

# Income Mobility in the United States and Germany: A Comparison of Two Classes of Mobility Measures using the GSOEP, PSID, and CPS

By Andrew J. Houtenville\*

## Summary

*The United States is often considered to be more free-wheeling and mobile than Germany; however, previous cross-national studies of income mobility find the opposite is true. This paper investigates these surprising results and finds that they are confirmed when income mobility is measured by changes in the positions of individuals in the income distribution — members of former West German households are more income mobile than Americans. However, when income mobility is measured by absolute movements in income, Americans are found to be more income mobile than members of former West German households.*

## 1. Introduction

Burkhauser and Poupore (1997) compared income mobility in the United States and former West Germany over the six-year period from 1983 through 1988. They were surprised to find that post-government income mobility over the period was greater in Germany. Burkhauser, Butler and Houtenville (1999) extended this analysis into the 1990s and found that equivalized post-government income mobility decreased for members of former West German households but remained higher than post-government income mobility in the United States.<sup>1</sup> These results run counter to the conventional belief that American society is more free-wheeling than German society. Worker credentials and joint union-management-government bargaining processes play a large role in the German labor market. The German government is more actively involved in dampening the business cycle than the United States government, and the German social welfare system is larger (higher taxes and more social welfare expenditures per capita) than its United States counterpart. These factors might lead one to expect less income mobility in Germany than in the United States.

Using similar techniques, Aaberge et al. (1997) compared Sweden, Norway, Denmark, and the United States from 1986 through 1990 and were also surprised to find that the United States had less post-government income mobility than Sweden and Norway. Only Denmark had less post-government income mobility. They expected the more extensive Scandinavian social welfare systems to dampen income mobility.

The purpose of this paper is to shed light on these surprising findings. The next section of this paper discusses the two classes of mobility measures. This is followed by discussions of the data, sample restrictions, results, and concluding remarks.

## 2. Two Classes of Mobility Measures

Fields and Ok (1996) made the distinction between two classes of income mobility measures — non-positional and positional measures.<sup>2</sup> Non-positional income mobility occurs when the incomes of individuals change over time. A simple way to measure non-positional income mobility is to calculate the mean absolute value of changes in the natural log of income from time  $t$  to time  $s$ ,

$$\frac{1}{n} \sum_{i=1}^n \left| \ln(y_{i,t}) - \ln(y_{i,s}) \right|,$$

where  $y_{i,t}$  is the income of individual  $i$  in time  $t$  and  $n$  is the number of individuals.

Positional income mobility occurs when the positions of individuals in the income distribution change over time. A simple way to measure positional movements is to calculate the mean absolute value of changes in deciles of the income distribution from time  $t$  to time  $s$ ,

$$\frac{1}{n} \sum_{i=1}^n \left| \text{dec}(y_{i,t}) - \text{dec}(y_{i,s}) \right|.$$

Burkhauser and Poupore (1997) use a more complex positional measure of income mobility, the Shorrocks measure, which considers income mobility at points within the period time  $t$  to time  $s$ . For example, the Shorrocks measure considers income fluctuations in all the years in the period 1983 to 1988, rather than just the difference between income in 1983 and income in 1988. Income mobility occurs when the positions of individuals in annual income distributions differ from their positions in the distribution of period income. The Shorrocks measure is

$$1 - \frac{I\left(\sum_{t=1}^s y_{i,t}\right)}{\sum_{t=1}^s a_t I(y_{i,t})},$$

where  $t = 1, 2, \dots, s$ ,  $I(\cdot)$  is an income inequality index, such as generalized entropy indices or the Gini coefficient.

\* School of Industrial and Labor Relations, Cornell University

<sup>1</sup> The phrase "members of former West German households" is used because in the years after reunification Burkhauser, Butler and Houtenville (1999) tracked only those individuals associated with households that were formed in former West Germany. This sample restriction is discussed below.

