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TRENDS IN LONG-RUN VERSUS CROSS-SECTION EARNINGS INEQUALITY IN THE 1970s AND 1980s

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This paper uses the PSID to assess the changes in earnings mobility and to compare the changes in cross-section and long-run inequality in the 1970s and 1980s. Previous inequality studies have primarily used measures of cross-section inequality. However, long-run inequality depends not only on cross-section inequality, but also on the degree of earnings mobility, which equalizes earnings over time. I find that earnings mobility increased during the 1970s, but fell during the 1980s. Consistent with this result, the increase in cross-section inequality overstated the true increase during the 1970s, but understated the true increase in inequality during the 1980s.

I. INTRODUCTION

Dick Armey, the current House Majority Leader, in his recently published book, *The Freedom Revolution* (1995), argues that there is a substantial amount of income mobility in the United States. Krugman (1995) contends that Armey's argument is a defense against the fact that income inequality grew substantially in the 1980s. Armey's implication is that inequality in any year does not matter since income mobility is so great that those low (high) in the income distribution are likely to move up (down) in the distribution within a few years.

Armey's inference highlights an important point: that overall or long-run inequality depends on not only incomes, or earnings, at a point in time, but also on the movements in people's earnings over time, or what can be described as earnings mobility. Accordingly, changes in overall inequality depend on changes in mobility as well as shifting earnings distributions. For example, if earnings mobility increases, then people's average earnings over time would converge so that long-run inequality would decrease relative to cross-section inequality. Yet in the growing literature on rising inequality, little mention has been made of the role of earnings mobility or changes in long-run inequality. Rather, researchers have focused on trends in "snapshot," or cross-section, inequality.

Schiller (1994) recognizes the importance of considering earnings mobility in studies on inequality. He attempts to determine the extent of earnings mobility in the 1980s and to ascertain whether mobility has risen over the recent period of increasing inequality. Using a sample of young men in their teens and twenties from the National Longitudinal Survey of Youth, he finds that earnings mobility was extensive in the 1980s. There is some evidence—though limited as Schiller describes it—that earnings mobility of teens increased from the 1960s to the 1980s. Thus, Schiller argues that we should exercise caution in making statements about the direction of changes in inequality. The extensive mobility Schiller finds,

Note: I would like to thank David Figlio, W. Lee Hansen, John Pepper, and John Shea for their helpful comments.

however, may be attributable to young people experiencing high mobility due to frequent entry into and exit from the labor market because of school.

This paper uses a sample from the Panel Study of Income Dynamics (PSID) that consists of people more committed to the labor force to compare the changes over time in cross-section and long-run earnings inequality and to explain the differences by changes in earnings mobility. In addition, it presents a decomposition of the changes in long-run inequality. From the decomposition, I estimate the effect of changing earnings mobility on long-run inequality relative to cross-section inequality when the earnings distributions are held constant.

Juhn, Murphy, and Pierce (1993), hereafter JMP, measure trends in cross-section wage inequality in the United States. They find that, between 1970 and 1989, the real wage of the 90th percentile worker increased by 15 percent, whereas the real wage for the 10th percentile worker decreased by 25 percent. Researchers have settled for the most part on two explanations for this rising inequality. First, production processes are becoming more technical, increasing the demand for workers with higher skills. Second, opening world trade markets are creating more competition for low-skill labor. As the argument goes, these structural changes in the economy are associated with a rise in the returns to skill: in particular, a rising return to unobserved skill in the 1970s (JMP) counteracting a decreasing return to education (Katz and Murphy, 1992); and increasing returns to education, experience (JMP; Katz and Murphy, 1992) and unobserved ability (JMP) in the 1980s.

Earnings mobility of workers may have been affected by the same forces that changed inequality in the United States. With the increasing returns to unobserved skill and the offsetting declines in the returns to education in the 1970s, the direction of change in earnings mobility in the 1970s is difficult to predict. The rising return to skill (education, experience, and unobserved ability) observed in the 1980s, on the other hand, may decrease the chances that low-skill or less-educated workers would rise in the earnings distribution. For highly-skilled workers, the increasing demand for their services would raise the probability that they remain high in the earnings distribution. Thus, earnings mobility should have decreased through the 1980s. The results show that earnings mobility increased from the early-1970s to the late-1970s, and then decreased through the 1980s. The results are consistent with the findings of Veum (1992) and Moffitt and Gottschalk (1993).

