

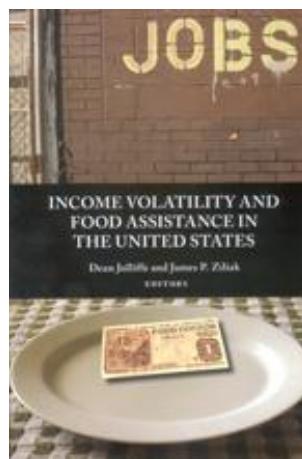
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## Trends in Income and Consumption Volatility, 1970-2000

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Chapter 2 (pp. 11-34) in:

**Volatility and Food Assistance in the United States**

Dean Jolliffe, James P. Ziliak, eds.

Kalamazoo, MI: W.E. Upjohn Institute for Employment Research, 2008

DOI: 10.17848/9781435684126.ch2

## 2

# Trends in Income and Consumption Volatility, 1970–2000

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A household's well-being depends not only on its level of income, but also on how much that income varies from year to year. A family with steady, predictable income finds it easier to plan, save, and anticipate future expenses such as college and retirement. On the other hand, a household with highly variable income must rely on prior savings, credit markets, or government transfers to maintain a consistent level of material comfort.

This chapter documents trends in the variability of individual earnings, family income, and household consumption in order to improve our understanding of their underlying dynamics. Trends are presented for household heads, who are classified by age, race, gender, and educational attainment. By using 30 years of data and looking beyond the earnings volatility of white men, I obtain results that extend the findings of previous studies.

Concerns about the increased risk that households face are drawing greater attention from researchers and policymakers alike (CBO 2007). Previous research finds that income volatility has significantly contributed to increased wage inequality: researchers estimate that roughly half of the overall dispersion in wages is due to temporary variation (Gottschalk and Moffitt 1994; Haider 2001; Moffitt and Gottschalk 1998).<sup>1</sup> Daly and Valletta (2006) attribute much of the difference between earnings inequality in the U.S. and earnings inequality in Great Britain and Germany to greater earnings instability in this country. Despite the fact that the U.S. aggregate economy has become less volatile over the past 20 years, individuals face greater income instability than ever before (Dynan, Elmendorf, and Sichel 2007).

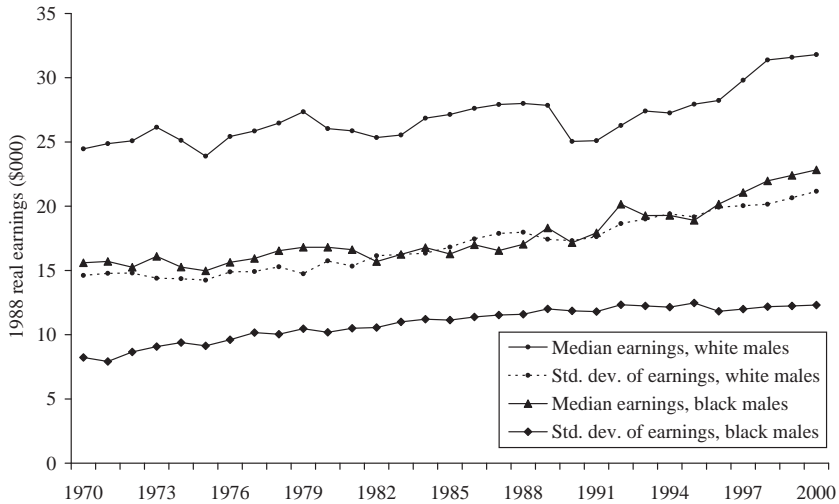
Other aspects of economic life, such as the receipt of employer-provided pensions and health care, have also become less stable in recent years. Thirty years ago, the majority of pensions were paid out in defined benefits, which meant the amounts were certain. Today, most employers provide defined-contribution plans that have uncertain payouts that depend on how successful workers are at investing these contributions. Households are increasingly responsible for maintaining health-care benefits as well, since out-of-pocket health-care costs have grown considerably faster than earnings.

The standard economic model of life-cycle consumption, the permanent income hypothesis, predicts that households should smooth consumption across good and bad income years. However, the results below suggest that rising income volatility has even affected the stability of household food consumption. Blundell, Pistaferri, and Preston (2005) document the transmission of income shocks into consumption shocks and find that self-insurance plays only a partial role. I also present evidence that consumption volatility, while smaller in magnitude than income volatility, is substantial and has been increasing since 1970, particularly among low-income households.

In the context of the Food Stamp Program, households with highly variable incomes may be reliant on the benefits of food stamps only for a short period of time, but these households would have particular difficulty smoothing out consumption in the absence of the program. Greater volatility would suggest that middle-income households would be increasingly likely to experience negative earnings shocks large enough to make them eligible for food stamps. The result of this increased income volatility is a widening in the range of households that could potentially benefit from the Food Stamp Program and other short-term government assistance programs.

This increase in volatility has coincided with a significant improvement in the overall economic position of American households. Data from the Panel Study of Income Dynamics (PSID) show that the median earnings of all male household heads have increased by nearly \$6,000 in real 1988 dollars, or about 21 percent since 1970, representing a sizable improvement in living standards.<sup>2</sup> Figure 2.1 presents the trends in the median and standard deviation of the annual earnings of white and black male household heads between the ages of 20 and 59 over the period from 1970 to 2000. The two solid lines, which represent

**Figure 2.1 Trends in Median and Standard Deviation of Earnings for White and Black Male Heads of Household, 1970–2000**