<sup>2</sup> Fields, Leary and Ok (1998) use these measures to compare income mobility in the 1970s and 1980s in the United States.

cient, and  $a_t$  is the ratio of mean income in time  $t$  to mean period income.<sup>3</sup> The latter portion of this formula is the ratio of the inequality of period income to the weighted sum of income inequality in the increments of time in the period. If income is perfectly immobile, then the Shorrocks measure equals zero. For example, if individuals receive the same income from year to year, then weighted sum annual income inequality equals the inequality of period income. In the results below, the income inequality is captured by a generalized entropy index known as the Theil(1) coefficient,

$$\frac{1}{n} \sum_{i=1}^n \frac{y_i}{\bar{m}_y} \ln \left( \frac{y_i}{\bar{m}_y} \right),$$

where  $\bar{m}_y$  is mean income.<sup>4</sup> Positional mobility is dependent upon the dispersion of the income distribution, which makes cross-national comparisons problematic. If the populations of two countries exhibit identical changes in income (non-positional mobility), the population with the narrower distribution will exhibit more positional mobility.

### 3. Data

To compare non-positional and positional income mobility in the United States and Germany, it is necessary to follow individuals over time. The Panel Study of Income Dynamics (PSID) and the German Socio-Economic Panel (GSOEP) contain such information. The PSID began in 1968 with approximately 4,800 American households (about 18,000 individuals). The GSOEP began in 1984 with approximately 5,600 households (about 17,500 individuals) in former West Germany. These households have grown and children have split off to form their own households. Drawing from these growing datasets, the PSID-GSOEP Equivalent File contains an unbalanced panel of 40,041 individuals in the United States for the period 1980–1998 and an unbalanced panel of 29,219 individuals from the original 1984 West German households for the period 1984–1998.<sup>5, 6</sup>

The 1980–1998 PSID-GSOEP Equivalent File contains the comparable income and household information needed to evaluate income mobility in the two nations. The analysis below focuses on equalized household post-government income in the year prior to the survey. For Germans, household post-government income is the sum of household labor earnings, interest income, dividends, rental income, the imputed rental value of owner-occupied housing, private and public transfers, and social security pensions, minus total household taxes. Labor earnings include earnings from all sources of employment (primary, secondary, and self-employment), plus any bonuses and profit-sharing income. Public transfers include housing allowances, child benefits, subsistence and special circumstance assistance, government student assistance, maternity benefits, unemployment

benefits, unemployment assistance, and unemployment subsistence allowances. The tax burden includes income taxes and payroll taxes.

For Americans, household post-government income is the sum of household labor earnings, interest income, dividends, rental income, the imputed rental value of owner-occupied housing, public transfers, and Social Security pensions, minus total household taxes. Labor earnings include earnings from all employment (including both the asset and labor portions of self-employment earnings), bonuses, overtime, and commissions. Public transfers include AFDC/TANF payments, SSI payments, unemployment compensation, Workers' Compensation, and the face value of food stamps. Taxes include payroll taxes plus federal and state income taxes, which are estimated using PSID variables and the National Bureau of Economic Research (NBER) TAXSIM Model.<sup>7</sup>

In survey year 1993 (income year 1992), the PSID switched from paper and pencil surveys to computer-assisted interview surveys and also reduced efforts to clean the data. These changes make it difficult to compare income mobility before and after these changes. Computer-assisted interviews may capture sources of income that were not captured previously and that are subject to more year-to-year fluctuations. In addition, changes in the cleaning process may also increase year-to-year movements in income.

The results from the PSID are compared to results using the March Demographic Supplement of the Current Population Survey (CPS) of the United States. This survey focuses on sources of household income, government program participation, and a variety of demographic characteristics. Information is collected from approximately 50,000 households (about 150,000 individuals). In the March CPS of any given year, approximately half of the households being surveyed were surveyed the prior

<sup>3</sup> Period income represents permanent income. See Maasoumi and Zandvakili (1986) for a more complete discussion of the Shorrocks measure and different specifications of permanent income.

<sup>4</sup> Previous work has shown that cross-national comparisons of income mobility using the Shorrocks measure are not dramatically different when alternative measures of income inequality are used.

<sup>5</sup> The PSID-GSOEP Equivalent Data File is a compilation of the efforts of researchers and staff affiliated with Cornell University and the German Institute for Economic Research (DIW).

