangling effects.

REFERENCES

Antos, Joseph, Mellow, Wesley, and Triplett, Jack E., "What is a Current Equivalent to Unemployment Rates of the Past?" *Monthly Labor Review*, Vol. 102, No. 3, March 1979, 36-46.

Bluestone, Barry, and Harrison, Bennett, *The Deindustrialization of America*, New York: Basic Books, 1982.

Bluestone, Barry, "The Impact of Schooling and Industrial Restructuring on Recent Trends in Wage Inequality in the United States," *Papers and Proceedings of the American Economic Association*, Vol. 80, No. 2, May 1990, 303-307.

Burtless, Gary, "Earnings Inequality Over the Business and Demographic Cycles," in *A Future of Lousy Jobs* (edited by Gary Burtless), Washington, D.C.: The Brookings Institution, 1990, 77-117.

Bradbury, Katharine L., "The Shrinking Middle Class," *New England Economic Review*, September/October 1986, 41-55.

Cancian, Maria, Danziger, Sheldon, and Gottschalk, Peter, "Working Wives and Family Income Inequality Among Married Couples," paper prepared for the Jerome Levy Economics Institute project on Economic Inequality at the Close of the Twentieth Century, January 1991.

Flaim, Paul O., "Population Changes, the Baby Boom, and the Unemployment Rate," *Monthly Labor Review*, Vol. 113, No. 8, August 1990, 3-10.

Freeman, Richard B., "The Effect of Demographic Factors on Age Earnings Profiles," *Journal of Human Resources*, Vol. 14, Summer 1979, 289-318.

Green, Gordon, and Welniak, Edward, Changing Family Composition and Income Differentials, *Special Demographic Analyses*, CDS-80-7, Washington, D.C.: U.S. Bureau of the Census, August 1982.

Hurd, Michael D., "Research on the Elderly: Economic Status, Retirement, and Consumption and Saving," *Journal of Economic Literature*, Vol. 28, June 1990, 565-637.

Juhn, Chinui, Murphy, Kevin M., and Pierce, Brooks, "Wage Inequality and the Rise in the Returns to Skill," version of a paper presented at a meeting of the Allied Social Science Association, December 1989.

Kuttner, Robert, "The Declining Middle Class," *Atlantic*, July 1983, 60-72.

Levy, Frank, *Dollars and Dreams*: *The Changing American Income Distribution*, New York: Russell Sage Foundation, 1987.

Thurow, Lester,"The Disappearance of the Middle Class", *New York Times,* February 5, 1984, Section 5, p. 2.

APPENDIX A. STANDARDIZATION METHODOLOGY

The standardization technique used in this paper involved adjusting sample weights on a current microdata set to reflect past demographic, social, and economic characteristics of households. Weighting adjustment factors are merely ratios derived by comparing past characteristics of households to current ones. The basis of adjustment for this paper is the March 1990, March 1980, and the March 1970 Current Population Surveys(CPS) microdata sets.

Weighting adjustment factors were derived from the set of demographic, social and economic variables shown in table A-1.

Table A-1. **Variables Used to Classify Households**[1]

Variable	Definition
Demographic:	
Age	Under 25 years
	25 to 44 years
	45 to 64 years
	65 years and over
Race	White
	Black
	Other
Social:	
Education	Less than college
	1 to 3 years college
	4 or more years college
Household type	Married-couple households
	Other family households
	Nonfamily households
Economic:	
Work experience (householder)	Did not work
	Year-round, full-time
	Other work experience
Work experience (wife)	Not a wife
	Did not work
	Year-round, full-time
	Other work experience
Industry	Did not work
	Goods producing[2]
	Service sector1[3]
	Service sector 2[4]

[1]Age, race, education, and industry variables are characteristics of the householder. In married-couple households, the husband was always designated the householder.

[2]Goods producing industries include: agriculture, forestry, fisheries, mining, construction, and manufacturing.

[3]Service sector 1 industries include: transportation, communication, public utilities, wholesale trade, finance, insurance, real estate, professional and related services, and public administration.

[4]Service sector 2 industries include: retail trade, business and repair services, personal services, and entertainment and recreation services.

These variables, when cross-classified with each other, produce a 5,184 cell matrix into which all households from the March 1990 CPS, March 1980 CPS, and the March 1970 CPS were categorized and tallied. These weighted tallies were used to compute weighting adjustment factors that were applied to the March 1990 CPS microdata. The adjustment factors (in the context of the March 1970 and March 1990 CPS) can be expressed as

$$F_i = \frac{P_{i70}}{P_{i90}}$$

where

$$P_i = \frac{t_i}{T} \quad \text{and} \quad T = \sum_{i=1}^{5184} t_i$$

for each of the years. t is the number of households in cell i. T is the total number of households for all cells in the matrix. P is the proportion derived by dividing t by T. F is the adjustment factor derived by dividing P_{i70} by P_{i90}. The adjustment factors are then applied to weights on the March 1990 CPS.

It is important to realize that not all of the 5,184 cells of the matrix necessarily contain any data. In fact, only 1,156 cells contained one or more sample cases in either year. Table A-2 shows the number of cells containing data for each of the classification variables individually and in combination. (Usable cells in the standardization using the March 1980 CPS and March 1990 CPS were of about the same magnitude.)

Table A-2. **Total and Usable Cells for Classification Variables**

Variable	Total cells	Usable cells
Economic	48	36
Social	9	9
Demographic	12	12
Economic-Social	432	133
Economic-Demographic	576	372
Social-Demographic	108	107
Economic-Social-Demographic	5,184	1,156

Cells not containing any observations were either unlikely combinations or in some cases, impossible ones. For example, in the economic variables, householders or wives who did not work obviously could not be assigned to a particular industry. The variables were

classified in the manner selected in order to be able to assign all households to each group in a mutually exclusive and exhaustive way.

To reduce the impact of high sampling variability in some of the more sparse cells of the matrix, a count of the number of sample cases within each cell was kept and only cells with 5 or more sample cases in both years were used to compute a weighting adjustment factor. Cells with fewer than 5 sample cases in either year were given a factor derived by collapsing the detail used to define the cell. The process of collapsing continued until a factor could be derived based on 5 or more sample cases. Although none of the demographic and social variables needed to be collapsed, about 23 percent of the economic variables were collapsed (approximately the same proportion were collapsed in the 1979-89 standardization). Additional collapsing was done for combinations of these variables that did not have at least five sample cases in both years.

APPENDIX B. INCOME MEASURES

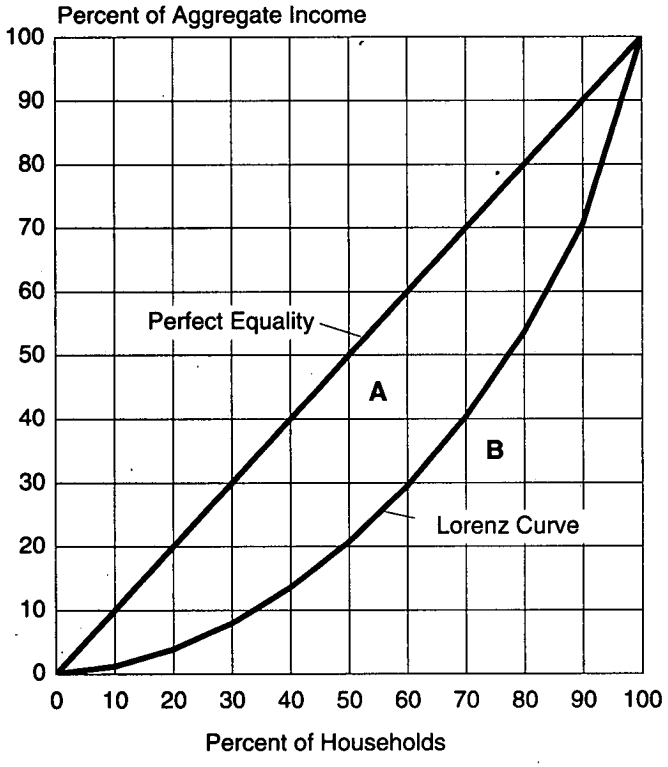
Household income. Income summary measures presented in this paper are limited to money income before payments of Federal, State, local, or Social Security taxes and before any other types of deductions, such as union dues and Medicare premiums. Total money income is the sum of the amounts received by all member of the housing unit age 15 years and over. Income sources include: wages and salaries, self-employment income, Social Security, Supplemental Security income, public assistance, interest, dividends, rent, royalties, estates or trusts, Veterans' payments, unemployment and workers' compensations, private and government retirement and disability pensions, alimony, child support and any other source of money income which are regularly received. Capital gains (or losses) and lump-sum or one-time payments such as life insurance settlements are excluded.

Median income. The median income is the amount which divides the income distribution into two equal groups, one having income above the median, and the other having incomes below the median. All medians in this paper were derived from grouped data using linear interpolation. The income intervals used were $2,500 groupings beginning with under $2,500 and ending with an interval of $100,000 and over.

Gini ratio. The Gini ratio (or index of income concentration) is a statistical measure of income equality ranging from 0 to 1. A measure of 0 indicates prefect equality, i.e., all households having equal shares of income; a measure of 1 indicates perfect inequality, i.e., one household has all the income and the rest have none. Thus, higher levels of the Gini ratio indicate higher levels of income inequality. The Gini ratio is derived by calculating the ratio of the area between a Lorenz curve and a diagonal to the area below the diagonal. As shown in figure 1, the Gini ratio can be expressed as:

$$G = \frac{A}{A+B} = \frac{\text{area between Lorenz curve and diagonal}}{\text{area under diagonal}}$$

Lorenz Curve



All Gini ratios presented in this paper were derived from grouped data. Basically, data in $2,500 intervals were interpolated to produce 100 percentile groupings. Mean incomes were then estimated for each percentile by either linear or Pareto interpolation. From these data, a Lorenz curve was developed and the area below the curve was estimated using trapezoidal approximation.

Income shares. Income shares are ratios of aggregate income for selected groups to the overall aggregate income of all groups and expressed as percentages. For this paper income shares are presented by income quintile. Quintiles are derived by ranking households by income and then dividing them into five groups with each group containing 20 percent of households. Aggregate income is then calculated for each of the five groups and expressed as a percentage of the total population aggregate income. All income shares presented in this paper were derived from grouped data.

Poverty definition. Official poverty estimates are based on money incomes of families and unrelated individuals.

Families and unrelated individuals are considered to be in poverty if their annual incomes fall below Federally established poverty thresholds. Weighted average poverty thresholds are displayed in table B-1.

Table B-1. **Weighted Average Poverty Thresholds in 1989**

Size of family unit	Threshold
One person (unrelated individual)	$6,311
Two persons	8,076
Three persons	9,885
Four persons	12,675
Five persons	14,990
Six persons	16,921
Seven persons	19,162
Eight persons	21,328
Nine persons or more	25,480

Poverty estimates in this paper are not official. Currently, no official poverty definition for households exists. The poverty definition presented in this paper is an adaptation of the current official poverty definition applied to the household concept. The poverty status of a household was determined by the poverty status of the primary family or primary unrelated individual residing in the housing unit. Furthermore, the poverty status of the primary family or individual for the year 1969 and 1979 was determined by applying current criteria for poverty instead of the criteria in place at that earlier time. This involved the use of a condensed set of poverty thresholds currently in place and deflating them to a 1969 and 1979 standard of living level as measured by the Consumer Price Index for All Urban Consumers (CPI-U; 1982-84 = 100).

FACTORS AFFECTING BLACK-WHITE INCOME DIFFERENTIALS: A DECOMPOSITION

by Gordon Green, Paul Ryscavage, and Edward Welniak

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I. INTRODUCTION

Real incomes of American households during the last two decades grew much slower than in the 25 or so years immediately following World War II. The consequences of this slowdown have been associated with a variety of economic developments in recent years. These range from concerns over the economic problems of the young and unskilled to more general ones about the prospects for the American standard of living. Another area of concern has been the economic status of Black Americans.

Blacks made great economic progress over the last fifty years, but the rate of progress slowed in the 1970's and 1980's. According to Smith and Welch (1986), the Black-White family income ratio rose from 41 percent in 1940 to 61 percent by 1970, but thereafter hardly changed at all. Indeed, the poverty rate for Blacks in 1989 was about three times as great as that for Whites, much as it was twenty years earlier. Evidence of this faltering progress was documented in the recent report of the National Academy of Sciences on the social and economic status of Blacks (Jaynes and Williams, Jr., 1990). And one economist has recently suggested that by some indicators, Blacks may have even lost ground in recent years (Aaron, 1990).

The slowdown in the rate of economic improvement of Blacks has been difficult to explain. But there is a belief it is related to the complex assortment of economic, social, and demographic changes that took place in the country over the last 20 years. Economic activity in this period was punctuated by periods of recession, inflation, and recovery, all at a time when profound changes were taking place in the Nation's industrial structure and labor market. Household living arrangements changed dramatically, partly in response to increases in divorce, separations, and births out of wedlock. And the baby boom generation, born between the years of 1946 and 1964, moved into adulthood, placing an added strain on the country's social structure.

Untangling these changes and then assessing their importance for the economic situation of Blacks is a formidable task. Analytical models have yet to be developed which capture the complexity of the interactions among these demographic, social, and economic changes. Researchers have had to rely on more indirect methods and apply them to aspects of the Black situation. The literature, consequently, contains numerous studies about the influence of the labor market or welfare system or family situation on the economic status of Blacks.

Despite the formidability of the task, we believe it is possible to provide some "evidence", in a very broad sense, as to what factors may be responsible for the slower economic improvement of Blacks in recent years. In this paper, we use a standardization procedure to identify those demographic, social, and economic factors that may have influenced the Black-White income ratio, and other income measures, over the 1969-89 period. Although such techniques are mechanical by nature, they are useful for approximating the effects of compositional changes on economic measures, as Sawhill (1988) points out. The evidence we present, therefore, may be helpful to researchers in the development of more appropriate models for understanding the dynamic process of economic change among Blacks.