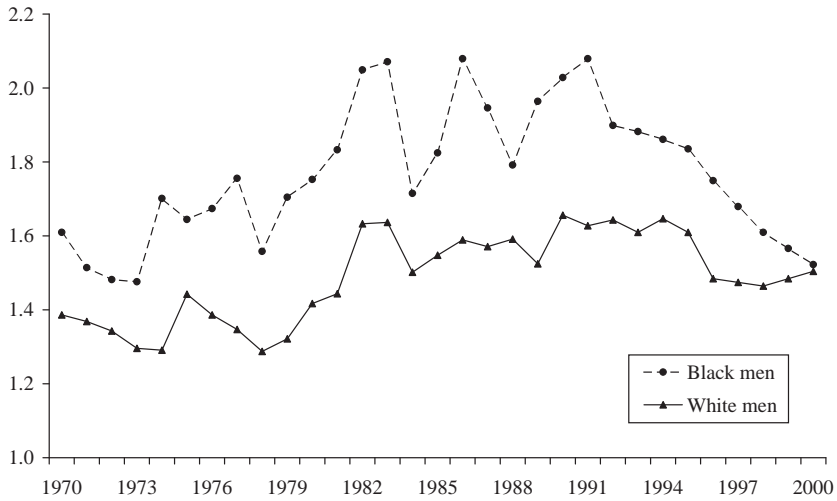


SOURCE: PSID.

the median annual earnings of white and black males, reveal the effects of business cycles (as evidenced by dips in earnings in the mid-1970s, early 1980s, and early 1990s) and the sharp increase in earnings during the economic boom of the 1990s. Over these decades, the median earnings of household heads increased by 25 percent for whites and by 45 percent for blacks.

Over the same period, the earnings distribution for men has significantly widened. The two lines of dashes in Figure 2.1 represent the standard deviation in annual earnings, which has steadily increased since roughly 1980 for white men, and which increased from 1971 to 1989 but then flattened out over the 1990s for black men. By any metric, inequality in the annual earnings distribution of adult males has grown from 1970 to 2000. Figure 2.2 presents the 90/10 ratio (the ratio of the 90th percentile to the 10th percentile) of white and black male log earnings for 1970–2000; it shows an increase in inequality between the 90th percentile and the 10th percentile in annual earnings starting in the late 1970s for both groups.

**Figure 2.2 Ratio of Ninetieth to Tenth Percentile of Annual Log Earnings of Males, 1970–2000**



SOURCE: PSID.

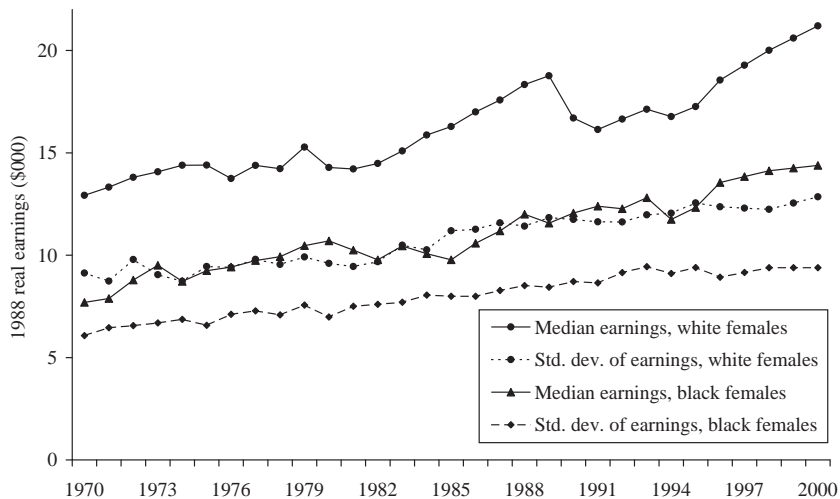
The degree of inequality within the distribution of black male household heads is larger throughout the period than that of whites, though the two series converged in the late 1990s. The PSID shows a flattening in the 90/10 ratio for white men (and a dramatic downturn for black men) after 1991. Although these calculations are for annual earnings, this pattern is consistent with evidence from the Current Population Survey (CPS) on inequality in hourly wages. Autor, Katz, and Kearney (2007) document a similar leveling off of the 90/10 ratio after 1992 for all men in the CPS Outgoing Rotation Group (ORG) data.

Daly and Valletta (2006), also using the PSID and focusing on male household heads, calculate a 90/10 ratio that shows roughly the same pattern as shown in Figure 2.2: much flatter than results based on the CPS, though the trend is less noisy throughout and the downturn at the end of the series is less severe. Figure 2.2 emphasizes the value of looking beyond the earnings of white men to analyze the increases in inequality since 1970. The different experiences of black and white men in the 1990s, particularly in the decrease of the 90/10 ratio for black men and the flattening of the standard deviation in black male earnings, are overlooked when viewing aggregate trends.

Figure 2.3 presents the trends in median earnings and in standard deviation of earnings for white and black female heads of household. While the sample sizes are not large enough to draw conclusive evidence from, the trends suggest steady increases in both the median and the standard deviation of female-headed earnings.<sup>3</sup> In contrast to the results for men, Figure 2.4 shows that both black and white female-headed 90/10 ratios have fallen since 1970, indicative of increased labor force participation and increased real earnings for women throughout the income distribution. Again, though the small sample sizes are the likely cause of the unevenness of the series, if anything the earnings of female-headed households have become more equal over time.<sup>4</sup> This result is consistent with the findings of Gottschalk and Danziger (2005), who document an increasing 90/10 ratio in female hourly wages but a decreasing 90/10 ratio in annual earnings because of differences in hours worked.