<sup>6</sup> These panels are unbalanced in the sense that an individual is not required to have information in all the years.

<sup>7</sup> For more information about the TAXSIM estimates, see Butrica and Burkhauser (1997). Estimates of inequality and mobility using the income tax liability reported by the PSID are very similar to the results below. As was expected when using the PSID figures, inequality was slightly higher (due to itemization), but mobility was virtually unchanged, suggesting that individuals retained their relative positions in the distribution regardless of which tax measure was used.

March, while the remaining households being surveyed are eligible to be surveyed the following March. This feature makes it possible to measure year-to-year income mobility. Tax estimates for CPS respondents are not available; therefore, equivalized pre-government income is used when comparing results from the CPS and PSID. In the PSID, household pre-government income is household post-government income, as defined above, ignoring household taxes and public transfers. In the CPS, it is the sum of household income from wages and salaries, farming, self-employment, rent, interest, dividends, and private transfers.

In all the results below, the unit of analysis is the individual. An individual is given an equal share of his or her household's equivalized post-government income.<sup>8</sup> This approach approximates an individual's access to household resources.

#### 4. Sample Restrictions

The multi-year nature of the Shorrocks mobility measure requires persons to be in the data over the entire period of the specific analysis. Consecutive six-year periods are used. All samples are restricted to those individuals who have complete information over a given six-year period.<sup>9</sup> All samples are restricted to working-age individuals (aged 25 through 59) with positive equivalized post-government income over a given six-year period.<sup>10</sup> To insure continuity, this restriction is applied to all mobility indices, even though some of the indices do not require income information for all years in a period. In order to eliminate potential outliers, in each six-year period, individuals are ranked according to the variance in their income profiles and the top 1 percent are dropped.<sup>11,12</sup>

The German sample is restricted to individuals in households that derive from the GSOEP's original 1984 sampling of households in former West Germany. Keep in mind that this sample includes (1) non-German citizens, (2) individuals in households that have split off the original 1984 sample households, and (3) individuals who have since become a part of these households, which includes residents of former East Germany. In addition, after reunification some members of these households moved to former East Germany. The phrase "members of former West German households" is used to describe the German sample used in the analysis below. This analysis is not an analysis of just German citizens or just individuals living in the western states of Germany.

Comparing results from the PSID and CPS is complicated by changes over the years in the way income is top-coded in the CPS. When comparing the CPS and PSID, individuals above the 90<sup>th</sup> percentile of the annual income distribution are given the income value at the 90<sup>th</sup> percen-

tile. This mitigates the influence of top-coding by restricting mobility in the upper tail.

#### 5. Results

Table 1 contains estimates of the positional and non-positional equivalized post-government income mobility of working age Americans and members of former West German households for consecutive six-year periods beginning in 1979 for Americans and 1983 for members of former West German households. The first two columns of Table 1 provide estimates of mean absolute value of decile changes (positional mobility) for the two populations.

In the first six-year period in which both groups can be compared, 1983 through 1988, members of former West German households were more mobile, moving an average of 1.64 deciles within their equivalized post-government income distribution. In the same period, Americans averaged 1.53 deciles within their distribution. As can be seen in the third and fourth columns of Table 1, this finding is confirmed by the other positional mobility measure, the Shorrocks measure. Over this period, 18.4 percent of the equivalized post-government income of members of former West German households was transitory, as compared to 15.3 percent for Americans.

The opposite holds true when mobility is not a function

<sup>8</sup> The United States Detailed Equivalence Scale is used to adjust household income for economies of household size. It is also assumed that individuals share equivalized household income equally. All dollars and deutsche marks are in 1992 figures. Adjusting for exchange rates is not necessary, because the mobility measures are homogeneous of degree zero.

<sup>9</sup> This choice of sample criteria allows as many individuals as possible for each calculation. While each period's sample contains a somewhat different set of people, the sample restrictions are the same and hence are comparable. An alternative is to draw a sample for the entire panel (which would require individuals to be in the sample for the entire length of the panel) and then subdivide the data into periods. While this would produce a more consistent sample over time, the sample would be very restrictive. Results using this more restrictive sample criteria yield similar mobility patterns across countries and over time.