In Section II of the paper, recent trends in the Black-White income ratio are presented as well as trends in demographic, social, and economic characteristics of Blacks and Whites that may have affected their income levels and poverty rates. The standardization methodology used in the analysis is presented in Section III. The results from two standardization exercises and their impact on the Black-White income differential and other measures are analyzed in Section IV: First, those obtained from standardizing 1989 incomes of Blacks and Whites for certain household characteristics as they existed in 1969; and second, standardizing 1989 Black household incomes by certain characteristics of White households as they existed in 1989. Section V of the paper contains a summary of the findings and the directions for further research we believe they suggest.

II. FACTORS AFFECTING INCOMES IN BLACK AND WHITE HOUSEHOLDS, 1969-89

Black-White income differentials, or ratios, have been used widely in the literature as measures of the economic gap separating the races (e.g., Gwartney, 1970).

A variety of these income ratios can be calculated from the income statistics of the March Current Population Surveys (CPS) over the post-World War II period.

Figure 1 shows the Black-White income ratio for all households and married couple households in the 1969-89 period. Clearly, the ratio for all households has changed very little over the last two decades, hovering around the .60 mark. This trend stands in sharp contrast to that based on income of Black and White "families" in the 1947-69 period, which is not shown; it increased from .51 to .63 reflecting the relatively faster growth in the incomes of Blacks and other races.[1]

The ratio for all households does not reveal the differences in income ratios that exist on the basis of household and family type. For example, the differential for married-couple families is much higher than it is for all families. And more importantly for our purposes, the trend in the Black-White income ratio for married-couples, as depicted in figure 1, has improved during the 1970's and 1980's. Real median family income among Black married couples increased by 33 percent (from $23,066 to $30,650), but for White married-couples the increase was about 22 percent (from $32,231 to $39,208).[2] This development, as well as others, has prompted researchers over the years to include noneconomic factors, along with economic factors, in their attempts to explain the slowdown in the economic progress of Blacks.

The following discussion, therefore, reviews some of the more important demographic and social—as well as economic trends—that may have affected Black and White incomes and the income ratio over the last 20 years or so. The first to be examined is a demographic factor, specifically the age structure of Blacks and Whites. It is well known that Blacks have higher fertility and mortality rates, and shorter life expectations. As a result, their population is younger on average than the White population (in 1988 the median age of Blacks was 27.5 compared to 33.3 for Whites). In addition, a "baby boom" among Blacks occurred in the years after World War II just as it did among Whites.

As a consequence of these demographic changes, both Black and White households during the 1969-89 period experienced an increase in the proportion of persons who were householders under age 45.[3] For Blacks, the proportion of householders under 45 in 1969 was 49 percent and by 1979 it had risen to 53 percent. For Whites, the comparable proportions went from 43 to 47 percent. But in the 1980's these proportions increased much less, the Black's reaching 55 percent and the White's, 48 percent. Another changing aspect of the age structure has been the slow but steady increase in the proportion of householders age 65 or over. Whites have a somewhat higher proportion of such households than Blacks, but both increased over the 1969-89 period. Since both younger and older households have relatively low incomes, the effect of these age structure changes on the broad income averages for both race groups was to depress them.

The two social trends examined here are the type of household, or living arrangements, of Blacks and Whites and the educational attainment of each group. Significant changes took place in the living arrangements of Blacks and Whites during the period under examination. As is popularly pointed out in the media, the traditional "Ozzie & Harriet" type family faded rapidly in importance during this period, and especially so for Blacks. As shown in figure 2, the proportion of all Black households that consisted of married couples dropped from 56.7 percent to to 35.7 percent between 1969 and 1989. This is why some economists have suggested that examining the economic status of Black married couples is not as meaningful in judging the overall economic progress of Blacks. For Whites, the proportion of all households that were married couples shrunk from 73 percent to 59 percent, not as sharp a drop as for Blacks.

Analyses of the changes in the structure of Black households, of course, are becoming more numerous. One of the more recent studies has found that declines in Black marriages have been far more important than changes in divorce or separation in explaining the decline in married couples (Ellwood and Crane, 1990). For Whites, in contrast, it appears that marriages and separations were critical factors.

The complement of this development, of course, has been the surge in other family households (primarily headed by women) and nonfamily households where incomes tend to be less than in married couples. Also shown in figure 2 are the increases in these types of households for Blacks and Whites. In 1969, the proportion of all households that were other family households rose from 25 to 35 percent, while for Whites the increase was only from 9 to 12 percent. Nonfamily households also increased in prevalence for both races. The implication for broad income measures, such as the median, is fairly evident.

Both races continued to show improvement in educational attainment. Indeed, although Blacks still lag behind Whites, the former had somewhat stronger gains over the 1970's and 1980's than the latter. Figure 3 shows the proportion of Blacks and Whites age 25 and over with 4 years of high school or more and 4 years of college or more. In terms of both measures, Blacks appeared to double their proportions of persons with the amounts of education indicated, compared to much

[1]Reflecting changing social customs and improvements in income data collection over the years, the Census Bureau made changes in the race and household type classifications. It was only in the 1960's and 1970's that income data for Black households became available. In addition, data became available for Blacks separately (not grouped with other races).

[2]Nominal incomes have been adjusted for inflation by the Consumer Price Index for All Urban Consumers (CPI-U-X1).

[3]The householder is the person in whose name the home is owned or rented.

Figure 1.
Income Ratio for Black and White Householder: 1969 to 1989

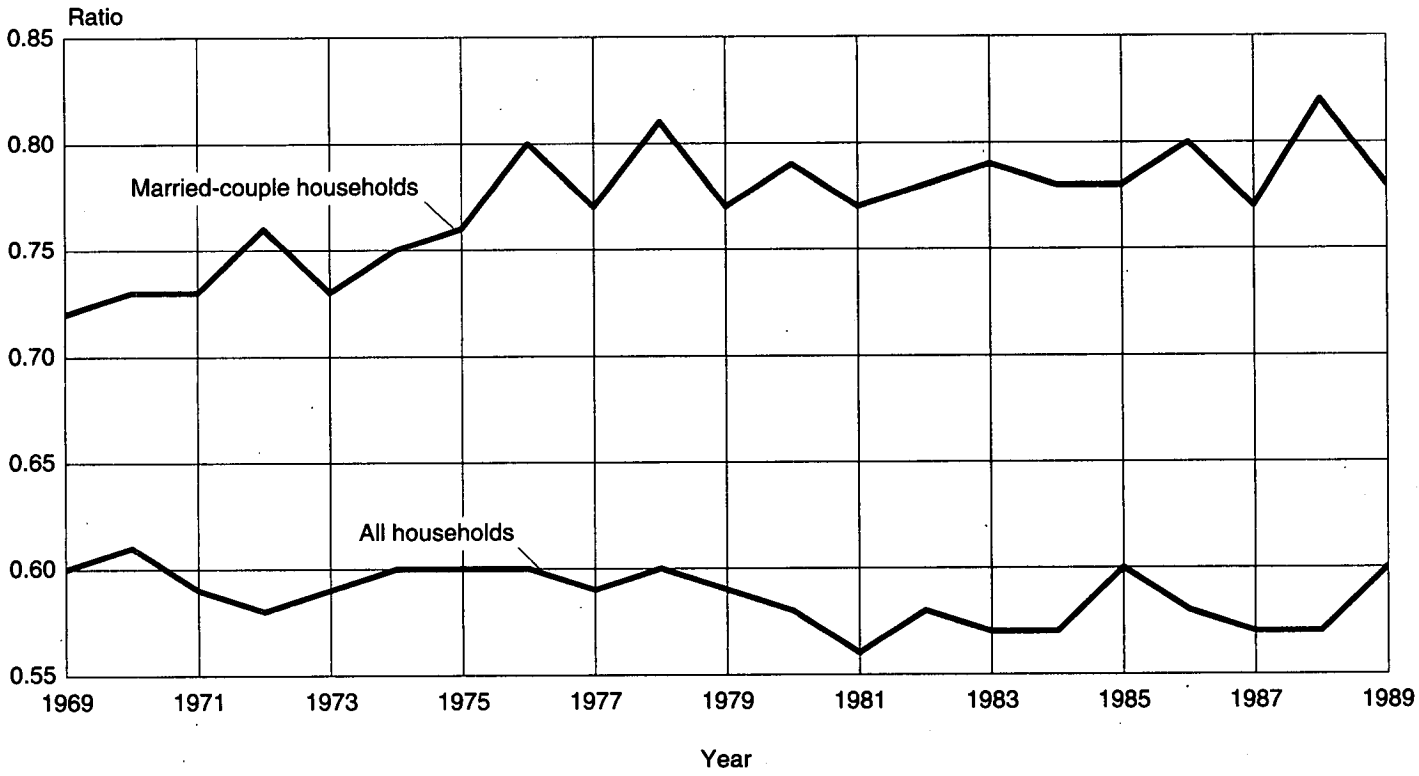
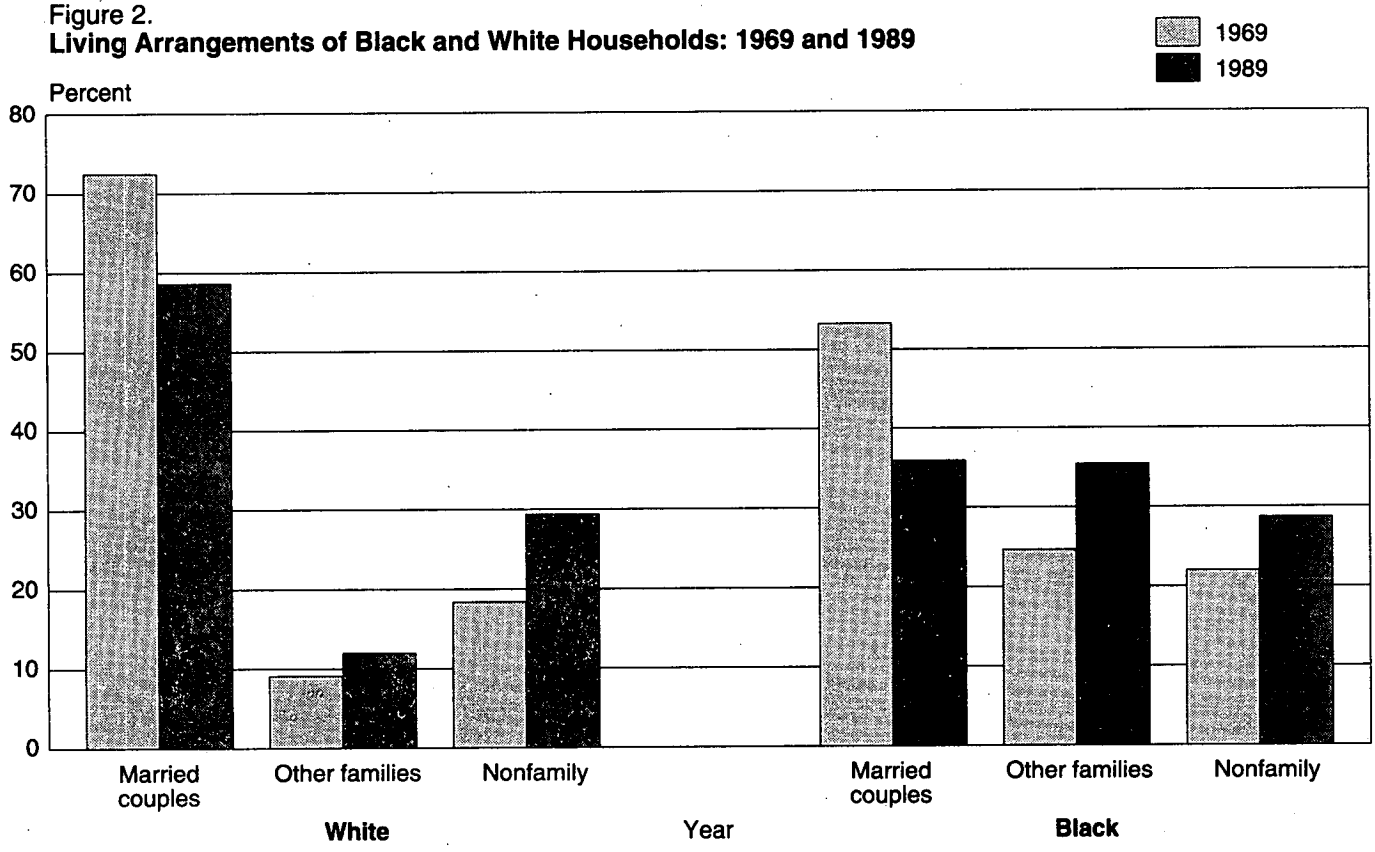


Figure 2.
Living Arrangements of Black and White Households: 1969 and 1989



smaller gains for Whites. This differential in the acquisition of human capital, of course, should have helped narrow Black-White income differences, if everything else remained the same.

Three economic trends were investigated: the work experience of householders, the work experience of wives in married-couple families, and the movement of workers from goods-production to service-production jobs. Much has been written about the employment problems of Black workers over the past 20 years and, in particular, Black men. The work of Smith and Welch (1986), alluded to at the outset, suggests that the Black-White "wage" gap changed little over the last two decades and, indeed, may have widened for younger men. Jaynes (1990) believes that the recent shifts in the supply-demand relationship for low-skilled workers stemming from broader economic developments have had a significant effect on the real wages of Blacks vis-a-vis Whites since a greater proportion of the former have a high school education or less. And O'Neill (1990) has concluded that even though Blacks continue to advance in terms of educational attainment, the increasing premiums placed on high skill levels makes "...differences in school quality, family and socioeconomic background..." more important for economic outcomes than in the past.