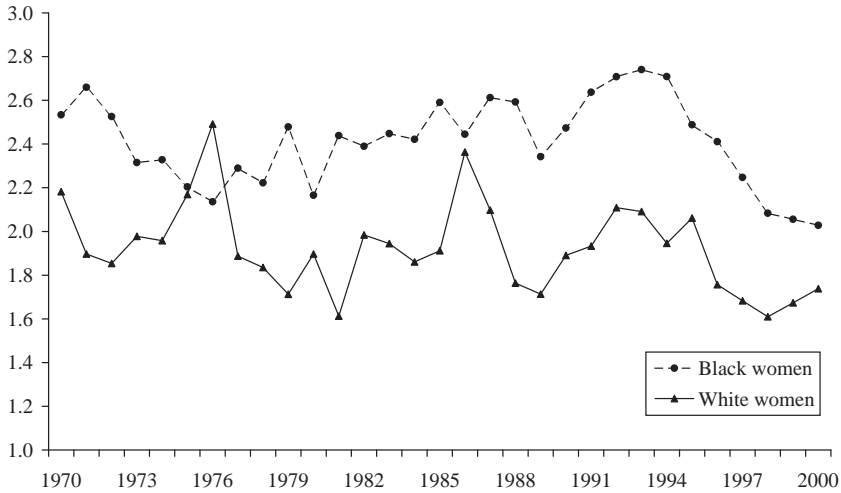
These figures suggest that focusing on white men ignores much of the interesting variation in the rest of the population. Also, as is discussed below, the basic trends in the level and distribution of earnings

**Figure 2.3 Trends in Median and Standard Deviation of Earnings for White Female Heads of Household, 1970–2000**



SOURCE: PSID.

**Figure 2.4 Ratio of Ninetieth to Tenth Percentile of Annual Log Earnings of Female Heads of Household, 1970–2000**



SOURCE: PSID.

mask changes in the permanent and transitory components of the variation. Studies that analyze overall population trends in inequality miss both the demographic variation and the permanent/transitory variation, which have very different implications for policymakers and researchers. If the permanent component is the sole driver of inequality, then structural inequalities in the labor market, such as educational opportunities, should be the primary focus for reform. If, instead, the transitory component dominates, then job retraining and temporary assistance programs should be emphasized to stabilize fluctuating earnings patterns. The rest of this chapter explores this dichotomy further and extends the analysis to household income and consumption. The next section describes how researchers traditionally measure volatility. The third section introduces the PSID, the data used here to document trends, and presents evidence of recent trends in income and consumption volatility. The final section offers concluding remarks.

## MEASURING VOLATILITY

The change in inequality in any given year can be separated into two distinct pieces, one due to changes in the dispersion of average earnings, the other due to changes in earnings volatility for a given individual (Baker 1997; Baker and Solon 2003; Gottschalk 1997; Haider 2001). Thus, the change in the total variance of earnings is the sum of the change in lifetime earnings inequality and the change in earnings instability. When researchers and pundits discuss the growth of earnings inequality over the past several decades, these two components are usually considered jointly using a measure of inequality such as the Gini coefficient or a ratio of earnings at the ninetieth percentile to those at the tenth percentile. However, it is of great interest to researchers and policymakers to determine which component is the primary driving force behind the increased inequality.

One approach to measuring the permanent and transitory components of income inequality is to perform a variance decomposition. Let  $y_{it}$  be the log of real annual earnings of an individual  $i$  in year  $t$ , age-adjusted by regressing log earnings on a quartic in age, and using the residual as the measure of  $y$ . This age adjustment removes the effect of life-cycle patterns over each decade. The age-earnings profile differs by demographic group, which allows for age-earnings heterogeneity across age group, gender, race, education, and family structure. Thus, for each time period, I measure deviations from the age-earnings profile. In addition, the log specification removes any years with zero earnings. I follow the same restriction for consumption and family income, which are consequently referred to as “age-adjusted.” Consider a permanent/transitory decomposition of earnings in any given year  $t$  for individual  $i$ :

$$(2.1) \quad y_{it} = \mu_i + v_{it},$$

where  $\mu_i$  is permanent earnings and  $v_{it}$  is transitory earnings, which vary over time. These are uncorrelated by construction, so calculating the variance involves a straightforward process of addition:

$$(2.2) \quad \text{var}(y_{it}) = \text{var}(\mu_i) + \text{var}(v_{it}).$$



The first term on the right-hand side is the permanent variance. When estimated in a population, it can be interpreted as a measure of the overall dispersion of permanent income, or the degree of permanent income inequality. The second term represents the transitory variance and can be thought of as the instability in a given individual's earnings profile.

Empirically, we are interested in the sample mean of the variance terms in Equation (2.2). To define the variance of the transitory component, I follow the example of Gottschalk and Moffitt (1994) in selecting a time period  $T$  and computing the squared deviations from an individual's (age-adjusted) earnings, which cluster around his mean earnings:

$$(2.3) \quad \text{var}(v_i) = \frac{1}{T_i - 1} \sum_i^{T_i} (y_{it} - \bar{y}_i)^2,$$

where  $\bar{y}_i$  is the mean earnings of the individual over  $T_i$  periods. Note that some individuals are not observed for all  $T$  years, so  $T_i$  varies at the individual level.

We denote the mean (across  $N$  individuals) of  $\text{var}(v_i)$  as  $\sigma_v^2$ .

The variance of the permanent component is thus the total variance minus the variance of the transitory component, using the following formula:

$$(2.4) \quad \sigma_\mu^2 = \frac{1}{N-1} \sum_i^N (\bar{y}_i - \bar{\bar{y}})^2 - \left( \frac{\sigma_v^2}{T} \right),$$

where  $\bar{\bar{y}}$  is the mean of  $T_i$  over all individuals and  $\bar{\bar{y}}$  is the mean of log earnings over all individuals over all time periods.

Clearly, the unit-root decomposition used in this analysis is an oversimplification of the dynamic process of earnings, consumption, and family income. A structural decomposition of variances that exploits the auto-covariance structure of earnings, wage-growth heterogeneity, and other aspects of the labor market is a more nuanced and potentially realistic approach than the one taken here (Baker 1997; Baker and Solon 2003; Haider 2001; Moffitt and Gottschalk 1995). For instance, Baker (1997) persuasively argues that the simple permanent/transitory decomposition ignores the relationship between education and earnings.<sup>5</sup> In addition, estimating variances by the methods described in Equations (2.1) through (2.4) requires choosing arbitrary end points, which makes the results potentially sensitive to the choice of time period  $T$ .