The evidence presented in this paper indicates that increasing earnings mobility from the early-1970s to the late-1970s caused long-run inequality to grow at a slower rate than cross-section earnings inequality. In contrast, from the late-1970s to the late-1980s, the declining earnings mobility contributed to an increase in long-run inequality relative to cross-section inequality. Thus, estimated trends in the conventionally-measured cross-section inequality understated the true increases in inequality in the 1980s.

II. The Connection Between Mobility, Cross-Section Inequality, and Long-Run Inequality

To understand the relationship between cross-section inequality, earnings mobility, and long-run inequality, consider the following inequality measures. Let

$I[Y(t)]$ denote the cross-section inequality measure for earnings distribution Y for period t, and let $I[Y(t, t+k)]$ be the inequality measure for the long-run distribution of earnings over the periods t to $t+k$. The long-run earnings distribution $Y(t, t+k)$ is comprised of the averages of individuals' real earnings over the periods t to $t+k$. Shorrocks (1978b) proves that long-run inequality is less than or equal to the average of the cross-section inequalities.[1] That is,

$$(1) \qquad I[Y(t, t+k)] \leq \sum_{i=0}^{k} I[Y(t+i)]/(k+1).$$

The relationship between the two inequality measures depends on the extent of earnings mobility.[2] Consider the extreme case of earnings being perfectly immobile, while assuming for simplicity that the annual earnings distribution remains constant. In this case, the average cross-section and long-run inequality measures would be equal. If people's earnings then become mobile, their average incomes over several years would be more equal. In general, increases in mobility over time will cause average incomes to converge, decreasing long-run inequality relative to cross-sectional inequality. If there were perfect mobility, then long-run inequality would be close to zero since people's average incomes over time would almost be the same.[3,4]

III. Data and Samples

The Panel Study of Income Dynamics is used in this study. The PSID began in 1968 with 4,802 families, and has conducted annual follow-up interviews of these and other families that have split off from the original families. Since the PSID oversamples low-income people, sample weights provided by the PSID are used in the analysis.

I create four five-year samples of males between 1970 and 1989. The criteria for being in a five-year sample are that the respondent must have been aged between 25 and 54 in the first of the five years and, for each of the five years, the respondent must have been a head of a household, had positive labor earnings, and had at least 1,000 cumulative hours of work and hours lost to unemployment. An advantage to using the earnings of the heads of households rather than family income is that family income would be affected by and would affect family formation and dissolution to a greater extent than would the earnings of heads of households. While analyzing earnings of heads of households may not capture total mobility, changes over time in the mobility of heads' earnings are probably

[1]Shorrocks uses a weighted average for the cross-sectional inequality measure, with the weight being the proportion of aggregate earnings received in a period.

[2]In fact, Shorrocks (1978b) defines as an index of mobility one minus the ratio of the left-hand side over the right-hand side of equation (1).

[3]Perfect mobility refers to the case in which people switch with the person opposite to them around the median. Perfect mobility would cause zero long-run inequality if the earnings distribution were symmetrical and if long-run inequality was measured over an even number of years.

[4]The one exception to increases in mobility causing long-run inequality to decrease relative to cross-sectional inequality is the case in which an increase in mobility causes people with typically high (low) earnings who find themselves with low (high) earnings one year to return to the top (bottom) of the distribution.

indicative of the changes in the mobility of family income, holding constant the effects of family formation and dissolution. And it is the change over time aspect of mobility rather than the level of mobility in which we are more interested. Moffitt and Gottschalk (1993) also examine the earnings of male heads of households (aged 20 to 59). However, Veum (1992) uses family income to measure mobility, while adjusting family income for changes in needs and standards from changes in family structure.

The restriction of having at least 1,000 hours of work and hours lost to unemployment serves to exclude workers whose primary undertaking during the year was not labor market work, while not excluding workers who suffer a significant amount of unemployment during the year. The sample is restricted to those between ages 25 and 54 to further attempt to exclude workers who had other prominent activities besides market work—e.g. schooling or partial retirement.[5] These restrictions mark a difference between this sample and Schiller's (1994), whose samples include people who may be less committed to the labor market. Schiller (1994) measures ten-year earnings mobility for men and women aged 16 to 19 in 1978 (the base year) and seven-year mobility for people aged 20 to 24 in 1981.[6]

The sample is also divided into three age groups: those aged 25–34, 35–44, and 45–54 in the first year of each five-year sample. This reduces the natural inequality due to age differences. In addition, it is better to compare how the earnings of a 30-year old change relative to others around his age rather than to the earnings of 50-year old workers. A drawback of this partition, however, is that it reduces the sample sizes significantly.