While our analysis does not address the Black-White wage gap per se, it does focus on labor supply changes that occurred between 1969 and 1989 among Black and White householders and wives. Obviously, market wages as well as many other factors contribute to labor supply decisions which in turn affect household income, or outcomes. Figure 4 displays proportions of Black and White householders and unrelated individuals who worked. (In 1969 the Nation's unemployment rate was 3.4 percent and in 1989, 5.2 percent.) The first item of interest is that smaller proportions of Black and White householders were working in 1989 than in 1969, but the decline was substantially greater among Blacks. Second, among Black and White unrelated individuals the proportion with some work experience increased among Whites but decreased for Blacks. While 1969 and 1989 are separated by two decades when many demographic, social, and economic developments were taking place that ultimately determined these changes, this basic work experience profile is revealing.

For both racial groups, the proportion of working wives among all married-couple families (as of March of each year) has increased between 1969 and 1989 (from 38 to 57 percent among Whites and from 53 to 64 percent for Blacks). However, when the proportion is calculated relative to all households, as shown in figure 5, a different picture is presented. In 1969, 29 percent of all Black households contained a working wife, but 20 years later the proportion had dropped to 23 percent. In contrast, for Whites the comparable proportion rose slightly from 28 to 34 percent. Consequently, the greater changes taking place in the living arrangements of Blacks have offset the positive effect of wives' earnings on their overall household income average.

The movement of jobs from goods-producing industries to service-producing industries in recent years has also been the focal point of much analysis because of its presumed importance for earnings inequality. While industrial distributions by race for as far back as 1969 were not tabulated (except in the decennial census), data for 1979 and 1989 were available. As shown in figure 6, shifts from goods-producing to service-producing industries occurred among both Black and White workers, and by similar amounts. However, it is also interesting to note that a greater proportion of Blacks are employed in the service-producing industries where wages are not only lower but more greatly dispersed.

III. THE STANDARDIZATION METHODOLOGY

The standardization methodology used in this paper allows us to obtain a first approximation of the effects of changes in particular demographic, social, and economic characteristics on the incomes of Black and White households—and the resulting income ratio. Techniques of this kind have been used for examining the effects of population changes on the Nation's unemployment rate (Flaim, 1990). In addition, the technique used here was also used by Green and Welniak (1982) to examine the effects of changing family composition on income differentials between Black and White families.

The conceptual framework for the methodology is as follows. Mean household income in 1989, whether for Black or White households, is defined as a weighted average

$$\bar{Y}_{89} = \sum_{i=1}^{n} p_{i89}\, \bar{y}_{i89}$$

where $\bar{Y}_{89}$ is the overall mean income in 1989, p_{i89} is the proportional weight of the ith group in 1989, and $\bar{y}_{i89}$ is its mean income in 1989. Alternatively, we could write the formula for standardized mean income as

$$\bar{Y}^{*}_{89} = \sum_{i=1}^{n} p_{i69}\, \bar{y}_{i89}$$

where the p is the ith group's proportion of all households in 1969. An equivalent way to write this equation is

$$\bar{Y}^{*}_{89} = \bar{Y}_{69} + \sum_{i=1}^{n} p_{i69} \Delta \bar{y}_{i}$$

where $\bar{Y}_{69}$ is the overall mean income in 1969 and $\Delta\bar{y}_i$ is the change in mean income for the ith group between 1969 and 1989. This is a useful formulation for a later

Figure 3.
Educational Attainment of Blacks and Whites Age 25 and Over: 1969 and 1989

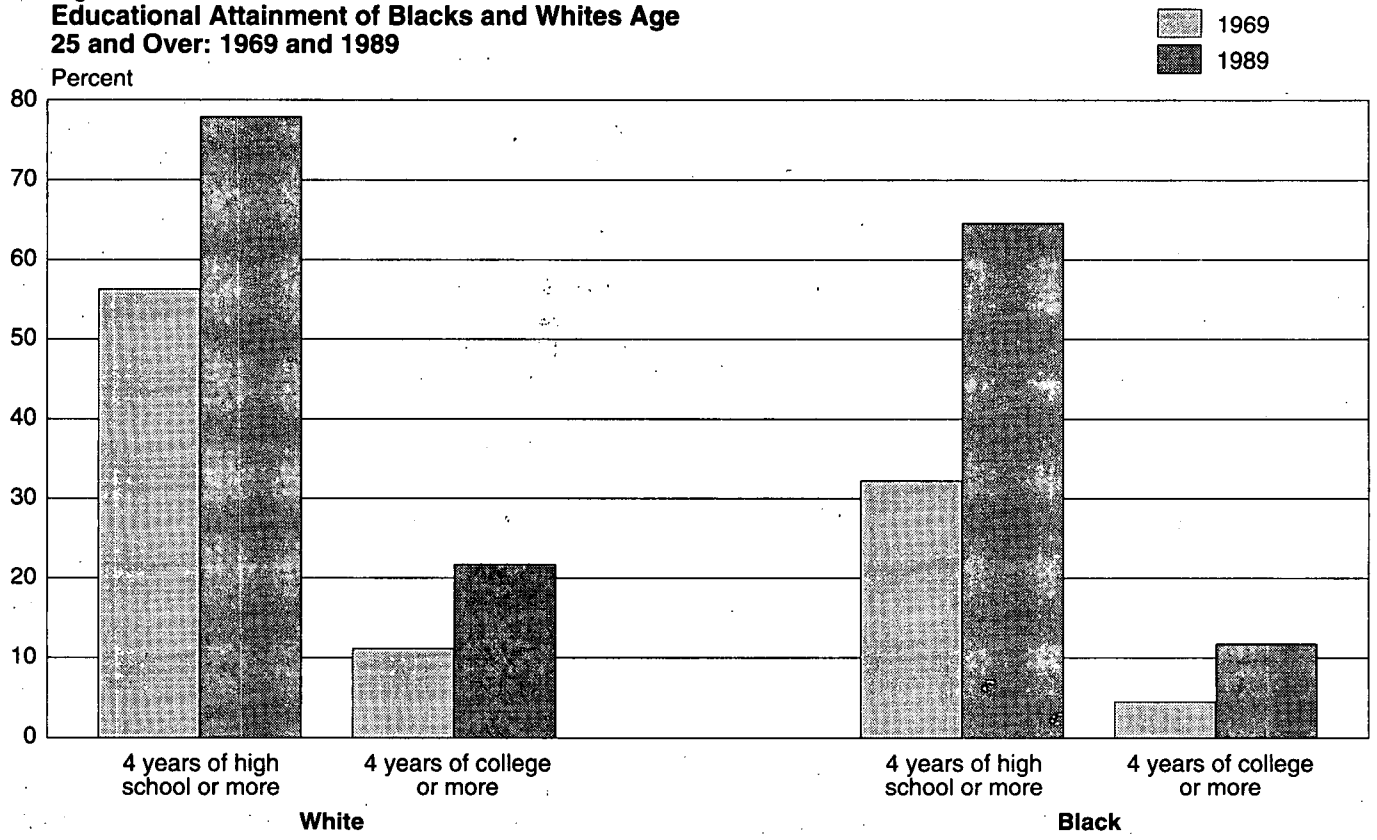


Figure 4.
Work Experience of Black and White Family Householders and Unrelated Individuals: 1969 and 1989

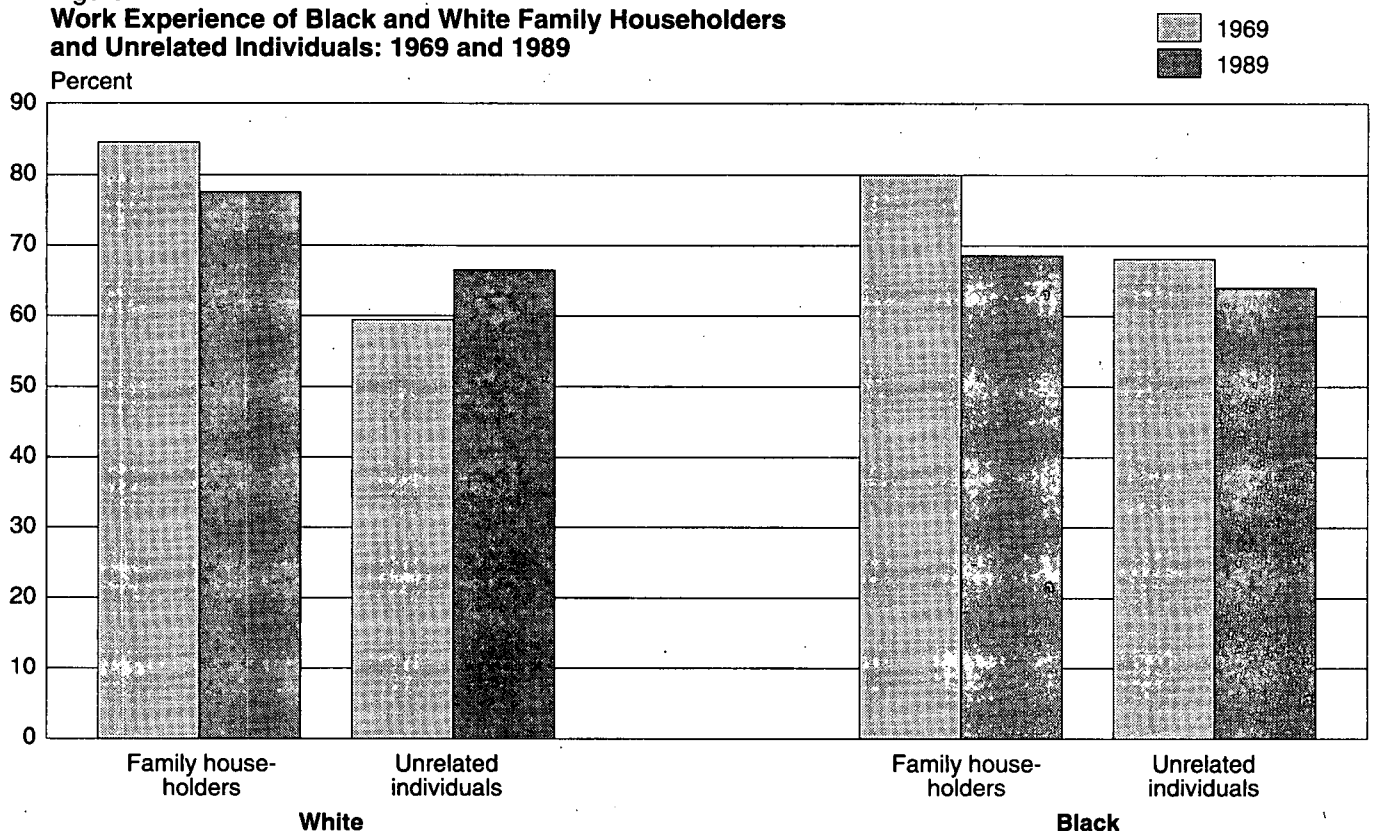


Table B2. Black Household's Effect on Income and Poverty of Standardizing for Social Variables: Type of Household and Education

(1989 incomes standardized to 1970 composition, in 1989 dollars)

Measures	1989 income				1969 income
		Standardized for--			
	Actual	Type of household	Education	Both	
Number of households (000)	10,513	10,513	10,513	10,513	6,053
Median household income	$18,146	$20,931	$16,288	$19,021	$17,880
Share of income received by:					
Lowest fifth	3.2	3.3	3.2	3.4	3.9
Second fifth	8.0	8.7	7.9	8.5	9.8
Third fifth	15.2	15.8	14.9	15.6	16.6
Fourth fifth	25.0	25.2	24.9	25.2	25.1
Highest fifth	48.7	47.0	49.1	47.3	44.5
Gini index	.459	.441	.462	.443	.410
Poverty rate	29.7	25.7	32.8	28.2	32.7

Table C1. White Household's Effect on Income and Poverty of Standardizing for Economic Variables: Work Experience and Industry

(1989 incomes standardized to 1970 composition, in 1989 dollars)

Measure	1989 income					1969 income
		Standardized for --				
	Actual	Work experience of householder	Work experience of wife	Industry	All three	
Number of households (000)	80,143	80,143	80,143	80,143	80,143	56,248
Median household income	$30,413	$31,773	$31,302	$31,946	$32,520	$29,581
Share of income received by:						
Lowest fifth	4.1	4.3	4.5	4.4	4.4	4.3
Second fifth	9.9	10.2	10.2	10.9	10.4	11.3
Third fifth	16.0	16.2	16.0	16.3	16.2	17.6
Fourth fifth	23.8	23.7	23.5	23.8	23.4	24.3
Highest fifth	46.2	45.5	45.9	45.1	45.5	42.5
Gini index	.420	.411	.412	.406	.409	.383
Poverty rate	9.8	8.9	8.9	8.9	9.1	12.0

Table C2. Black Household's Effect on Income and Poverty of Standardizing for Economic Variables: Work Experience and Industry

(1989 incomes standardized to 1970 composition, in 1989 dollars)

Measure	1989 income					1969 income
		Standardized for--				
	Actual	Work experience of householder	Work experience of wife	Industry	All three	
Number of households (000)	10,513	10,513	10,513	10,513	10,513	6,053
Median household income	$18,146	$19,681	$19,219	$19,659	$19,057	$17,880
Share of income received by:						
Lowest fifth	3.2	3.3	3.4	3.3	3.2	3.9
Second fifth	8.0	8.6	8.7	8.6	8.5	9.8
Third fifth	15.2	15.6	15.6	15.6	15.6	16.6
Fourth fifth	25.0	25.0	24.9	25.0	25.2	25.1
Highest fifth	48.7	47.5	47.3	47.5	47.5	44.5
Gini index	.459	.446	.442	.445	.447	.410
Poverty rate	29.7	26.9	27.2	26.9	28.8	32.7

between 1969 and 1989, but Black incomes would have risen by 8.5 percent (table C2). This further suggests that the income differential would have risen to almost .62.