Nonetheless, the structural results have aligned relatively closely with this transparent decomposition. Moffitt and Gottschalk (1998) estimate a formal ARMA(1,1) model and Haider (2001) analyzes a parametric heterogeneous growth model of earnings dynamics, but both reach conclusions that are broadly similar to the earlier work on the subject (Gottschalk and Moffitt 1994)—namely that roughly half of the increase in the variance of earnings (within education and age) can be attributed to an increase in the permanent component, and the other half to an increase in the transitory component. Moffitt and Gottschalk (1998) and Haider (2001) disagree on the timing of the increases, however. In related cross-national work, Daly and Valletta (2006) use a similar approach to that of Haider (2001) and draw analogous conclusions. In light of this evidence, the simple decomposition approach is sparingly illustrative, capturing the general trends and demographic heterogeneity relevant for this volume.

## **RECENT TRENDS IN VOLATILITY**

To estimate trends in the permanent and transitory components of inequality in the population, longitudinal data that follows the same individuals over time is required. I use the Panel Study of Income Dynamics (PSID), a nationally representative survey that has interviewed roughly 8,000 households annually from 1968 to 1996 and biannually starting in 1997. The PSID obtains information on earnings, family income, consumption, family structure, and many other household- and individual-level attributes. I exclude all observations with zero earnings, then use a log transformation of earnings and trim the top and bottom 1 percent of the distribution to remove outliers.<sup>6</sup>

I follow the methodology of Gottschalk and Moffitt (1994) and further narrow my sample to nonstudent heads of household observed between the ages of 20 and 59. Thus individuals enter the sample by turning 20 and leave the sample by turning 60. Individuals are included only when they are heads of households, and two years' worth of valid information is required in each 10-year time period for inclusion in the sample. I follow the same sample restrictions for men and women, but given that the PSID is designed as a survey of “heads” and “wives,”

with men being designated as the default head of the household, the sample contains many more men than women.<sup>7</sup>

Table 2.1 presents the basic results of the above method of decomposition for the annual earnings of white males aged 20–59 for three periods: 1970–1979, 1980–1989, and 1990–2000.<sup>8</sup> The table presents the two components of the variance in earnings for all white males in the top row and for various demographic groups in the other rows. Below, I discuss the primary trends visible in the data.

In the first three columns, the increase in the permanent component of variance of (age-adjusted) earnings for white males across the three decades is evidence of the increase in lifetime earnings inequality. The difference from the 1970s through the 1990s represents a 31.5 percent increase in the dispersion of average annual earnings.

The nearly 38 percent growth in the transitory component of earnings, on the other hand, represents the increase in the average instability of individual earnings, which I refer to as “earnings volatility” (column 8). This is a sizable increase and is in line with earlier estimates (Gottschalk and Moffitt 1994). In addition, note that most of the growth in both the permanent and the transitory variance of earnings had occurred by the end of the 1980s; both the permanent and the transitory variances were about the same in 2000 as they were in 1989. This pattern is consistent with the evidence presented by Moffitt and Gottschalk (2002), which shows an increase in both components in the early 1990s but a decrease after 1992. Throughout the 30-year period, the permanent component is more than twice as large as the transitory component, suggesting that the majority of the overall dispersion is due to lifetime differences in earnings.

The second panel of Table 2.1 splits the sample of white male household heads by years of education. Those without a high school degree (row 1) have both larger permanent and larger transitory components of variance than the full white-male sample, and there is a similar increasing trend over the period. The most rapid increase in the permanent variance of earnings is for white male household heads with at least a college degree (row 3)—their variance increased by 76.6 percent over the 30 year period. College graduates, however, experienced the smallest increase in income volatility, at 37.4 percent, whereas volatility increased by 50.5 percent for high school graduates and by 42 percent for dropouts. The levels of both the permanent and the transitory

**Table 2.1 Variances of Permanent and Transitory Real Annual Earnings, 1970–2000**

	Permanent variance				Transitory variance			
	1970– 1979	1980– 1989	1990– 2000	Percent change	1970– 1979	1980– 1989	1990– 2000	Percent change
White males	0.28	0.36	0.37	31.5	0.11	0.16	0.16	37.7
By years of completed education								
<12 years	0.32	0.45	0.41	27.5	0.14	0.25	0.20	42.0
12+	0.23	0.32	0.31	38.3	0.10	0.14	0.15	50.5
16+	0.19	0.26	0.33	76.6	0.10	0.09	0.14	37.4
By age								
20–29	0.20	0.30	0.36	75.9	0.12	0.16	0.15	25.8
30–39	0.27	0.40	0.38	42.3	0.09	0.13	0.13	48.9
40–49	0.31	0.41	0.35	12.9	0.08	0.10	0.11	41.3
By permanent earnings								
Lowest quartile					0.26	0.36	0.31	20.4
Middle two quartiles					0.08	0.11	0.12	65.3
Top quartile					0.04	0.06	0.08	84.1
By race and gender								
White women	0.63	0.60	0.49	–22.2	0.32	0.36	0.35	9.0
Black men	0.42	0.71	0.80	88.4	0.18	0.34	0.34	90.4
Black women	0.91	0.90	0.88	–3.7	0.44	0.43	0.51	16.9

NOTE: Heads of households with positive wage and salary earnings, aged 20–59. Earnings are in logs, and observations are weighted using sample weights. “Percent change” is measured as the difference between the 1990s and the 1970s, relative to the value for the 1970s.