For each year of a five-year sample, respondents are assigned to labor earnings deciles according to how their earnings compare to the weighted distribution for their sample. It is important to calculate mobility by comparing the movements in individuals' earnings within their own sample and not with respect to all workers. This eliminates natural earnings mobility from salary increases due to increased experience. The U.S. Department of Treasury (1992) measures income mobility by comparing the changes in income over time for a selected group of individuals who filed income tax returns over ten straight years—which constituted only about one-half of the working population over the 1979 to 1988 period (Krugman, 1995)—to the distribution of incomes over the entire working population for a given year. This is the study that Armey uses to argue that income mobility is extensive. Similarly, Cox and Alm (1995), using the PSID, find significant income mobility in the United States. However, they also apparently compare the incomes of the selected respondents—who had their earnings reported in both the 1975 and 1991 waves of the PSID—to those of the whole income distribution. In fact 35 percent of Cox and Alm's sample were in the highest quintile in 1991, while only three percent were in the lowest quintile. One could argue that these

[5]The PSID asks respondents whether they are attending school in some years, but not all years. Thus, I cannot consistently exclude respondents who were enrolled in school.

[6]Schiller (1994) does partially eliminate those without firm attachment to the labor market by dropping from the sample those who had earnings less than the approximate annual earnings for working half-time at the minimum wage. This eliminated the lower 14 ventiles of the 1978 16 to 19 year old sample and the lower five ventiles of the 1981 20 to 24 year olds.

studies find significant income mobility because they examine a selected group and because young people's incomes naturally rise relative to the population.

Although the sample from the PSID used in this study would be more representative of the U.S. population than the samples from the aforementioned articles, the sample restrictions may still cause sample selection bias. Since the sample excludes discouraged workers who leave the labor force, the mobility measures may understate the true extent of mobility.[7] This potential for sample selection bias would be greater with a lengthier long-run period.

In this study, five-year intervals are used as a compromise from the trade-off between better measures of long-run earnings distributions and greater attrition and sample selection bias associated with longer samples.[8] To determine the intervals, I consider the trends in cross-section inequality. Figure 1 plots Gini coefficients based on cross-section earnings distributions from the PSID.[9] The sample for each year consists of those who satisfy the criteria mentioned above only for the given year. Cross-section inequality rose sharply from 1980 to 1985.[10] The two periods surrounding this increase, 1975–79 and 1985–89, had relatively steady inequality within the period. Thus, the five-year periods I use are 1970–74, 1975–79, 1980–84, and 1985–89.

IV. Earnings Mobility

To formally compute earnings mobility, I use a measure devised by Bartholomew (1967). His mobility measure is $M=\sum_i \pi_i \sum_j p_{i,j}|i-j|$, where π_i represents the equilibrium distribution of individuals across deciles and $p_{i,j}$ is the proportion of people who were in the j-th earnings decile in any year given that they were in decile i in the previous period.[11] If the equilibrium distribution of individuals is evenly split into deciles, the measure is the average number of deciles that an individual moves from one year to the next.[12] Since a person's four one-year transitions within a five-year period are correlated, I make an observation the average number of deciles that an individual moves in the four one-year transitions within the five-year period, so each person has one observation rather than four.

[7]The changes in measured mobility would still be indicative of the actual changes in mobility if the selection bias is relatively constant over time.

[8]Becketti *et al.* (1988) find that the entry to and exit from the PSID maintained the representativeness of the sample through the first 14 years of the survey. Therefore, for the samples from which the income distributions are created, there is probably little selection bias due to attrition from the PSID. Rather, the attrition potentially causing a bias may come from not satisfying the sample criteria any longer.

[9]The Gini coefficient is calculated from the Lorenz curve, which plots cumulative proportions of the working population (sorted by income level) against the cumulative proportions of total income earned. The Gini coefficient is the area between the curve and the diagonal line, which represents perfect equality, divided by the area under the diagonal line. Perfect equality would produce a Gini coefficient of zero since the Lorenz curve would be the diagonal line, while perfect inequality would be characterized by a value of one. This is calculated by using a width for each individual that is the sample weight divided by the sum of all sample weights.

[10]While 1980 marks the beginning of the sharp rise in earnings inequality for this sample, other studies mark 1979 as the start of the acceleration in the increase in inequality (Levy and Murnane, 1993).

[11]The transition matrices are available from the author upon request.

[12]With a weighted analysis, the proportion of a sample in any decile may be slightly smaller or larger than ten percent. However, I just assume that each decile has 10 percent of the distribution.