<sup>10</sup> Positive income values for each individual are necessary because natural logarithms are used.

<sup>11</sup> See Burkhauser, Butler and Houtenville (1999) for more complete discussion of this restriction.

<sup>12</sup> Both surveys oversampled certain sub-populations. Roughly two-fifths of the original PSID households were intentionally drawn from low-income neighborhoods. About one-fourth of the original GSOEP households were intentionally drawn from the population of non-German guest-workers. Both surveys provide sample weights to adjust for these oversamples. The results below use these oversamples in conjunction with the individual sample weights (specifically, the individual sample weight of the last year of the period). Results derived without using the individual sample weights and results derived from the primary samples are available upon request. The results are similar to the results below.

Table 1

**Estimates of Positional and Non-Positional Equivalized Post-Government Income Mobility and Equivalized Post-Government Income Inequality for Working-Age Americans and Members of Former West German Households for Consecutive Six-Year Periods from 1979 and 1996<sup>a,b</sup>**

	Positional Mobility			Non-Positional Mobility			Theil(1) Measure of Inequality for the First Year of the Period
	Mean Absolute Value of Changes in Income Decile		Shorrocks Mobility Measure	Mean Absolute Value of Changes in Log-Income			
Six-Year Period	Americans	Members of Former West German Households	Americans	Members of Former West German Households	Americans	Members of Former West German Households	Members of Former West German Households
1979–1984	1.58	—	0.161	—	0.340	—	—
1980–1985	1.60	—	0.159	—	0.351	—	—
1981–1986	1.60	—	0.157	—	0.377	—	—
1982–1987	1.61	—	0.157	—	0.402	—	—
1983–1988	1.53	1.64	0.153	0.184	0.406	0.326	0.099
1984–1989	1.55	1.74	0.153	0.182	0.388	0.354	0.103
1985–1990	1.53	1.68	0.148	0.164	0.383	0.351	0.096
1986–1991	1.53	1.65	0.148	0.158	0.374	0.335	0.099
1987–1992 <sup>c</sup>	1.60	1.64	0.158	0.163	0.386	0.328	0.103
1988–1993 <sup>c</sup>	1.66	1.59	0.178	0.165	0.451	0.310	0.104
1989–1994 <sup>c</sup>	1.59	1.60	0.185	0.159	0.438	0.307	0.103
1990–1995 <sup>c</sup>	1.56	1.56	0.192	0.162	0.425	0.297	0.109
1991–1996 <sup>c</sup>	1.60	1.58	0.199	0.163	0.433	0.297	0.109

Source: Author's calculations using the PSID-GSOEP Equivalent Files, 1980–1997.

<sup>a</sup> The German sample is restricted to individuals in households that derive from the GSOEP's original 1984 sampling of households in former West Germany. This sample includes (1) non-German citizens, (2) individuals in households that have split off from the original 1984 sample households, and (3) individuals who have since become members of these households, which includes residents of former East Germany. In addition, after reunification some of these households moved to former East Germany. This analysis should not be seen as an analysis of solely German citizens or solely people in the western states of Germany.

<sup>b</sup> The US detailed equivalence scale is used in all calculations.

<sup>c</sup> In survey year 1993 (income year 1992) the PSID switched to computer-assisted interviews system.

Table 2

**Estimates of Positional and Non-Positional Equivalized Pre-Government Income Mobility and Equivalized Pre-Government Income Inequality for Working-Age Americans for Consecutive Two-Year Periods from 1979 and 1998 using the Panel Study of Income Dynamics (PSID) and the Current Population Survey (CPS)<sup>a</sup>**