SOURCE: Author’s calculations using the Panel Study of Income Dynamics (PSID).

components by decade for highly educated white males are for the most part smaller than for the other education groups. These patterns are reflective of the changes to low-skilled labor demand from 1970 to 2000, and of the increasing returns to skill over that time period.

Similar comparisons across age groups (third panel) and average permanent earnings (fourth panel) suggest that younger and lower-skilled white male workers are experiencing significantly greater income volatility than they did 30 years ago.<sup>9</sup> The instability in the highest quartile of permanent earnings is nearly 75 percent lower than the instability in the lowest quartile for the 1990s and more than 80 percent lower for the earlier decades.

The last panel of Table 2.1 presents differences across race and gender. The sample sizes for these subgroups are all significantly smaller than for white male-headed households, so the estimates should be interpreted with caution. White female heads of households have both greater permanent and greater transitory components than their male counterparts. The income volatility of white females is more than double that of white males, and this is likely an underestimate of the instability in earnings, given that this analysis excludes any years in which the household head has no earnings and that women are more likely to temporarily exit the labor force. Notably, the trend in inequality among white women is in the opposite direction from that of white men, as the permanent component of the variance has fallen by 22.2 percent, which is consistent with evidence from the 90/10 ratio shown in Figure 2.4.

The volatility of earnings of African American men and women also has increased since 1970. However, the inequality of earnings of black men has vastly increased (88 percent), while the trend in the permanent component of variance for black women is essentially flat across the three decades. The results from the fourth panel of Table 2.1 demonstrate that inequality among women (within race) has actually declined since 1970, that volatility has increased more slowly for women than for men, and that earnings are more unstable for African Americans than for white household heads across gender.

Table 2.2 investigates the similar decomposition for (age-adjusted) household consumption. The only measure of consumption available in the PSID for 30 years is food consumption. Here I use the sum of the cost of food consumed at home and of food purchased at a restaurant, not including food stamps. The consumption data is treated in an

**Table 2.2 Variances of Permanent and Transitory Real Annual Food Consumption, 1970–2000**

	Permanent variance				Transitory variance			
	1970– 1979	1980– 1989	1990– 2000	Percent change	1970– 1979	1980– 1989	1990– 2000	Percent change
White males	0.11	0.13	0.17	57.1	0.08	0.10	0.10	30.8
By years of completed education								
<12 Years	0.11	0.18	0.26	125.4	0.09	0.14	0.15	69.0
12+	0.10	0.13	0.15	54.2	0.08	0.09	0.10	26.7
16+	0.10	0.12	0.15	47.5	0.07	0.07	0.07	5.8
By age								
20–29	0.10	0.13	0.17	72.9	0.09	0.13	0.15	60.2
30–39	0.11	0.14	0.18	67.3	0.06	0.08	0.09	42.2
40–49	0.13	0.15	0.19	44.5	0.06	0.07	0.08	44.6
By permanent consumption								
Lowest quartile					0.10	0.14	0.15	39.4
Middle two quartiles					0.08	0.09	0.09	22.7
Top quartile					0.06	0.07	0.07	25.0
By race and gender								
White women	0.21	0.24	0.24	18.0	0.18	0.22	0.20	12.2
Black men	0.12	0.21	0.22	73.4	0.14	0.21	0.23	57.6
Black women	0.25	0.36	0.36	41.3	0.32	0.36	0.38	18.6

NOTE: Heads of households with positive wage and salary earnings, aged 20–59. Earnings are in logs, and observations are weighted using sample weights. “Percent change” is measured as the difference between the 1990s and the 1970s, relative to the value for the 1970s.

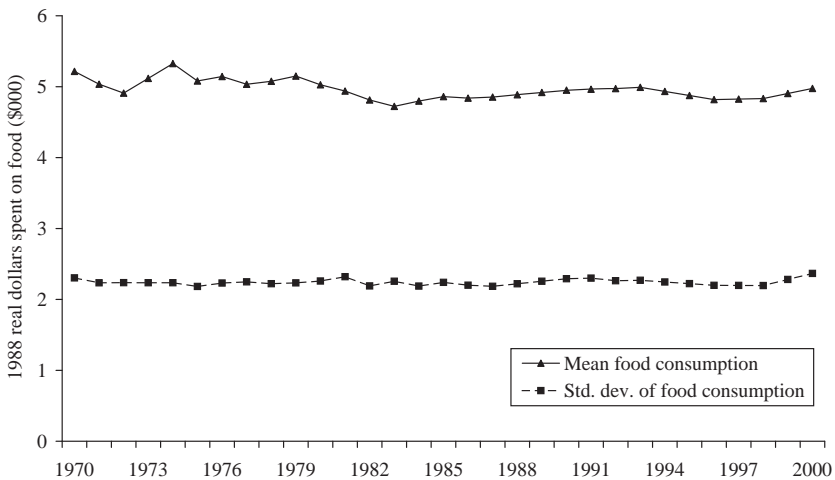
SOURCE: Author’s calculations using the Panel Study of Income Dynamics (PSID).

identical manner to the earnings data by removing zero observations, performing a log-transformation of the data, and trimming outliers. In addition, there are a few missing years of data because of the food consumption questions not being asked.