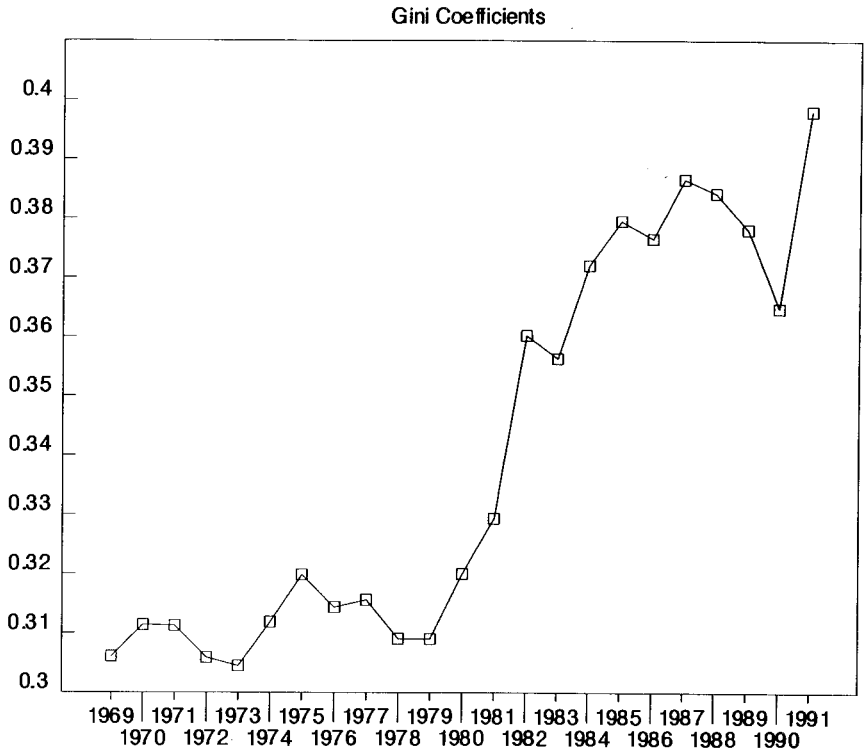

Figure 1. Cross-sectional Inequality

Perfect immobility of workers' earnings would produce a mobility measure of zero, while perfect mobility would be associated with a measure of 5. Random mobility—the case in which a person's earnings decile one period is independent of his decile from the previous period—would be characterized by a value of 2.5.

Table 1 presents the mobility measures for the one-year transitions within the five-year periods, and Table 2 presents those for the four-year transitions, for which an observation represents the number of deciles moved from the first year to the last year of a five-year period.[13] For the sample of all age groups (25–54), the average number of deciles moved from one year to the next over the 20 years was 0.895, which is roughly 18 percent of perfect mobility and 36 percent of random mobility. The average number of deciles moved over four years was 1.377, which is 55 percent of random mobility.

One-year earnings mobility increased slightly from the 1970–74 period to the 1975–79 period. The change was not statistically significant.[14] It then decreased substantially through the late 1980s. The decreases from 1975–79 to 1980–84 and from 1980–84 to 1985–89 were statistically significant at the one percent level. One-year earnings mobility eventually decreased to an amount in the 1985–89 period that was far below that in the 1970–74 period. The results are similar for

[13]The one-year mobility measures do not include the transitions across five-year periods, e.g. 1974–75.

[14]The standard errors of the differences are corrected for the dependence across samples due to some common respondents.

TABLE 1

ONE-YEAR EARNINGS MOBILITY: AVERAGE NUMBER OF DECILES MOVED

	1970–74	1975–79	1980–84	1985–89
All ages (25–54)				
Mobility	0.944	0.952	0.877	0.810
	(0.022)	(0.022)	(0.020)	(0.015)
Change from previous period		0.008	−0.075*	−0.067*
		(0.027)	(0.026)	(0.024)
Observations	1,557	1,517	1,577	1,605
Ages 25–34				
Mobility	1.092	1.149	1.002	0.897
	(0.040)	(0.037)	(0.031)	(0.029)
Change from previous period		0.057	−0.147*	−0.105*
		(0.050)	(0.045)	(0.040)
Observations	525	620	760	778
Ages 35–44				
Mobility	0.893	0.941	0.817	0.795
	(0.034)	(0.041)	(0.037)	(0.036)
Change from previous period		0.048	−0.124*	−0.022
		(0.051)	(0.051)	(0.057)
Observations	585	461	418	537
Ages 45 54				
Mobility	0.862	0.812	0.768	0.733
	(0.039)	(0.037)	(0.038)	(0.042)
Change from previous period		−0.050	−0.044	−0.035
		(0.048)	(0.048)	(0.062)
Observations	447	436	399	290

Note: Standard errors of the mobility measures and the change from the previous period are in parentheses.