Given the great increase in the participation of wives in the labor market over the last two decades, the expectation would be that median incomes for both Black and White households would have been lower if this had not occurred. The standardization results show just the opposite. This is because in standardizing for this effect, "nonmarried-couple households" had to be included as well. Since these types of households grew more common over the 1969-89 period and their average incomes are lower than married-couple households, they tended to drag down the overall median income. Therefore, the standardized result for working wives contains a "type of household" effect which apparently dominates the working wives effect.

When we examine the working wife effect purely within the context of married couples, however, the expected result appears, as is shown in the text table below.

	Married-couple families	
	Actual 1989 Income	Standardized 1989 Income
Black	$30,819	$26,756
White	39,351	36,332
B/W income ratio	.78	.74

Thus, the increase in working wives had a significant effect on the income levels of Black and White married-couple families.

The last economic factor accounted for was the employment shifts from goods-producing to service-producing industries that occurred over the last two decades. This shift appeared to have a bigger effect on Black household income than White household income. The Black-White income differential would have increased to about .62.

When these three economic factors are combined, the impact on White household income is even greater than the individual effects. Their median income would have risen by almost 7 percent. This probably occurs because of two reasons: First, many of the householders shifted into service-producing industries where wages were generally lower and, two, the "type of household" effect, which was embodied in the working wives standardization, dominated the effect of working wives. On the other hand, the median income for Black households would rise by only 5 percent, much less than their separate economic effects. This is probably because a relatively smaller proportion of Black householders shifted from goods-producing jobs to service-producing jobs simply because there weren't as many of them in goods-producing jobs in the first place. All of these economic effects appear to offset one another when the 1989 standardized Black-White income differential is calculated—it would have been .586 compared to the actual .597.

Combining Demographic, Social, and Economic Factors. The standardization procedure allows us to combine these factors by pairs as well as let all three factors interact simultaneously. Tables D1 and D2 present the resulting 1989 standardized incomes on these bases.

In percentage terms, the pair-wise comparisons find standardized Black household incomes rising more than White household incomes suggesting that the compositional changes had a greater effect on the former than the latter. The resulting income ratios would range from .60 (the social-economic effects) to .64 (the demographic-economic effects).

When all of the factors are combined, the results suggest that shifts in the demographic, social, and economic characteristics of Black households between 1969 and 1989 were considerably more important than shifts taking place for White households. Real median income among Whites would have been virtually unchanged at about $30,400, while among Blacks it would have risen from $18,146 to $19,596, or 8 percent. The Black-White income differential would have reached .65.

In addition, while the effect on the median income level and poverty rate for White households would have been very small, their income distribution would have become somewhat more equal as measured by the Gini index. For Black households, however, inequality and poverty would have been lessened as well. The Gini index for Blacks would have been .431 instead of .459 and the poverty rate 26.3 percent instead of 29.7 percent.

B. Standardizing 1989 Black Incomes by White Household Characteristics

Another hypothetical question can be answered using the standardization technique: How would the various income measures for Black households change if Black households had the same characteristics as White households? Such an exercise was carried out using the 1990 CPS income data.

This standardization was conducted by assigning White demographic, social, and economic characteristics (the same characteristics used earlier) to Blacks and recalculating overall Black household income. The standardized mean household income for Blacks, $\bar{Y}^B$, therefore, can be expressed as:

$$\bar{Y}^B = \sum_{i=1}^{h} p_i^w \bar{y}_i^B$$

Table D1. **White Household's Effect on Income and Poverty of Standardizing for Demographic, Social, and Economic Variables**

(1989 incomes standardized to 1970 composition, in 1989 dollars)

Measure	1989 income					
		Standardized for--				
	Actual	Demographic, social	Demographic, economic	Social, economic	Demographic, social, economic	1969 income
Number of households (000)	80,143	80,143	80,143	80,143	80,143	56,248
Median household income	$30,413	$30,721	$32,018	$30,703	$30,384	$29,581
Share of income received by:						
Lowest fifth	4.1	4.5	4.3	4.6	4.5	4.3
Second fifth	9.9	10.4	10.1	10.6	10.5	11.3
Third fifth	16.0	16.5	16.0	16.5	16.4	17.6
Fourth fifth	23.8	24.0	23.4	23.7	23.7	24.3
Highest fifth	6.2	44.6	46.1	44.6	45.0	42.5
Gini index	.420	.402	.416	.399	.404	.383
Poverty rate	9.8	9.5	9.4	9.8	10.0	12.0

Table D2. **Black Household's Effect on Income and Poverty of Standardizing for Demographic, Social, and Economic Variables**

(1989 incomes standardized to 1970 composition, in 1989 dollars)

Measure	1989 income					
		Standardized for--				
	Actual	Demographic, social	Demographic, economic	Social, economic	Demographic, social, economic	1969 income
Number of households (000)	10,513	10,513	10,513	10,513	10,513	6,053
Median household income	$18,146	$19,236	$20,437	$18,519	$19,596	$17,880
Share of income received by:						
Lowest fifth	3.2	3.4	3.4	3.4	3.5	3.9
Second fifth	8.0	8.7	9.0	8.7	9.2	9.8
Third fifth	15.2	15.9	15.8	15.8	16.0	16.6
Fourth fifth	25.0	25.3	24.9	25.3	24.9	25.1
Highest fifth	48.7	46.7	46.9	46.8	46.5	44.5
Gini index	.459	.438	.437	.439	.431	.410
Poverty rate	29.7	28.0	25.2	29.4	26.3	32.7

where p_i^W are the proportions of White households with the various characteristics in 1989 and $\bar{y}_i^B$ are the mean incomes actually received by Blacks in those groups in 1989.

The results of standardizing Black incomes according to the age structure of White households is shown in table E. Black median household income would fall from $18,146 to $17,350, or by 4.4 percent. The drop in income is probably due to the large proportion of elderly White householders. Little change would take place in the income distribution or in the percentage of Black households that were poor.

Applying the household type characteristics of White households and the White householders' educational characteristics to Black households has the expected effects. Table F shows that if Blacks had the same type of living arrangements as Whites, the Black median household income in 1989 would have been $22,236 instead of $18,146. If they had the White's educational characteristics, incomes would have increased to $20,884.

When both sets of characteristics are combined, the effect on Black median household income is even greater than the separate effects. Their income would have reached $24,561 and the Black-White income ratio would have been .81 in 1989. A strong effect is also observable in the Black household income distribution: The distribution would be more equally distributed with the second and third quintiles receiving a greater share of the aggregate income and the poverty rate for Black households would have been 19.8 percent instead of the actual 1989 rate of 29.7 percent.

Table E. **Black Income and Poverty Standardized by White Demographic Variables: Age**

(1989 income)

Measure	White	Black	
		Actual	Standardized by White age
Number of households (000)	80,143	10,513	10,513
Median household income	$30,413	$18,146	$17,350
Share of income received by:			
Lowest fifth	4.1	3.2	3.2
Second fifth	9.9	8.0	7.8
Third fifth	16.0	15.2	14.8
Fourth fifth	23.8	25.0	24.9
Highest fifth	46.2	48.7	49.3
Gini index	.420	.459	.464
Poverty rate	9.8	29.7	30.0

Table F. **Black Income and Poverty Standardized by White Social Variables: Type of Household and Education**

(1989 income)

Measure	White	Black			
		Actual	Standardized by--		
			Type of household	Education	Both
Number of households (000)	80,143	10,513	10,513	10,513	10,513
Median household income	$30,413	$18,146	$22,236	$20,884	$24,561
Share of income received by:					
Lowest fifth	4.1	3.2	3.4	3.1	3.3
Second fifth	9.9	8.0	9.0	8.3	9.2
Third fifth	16.0	15.2	16.1	15.4	16.1
Fourth fifth	23.8	25.0	25.3	24.9	25.2
Highest fifth	46.2	48.7	46.2	48.4	46.1
Gini index	.420	.459	.433	.456	.431
Poverty rate	9.8	29.7	22.3	25.7	19.8

Standardizing 1989 Black incomes for the economic characteristics of White households has a somewhat less strong effect on Black incomes than the social characteristics. Nevertheless, as is shown in table G, median incomes rise, ranging from 8 percent in the case of the industry standardization to 17 percent for the standardization involving the work experience of the householder. The combined effect of all three economic variables is again stronger than the individual effects. The median income of Black households rises to $22,213 in 1989, not quite as high as the effect of the social variables. Here too the Black income distribution becomes more equally distributed and the poverty rate would drop to 22.6 percent.

Table H contains the results of the standardizations when pairs of demographic, social, and economic variables are combined and when all characteristics are combined. All of the pair-wise combinations result in increases in median income, reductions in inequality, and declines in poverty rates. Overall, the median Black household income would rise to $23,648 and the Black-White income ratio would have been .78. The amount of inequality in the Black income distribution, as reflected by the Gini index, would be reduced to almost the same extent as the White's (Gini index equal to .420 for Whites and .428 for Blacks). And the Black poverty rate would have dropped by 10 percentage points to 19.0 percent.

V. SUMMARY AND DIRECTIONS FOR FUTURE RESEARCH

A central finding of the 1969-89 standardization exercise is that demographic, social, and economic changes have had a greater effect on Black household incomes than White household incomes. Our estimate of what the Black-White household income differential would have been in 1989, if the changes had not taken place, was .65. This compares to the actual differential of .60 in 1989.

Table G. **Black Income and Poverty Standardized by White Economic Variables: Work Experience and Industry**

(1989 income)

Measure	White	Black				
		Actual	Standardized by--			
			Work experience of householder	Work experience of wife	Industry	All three
Number of households	80,143	10,513	10,513	10,513	10,513	
Median household income	$30,413	$18,146	$20,502	$21,300	$19,595	$22,213
Share of income received by:						
Lowest fifth	4.1	3.2	3.3	3.5	3.3	3.6
Second fifth	9.9	8.0	8.8	9.2	8.6	9.5
Third fifth	16.0	15.2	15.9	16.0	15.6	16.2
Fourth fifth	23.8	25.0	25.0	25.0	25.0	25.1
Highest fifth	46.2	48.7	47.0	46.3	47.5	45.6
Gini index	.420	.459	.440	.431	.445	.422
Poverty rate	9.8	29.7	25.5	24.2	27.0	22.6

Table H. **Black Income and Poverty Standardized by White Demographic, Social, and Economic Variables**

(1989 income)

Measures	White	Black				
		Actual	Standardized by--			
			Demographic, social	Demographic, economic	Social, economic	Demographic, social, economic
Number of households(000)	80,143	10,513	10,513	10,513	10,513	10,513
Median household income	$30,413	$18,146	$23,590	$22,458	$23,204	$23,648
Share of income received by:						
Lowest fifth	4.1	3.2	3.3	3.9	3.4	3.6
Second fifth	9.9	8.0	8.8	9.6	9.2	9.3
Third fifth	16.0	15.2	15.8	16.2	15.9	15.9
Fourth fifth	23.8	25.0	25.2	25.0	25.1	25.0
Highest fifth	46.2	48.7	47.0	45.4	46.4	46.2
Gini index	.420	.459	.440	.418	.432	.428
Poverty rate	9.8	29.7	20.4	20.4	20.5	19.0

Some of the more significant individual factors affecting Black incomes were related to both social and economic factors. The changes in the types of households Blacks live in appeared to have a major impact on their incomes. Similarly, the change in the work experience profiles of Black householders, which is no doubt related to changes in living arrangements, had a strong effect on their income levels. Both factors appeared to be important for lowering their poverty rates and levels of income inequality.

But a lot of the income gap between Black and White households has yet to be explained. Even when the 1989 incomes of Blacks are standardized on the basis of White characteristics the income differential rises only to .78. Other factors clearly are at work, factors not accounted for by the standardization.

As stated in the introduction, standardizations are only first approximations of the possible effects of various compositional shifts occurring in the country's demography, society, and economy. The results of the standardizations can tell us, in general terms, what these shifts have meant for our various income measures of Blacks and Whites. However, they leave us in the dark regarding the processes of change. For this we need more sophisticated measuring devices and data bases. Our findings suggest that the relationship between household type and the work experience of the householder requires further examination. A more detailed specification of these variables along with a more powerful methodology and a longitudinal data base might shed additional light on the recent trends in the Black-White income differential.

REFERENCES

Aaron, Henry J., "Symposium on the Economic Status of African Americans," *Journal of Economic Perspectives*, Vol. 4, No. 4, Fall 1990, 3-7.

Antos, Joseph, Mellow, Wesley, and Triplett, Jack E., "What is a Current Equivalent to Unemployment Rates of the Past?" *Monthly Labor Review*, Vol. 102, No. 3, March 1979, 36-46.

Ellwood, David T., and Crane, Jonathan, "Family Change Among Black Americans: What Do We Know?" *The Journal of Economic Perspectives*, Vol. 4, No. 4, Fall 1990, 65-84.

Flaim, Paul O., "Population Changes, the Baby Boom, and the Unemployment Rate," *Monthly Labor Review*, Vol. 113, No. 8, August 1990, 3-10.

Green, Gordon, and Welniak, Edward, Changing Family Composition and Income Differentials, *Special Demographic Analyses*, CDS-80-7, Washington, D.C.: U.S. Bureau of the Census, August 1982.

Gwartney, James, "Discrimination and Income Differentials," *The American Economic Review*, Vol. 60, No. 3, June 1970, 306-408.

Jaynes, Gerald David, "The Labor Market Status of Black Americans: 1939-1985," *The Journal of Economic Perspectives*, Vol. 4, No. 4, Fall 1990, 9-24.

Jaynes, Gerald David, and Williams, Jr., Robin M., *A Common Destiny: Blacks and American Society*, Washington, D.C.: National Academy Press, 1989.