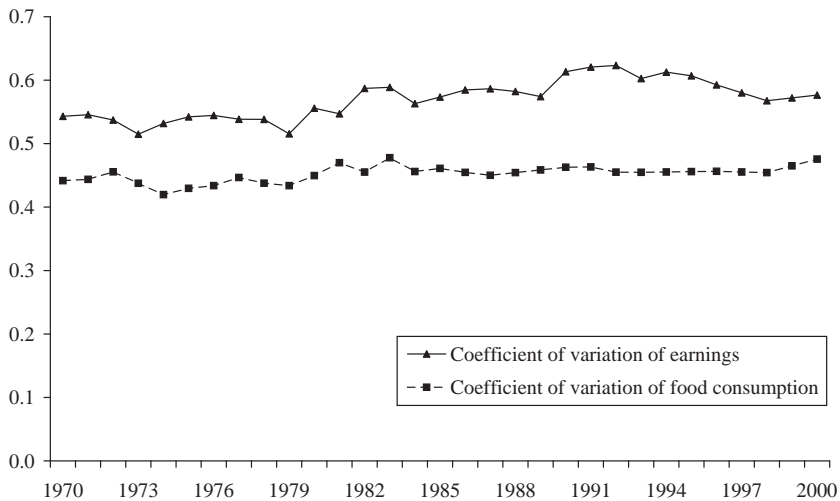
The first row of Table 2.2 demonstrates that there is far less instability in food consumption than there is in earnings, which is consistent with households smoothing consumption across income fluctuations as predicted by the Permanent Income Hypothesis (PIH). Figure 2.5 also presents evidence that there has been little growth in either the mean or the variance of food consumption. Compared to earnings in Figure 2.6, the coefficient of variation (the mean divided by the standard deviation) of consumption is consistently below that of earnings (0.45 as compared to 0.55, on average). However, as shown in the remainder of Table 2.2, the basic demographic facts about lifetime inequality and instability hold true for consumption as well as earnings.

First, households where the head is less educated have greater lifetime inequality of consumption, as well as greater consumption instability. The instability for dropouts is nearly twice as large as the volatility for households headed by either a high-school or a college graduate

**Figure 2.5 Trends in Mean and Variance of Food Consumption for White Males, 1970–2000**



SOURCE: PSID.

**Figure 2.6 Coefficient of Variation of Earnings and Food Consumption for White Males, 1970–2000**

SOURCE: PSID.

in the 1990s. Second, younger households have significantly more consumption instability, a consistent trend throughout the time period. In addition, if we compare average consumption over the decade to calculate permanent consumption, we see that low permanent consumption households have much greater volatility than high permanent consumption households. Finally, households headed by white women have roughly twice the transitory variance of households headed by white men, and African American–headed households have significantly greater consumption volatility than white households (within gender).

The Food Stamp Program and other support services place a particular emphasis on aiding single mothers and a more general emphasis on helping other households with children. Tables 2.3 and 2.4 investigate instability and inequality of earnings and consumption for different household types. The second panel of Table 2.3 splits the sample of white male–headed households by whether there are children in the household and by whether the household head is married with children or unmarried with children.

White males in married households appear to have slightly lower earnings volatility than in unmarried households (both with children).



**Table 2.3 Variances of Permanent and Transitory Real Annual Earnings, 1970–2000**

	Permanent variance				Transitory variance			
	1970– 1979	1980– 1989	1990– 2000	Percent change	1970– 1979	1980– 1989	1990– 2000	Percent change
White males	0.28	0.37	0.37	31.5	0.11	0.16	0.16	37.7
White male-headed								
No children	0.30	0.41	0.36	20.0	0.11	0.17	0.17	52.2
Married w/ children	0.24	0.35	0.39	59.4	0.10	0.13	0.12	26.8
Unmarried w/ children	0.19	0.45	0.29	52.9	0.09	0.17	0.18	102.3
Black male-headed								
No children	0.52	0.95	1.10	113.6	0.19	0.41	0.38	98.9
Married w/ children	0.31	0.40	0.46	48.4	0.14	0.17	0.20	40.0
Unmarried w/ children	0.42	0.60	0.69	62.7	0.29	0.14	0.46	57.7
White female-headed								
Unmarried w/ children	0.76	0.73	0.69	−9.2	0.43	0.56	0.46	7.7
Unmarried w/o children	0.50	0.44	0.36	−27.3	0.24	0.19	0.22	−6.7
Black female-headed								
Unmarried w/ children	1.02	0.97	0.87	−14.8	0.46	0.56	0.65	40.9
Unmarried w/o children	0.55	0.52	0.90	62.2	0.30	0.23	0.25	−17.8

NOTE: Heads of households with positive wage and salary earnings, aged 20–59. Earnings are in logs, and observations are weighted using sample weights. “Percent change” is measured as the difference between the 1990s and the 1970s, relative to the value for the 1970s.

SOURCE: Author’s calculations using the Panel Study of Income Dynamics (PSID).

In the third panel, the earnings of black males in married households are substantially less unstable than those of black males in unmarried households with children or those of black males in unmarried households with no children present.

For female-headed households, I present results for unmarried women without children and for the case of single mothers, as the PSID generally classifies all married couples as “male-headed.” Compared to male-headed families, both married and unmarried, single mothers have much greater lifetime income inequality (permanent component of variance) and greater earnings instability. Furthermore, the transitory component is more than double that of single childless women (for whom the volatility trend is essentially flat). Thus, income inequality and volatility present a particular difficulty for the children of households headed by single mothers to overcome.

Table 2.4 shows that the headship patterns of earnings volatility also hold true for consumption volatility. Male-headed households with children have somewhat smaller consumption inequality and consumption instability than other types of male-headed households. Single mothers are again subject to the greatest instability, and this volatility has increased since 1970. Recall that I exclude any consumption from food stamps, which would smooth out consumption fluctuations, as shown in previous work by Gundersen and Ziliak (2003).

In Tables 2.5 and 2.6, I perform the same decomposition for (age-adjusted) family income (instead of individual earnings), as the consumption measure is a household measure and thus may be more comparable. If spouses’ joint earnings ensure against either spouse’s possible earnings fluctuations, we would expect that there would be less variability in household income. Indeed, as seen in Table 2.5, for white males the transitory component of variance is slightly smaller when measured by family income (0.135) than when measured by earnings from wages and salaries (0.157).