* Denotes a mobility measure that is different from the previous five-year period by an amount that is statistically significant at the 5 percent level.

the 25–34 sample. For the 35–44 and 45–54 samples, the changes were similar, but mostly statistically insignificant.

Four-year earnings mobility followed mostly the same patterns as one-year mobility. One difference is that the increase in mobility from 1970–74 to 1975–79 was statistically significant for the whole sample and for the 25–34 sample. Another difference is that the decrease in mobility from the early-1980s to the late-1980s was smaller for each sample except the 45 to 54 group.

Tables 3 and 4 show earnings mobility based on ventiles rather than deciles. The mobility based on ventiles follows a similar pattern as mobility across deciles, with an increase in mobility in the 1970s and decreases in mobility through the 1980s. The average number of ventiles moved from one year to the next for the sample of all ages was 1.819, roughly double the average number of deciles moved. This mobility, as well as that for the 25–34 sample, is not as extensive as that measured by Schiller (1994), probably because Schiller's sample consists of younger people who enter and exit the labor market more often.

TABLE 2

FOUR-YEAR EARNINGS MOBILITY: AVERAGE NUMBER OF DECILES MOVED OVER FOUR YEARS

	1970–74	1975–79	1980–84	1985–89
All ages (25–54)				
Mobility	1.347	1.471	1.378	1.316
	(0.038)	(0.043)	(0.039)	(0.038)
Change from previous period		0.124*	−0.093	−0.062
		(0.051)	(0.054)	(0.051)
Observations	1,557	1,517	1,577	1,605
Ages 25–34				
Mobility	1.510	1.816	1.553	1.554
	(0.069)	(0.072)	(0.057)	(0.059)
Change from previous period		0.306*	−0.263*	0.001
		(0.095)	(0.089)	(0.081)
Observations	525	620	760	778
Ages 35–44				
Mobility	1.273	1.383	1.241	1.203
	(0.060)	(0.073)	(0.071)	(0.065)
Change from previous period		0.110	−0.142	−0.038
		(0.088)	(0.099)	(0.106)
Observations	585	461	418	537
Ages 45–54				
Mobility	1.201	1.226	1.174	1.010
	(0.070)	(0.072)	(0.074)	(0.077)
Change from previous period		0.025	−0.052	−0.164
		(0.092)	(0.100)	(0.110)
Observations	447	436	399	290

Note: Standard errors of the mobility measures and the change from the previous period are in parentheses.

* Denotes a mobility measure that is different from the previous five-year period by an amount that is statistically significant at the 5 percent level.

The changes in earnings mobility do not appear to be attributable to business cycles. Table 5 presents the results of several regressions of the one-year mobility measure on trend terms and on economic variables for the 16 one-year transitions for the 25–54 sample. The economic variables include the real gross domestic product growth rate, the unemployment rate for males aged 20 and over (UR), the change in UR, and the absolute change in UR. The coefficient estimates on the trend terms demonstrate the increase in mobility in the 1970s and the decrease in the 1980s. In no case is the coefficient estimate on economic variable statistically significant. The results suggest that the changes in mobility in the United States were not the result of less volatility or other changes in the performance of the economy.

As described in Section II, the relationship between cross-section and long-run earnings inequality depends on the extent of earnings mobility. An increase

TABLE 3

ONE-YEAR EARNINGS MOBILITY: AVERAGE NUMBER OF VENTILES MOVED

	1970–74	1975–79	1980–84	1985–89
All ages (25–54)				
Mobility	1.905	1.950	1.788	1.642
	(0.048)	(0.051)	(0.045)	(0.042)
Change from previous period		0.045	−0.162*	−0.146*
		(0.063)	(0.060)	(0.055)
Observations	1,557	1,517	1,577	1,605
Ages 25–34				
Mobility	2.214	2.289	2.026	1.834
	(0.094)	(0.090)	(0.073)	(0.067)
Change from previous period		0.075	−0.263*	−0.192*
		(0.124)	(0.110)	(0.092)
Observations	525	620	760	778
Ages 35–44				
Mobility	1.805	1.905	1.902	1.605
	(0.066)	(0.092)	(0.097)	(0.074)
Change from previous period		0.100	−0.003	−0.297*
		(0.115)	(0.129)	(0.115)
Observations	585	461	418	537
Ages 45 54				
Mobility	1.744	1.661	1.544	1.477
	(0.084)	(0.079)	(0.081)	(0.088)
Change from previous period		−0.083	−0.117	−0.067
		(0.105)	(0.104)	(0.111)
Observations	447	436	399	290

Note: Standard errors of the mobility measure and the change from the previous period are in parentheses.