O'Neill, June, "The Role of Human Capital in Earnings Differences Between Black and White Men," *The Journal of Economic Perspectives*, Vol. 4, No. 4, Fall 1990, 25-45.

Sawhill, Isabell, "Poverty in the U.S.: Why Is It So Persistent?" *Journal of Economic Literature*, Vol. 26, No. 3, 1988, 1073-1119.

Smith, James P. and Welch, Finis R., *Closing the Gap: Forty Years of Economic Progress for Blacks*, Santa Monica, CA: The RAND Corporation, R-3300-DOL, 1986.

Table A-2. **Total and Usable Cells for Classification Variables**

Variable	Total cells	Usable cells
Economic	48	36
Social	9	9
Demographic	4	4
Economic-Social	432	133
Economic-Demographic	192	136
Social-Demographic	36	36
Demo.-Soc.-Econ.	1,728	472

Cells not containing any observations were either unlikely combinations or in some cases impossible ones. For example, in the economic variables, householders or wives who did not work obviously could not be assigned to a particular industry. The variables were classified in the manner selected in order to be able to assign all households to each group in a mutually exclusive and exhaustive way.

To reduce the impact of high sampling variability in some of the more sparse cells of the matrix, a count of the number of sample cases within each cell was kept and only cells with 5 or more sample cases in both years were used to compute a weighting adjustment factor. Cells with fewer than 5 sample cases in either year were given a factor derived by collapsing the detail used to define the cell. The process of collapsing continued until a factor could be derived based on 5 or more sample cases. Although none of the demographic and social variables needed to be collapsed, approximately 14 percent of the economic variables were collapsed. Additional collapsing was done for combinations of these variables that did not have at least five sample cases in both years.

APPENDIX B. INCOME MEASURES

Household income. Income summary measures presented in this paper are limited to money income before payments of Federal, State, local, or Social Security taxes and before any other types of deductions, such as union dues and Medicare premiums. Total money income is the sum of the amounts received by all member of the housing unit age 15 years and over.[1] Income sources include: wages and salaries, self-employment income, Social Security, Supplemental Security income, public assistance, interest, dividends, rent, royalties, estates or trusts, Veterans' payments, unemployment and workers' compensations, private and government retirement and disability pensions, alimony, child support and any other source of money income which are regularly received. Capital gains (or losses) and lump-sum or one-time payments such as life insurance settlements are excluded.

Median income. The median income is the amount which divides the income distribution into two equal groups, one having income above the median, and the other having incomes below the median. All medians in this paper were derived from grouped data using linear interpolation. The income intervals used were $2,500 groupings beginning with under $2,500 and ending with an interval of $100,000 and over.

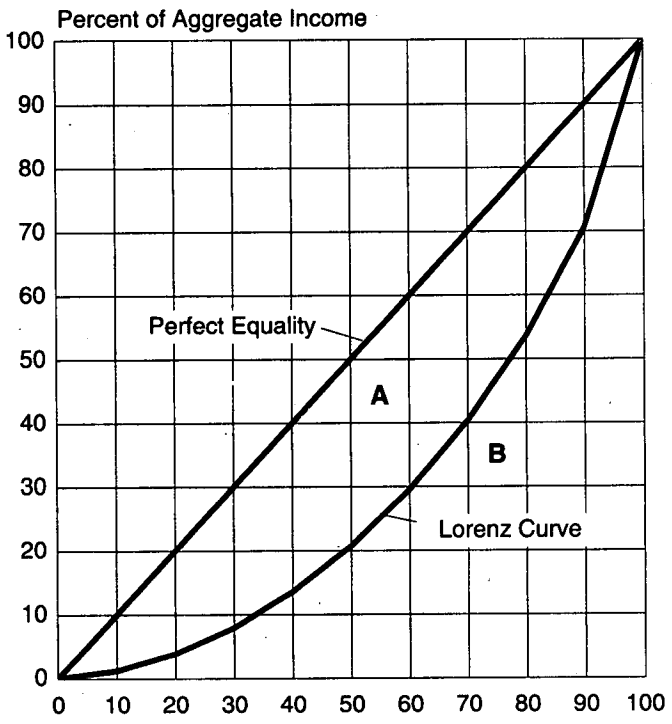
Gini ratio. The Gini ratio (or index of income concentration) is a statistical measure of income equality ranging from 0 to 1. A measure of 0 indicates prefect equality, i.e., all households having equal shares of income; a measure of 1 indicates perfect inequality, i.e., one household has all the income and the rest have none. Thus, higher levels of the Gini ratio indicate higher levels of income inequality. The Gini ratio is derived by calculating the ratio of the area between a Lorenz curve and a diagonal to the area below the diagonal.[2] As shown in figure 1, the Gini ratio can be expressed as:

$$G = \frac{A}{A+B} = \frac{\text{area between Lorenz curve and diagonal}}{\text{area under diagonal}}$$

[1]Income data for 1969 were collected for all persons age 14 years and over.

[2]The Lorenz Curve is obtained by plotting the cumulative percent of households against the cumulative percent of aggregate income.

Lorenz Curve



All Gini ratios presented in this paper were derived from grouped data. Basically, data in $2,500 intervals were interpolated to produce 100 percentile groupings. Mean incomes were then estimated for each percentile by either linear or Pareto interpolation. From these data, a Lorenz curve was developed and the area below the curve was estimated using trapezoidal approximation.

Income shares. Income shares are ratios of aggregate income for selected groups to the overall aggregate income of all groups and expressed as percentages. For this paper income shares are presented by income quintile. Quintiles are derived by ranking households by income and then dividing them into five groups with each group containing 20 percent of households. Aggregate income is then calculated for each of the five groups and expressed as a percentage of the total population aggregate income. All income shares presented in this paper were derived from grouped data.

Poverty definition. Official poverty estimates are based on money incomes of families and unrelated individuals. Families and unrelated individuals are considered to be

in poverty if their annual incomes fall below Federally established poverty thresholds. Weighted average poverty thresholds are displayed in Table B-1.

Table B-1. **Weighted Average Poverty Thresholds in 1989**

Size of family unit	Threshold
One person (unrelated individual)	$6,311
Two persons	8,076
Three persons	9,885
Four persons	12,675
Five persons	14,990
Six persons	16,921
Seven persons	19,162
Eight persons	21,328
Nine persons or more	25,480

Poverty estimates in this paper are not official. Currently, no official poverty definition for households exists. The poverty definition presented in this paper is an adaptation of the current official poverty definition applied to the household concept. The poverty status of a household was determined by the poverty status of the primary family or primary unrelated individual residing in the housing unit. Furthermore, the poverty status of the primary family or individual for the year 1969 and 1979 was determined by applying current criteria for poverty instead of the criteria in place at that earlier time. This involved the use of a condensed set of poverty thresholds currently in place and deflating them to a 1969 and 1979 standard of living level as measured by the Consumer Price Index for All Urban Consumers (CPI-U, 1982-84=100).

INTERNATIONAL COMPARISONS OF EARNINGS INEQUALITY FOR MEN IN THE 1980's

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ABSTRACT

This paper presents a comparative analysis of earnings inequality during the 1980's among prime age men who headed households and worked year round full time from five industrialized countries—Canada, Sweden, Australia, West Germany, and the United States. The data were obtained from the Luxembourg Income Study (LIS) database, a multinational collection of microdata sets from various countries which have been assembled for the primary purpose of making cross-national comparisons of economic and social well-being. The results of the comparison indicated that during the mid-1980's, the United States had the most unequal distribution of earnings and Sweden the least unequal. Between the early-1980's and mid-1980's, however, the earnings distributions in all five countries showed evidence of becoming more unequal, and especially so in the United States, Canada, and Sweden.

INTRODUCTION

Growing inequality in the distribution of labor market earnings in the United States has become one of the more popular research topics in labor economics in recent years. Researchers in the early 1980's first observed rising earnings inequality among men (e.g., Henle and Ryscavage, 1980; Plotnick, 1982;). Since that time many papers, articles, and books have been written about the increase in earnings inequality during the 1980's and the possible explanations for the development (Levy and Murnane, 1991).

The analytical framework for explaining the greater dispersion in the earnings distribution has typically involved identifying the sources—or groups of workers—responsible for the growing inequality. Initially, an analysis of variance approach was suggested (Dooley and Gottschalk, 1982), but other decomposition techniques have been used. Sources of change in inequality measures are typically decomposed into those generated between and within specific groups of workers. These groups are typically defined on the basis of human capital attributes, such as age, experience, and education.

This new literature, of course, focuses almost exclusively on increasing earnings inequality in the U.S. over the last 20 years or so, with particular emphasis on its acceleration in the 1980's. In this paper, trends in earnings inequality during the 1980's for men from five industrialized countries—Canada, Sweden, Australia, West Germany, and the U.S.—are presented. While our analysis does not involve decomposing changes in inequality, it may prove useful in understanding the changes occurring in the U.S. If a pattern of rising inequality is observed in other developed nations, it may be that the same phenomena causing it there is also at work in the U.S. (e.g. skill-biased technological changes). Or if there has been no change in earnings inequality in these other nations, the reason for growing inequality in the U.S. may be due to problems unique to the U.S. (e.g. import trade imbalances).

Analyses of changes in the inequality of earnings distributions in other countries are rare.[1] Some related evidence, however, was made available by the Organisation for European Co-operation and Development (OECD) in their Employment Outlook for 1987 (OECD, 1987). The OECD examined earnings differentials between non-manual and manual workers in 16 of its member countries over the last two or three decades. Their analysis revealed that in 8 of the 16 countries studied, the trend in the differentials since 1980 was upward. These countries were Canada, Denmark, West Germany, Italy, the Netherlands, Norway, the United Kingdom, and the United States. Although the OECD data are only suggestive at best (given comparability problems, the aggregative nature of the data, and so on), they may reflect underlying changes taking place in the earnings and wage distributions of these countries.

This paper begins with a brief discussion of the various measures of inequality used in the comparison, followed by a section which discusses the data from the Luxembourg Income Study (LIS) that was used in the analysis. The next section presents the results of the comparison and consists of first determining how much

[1] Cross-national comparisons of "income" inequality, however, are more common. For example, see O'Higgins, Schmaus, and Stephenson (1989).

inequality existed in each nation's earnings distributions in the mid-1980's and second, whether or not inequality changed in these countries between the early-1980's and mid-1980's. The final section summarizes the findings and discusses their implications for further research.

MEASURES OF EARNINGS INEQUALITY

Numerous indices exist for measuring the degree of inequality in an earnings distribution. They range from simple measures like the share of aggregate earnings received by each quintile, the coefficient of variation, and the variance of the natural logarithm of earnings, to more complex measures such as the Gini, Theil, Atkinson measures, and generalized entropy indices. All have different mathematical constructions and can lead to different assessments concerning the degree of inequality (Slottje, 1989). For this reason, multiple measures of inequality are examined in our cross-national comparison of earnings inequality in the interest of robustness.

Four of these measures of inequality deserve discussion since they have particular properties that some readers may not be aware of.[2] The variance of the natural logarithm is a popular measure of inequality but does not always satisfy the "principle of transfers." When income is transferred from a high paid worker to a less highly paid worker, earnings inequality should be reduced, however, in some instances this inequality measure can produce the opposite finding. In addition, this measure is particularly sensitive to changes in earnings levels in the lower end of the distribution.

The Gini index, while always satisfying the principle of transfers, is more sensitive to changes in the middle of the earnings distribution rather than the tails. This is because it is derived from the Lorenz curve which expresses the relationship between the cumulated percentage of aggregate earnings and cumulated percentage of earners. An increase or decrease in earnings in the middle of the distribution will have a greater impact on the measure than a similar change at either end since there are more earners in the middle ranks.

The Theil index also satisfies the principle of transfers but is also most sensitive to movements within the middle of the distribution. Its primary advantage in analyses of inequality is its property of decomposition: Overall inequality can be decomposed into "between" and "within" groups comprising the distribution.

Both the Gini and Theil indices, however, have a common disadvantage. if they are derived from distributions with intersecting Lorenz curves, that is, curves showing the relationship between the cumulated percentage of earnings and the cumulated percentage of earners, meaningful comparisons of the indices become problematic (Braun, 1988). This is commonly referred to as Lorenz dominance.

[2]Their mathematical constructions are given in the Appendix.

The Atkinson measures were developed to overcome this problem. Basically, the Atkinson measures allow one to shift the "weight" given to the middle ranks of the distribution to either the lower or upper ends of the distribution. The researcher can specify the degree of sensitivity to transfers within the distribution. In this paper three different values of "epsilon," or the weight, were chosen—0.5, 0.8, and 1.5. As the value of epsilon rises, the measure becomes increasingly sensitive to inequality among low earners.

THE DATA

The data for our comparison have been obtained from the Luxembourg Income Study (LIS), a multinational collection of microdata sets from various countries (Coder, Rainwater, and Smeeding, 1988). All of the data were collected in household surveys or surveys of administrative systems (Sweden) by institutions in countries participating in LIS. Each survey used different questionnaires, collection, and processing techniques, and differences also existed in population universes, variable definitions, and response rates. To the extent possible, however, definitions of income sources and family and household characteristics have been placed on a common foundation.

As of mid-1990, the LIS database consisted of microdata sets for 14 countries.[3] The countries of Canada, Australia, Sweden, West Germany, and the United States were selected for comparison because it is only for these countries that data were available covering two different periods of time in the 1980's. We refer to these periods as the early 1980's and mid-1980's, the former comprising 1979 to 1981 and the latter 1984 to 1987.[4] The following are the specific years used for each country:

	Early-1980's	Mid-1980's
Canada	1981	1987
Australia	1981	1985
Sweden	1981	1987
West Germany	1981	1984
United States	1979	1986

The universe initially selected for examination was adult men age 25 to 54 who headed households, worked year round, full time, and received no social insurance pension or private pension. This universe was chosen since the objective of the analysis was to focus on, as closely as possible, distributions of labor income which reflected standardized units of labor input (e.g., an hourly wage rate). In other words, by identifying a

[3]The countries are Luxembourg, Italy, Poland, France, Israel, Netherlands, Norway, Switzerland, the United Kingdom, Canada, Australia, Sweden, West Germany, and the United States.