Comparing family income to individual earnings, we find that there is essentially no difference in inequality in the 1990s. However, in the previous two decades family income is dramatically less dispersed, and the growth of inequality in family income occurs a decade later than that of inequality in earnings. Determining why earnings inequality increased in the 1980s and then leveled out, while inequality in family income increased in both the 1980s and the 1990s, is worthy of further

**Table 2.4 Variances of Permanent and Transitory Real Annual Food Consumption, 1970–2000**

	Permanent variance				Transitory variance			
	1970– 1979	1980– 1989	1990– 2000	Percent change	1970– 1979	1980– 1989	1990– 2000	Percent change
White males	0.11	0.13	0.17	57.1	0.08	0.10	0.10	30.8
White male-headed								
No children	0.12	0.15	0.17	40.7	0.09	0.10	0.11	14.9
Married w/ children	0.08	0.11	0.13	61.7	0.05	0.07	0.07	35.3
Unmarried w/ children	0.13	0.12	0.16	20.1	0.08	0.06	0.13	50.6
Black male-headed								
No children	0.15	0.22	0.21	43.8	0.18	0.21	0.23	29.2
Married w/ children	0.08	0.18	0.16	97.6	0.09	0.15	0.15	73.0
Unmarried w/ children	0.12	0.25	0.21	81.2	0.35	0.18	0.23	–34.3
White female-headed								
Unmarried w/ children	0.19	0.32	0.31	66.1	0.17	0.25	0.26	51.7
Unmarried w/o children	0.20	0.21	0.19	–1.5	0.16	0.18	0.16	0.6
Black female-headed								
Unmarried w/ children	0.30	0.44	0.42	40.5	0.32	0.42	0.43	32.4
Unmarried w/o children	0.21	0.26	0.28	31.3	0.21	0.24	0.21	–4.2

NOTE: Heads of households with positive wage and salary earnings, aged 20–59. Earnings are in logs, and observations are weighted using sample weights. “Percent change” is measured as the difference between the 1990s and the 1970s, relative to the value for the 1970s.

SOURCE: Author’s calculations using the Panel Study of Income Dynamics (PSID).

**Table 2.5 Variances of Permanent and Transitory Real Annual Family Income, by Education, Age, Income, and Race and Gender, 1970–2000**

	Permanent variance				Transitory variance			
	1970– 1979	1980– 1989	1990– 2000	Percent change	1970– 1979	1980– 1989	1990– 2000	Percent change
White males	0.20	0.28	0.37	81.2	0.08	0.10	0.14	80.0
By years of completed education								
<12 years	0.25	0.33	0.40	62.6	0.09	0.15	0.21	120.4
12+	0.16	0.24	0.32	101.9	0.07	0.09	0.12	73.9
16+	0.16	0.20	0.29	81.0	0.06	0.07	0.11	78.0
By age								
20–29	0.16	0.23	0.32	98.1	0.08	0.11	0.15	89.9
30–39	0.18	0.28	0.37	104.4	0.06	0.07	0.11	73.8
40–49	0.21	0.32	0.42	102.4	0.05	0.07	0.11	100.0
By permanent family income								
Lowest quartile					0.11	0.15	0.20	89.7
Middle two quartiles					0.07	0.09	0.12	72.9
Top quartile					0.06	0.06	0.09	65.5
By race and gender								
White women	0.28	0.39	0.44	56.9	0.18	0.20	0.26	45.9
Black men	0.36	0.66	0.89	147.9	0.13	0.29	0.41	228.0
Black women	0.31	0.52	0.63	103.9	0.17	0.24	0.36	106.4

NOTE: Heads of households with positive wage and salary earnings, aged 20–59. Earnings are in logs, and observations are weighted using sample weights. “Percent change” is measured as the difference between the 1990s and the 1970s, relative to the value for the 1970s.

SOURCE: Author’s calculations using the Panel Study of Income Dynamics (PSID).

**Table 2.6 Variances of Permanent and Transitory Real Annual Family Income, by Race, Gender, and Marital and Familial Status, 1970–2000**

	Permanent variance				Transitory variance			
	1970– 1979	1980– 1989	1990– 2000	Percent change	1970– 1979	1980– 1989	1990– 2000	Percent change
White males	0.20	0.28	0.37	81.2	0.08	0.10	0.14	80.0
White male–headed								
No children	0.28	0.35	0.44	56.8	0.08	0.11	0.16	100.0
Married w/ children	0.16	0.23	0.29	86.5	0.06	0.07	0.10	61.7
Unmarried w/ children	0.27	0.26	0.34	25.3	0.07	0.12	0.14	87.7
Black male–headed								
No children	0.56	0.90	1.15	105.2	0.19	0.43	0.59	213.4
Married w/ children	0.26	0.29	0.35	35.4	0.09	0.10	0.14	58.6
Unmarried w/ children	0.28	0.46	0.48	74.5	0.14	0.09	0.62	348.9
White female–headed								
Unmarried w/ children	0.25	0.40	0.47	92.2	0.17	0.21	0.25	47.9
Unmarried w/o children	0.32	0.37	0.43	35.1	0.20	0.18	0.25	23.6
Black female–headed								
Unmarried w/ children	0.27	0.47	0.51	89.5	0.15	0.23	0.31	104.7
Unmarried w/o children	0.40	0.71	0.98	146.6	0.21	0.31	0.40	90.9

NOTE: Heads of households with positive wage and salary earnings, aged 20–59. Earnings are in logs, and observations are weighted using sample weights. “Percent change” is measured as the difference between the 1990s and the 1970s, relative to the value for the 1970s.

SOURCE: Author’s calculations using the Panel Study of Income Dynamics (PSID).

research. This discrepancy is perhaps due to increases in dual-earner households or trends in assortative mating by education, and thus earnings potential, as well as to major changes in tax and social policy.