* Denotes a mobility measure that is different from the previous five-year period by an amount that is statistically significant at the 5 percent level.

in earnings mobility would decrease long-run earnings inequality relative to cross-section inequality, and a decrease in mobility would increase long-run relative to cross-section inequality. Thus, the increasing earnings mobility from the early-1970s to the late-1970s should translate into long-run earnings inequality growing at a slower rate (or decreasing faster) than cross-section inequality. The continually decreasing earnings mobility from the late-1970s to the late-1980s should indicate that long-run inequality grew at a faster rate than the conventionally-measured cross-section inequality.

V. LONG-RUN VERSUS CROSS-SECTION EARNINGS INEQUALITY

To compare the changes in long-run and cross-section inequality in the United States, I calculate the Gini coefficient for the cross-section and long-run earnings distributions. A nice property of this measure is that a transfer of one dollar

TABLE 4

FOUR-YEAR EARNINGS MOBILITY: AVERAGE NUMBER OF VENTILES MOVED OVER FOUR YEARS

	1970 74	1975–79	1980 84	1985 89
All ages (25 54)				
Mobility	2.693	3.018	2.753	2.663
	(0.085)	(0.099)	(0.088)	(0.086)
Change from previous period		0.325*	−0.265*	−0.090
		(0.121)	(0.126)	(0.118)
Observations	1,557	1,517	1,577	1,605
Ages 25–34				
Mobility	3.086	3.605	3.134	3.184
	(0.167)	(0.177)	(0.138)	(0.146)
Change from previous period		0.519*	−0.471*	0.050
		(0.240)	(0.222)	(0.198)
Observations	525	620	760	778
Ages 35–44				
Mobility	2.548	2.693	2.541	2.485
	(0.134)	(0.165)	(0.158)	(0.142)
Change from previous period		0.145	−0.152	−0.056
		(0.204)	(0.224)	(0.206)
Observations	585	461	418	537
Ages 45 54				
Mobility	2.425	2.527	2.382	2.109
	(0.150)	(0.159)	(0.163)	(0.164)
Change from previous period		0.102	−0.145	−0.273
		(0.204)	(0.221)	(0.218)
Observations	447	436	399	290

Note: Standard errors of the mobility measures and the change from the previous period are in parentheses.

* Denotes a mobility measure that is different from the previous five-year period by an amount that is statistically significant at the 5 percent level.

from one person to another with lower earnings always results in a decrease in inequality. I use the Gini coefficient rather than percentile earnings ratios (e.g. the 90th percentile divided by the 10th percentile earnings levels) because this property does not hold for the earnings ratios and because, given the relatively small sample sizes, inequality measures based on specific percentile earnings ratios would likely be more susceptible to errors due to noise than an inequality measure based on the distribution as a whole.

The cross-section measure of earnings inequality for a five-year period is the average of the Gini coefficients for the five separate years. The long-run inequality measure, meanwhile, is the Gini coefficient based on the distribution of individuals' average real earnings over the five years. A comparison of the cross-section and long-run inequality measures are presented in Table 6. Given the increased mobility from the 1970–74 period to the 1975–79 period, one would expect the change in cross-section inequality to overstate the change in long-run inequality. Indeed,

TABLE 5

MOBILITY AS A FUNCTION OF CHANGES IN THE ECONOMY

	(1)	(2)	(3)	(4)
Constant	0.9535*	0.9479*	0.9376*	0.9368*
	(0.0304)	(0.0309)	(0.0263)	(0.0272)
Trend	0.0055	0.0094	0.0063	0.0061
	(0.0061)	(0.0078)	(0.0062)	(0.0064)
Trend-squared	−0.00075*	−0.00092*	−0.00078*	−0.00078*
	(0.00029)	(0.00036)	(0.00030)	(0.00031)
Real GDP growth rate	−0.0039			
	(0.0039)			
Unemployment rate (UR)		−0.0045		
		(0.0069)		
Change in UR			0.0059	
			(0.0085)	
Absolute change in UR				0.0013
				(0.0129)
R-squared	0.811	0.802	0.803	0.796

Note: The unemployment rate is the annual unemployment rate for males age 20 and over.