[4]A brief description of the surveys from each country is contained in the Appendix.

universe fully committed to the work force it was possible to minimize the confounding effect of differences in annual hours worked on annual wage and salary earnings.[5]

In defining the universes for analysis, however, a number of potentially troublesome comparability problems were encountered.[6] The most important related to the lower tail of the distributions where sampling and data collection problems tend to be most conspicuous. Since the universe being analyzed was composed of prime-age men, who were household heads and work year round, full time, it would be expected that the lower tail of the earnings distribution would be truncated at a "minimum wage" level or its equivalent. As shown in Table 1a, unreasonably low amounts of earnings for men were observed for Sweden at the 1st percentile of the distribution; in addition, particularly low levels were also observed at the 1st percentile for Canada and Australia. After investigating the data for Sweden in some detail it was found that this problem was caused by self-employed workers (farmers and other entrepreneurs) who had also received small amounts of wage and salary income. This finding was suggestive of a more general problem which applied to the other countries, that is, year-round, full-time "self-employed" workers with wage and salary income from other jobs.

Other potential problems concerned the upper tail of the distribution where data problems are often concentrated. One of these problems concerns "topcoding." In some countries, such as the United States, earnings in excess of certain levels may be topcoded, that is, all amounts higher than the specified limit are reduced to the limit before the data are released to the public. This practice is a means of preserving the confidentiality of survey respondents. However, it does introduce a bias into the data and affects measures of inequality. The presence of topcoding is clearly evident in the data for the U.S. shown in Table 1a where the topcode in 1979 was $50,000 and in 1986, $100,000. In the other countries it is not so evident given the differences between the maximum value of wage and salary earnings reported and the earnings at the 99th percentile.

While no adjustments were made for the problem of topcoding, it was possible to adjust the data for those year-round, full-time self-employed workers with wage and salary income.[7] In each country, they were excluded from the universe of male heads of households, age 25 to 54, who worked year round, full time. The results of this exclusion on the distributions can be seen in Table 1b.

The adjusted data in Table 1b also provide some preliminary evidence as to how these earnings distributions changed during the 1980's. The mean-to-median ratio for each country rose during the 1980's indicating that the mean in these distributions were being "pulled" up by increasingly high earnings values (Col. H). The highest-to-lowest decile ratio increased in all countries except Australia, indicative of greater dispersion in the

[5]There is, no doubt, variation across countries in the definition of year-round, full-time employment. For example, in the United States the definition was 50 or more weeks of employment at 35 hours or more a week. In Sweden, on the other hand, the definition is 1,872 hours of employment or more during the year. In Canada, Australia, and West Germany precise details concerning the definition of year-round, full-time employment was not provided in the dataset, although variables identifying year-round, full-time workers were provided.

[6]All of the microdata were weighted using sample weights and all the data presented, therefore, are weighted estimates.

[7]Another procedure for reducing "survey noise" and data collection and processing problems is simply to censor the distributions at the lower and upper ends (e.g., 1st and 99th percentiles). We rejected this procedure on the grounds of its arbitrariness.

Table 1a. **Summary Earnings Measures for Men, Heads of Households, Age 25 to 54 Years, Who Worked Year Round, Full Time in Selected Countries, Early-1980's and Mid-1980's**

(All numbers in currency of specified country)

Country/year	A median	B mean	Decile* C low	Decile* D high	Percentile* E 1st	Percentile* F 99th	G max. value	In percent H B/A	In percent I D/C	In percent J E/A	In percent K F/A
US79	18,700	20,079	9,750	32,000	3,000	50,000	50,000	107	328	16	267
US86	27,500	30,848	13,000	50,600	5,200	100,000	100,000	112	389	19	364
SW81	81,900	87,185	55,808	126,272	1,807	238,212	700,000	106	226	2	291
SW87	129,800	140,629	86,607	207,963	924	387,609	1,800,000	108	240	1	299
CN81	23,510	24,761	13,501	37,539	4,590	57,835	105,000	105	278	20	246
CN87	31,410	33,398	14,430	52,210	1,765	95,122	260,000	106	362	6	303
AS81	17,490	18,292	10,971	27,213	2,224	42,000	170,000	105	248	13	240
AS85	23,290	24,763	14,088	37,190	1,318	59,352	200,000	106	264	6	255
WG81	36,700	40,071	25,680	58,680	10,000	88,300	200,000	109	229	27	241
WG84	41,200	46,173	28,900	69,300	18,000	107,900	236,000	112	240	44	262

* Figures for deciles and percentiles are upper limits of the specified group.

NOTE: U.S. = United States, 1979 and 1986; SW = Sweden, 1981 and 1987; CN = Canada, 1981 and 1987; AS = Australia, 1981 and 1985; WG = West Germany, 1981 and 1984.

Table 3. **Measures of Earnings Inequality for Men, Heads of Households, Age 25 to 54, Working Year Round, Full Time for Selected Countries: Mid-1980's**

Rank	Ln Y	Gini	Theil	Atkinson (0.5)	Atkinson (0.8)	Atkinson (1.5)
1	.453(US)	.298(US)	.149(US)	.074(US)	.120((US)	.341(US)
2	.280(CN)	.253(CN)	.116(CN)	.057(CN)	.091(CN)	.185(CN)
3	.210(AS)	.212(AS)	.087(AS)	.042(AS)	.067(AS)	.146(AS)
4	.133(WG)	.204(WG)	.071(WG)	.034(WG)	.053(WG)	.097(WG)
5	.111(SW)	.190(SW)	.071(SW)	.032(SW)	.049(SW)	.082(SW)

NOTE: US = United States, 1986; CN = Canada, 1987; AS = Australia, 1985; WG = West Germany, 1984; SW = Sweden, 1987.

was present in the these distributions. Each of the Atkinson measures produced the same ranking of countries, although the magnitude of the differences varied between the measure which gives more weight to the low end of the distribution and the measure which weights the upper end more heavily.

Earnings Inequality: Early-1980's vs. Mid-1980's

Among the many factors that can influence changes in a Nation's distribution of earnings are changes in the health of the economy. Although measures of earnings inequality for these countries are compared over somewhat different time periods, the economies of these countries in the early-1980's and mid-1980's were, generally speaking, in similar phases of the business cycle (OECD, 1990). In each country, the mid-1980's represented years of economic growth and recovery from recessions in the early 1980's. Gross domestic products were rising and inflation had moderated relative to the early 1980's. In the early 1980's, on the other hand, economic growth was less robust and inflation more problematic as each country was in or about to enter a period of economic slowdown.

The data presented in Table 4 show the percentage share of aggregate wages and salaries by quintile for men age 25 to 54 who headed households and worked full time, year round in Canada, Sweden, Australia, West Germany, and the U.S. in the early-1980's and mid-1980's.[8] In each country there is evidence to varying degrees of a greater concentration of earnings in the upper quintiles of the earnings distributions. For the U.S., Canada, and Sweden, the share of earnings received by each of the lowest three quintiles declined while the share for the top quintiles increased. In the U.S., for example, the share of aggregate wage and salary earnings received by the top one-fifth of earners increased from 35.0 percent to 38.1 percent, or 3.1 percentage points. Canada had a 2.1 percentage point increase in the share going to the highest earners. The increase in the share going to Sweden's top earners, however, was only 0.7 percentage points.

In the case of Australia and West Germany, the patterns of change in the distributions were somewhat different than in the other countries. In Australia, the

[8]Quintiles instead of deciles are examined here since the changes in this unit of measurement over time are larger and can be more easily seen.

Table 4. **Shares (in percent) of Aggregate Wage and Salary Income Received by Men, Heads of Households, Age 25 to 54, Working Year Round, Full Time, by Quintile for Selected Countries, Early-1980's and Mid-1980's**

Country/year	Total	Quintile				
		Lowest	Second	Third	Fourth	Highest
United States						
1986	100.0	7.9	13.3	17.8	22.9	38.1
1979	100.0	8.9	14.6	18.6	22.9	35.0
Canada						
1987	100.0	9.1	14.7	18.7	23.0	34.5
1981	100.0	10.1	15.5	19.0	23.0	32.4
Sweden						
1987	100.0	13.0	15.7	17.9	21.1	32.3
1981	100.0	13.2	16.1	18.1	21.0	31.6
Australia						
1985	100.0	11.0	15.6	18.7	22.3	32.4
1981	100.0	10.8	15.9	19.0	22.7	31.6
West Germany						
1984	100.0	12.2	15.4	17.9	22.0	32.6
1981	100.0	12.0	16.0	18.3	21.8	31.9

share received by the highest fifth of earners increased and the share increased (slightly) for the lowest fifth of earners as well. A similar pattern of change was evident in West Germany, except that the share also rose slightly in the fourth quintile. In other words, in these two countries the middle quintiles received slightly smaller shares of aggregate earnings. It is also important to note that Lorenz curves for the early-1980's and mid-1980's in both Australia and West Germany crossed at the lower end of the distributions.

The above share analysis strongly suggests that earnings of the highest paid men in each of the countries examined were becoming more concentrated in the 1980's. This development was particularly acute in the United States and Canada. Nevertheless, some change towards greater earnings inequality was detected in Sweden, Australia, and West Germany as well. More sophisticated measures of inequality, however, are required to confirm this finding.

Table 5 displays the inequality measures that were previously discussed in connection with the question of which country had the most and least amount of inequality in its distribution. This Table, however, now includes the values of these measures for the early 1980's, and the percentage change in the measures between the early-1980's and mid-1980's. As might be expected from the share analysis, all of the measures indicate a strong increase in inequality in the United States and Canada. The percentage increases in the measures for the United States ranged from 16 percent (the Gini index) to 34 percent (Atkinson, 1.5 epsilon); for Canada, they ranged from 14 percent (the Gini index) to 38 percent (the Theil index).

All of the inequality measures for Sweden registered increases as well, but they were not as large as for the North American countries. They ranged from as little as 4 percent (Atkinson, 1.5 epsilon) to 13 percent (the Theil index). Interestingly, the increases in both the variance of the logarithm of annual earnings and the Atkinson measure (1.5 epsilon)—two measures sensitive to the low end of the distribution—were on the low side of this range reflecting the small change that occurred in the share of aggregate earnings received by the lowest quintile.

In Australia four of the six measures increased and in West Germany three measures moved higher. The increases for both were generally smaller than in the other countries (except the Theil measure for Australia). It should be remembered, however, that the span of years comprising the comparisons for these two countries is relatively short. Again, the measures sensitive to the bottom of the distribution—the variance of the logarithm and the Atkinson measure (1.5 epsilon)—registered declines in inequality reflecting the share increases at the bottom of the distributions discussed earlier.

IMPLICATIONS OF RESULTS

The growth of earnings inequality in the U.S. in recent years has been well-documented and the subject of much concern in both the research and policy communities. One of the concerns has been whether or not the millions of jobs created in the U.S. during the 1980's were primarily of the "low paying, low productivity" variety. Another related concern, of course, is how much of the growing earnings inequality was responsible for the growing inequality of incomes among families and households.

Table 5. **Changes in Measures of Earnings Inequality for Men, Heads of Households, Age 25 to 54 Years, Working Year Round, Full Time for Selected Countries, Early-1980's and Mid-1980's**

Country/year	Ln Y	Gini	Theil	Atkinson (0.5)	Atkinson (0.8)	Atkinson (1.5)
United States						
1986	.453	.298	.149	.074	.120	.341
1979	.354	.258	.111	.057	.094	.254
Percent change	28.0	15.5	34.2	29.8	27.7	34.3
Canada						
1987	.280	.253	.116	.057	.091	.185
1981	.225	.222	.084	.043	.071	.148
Percent change	24.4	14.0	38.1	32.6	28.2	25.0
Sweden						
1987	.111	.190	.071	.032	.049	.082
1981	.105	.180	.063	.029	.045	.079
Percent change	5.7	5.6	12.7	10.3	8.9	3.8
Australia						
1985	.210	.212	.087	.042	.067	.146
1981	.234	.208	.075	.040	.065	.155
Percent change	−9.3	1.9	16.0	5.0	3.1	−5.8
West Germany						
1984	.133	.204	.071	.034	.053	.097
1981	.162	.195	.068	.033	.054	.114
Percent change	−17.9	4.6	4.4	3.0	−1.9	−14.9

The results presented above suggest that the U.S. was not the only industrialized country during the 1980's to experience an increase in earnings inequality among prime age men who head families that were fully committed to the labor force. It was shown that the wage and salary earnings distributions for similar men from Canada and Sweden became more unequal as well. In addition, there was evidence that inequality was growing for these groups of men in Australia and West Germany. These findings may be further evidence of underlying structural changes taking place in the distributions of labor market incomes in many developed countries.

Table 6. **Average Annual Growth Rates in Total Employment for Selected Countries, Early-1980's to Mid-1980's**

Country	Period	Average annual growth rate
United States	1979-86	1.49
Canada	1981-87	1.28
Australia	1981-85	1.08
Sweden	1981-87	.43
West Germany	1981-84	-.77

Clearly, the "job quality" issue as a cause of growing earnings inequality in the U.S. loses credibility when rates of employment growth in these other countries are compared to the U.S. experience. Each country had quite different employment experiences during the periods in which inequality was rising, as shown in Table 6 (OECD, 1990). In the U.S. and Canada, the annual average rate of growth was in the 1.3 to 1.5 percent range and in Australia it was 1.1 percent. In Sweden employment growth was meager, while in West Germany it was declining.