Two-Year Period	Positional Mobility				Non-Positional Mobility				Theil(1) Measure of Inequality for the First Year of the Period			
	Mean Absolute Value of Changes in Income Decile		Shorrocks Mobility Measure		Mean Absolute Value of Changes in Log-Income							
	PSID	CPS	PSID	CPS	PSID	CPS	PSID	CPS	PSID	CPS	PSID	CPS
1979–1980	0.88	1.28	0.059	0.121	0.245	0.358	0.148	0.140	0.148	0.140	0.148	0.140
1980–1981	0.88	1.26	0.059	0.118	0.245	0.356	0.156	0.140	0.156	0.140	0.156	0.140
1981–1982	0.89	1.29	0.060	0.123	0.256	0.382	0.160	0.150	0.160	0.150	0.160	0.150
1982–1983	0.86	1.22	0.059	0.115	0.270	0.379	0.173	0.158	0.173	0.158	0.173	0.158
1983–1984	0.87	1.22	0.061	0.116	0.277	0.382	0.172	0.162	0.172	0.162	0.172	0.162
1984–1985 <sup>b</sup>	0.87	—	0.057	—	0.260	—	0.172	—	0.172	—	0.172	—
1985–1986	0.87	1.19	0.057	0.108	0.260	0.360	0.175	0.159	0.175	0.159	0.175	0.159
1986–1987	0.83	1.22	0.052	0.109	0.251	0.347	0.171	0.160	0.171	0.160	0.171	0.160
1987–1988	0.81	1.20	0.051	0.107	0.253	0.339	0.177	0.151	0.177	0.151	0.177	0.151
1988–1989	0.81	1.18	0.052	0.104	0.249	0.333	0.179	0.156	0.179	0.156	0.179	0.156
1989–1990	0.81	1.22	0.051	0.108	0.251	0.339	0.180	0.156	0.180	0.156	0.180	0.156
1990–1991	0.79	1.19	0.053	0.107	0.256	0.335	0.181	0.153	0.181	0.153	0.181	0.153
1991–1992 <sup>c</sup>	0.96	1.15	0.072	0.100	0.315	0.340	0.183	0.159	0.183	0.159	0.183	0.159
1992–1993 <sup>c</sup>	1.15	1.20	0.098	0.110	0.390	0.375	0.188	0.163	0.188	0.163	0.188	0.163
1993–1994 <sup>c</sup>	1.04	1.26	0.090	0.116	0.381	0.370	0.209	0.166	0.209	0.166	0.209	0.166
1994–1995 <sup>b,c</sup>	1.02	—	0.085	—	0.348	—	0.196	—	0.196	—	0.196	—
1995–1996 <sup>c</sup>	1.09	1.29	0.098	0.120	0.372	0.385	0.188	0.165	0.188	0.165	0.188	0.165
1996–1997	—	1.30	—	0.119	—	0.391	—	0.171	—	0.171	—	0.171
1997–1998	—	1.35	—	0.127	—	0.392	—	0.168	—	0.168	—	0.168

Source: Author's calculations using the PSID-GSOEP Equivalent Files, 1980-1997, and the March Current Population Survey, 1980-1999.

<sup>a</sup> The US detailed equivalence scale is used in all calculations.

<sup>b</sup> In the CPS, it is not possible to match individuals from 1985 to 1986 and 1995 to 1996.

<sup>c</sup> In survey year 1993 (income year 1992) the PSID switched to computer-assisted interviews system.



of the income distribution. In the period 1983 through 1988, non-positional movements in the equivalized post-government income of Americans were larger than those of members of former West German households. As can be seen in the fifth and sixth columns of Table 1, the log equivalized post-government income of Americans moved an average of 0.406, as compared to 0.326 for members of former West German households.

These results show that in the period 1983 through 1988 members of former West German households experienced smaller movements in equivalized post-government income than Americans. Yet in the same period members of former West German households experienced larger positional changes than Americans. This suggests that the distribution of equivalized post-government income is narrower among members of former West German households than it is among Americans. As can be seen in the eighth and ninth columns of Table 1, this is the case. In the first year of the period (1983), the Theil(1) coefficient of members of former West German households (0.099) is smaller than that of Americans (0.157).

Using several measures of mobility, Schluter (1998) examined the equivalized post-government income mobility in Germany, Britain, and the United States. When using positional measures he found greater mobility in Germany, which was due to more positional movement in the lower portion of the income distribution. He also compared non-positional movements in the three countries by drawing the distribution of changes in log equivalized post-government income via kernel densities estimation and found that changes in the United States were larger than those in Germany.