Not surprisingly, family income is no different than earnings or consumption with regard to demographic patterns, as families headed by less-educated men, younger men, and lower-income men all have much higher family income instability (Table 2.6). Households headed by white women have double the family income volatility in the 1990s as those headed by men, and measures of income instability are even larger for African American households headed by either men or women. In addition, female-headed households with children have experienced a steeper increase in transitory income volatility than female-headed households without children. This is consistent with the recent work of Bollinger and Ziliak (2007), which documents a 70 percent increase in inequality of single mothers since welfare reform in the mid-1990s. In sum, married households have experienced smaller increases in volatility in family incomes from 1970 to 2000, while the increases in both components of the variance for single mothers have been particularly acute.

## CONCLUSION

This chapter has presented trends in individual earnings, family income, and household consumption volatility over 30 years for the main demographic subgroups of interest. Using the PSID, the best available panel data to study these patterns, I find a strong increase in the transitory variance of earnings, family income, and consumption over the period of 1970–2000 for all groups. This variance growth is consistent across race, gender, education, age, and family structure and is a robust result not presented elsewhere in the literature on volatility.

Focusing on the permanent component of the variance, I find that lifetime earnings inequality has increased for all demographic groups except women. However, at the household level, female-headed households have experienced an increase in the inequality of total family income. The majority of the dispersion of earnings, income, and consumption is from the permanent component, suggesting that much of

the debate over inequality must address underlying fundamental determinants of lifetime earnings potential, such as health and education.

With regard to the transitory component of the variance, the earnings instability of the least-skilled, of young household heads, and of African American workers should be a preeminent policy concern. This is in part due to the sizable relative magnitude of the variance, but also because these three segments of the population are directly served by most of the government's nonretirement income assistance programs.

The trend toward increased consumption volatility since 1970 is a striking finding of this research. Consumption instability has increased 31 percent since the 1970s, an increase nearly as large as the increase in income volatility. Notably, consumption volatility is substantially smaller than earnings volatility, which suggests that households are able to smooth consumption across years by borrowing and saving accordingly. Nonetheless, the increase in fluctuations of consumption at the household level is of particular interest, given that consumption is a basic measure of well-being.

Determining the causes of these trends and demographic differences is especially challenging because of the broad secular changes that the labor force has experienced since 1970. Explanations as varied as skill-biased technical change (SBTC), secular declines in unionism, increased openness for international trade, capital complementarities, and computerization of the workforce, among others, have been offered elsewhere in the literature. In addition, the increase in the labor force participation of women has dramatically altered the demographic makeup of the workforce since 1970, making comparisons across decades difficult.

Further exploration of the underlying dynamics of earnings and consumption will broaden our understanding of the relationships between income and consumption volatility and the important way in which assistance programs such as the Food Stamp Program can serve to reduce the impact of short-term earnings fluctuations on the well-being of our nation's families.

## Notes

As a PhD candidate in the Department of Economics at the University of Michigan, I am grateful for helpful comments from Rebecca Blank, Brian Cadena, Sheldon Danziger, Peter Gottschalk, Sisi Zhang, conference participants, and the editors of this volume. I thank the National Poverty Center and the Department of Education's Jacob K. Javits Fellowship for financial support. Any errors are my own.

1. Previous research disagrees on the timing of the increase in permanent income inequality and earnings volatility, however, as discussed below.
2. Median annual earnings adjusted for inflation for male household heads in the PSID increased from \$21,443 to \$27,254 between 1970 and 2000. The growth in mean earnings was roughly \$9,000 over the same period (from \$23,096 to \$32,054). Throughout the paper, dollar amounts are converted to real 1988 dollars using the GDP chain-weighted deflator.
3. Sample sizes for female-headed households in the PSID range from 292 to 600 observations for whites and from 351 to 747 for blacks.
4. In addition, there has been little change in the fraction of women in the PSID who are heads of household. In 1970, 25 percent of the 3,796 age-eligible women were heads. In 1999, 27 percent of the 5,196 age-eligible women were heads.
5. I address this concern by estimating separate age-earnings profiles that differ by education group.
6. Removing outliers using this method is common practice in empirical studies of volatility because of potential measurement error and top-coding of variables.
7. Because certain questions in the PSID are only asked of household heads, individuals are in the data only as long as they are heads of households, which is not necessarily a constant status over time. Childless men and women are counted as heads if they have their own households, but not if they live with their parents.
8. Because the PSID shifted from annual surveys to biennial surveys, information on earnings and incomes are available for calendar years 1998 and 2000, but not for 1997 or 1999. For this reason, the last period appears to cover 11 years of statistics but really covers only 9.
9. To estimate permanent earnings, I calculate the average earnings over the decade and separate workers into quartiles.

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# **Income Volatility and Food Assistance in the United States**

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James P. Ziliak  
*Editors*

2008

W.E. Upjohn Institute for Employment Research  
Kalamazoo, Michigan

**Library of Congress Cataloging-in-Publication Data**

Income volatility and food assistance in the United States / Dean Jolliffe, James P. Ziliak, editors.

p. cm.

Includes bibliographical references and index.

ISBN-13: 978-0-88099-335-7 (pbk. : alk. paper)

ISBN-10: 0-88099-335-9 (pbk. : alk. paper)

ISBN-13: 978-0-88099-336-4 (hardcover : alk. paper)

ISBN-10: 0-88099-336-7 (hardcover : alk. paper)

1. Food relief—United States. 2. Income—United States. 3. Food stamps—United States. 4. School children—Food—United States. 5. Elderly poor—Nutrition—United States. 6. Economic assistance, Domestic—United States. I. Jolliffe, Dean, 1963- II. Ziliak, James Patrick.

HV696.F6I525 2008

363.8'830973—dc22

2008037350

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Cover design by Alcorn Publication Design.  
Index prepared by Diane Worden.  
Printed in the United States of America.  
Printed on recycled paper.