The fact that rising earnings inequality occurred in other industrialized countries with different job creation experiences suggests that rising inequality may be related to more general phenomena occurring across nations. One possibility involves changing technologies. Computer and communication technologies have changed dramatically in recent years and these may have altered the demand for different skill classes of labor. Production processes may have been so altered that companies and factories now require more highly skilled and educated workers, while the demand for less well-trained labor associated with older production processes has declined. At the same time these shifts in demand have taken place, the supply of workers in various skill classes may have changed less rapidly thereby increasing inequality in the earnings distribution. This, of course, is speculation. Nevertheless, evidence now exists that the phenomenon of growing earnings inequality may have an international dimension.

REFERENCES

Braun, Denny, "Multiple Measurements of U.S. Income Inequality," *The Review of Economics and Statistics*, Vol. 70, No. 3, 398-405, August, 1988.

Coder, John, Lee Rainwater, and Timothy Smeeding, "LIS Information Guide," LIS-CEPS Working Paper No. 7, Walferdange, Luxembourg, rev. November, 1988

Dooley, Martin and Peter Gottschalk, "Does a Younger Male Labor Force Mean Greater Earnings Inequality?" *Monthly Labor Review*, Vol. 105, No. 11, 42-45, November, 1982.

Henle, Peter and Paul Ryscavage, "The Distribution of Earned Income Among Men and Women, 1958-1977," *Monthly Labor Review*, Vol. 103, No. 4, 3-10, April, 1980.

Levy, Frank and Richard J. Murnane, "Earnings Levels and Earnings Inequality: A Review of Recent Trends and Proposed Explanations," *Journal of Economic Literature,* (forthcoming).

Plotnick, Robert D., "Trends in Male Earnings Inequality," *Southern Economic Journal*, Vol. 48, No. 3, 724-732, March, 1982.

O'Higgins, Michael, Guenther Schmaus, and Geoffrey Stephenson, "Income Distribution and Redistribution: A Microdata Analysis for Seven Countries," *The Review of Income and Wealth*, Series 35, No. 2, 107-131, June, 1989.

Organisation for Economic Co-operation and Development, *The OECD Employment Outlook*, Paris: OECD, September, 1987.

Organisation for Economic Co-operation and Development, *OECD Economic Outlook*, Paris: OECD, June, 1990.

Slottje, D. J., *The Structure of Earnings and the Measurement of Income Inequality in the U.S.*, North Holland, Amsterdam, 1989.

Table 3. **Distribution of Aggregate Household Income, by Quintile and the Number of Elderly Households Represented in Each Quintile: 1979 and 1989**

Year	Total	Distribution by quintile			
		Bottom	Middle three	Top	Gini index
AGGREGATE INCOME OF ALL HOUSEHOLDS (in percent)					
1989	100.0	3.8	49.3	46.8	.431
1979	100.0	4.1	51.7	44.2	.404
ELDERLY HOUSEHOLDS (in thousands)					
1989	20,156	7,759	10,778	1,619	(NA)
1979	16,544	7,457	8,118	969	(NA)

NA Not applicable.
Source: U.S. Bureau of the Census, Current Population Survey.

middle and highest quintiles of the distribution. In other words, the elderly, while still very common at the bottom of society's income ladder, made progress in climbing to higher rungs of that ladder during the 1980's.

Also shown in table 3 are the Gini indexes, or the shorthand measures of how much inequality exists in the country's income distribution.[5] If each household had the same income—perfect equality—this index would have a value of 0.0; however, if one household received all the income—perfect inequality—then the Gini index would be 1.0. In other words, the measure is bounded between 0 and 1. The Gini index for the U.S. household income distribution rose from .404 to .431 between 1979 and 1989, a statistically significant increase. According to the Census Bureau, the rate of increase was twice as great as the increase during the 1970's, so during the 1980's there was an acceleration in income inequality.

Poverty. Table 4 presents the trend in poverty for the elderly during the 1980's. In terms of the total population in 1989, 31.5 million persons were considered poor based on the Federal government's poverty definition, or 12.8 percent of the population. This poverty rate was slightly higher than that in 1979 (11.7 percent), but considerably lower than the rate in 1983 (15.2 percent) which reflected the economic downturn experienced in the opening years of that decade.

[5]The Gini index can be written as

$$G = 1.0 - \sum_{i=1}^{m} f\,(y_i + y_{i-1})$$

where f is the proportion of income recipients in interval i and y_i is the proportion of aggregate income received by the recipients in interval i and all lower intervals.

Among the elderly, 3.4 million persons had incomes below the poverty line in 1989, or 11.4 percent of all the elderly. This rate was well below that for the Nation as a whole and was well below the elderly's rate in 1979 of 15.2 percent.[6] The economic downturn of the early 1980's had less of an impact on the elderly than the population primarily because a smaller proportion of the elderly are in the work force and susceptible to periods of unemployment.

Indeed, the improvement in the poverty picture for the elderly during the 1980's stands out in sharp contrast to that of the nonelderly. The tabulation below shows that over the 10 year period the incidence of poverty worsened for nonelderly persons between the ages of 18 and 64 and for persons under age 18 (the majority of whom were children).[7]

Group	Percentage poor in	
	1979	1989
Total population	11.7	12.8
Persons under 18	16.4	19.6
Persons 18 to 64	8.9	10.2
Persons 65 and older	15.7	11.4

These differential changes in poverty rates, of course, reflect the changing composition of the poverty population. The elderly's share of it in 1979 was 14.1 percent and by 1989 it was 10.7 percent.

Special Problem Groups Among the Elderly

The foregoing suggests that the elderly, on average, did quite well in the 1980's relative to the population. It should be remembered, however, that their average income is still far below that for all households in the Nation (46 percent below) [8] and that 2 out of every 5 households in the lowest income quintile are elderly households. Furthermore, not everyone within the elderly population shared equally in the income gains of the 1980's.

[6]According to the Bureau of the Census, the rate in 1989 for the elderly would have been 5.1 percent and 8.9 percent for the Nation if the value of certain noncash benefits were included and other adjustments to the poverty definition had been made. See "Measuring the Effect of Benefits and Taxes on Income and Poverty: 1989," Current Population Reports, Series P-60, No. 169-RD, U.S. Bureau of the Census, USGPO, Washington, D.C. 1990.

[7]Just as for the total population, poverty rates increased for persons aged 18 to 64 and persons under 18 during the early 1980's as a result of the economic slowdown in those years, and then the rates declined as the recovery began.

Poverty rates in 1989 for the groups shown here would be much lower if data on taxes, capital gains, and the value of certain noncash benefits were included in the CPS income concept. See "Measuring the Effect of Benefits and Taxes on Income and Poverty: 1989," Current Population Reports, Series P-60, No. 169-RD, U.S. Bureau of the Census, USGPO, Washington, D.C., 1990.

[8]Research has shown that this income differential is smaller if the CPS income were "adjusted" for some of the limitations discussed earlier. See Michael D. Hurd, "Research on the Elderly," cited in footnote 1, above.

Table 4. **Number of Persons With Incomes Below the Poverty Level and the Poverty Rate for Elderly Persons and All Persons: 1979 to 1989**

Years	Elderly persons		All persons	
	Number (thous.)	Rate (percent)	Number (thous.)	Rate (percent)
1989	3,369	11.4	31,534	12.8
1988	3,481	12.0	31,745	13.0
1987	3,563	12.5	32,221	13.4
1986	3,477	12.4	32,370	13.6
1985	3,456	12.6	33,064	14.0
1984	3,330	12.4	33,700	14.4
1983	3,625	13.8	35,303	15.2
1982	3,751	14.6	34,398	15.0
1981	3,853	15.3	31,822	14.0
1980	3,871	15.7	29,272	13.0
1979	3,682	15.2	26,072	11.7

Source: U.S. Bureau of the Census, Current Population Survey.

Table 5 shows the distribution of aggregate income by quintiles for elderly households in 1979 and 1989, just as was shown for all households in table 3. The first thing to note is that when measured by the Gini index, the elderly have a somewhat more unequal distribution of income than society as a whole. Their Gini index in 1989 was .467. But, more importantly, even among the elderly there was some evidence of an increase in inequality over 1979-89 period. According to the Gini index, inequality in the elderly's distribution rose from .446 to .467 (the increase, however, was not statistically significant).[9] Some groups among the elderly were left behind also. Who were they?

Elderly Women Living Alone. There are a number of ways to answer this question. One way is to look at the data by the elderly's living arrangements and marital status. (Unfortunately, the only published data available from the Census Bureau at the time of this writing was for 1987. Nevertheless, these data are useful.)

Table 6 shows that real median annual incomes between 1979 and 1987 rose by only 12.9 percent for elderly female unrelated individuals, or from $6,966 to $7,863. For female family householders in which the husband was absent, incomes rose but the increase was not statistically significant. These are sizable groups when compared to all elderly families and unrelated individuals. The increases in their income levels were far

[9]The change in the Gini index for elderly households was on the borderline of statistical significance. Other researchers have observed growing inequality of income among elderly households during the 1980's. See Daniel B. Radner, "Changes in the Incomes of Age Groups, 1984-89," *Social Security Bulletin*, Vol. 54, No. 12, December, 1991, pp. 2-18.

Table 5. **Distribution of Aggregate Household Income, by Quintile for Households With an Elderly Householder: 1979 and 1989**

(In percent)

Quintile	1979	1989
Total	100.0	100.0
Lowest	4.8	4.5
Second	9.0	8.5
Third	14.3	13.5
Fourth	22.0	21.7
Highest	50.0	51.9
Mean	$11,144	$23,452
Gini index	.446	.467

Source: U.S. Bureau of the Census, Current Population Survey.

below the increases experienced by elderly married couple families.

The relatively poor income growth performance of elderly women during the 1980's is also reflected in their poverty statistics. As shown in table 7, while their poverty rate fell from 30.4 to 23.4, it still remains very high. And the economic situation for elderly Black women who are poor has been particularly intractable. The poverty rate for the 371,000 Black elderly women in 1989 was 59.8 percent; in 1979 the comparable figure was 64.8 percent, not significantly different. The vast majority of these women are widowed and live alone. Clearly, the income picture for elderly Black women did not brighten much in the 1980's.

Table 6. **Real Median Income of Elderly Families, by Type and Elderly Unrelated Individuals, by Sex: 1979 and 1987**

(In 1987 dollars)

Type of family and sex	1979		1987	
	Number (thous.)	Income	Number (thous.)	Income
FAMILIES				
Total	8,792	$17,362	10,502	$20,813
Married-couples	7,248	17,330	8,631	20,996
Male householder, no wife	304	18,606	391	24,946
Female householder, no husband	1,240	17,235	1,479	18,761
UNRELATED INDIVIDUALS				
Total	7,656	7,141	9,330	8,205
Male	1,666	7,961	2,158	9,584
Female	5,990	6,966	7,173	7,863

Source: U.S. Bureau of the Census, Current Population Survey.

The Elderly "Slightly Above" the Poverty Line. Another way to find out who was left behind is to look at how far

Table 7. **Poverty Levels and Poverty Rates of Elderly Families, by Type and of Elderly Unrelated Individuals, by Sex: 1979 and 1989**

Type of family and sex	1979		1989	
	Number (thous.)	Rate (percent)	Number (thous.)	Rate (percent)
FAMILIES				
Total	797	9.1	703	6.6
Married couples	594	8.2	495	5.6
Male householder, no wife	35	11.7	28	7.8
Female householder, no husband	168	13.5	180	12.2
UNRELATED INDIVIDUALS				
Total	2,243	29.3	2,166	22.0
Male	421	25.3	385	17.3
Female	1,822	30.4	1,780	23.4
Black	295	64.8	371	59.8

Source: U.S. Bureau of the Census, Current Population Survey.

above and below the poverty line the elderly were located in 1979 and 1987. (Again, we must rely on data for 1987.) To do this the ratio of income to the poverty line is computed for elderly householders and unrelated individuals.[10]

As was indicated earlier, income levels of the elderly rose during the 1980's but at different rates for different groups of the elderly. The data in table 8 show that the proportions of elderly family householders with income to poverty line ratios of under 2.0 (or incomes below twice the poverty line) declined between 1979 and 1987. Moreover, the proportion with income to poverty ratios of 2.0 or more rose from 62 to 70 percent of all the elderly.

But when we examine the data for elderly unrelated individuals, the improvement is less impressive, especially just slightly above the poverty line. The proportion of unrelated individuals with income-to-poverty line ratios of between 1.26 and 2.00 was not significantly different during the 1980's, vis-a-vis the situation for all elderly households. Almost 25 percent of all elderly unrelated individuals were located in this part of the distribution in both 1979 and 1987. This lack of identifiable change was particularly obvious among elderly women who were unrelated individuals (most of whom live alone), as is shown in table 8. These are probably persons with Social Security income as their only source of income.

[10]The poverty index, of course, varies by family size, number of children, and age of householder for one or two person households. In 1987, the poverty line for an elderly unrelated individual was $5,447; for an elderly two-person household, it was $6,865.

In contrast, the proportions of elderly unrelated individuals located below 1.25 of the poverty line did decline significantly between 1979 and 1987, while the proportion above 2.0 of the poverty line increased. In consequence, the general improvement in the income situation of the elderly was not necessarily shared by groups with incomes slightly above their poverty lines.

The Elderly and Wealth

Another important dimension of the economic well-being of the elderly is their wealth or net worth. While the incomes of the elderly are lower than the nonelderly, on average, their net worth is much higher simply because they have had a longer period of time to accumulate assets. This wealth is an important source of income and security for the elderly.

There is a general impression that asset holdings appreciated across society during the 1980's. Real estate values and stock market prices did rise, while investment opportunities abounded given the expansion in corporate indebtedness. Of interest, of course, is what happened to the asset position of the elderly during this period.