* Indicates that the coefficient estimate is statistically significant at the 5 percent level. The trend term equals 1 for the 1970–71 transition and equals 19 for the 1988–89 transition.

that occurred for the whole sample, as well as for the 25–34 and 35–44 age groups. For the whole sample, cross-section inequality increased by 3.5 percent while long-run inequality increased by 2.3 percent. The difference in growth rates was largest for the 25–34 sample: while cross-section inequality increased by 1.8 percent, long-run inequality actually decreased by 0.6 percent for this group. For the 45–54 age group, for which the direction of the change in earnings mobility from 1970–74 to 1975–79 was ambiguous, cross-section inequality increased at a slightly slower rate than long-run inequality.

As earnings mobility fell from the 1975–79 period to the 1985–89 period, long-run inequality grew at a faster rate than cross-section inequality for each sample. For the whole sample, long-run inequality grew by 22.2 percent compared to 19.7 percent growth for cross-section inequality. The difference in the growth rates was largest for the 25–34 sample (24.0 and 19.9 percent growth for long-run and cross-section growth), which is consistent with this age group being that for which earnings mobility decreased the most from the late-1970s to the late-1980s.

The divergences between the growth rates of cross-section and long-run inequality are likely attributable to changes in earnings mobility. The following decomposition attempts to determine how much changes in the extent of earnings mobility, as well as shifting earnings distributions, contributed to changes in long-run earnings inequality in the 1970s and 1980s.

VI. THE DECOMPOSITION OF CHANGES IN LONG-RUN EARNINGS INEQUALITY

To decompose the change in long-run inequality, either mobility or the earnings distribution is held constant as the other one is allowed to change over

TABLE 6

CROSS-SECTION VERSUS LONG-RUN INEQUALITY—GINI COEFFICIENTS

	1970–74	1975–79	1980–84	1985–89
All ages (25–54)				
Cross-section	0.282	0.293	0.316	0.356
(Percent change from previous period)		(3.5)	(7.9)	(11.9)
[Percent change from 1975–79]				[19.7]
Long-run	0.265	0.271	0.298	0.339
(Percent change from previous period)		(2.3)	(9.4)	(12.8)
[Percent change from 1975–79]				[22.2]
Observations	1,557	1,517	1,577	1,605
Ages 25–34				
Cross-section	0.253	0.258	0.286	0.314
(Percent change from previous period)		(1.8)	(10.4)	(9.5)
[Percent change from 1975–79]				[19.9]
Long-run	0.233	0.232	0.265	0.294
(Percent change from previous period)		(−0.6)	(13.3)	(10.7)
[Percent change from 1975–79]				[24.0]
Observations	525	620	760	778
Ages 35–44				
Cross-section	0.297	0.301	0.309	0.340
(Percent change from previous period)		(1.4)	(2.3)	(9.8)
[Percent change from 1975 79]				[12.1]
Long-run	0.281	0.281	0.292	0.322
(Percent change from previous period)		(0.0)	(4.0)	(9.8)
[Percent change from 1975 79]				[13.7]
Observations	585	461	418	537
Ages 45–54				
Cross-section	0.286	0.314	0.356	0.432
(Percent change from previous period)		(9.1)	(12.8)	(19.3)
[Percent change from 1975–79]				[32.0]
Long-run	0.271	0.298	0.341	0.420
(Percent change from previous period)		(9.5)	(13.7)	(20.6)
[Percent change from 1975–79]				[34.4]
Observations	447	436	399	290

time. Long-run average earnings is considered to be a function of the transition probabilities and the annual earnings distributions. First, I calculate the long-run average predicted earnings for those originally in decile i in (five-year) period t as:

$$(2)\qquad Y_{it}=\tfrac{1}{5}\Bigg[\bar{w}_{i,1}(t)+\sum_{j=1}^{10}\bar{w}_{j,2}(t)p_{i,j(1)}(t)+\sum_{j=1}^{10}\bar{w}_{j,3}(t)p_{i,j(2)}(t)+\sum_{j=1}^{10}\bar{w}_{j,4}(t)p_{i,j(3)}(t)+\sum_{j=1}^{10}\bar{w}_{j,5}(t)p_{i,j(4)}(t)\Bigg]$$

where $\bar{w}_{i,\tau}(t)$ is the median earnings for decile i in years $\tau=1, 2, 3, 4$, and 5 of five-year period t and $p_{i,j(k)}(t)$ is the estimated probability of being in the j-th

decile in k years for $k = 1, 2, 3$, and 4 given that a person is in the i-th decile in year 1 of the five-year period t. That is, the long-run average earnings for a decile is comprised of the median earnings of that decile in the first year and the average earnings in each subsequent year. The average earnings for years 2 to 5 of each five-year period are calculated by multiplying the median earnings for each decile j in years 2, 3, 4, and 5 by the probability of moving from decile i to each decile j over one, two, three, and four years, respectively. I calculate this five-year distribution of earnings once for each of the four five-year periods, so that there are four observations per decile. Next, the following variants of the above long-run average earnings are computed:

(1) $Y^1_{i,t}$ (as described above) allows mobility ($p_{i,j(k)}(t)$) and the earnings distributions ($\bar{w}_{i,\tau}(t)$) to change across the five-year periods. The changes in inequality using Y^1 show how long-run earnings inequality has changed over these five-year periods when the earnings distributions and earnings mobility can change over time, with the given constraint of holding the distributions constant within a five-year period.

(2) $Y^2_{i,t}$ holds earnings mobility (transition probabilities) constant as the earnings distributions change over time. The constant transition probabilities are the averages of the one-, two-, three-, and four-year transitions from the base years of the five-year samples (1970, 1975, 1980, and 1985). The changes in inequality here represent those attributable to changing earnings distributions.

(3) $Y^3_{i,t}$ holds the earnings distributions constant across the five-year periods, but mobility is allowed to change. The earnings distribution used is the average median earnings for each decile, from the five-year periods, over the 1970–89 period. Changes in the inequality measures over time using Y^3 are due to evolving earnings mobility.

TABLE 7

DECOMPOSITION OF CHANGES IN LONG-RUN INEQUALITY—GINI COEFFICIENTS FOR THE 25–54 SAMPLE

Variable	1970–74	1975–79	1980–84	1985–89
Y^1	0.219	0.221	0.241	0.267
(Percent change from previous period)		(1.0)	(8.6)	(10.2)
[percent change from 1975–79]				[18.8]
Y^2	0.218	0.224	0.237	0.263
(Percent change from previous period)		(2.9)	(5.5)	(10.4)
[percent change from 1975–79]				[15.8]
Y^3	0.236	0.230	0.240	0.241
(Percent change from previous period)		(−2.3)	(4.1)	(0.5)
[percent change from 1975–79]				[4.6]

Table 7 reports the Gini coefficients for the distributions of Y^1, Y^2, and Y^3 for the sample of all age groups.[15] From the early 1970s to the late 1980s, inequality

[15]The Gini coefficients are smaller here than for the actual earnings distributions probably because of the simplifications of the distribution. In particular, the lowest decile has a larger share and the highest decile has a smaller share of total earnings than in the actual earnings distributions since median earnings within deciles are used to determine the earnings distributions.

based on Y^2 continually increased. Since the Y^2 distribution holds mobility constant, this indicates that changes in the cross-section earnings distributions steadily widened over this period. The increased inequality from widening earnings distributions from 1970–74 to 1975–79 in this model was almost offset by decreases in long-run inequality due to increasing earnings mobility, as seen by the decrease in inequality based on the Y^3 distribution, which holds the cross-section earnings distribution constant over time. The decrease in inequality for Y^3 indicates that if the earnings distributions were held constant then long-run inequality would have decreased by 2.3 percent, according to this model, because of increasing earnings mobility. The decreasing earnings mobility then augmented the increase in long-run inequality from widening earnings distributions from the late-1970s to the late-1980s. From 1975–79 to 1985–89, if earnings distributions were held constant, the decreasing earnings mobility would have increased long-run inequality by 4.6 percent.

VI. Conclusion

This paper incorporates earnings mobility into measurements of inequality to explain the trends in long-run relative to cross-section earnings inequality in the 1970s and 1980s. Dick Armey implicitly denies that there were considerable increases in inequality in the 1980s by arguing that earnings mobility was extensive. In reply, I argue that it is the changes in earnings mobility, rather than the extent of mobility, that matter for the changes in overall inequality over time. Obviously Armey is correct that long-run inequality is less than cross-section inequality. The more important question, as Schiller (1994) points out, is whether mobility has changed, or equivalently whether long-run inequality has changed relative to cross-section inequality. From the early-1970s to the late-1970s, increasing earnings mobility mitigated the increase in inequality resulting from a widening of the earnings distributions. However, when the widening of the earnings distributions accelerated in the 1980s, earnings mobility decreased causing long-run or overall inequality to increase faster than the conventionally-measured cross-section inequality. These results demonstrate the importance of using a more long-run measure of earnings to acquire an accurate indication of the changes in inequality over time.

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