As can be seen in the other six-year periods presented in Table 1, these patterns exist until the period 1988 through 1993, when Americans registered unusually large increases in all three mobility measures and members of former West German households experienced slight declines in all three measures. Americans moved an average of 1.66 deciles, as compared to 1.59 for members of former West German households. According to the Shorrocks measure, 17.8 percent of the equivalized post-government income of Americans was transitory, as compared to 16.5 percent for members of former West German households. As for positional movements, log equivalized post-government income of working-age Americans moved an average of 0.451, as compared to 0.307 for working-age members of former West German

households. In the remaining periods, only once did any of the measures register more mobility for working-age members of former West German households — mean absolute value of decile movements in 1989 through 1994.

The change in the relationship between the two populations coincides with the PSID's introduction of computer-assisted interviewer surveys in income year 1992 (survey year 1993) and a change in the process used to clean income data. In order to investigate changes in income mobility and inequality among Americans in the 1990s, Table 2 duplicates the structure of Table 1 but with results from the CPS and PSID. However, Table 2 contains results using equivalized pre-government income and consecutive two-year intervals.

As can be seen in Table 2, the equivalized pre-government income mobility of working-age Americans was in general higher when using the CPS, but the inequality of equivalized pre-government income was higher when using the PSID. The results from both datasets and all three measures of mobility show an increase in positional and non-positional mobility in the 1990s. However, the changes in mobility when using the PSID were much more dramatic. In 1991-1992 (the first interval to include data from PSID computer-assisted interviews), the PSID results show a very large increase in positional and non-positional mobility, while the CPS results show slight decreases in positional mobility and a slight increase in non-positional mobility. Keep in mind that the PSID income data for survey years 1994, 1995, 1996, and 1997 are from early release files. The PSID staff is working on cleaning these files. The release of new income files is slated for September 2000.

## 6. Conclusions

The results from two different classes of income mobility measures confirms that, until the 1990s, positional income mobility was higher among members of former West German households than among Americans, which is counter to conventional beliefs about the two countries. However, in line with conventional beliefs, non-positional income mobility was higher among Americans than among former West German households. In the 1990s, income mobility among Americans appears to increase when using either the CPS or PSID; however, more work is needed to insure the validity of this finding.

## References

- Aaberge, Rolf, Anders Björklund, Markus Jäntti, Mårten Palme, Peder J. Pedersen, Nina Smith, and Tom Wennemo. 1997. "Income Inequality and Income Mobility in the Scandinavian Countries Compared to the United States," mimeo, August. Turku, Finland: Åbo Akademi University.
- Burkhauser, Richard V., J.S. Butler, and Andrew J. Houtenville. 1999. "Inequality Reaches Germany: A Cross-National Comparison of Permanent Inequality in the United States and Germany in the 1990s," mimeo, Cornell University.
- Burkhauser, Richard V. and Barbara A. Butrica. 1997. "Estimating Federal Income Tax Burdens for Panel Study Income of Dynamics (PSID) Families Using the National Bureau of Economic Research TAXSIM Model." Aging Studies Program Series Paper No. 12, Center for Policy Research, The Maxwell School. Syracuse, NY: Syracuse University, December.
- Burkhauser, Richard V. and John G. Poupore. 1997. "A Cross-National Comparison of Permanent Inequality in the United States and Germany," *Review of Economics and Statistics*, 79(1) (February): 10-17.
- Fields, Gary, S. Jesse B. Leary, and Efe A. Ok. 1998. "Income Movement in the United States in the Seventies and Eighties," Working Paper, Cornell University.
- Fields, Gary, S. and Efe A. Ok. 1996. "The Meaning and the Measurement of Income Mobility," *Journal of Economic Theory*, 71: 349-377.
- Maasoumi, Esfandiar and Sourushe Zandvakili. 1986. "A Class of Generalized Measures of Mobility with Applications," *Economics Letters*, 22: 97-102.
- Schluter, Christian. 1998. "Income Dynamics in Germany, the USA and the UK — Evidence from Panel Data," Paper presented at GSOEP98 Conference.