The Census Bureau's Survey of Income and Program Participation (SIPP) periodically surveys households about their economic well-being, including wealth holdings or net worth.[11] The Census Bureau defines net worth as the value of assets minus liabilities. Specifically, interest-earning assets, stocks and mutual fund shares, real estate, own businesses or professions, mortgages held by sellers, and vehicles, minus debts secured by any asset, credit card or store bills, bank loans, and other unsecured debts equals net worth. The Bureau recently released the results of their wealth survey for 1988 and it is possible to compare it to the results of the same survey in 1984.

What the Elderly Have. Before we examine what happened to the net worth of the elderly in the 1980's it would be useful to take an inventory of their assets as compared to the rest of the population. The total value of the elderly's net worth, of course, is twice as high as that of all households—the median net worth for the elderly was $73,471 compared to $35,752 for all households. Table 9 displays the distribution of net worth in 1988 by asset type for all households in the population as well as those households with elderly householders. Also shown are the median values of these assets.

[11]See Household Wealth and Asset Ownership: 1988, Current Population Reports, Series P-70, No. 22, U.S. Bureau of the Census, USGPO, Washington, D.C., 1990, and Household Wealth and Asset Ownership: 1984, Current Population Reports, Series P-70, No. 7, U.S. Bureau of the Census, USGPO, Washington, D.C., 1986.

Table 8. **Distribution of Elderly Family Households, Elderly Unrelated Individuals, and Elderly Persons by Their Income-to-Poverty Line Ratio, 1979 and 1987**

(In percent)

Ratio	Elderly households		Elderly unrelated individuals		Elderly female unrelated individuals		Elderly persons	
	1979	1987	1979	1987	1979	1987	1979	1987
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Less than .50	1.6	1.4	4.0	2.9	3.8	3.0	2.4	1.9
.50-1.00	7.4	5.7	25.3	21.1	26.5	22.4	12.7	10.3
1.01-1.25	6.2	4.5	17.1	15.0	17.8	15.4	9.6	8.0
1.26-1.50	6.9	5.7	11.7	11.0	11.7	11.7	8.2	7.2
1.51-2.00	15.7	12.8	14.3	13.8	14.2	13.7	15.3	13.1
2.00 or +	62.1	69.8	27.7	36.1	25.8	33.8	51.9	59.4

Source: U.S. Bureau of the Census, Current Population Survey.

Table 9. **Distribution of Net Worth, by Asset Type and Median Value for Elderly Households and All Households: 1988**

Asset type	Elderly households		All households	
	Total (percent)	Median value	Total (percent)	Median value
Total	100.0	$73,471	100.0	$35,752
Interest earning assets[1]	22.4	14,560	14.1	3,494
Other interest earned[2]	6.8	24,080	4.2	10,911
Checking accounts	0.5	605	0.6	487
Stocks, mutual funds	8.2	11,017	6.5	4,510
Home equity	40.4	55,447	43.1	43,070
Rental property equity	6.7	45,075	7.9	37,439
Other real estate equity	2.6	17,417	4.3	18,064
Vehicles	3.1	3,834	5.8	4,416
Business equity	3.0	10,662	8.8	10,446
U.S. savings bonds	0.6	1,430	0.6	546
IRA/Keogh	2.8	12,155	4.2	9,016
Other financial investments	3.5	26,891	3.0	16,204
Unsecured assets	−0.5	(NA)	−2.9	(NA)

1/Includes savings accounts, money market deposit accounts, certificates of deposit, and interest earning checking accounts.
2/Includes money market funds, government securities, corporate or municipal bonds, and other interest earning assets.
Source: U.S. Bureau of the Census, Survey of Income and Program Participation.

As is well known, the single most important component of the average household's assets is the equity in the home—43 percent of total net worth. This is also true for the elderly, although to a slightly lesser extent. Interest earning assets, however, are a very important element of the elderly's net worth vis-a-vis the population in general. Almost 25 percent of the elderly's net worth is comprised of passbook savings accounts, money market deposit accounts, certificates of deposit, and other interest earning assets held at financial institutions. Only 14 percent of all households' net worth is comprised of these assets.

Changes in the Elderly's Net Worth, 1984 to 1988. So did "wealth" increase during the 1980's and what happened to the elderly's net worth? Table 10, which shows the median net worth for all households and elderly households by monthly income quintiles, attempts to answer to that question. (As with the income data, net worth data are presented in "real" terms.) [12]

The table shows that despite the economic expansion of the 1980's, wealth did not change. The real median net worth of all households in the country was about $36,000 in both 1984 and 1988. (The difference shown in the table was not statistically significant.) For the elderly, however, median net worth rose from $68,600 to $73,471, a statistically significant increase. In addition, the elderly in the third and highest monthly income quintiles also experienced statistically significant increases in their net worth. Net worth increased from roughly $110,000 to $142,000 in the third quintile and from

[12]The net worth data for 1984 are expressed in terms of 1988 dollars having been adjusted for inflation by the Bureau of Labor Statistics' Consumer Price Index (CPI-U).

Table 10. **Median Value of Household Net Worth, by Monthly Income Quintile and Median Value of Household Net Worth After Excluding Home Equity, by Monthly Income Quintile for Elderly Households and All Households: 1984 and 1988**

(In 1988 dollars)

Year	Total	Monthly income quintile				
		Bottom	Second	Third	Fourth	Highest
NET WORTH						
Elderly Households						
1988	$73,471	$25,220	$76,050	$141,811	$201,562	$343,015
1984	68,600	25,088	73,814	109,998	194,876	273,982
All Households						
1988	$35,752	4,324	19,694	28,044	46,235	111,770
1984	37,012	5,130	21,248	29,459	49,947	98,411
NET WORTH (excluding home equity)						
Elderly Households						
1988	$23,856	3,536	28,168	57,026	100,480	208,789
1984	21,557	3,193	26,200	51,827	97,677	185,844
All Households						
1988	$9,840	1,152	5,454	8,418	14,376	40,688
1984	8,800	1,112	5,320	7,938	12,406	35,744

Source: U.S. Bureau of the Census, Survey of Income and Program Participation.

$274,000 to $343,000 in the highest. Only about 17 percent of all elderly households fall in the third quintile and only 8 percent in the highest. So, it was only in these relatively small groups of the elderly population that gains in net worth were registered.

Also shown in table 10 is the median net worth position of the elderly and the population as a whole, excluding the equity in the home. Obviously, these medians are much lower reflecting the importance of the home in an elderly household's net worth. What is of interest for the elderly is that, although the medians had increased between 1984 and 1988, none of the changes were statistically significant.

Other Aspects of the Elderly's Net Worth

As indicated above, while the net worth position of the elderly did increase "on average" during the heart of the 1980's, it was not a uniform increase across all income groups. In general, the improvement was found among those in the middle and upper monthly income brackets of society. But as was also pointed out earlier, the elderly are more commonly found in the lower portion of the income distribution.

Table 11 shows two other dimensions of the increase in the real net worth of the elderly between 1984 and 1988. First, the increase was concentrated among those households in which the householder was 70 to 74 years of age. Real net worth rose from $68,500 to $82,111. Changes for the other age groups were not statistically significant. The same pattern was observed when home equity was excluded from net worth: only among those elderly households in which the householder was 70 to 74 did net worth increase. (Table 11 also shows how net worth drops after age 74—from roughly $82,000 to $61,000. Those householders age 75 and over are a growing proportion of the elderly.)

Table 11. **Median Value of Net Worth and Median Value of Net Worth After Excluding Home Equity for Edlerly Households, by Age and Type of Household: 1984 and 1988**

(In 1988 dollars)

Age and type of household	Net worth		Net worth (excluding home equity)	
	1984	1988	1984	1988
AGE				
65 and over	$68,600	$73,471	$21,557	$23,856
65 to 69	75,992	83,478	24,757	27,482
70 to 74	68,514	82,111	21,321	28,172
75 and over	62,865	61,491	19,469	18,819
TYPE OF HOUSEHOLD				
Married couple	98,128	124,419	39,270	45,890
Male householder	47,504	48,883	14,448	15,914
Female householder	48,386	47,233	11,622	10,693

Source: U.S. Bureau of the Census, Survey of Income and Program Participation.

A second dimension of the table, net worth by type of household, also illustrates the rather narrowly based increase in net worth for the elderly. Only among elderly married couple households did real median net worth increase. It rose from $98,128 in 1984 to $124,419 in

1988. These types of households, of course, make up less than half of all elderly households and are comprised of 65 to 74 year olds. For single male and female householders, on the other hand, little change was observed in their net worth positions. This pattern was also evident after the exclusion of home equity. (The table also demonstrates how much lower wealth holdings are for these single householders, especially women, as compared to married couple households.)

Conclusions

In general, the 1980's were relatively good years for the elderly, at least in terms of income growth and increases in net worth or wealth. Broad measures of income and net worth for elderly households increased more than they did for all households. However, as was true concerning the entire population, the gains in income and wealth associated with the economic expansion of the 1980's were not shared by all elderly households.

Growth in real income was weakest for elderly single householders, especially women, and those elderly households slightly above the poverty line. The situation was particularly acute for elderly Black women living alone—a group whose poverty rate changed very little in the decade. Elderly married couple households, on the other hand, appeared to have fared best during the decade. Income inequality became somewhat more acute for the elderly as well.

Although data on net worth, or wealth, are not as readily available as income data, survey data for 1984 and 1988 provide two points in time by which we might obtain a glimpse of what was happening in the decade. The data showed that for all households there was very little change, and only among the highest income households did median net worth increase. In contrast, among elderly households net worth increased and was up particularly for middle income and high income elderly households. The increase was confined generally to married couple households and those with householders aged 70 to 74.

As the elderly left the 1980's and entered the 1990's, therefore, it appears that, on average, they were better off, at least with respect to income and wealth, then when they entered the 1980's. But the 1990's began on less than a sanguine note—recession, indebtedness, and unexpected costs. For those among the elderly who did not share in the benefits of the economic expansion of the 1980's, the years immediately ahead may produce considerable economic stress. Indeed, these groups would appear to be the most economically vulnerable.

Source and Accuracy of Estimates for Studies in the Distribution of Income

SOURCE OF DATA

Most estimates in this report come from data obtained in March of 1970 through 1990 in the Current Population Survey (CPS). The Bureau of the Census conducts this survey every month, although this report uses only March data for its estimates. The March survey uses two sets of questions, the basic CPS and the supplement. The basic CPS collects labor force data for the civilian noninstitutional population. In March, supplemental data is collected on money income received during the previous calendar year.

Some estimates in this report come from data obtained in the 1984, 1986, and 1987 Survey of Income and Program Participation (SIPP) topical module, Assets and Liabilities. The 1984 data were collected during the fourth interview of the 1984 panel. The 1988 data were collected during the seventh interview of the 1986 panel and the fourth interview of the 1987 panel.

Another source of data for this report is the Luxembourg Income Study (LIS). The LIS is a multinational collection of microdata sets from various countries. All of the data were collected in household surveys or surveys of administrative systems by institutions in countries participating in LIS.

Survey Estimates. The estimation procedures used for CPS and SIPP data inflate weighted sample results to independent estimates of the civilian noninstitutional population of the United States by age, sex, race, and Hispanic/non-Hispanic categories. These independent estimates are based on statistics from decennial censuses; statistics on births, deaths, immigration, and emigration; and statistics on the size of the Armed Forces. The estimation procedure for 1980 through 1990 data used independent estimates based on the 1980 decennial census; 1970 through 1979 data used independent estimates based on the 1970 decennial census. This change in independent estimates had relatively little impact on summary measures, such as medians and percent distributions, but did have a significant impact on levels. For example, use of the 1980 based population controls resulted in about a 2 percent increase in the civilian noninstitutional population and in the number of families and households. Thus, estimates of levels for 1980 and later will differ from those for earlier years by more than what could be attributed to actual changes in the population. These differences could be disproportionately greater for certain population subgroups than for the total population.

ACCURACY OF ESTIMATES

Since the CPS and SIPP estimates are based on samples, they may differ somewhat from the figures from a complete census using the same questionnaires, instructions, and enumerators. There are two types of errors possible in an estimate based on a sample survey: sampling and nonsampling. The standard errors provided in most Current Population Reports primarily indicate the magnitude of the sampling errors. They also partially measure the effect of some nonsampling errors in response and enumeration but do not measure any systematic biases in the data. Bias is the difference, averaged over all possible samples, between the estimate and the desired value. The accuracy of a survey result depends on the net effect of sampling and nonsampling errors. Particular care should be exercised in the interpretation of figures based on a relatively small number of cases or on small differences between estimates.

Nonsampling Variability. As in any survey work, the results are subject to errors of response and nonreporting in addition to sampling variability. Nonsampling errors can be attributed to many sources, e.g., inability to obtain information about all cases in the sample, definitional difficulties, differences in the interpretation of questions, inability or unwillingness on the part of the respondents to provide correct information, inability to recall information, errors made in collection such as in recording or coding data, errors made in processing data, errors made in estimating values for missing data, and failure to represent all units with the sample (undercoverage).

Comparability of Data. Data obtained from sample surveys and other sources are not entirely comparable. This is due largely to differences in interviewer training and experience and in differing survey procedures. This is an additional component of error that is not reflected in the standard errors. Therefore, caution should be used in comparing results among these sources.

Sampling Variability. Standard errors are primarily measures of sampling variability, that is, of the variations that occur by chance because a sample rather than the entire population is surveyed. Standard errors are not given in this report because of the wide range of topics included and the wide variety of data sources. Standard errors may be found in the publications that are noted at the end of each section or by contacting John Coder, Gordon Green, Paul Ryscavage, or Edward Welniak.

Some statements may contain estimates followed immediately by another number in parenthesis. For those statements one needs only to add to and subtract from the estimate that number to calculate upper and lower bounds of the 90-percent confidence interval. For example, if a statement contains the phrase "grew by 1.7 ($\pm$1.0) percent," the 90-percent confidence interval for the estimate, 1.7 percent, would be from 0.7 percent to 2.7 percent.