8-1997

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ISSN 1061 1843

Income Security Policy Series
Paper No. 18

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August 1997

$5.00

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Abstract

We use cross-sectional and longitudinal data from Germany (Socio-Economic Panel) and the United States (Panel Study on Income Dynamics) to show how the income distribution changed over the 1980s business cycle in these two countries. Consistent with other researchers we find income inequality in the United States increased over the peak years of the 1980s business cycle and that the middle of the income distribution shrank. However, we also find that the great bulk of the disappearing middle shifted to the right—became richer—over the period. Hence, it was disproportionate gains from growth rather than the "immiseration" of the middle class that explains the rise in inequality over the period.

Focusing on the upswing years of the 1980s business cycle, we find that cross-sectional comparisons understate the gains to persons who lived in working-age households over the period. This is especially true of persons who were living in nonworking households at the start of the period. We find similar results for Germany. However, regardless of the data used, the distribution of the fruits of economic growth during the 1980s were more evenly distributed in Germany than in the United States. Economic gains by persons living in nonworking households and in households headed by relatively low educated workers in Germany were much closer to the gains of other working age households than was true in the United States.

Introduction

> The trouble with the world is not that people know too little, but that they know so many things that ain't so.
>
> Mark Twain

Economic growth has historically been seen as the most effective way to raise the well-being of all members of society. Yet it has been argued that, for the last two decades, the gains from economic expansion in the United States have primarily flowed toward the top of the distribution, increasing income inequality, diminishing the middle class, and raising concerns that the link between economic growth and broad based prosperity has been broken (U.S. Bureau of the Census 1991; Karoly 1993; Easterlin, MacDonald, and Macunovich 1991). Despite seven years of sustained economic expansion, the decade of the 1980s closed with a higher degree of income inequality, a larger number of individuals in poverty, and a smaller portion of the population in the middle of the income distribution than had been there at its beginning. Such facts have lead some academics and policymakers to argue that economic growth was benefitting only the wealthiest of the population (Duncan, Smeeding, and Rodgers 1992; Karoly and Burtless 1995; Danziger and Gottschalk 1995). It has been further argued that such an outcome was unique to the United States and not experienced in industrialized nations with more intervention-oriented economic policies (Burtless and Smeeding 1995).

In many ways research on the changing patterns of the United States income distribution during the 1980s lends credence to these arguments.[1] The large body of research on the United States income distribution shows that income inequality increased in the United States during the 1980s and suggests that these changes diminished the middle class and left the "vulnerable" more exposed to economic losses due to a weakened social safety net (Karoly and Burtless 1995; Karoly 1993; Duncan, Smeeding, and Rodgers 1992). The international literature indicates that

while inequality has grown in other western industrialized countries throughout the 1980s, the United States had the highest level of income inequality (Gottschalk and Smeeding 1997).

However, characterizations of the United States income distribution and how it changed in the 1980s as well as comparisons of these changes with other industrialized countries are based almost entirely on parametric calculations, such as the Gini or Theil coefficients, which summarize information about the income distribution into a single number. Furthermore, such calculations have been almost entirely based on cross-sectional comparisons between groups of people rather than tracing the outcomes of persons over time. While these calculations provide a useful measure of change in the overall income distribution, a richer panorama of the 1980s can be seen by comparing changes in the entire income distribution over the period and by including longitudinal as well as cross-sectional pictures of change in that panorama. We do so by using a statistical technique known as kernel density estimation to draw a picture of the distribution of income for each country in each year of observation and by comparing estimations based on cross-sectional data with their longitudinal counterparts.[2]

Here we use kernel density estimation to describe how the level and character of economic well-being and income distribution in the United States changed over the full business cycle of the 1980s. We then concentrate on the upswing in the 1980s cycle and examine whether the outcomes realized in the United States were unique by comparing outcomes in the United States and Germany. Such comparisons provide information about the extent to which explicit commitments to maintain income equality, like the ones made in Germany, equalized the gains and losses experienced by various sub-populations during the growth period of the 1980s.[3]

Consistent with other researchers, we find that income inequality increased over the peak years of the 1980s business cycle and that the middle of the income distribution shrank. However,

we also find that the great bulk of the disappearing middle shifted to the right—became richer—over the period. Hence, it was disproportionate gains from growth rather than the "immiseration" of the middle class that explains the rise in inequality over the period. When we focus only on the upswing years of the 1980s business cycle, we find that cross-sectional comparisons understate the gains in economic well-being that persons living in working-age households actually achieved over the period. This is especially true of persons who were living in nonworking households at the start of the period. We find similar results for Germany. However, regardless of the data used, we also find that the distribution of the fruits of economic growth during the period were more evenly distributed in Germany than in the United States. Economic gains by persons living in nonworking households and in households headed by relatively low educated workers in Germany were much closer to the gains of other working age households than was true in the United States.

The Value of Kernel Density Estimation

Traditional summary measures of income inequality—such as the 90/10 ratio or the Gini, Thiel, and coefficient of variation indices—are well established methods for summarizing inequality in an income distribution. (See Atkinson 1983 for a discussion of these measures.) By design, however, these measures summarize an entire distribution with one value. Because few distributions with known properties can be completely described by one parameter, however, the use of these summary indices produces an incomplete view of the underlying distribution of interest.

Kernel density estimation is an elegant alternative to using traditional summary statistics to measure income inequality. It provides a picture of the entire income distribution in terms of the income density function, from which we can observe the distribution's location, spread and

modality simultaneously. It can also capture absolute increases or decreases in income levels via shifts in the density function to the right or left. Hence, it can show that increases in inequality arise from a variety of types of changes in the shape of the density function. One type, a "squashing down" in the middle combined with a "stretching" at each end, is typically discussed in the literature (see, for example, Danziger and Gottschalk 1995, Figure 5.1, p. 99). But this is only one possibility, as our data will show. Changes in modality are also revealed by changes in "clumping" at different points along the income scale.

Lorenz curves also provide a picture of the income distribution, but they only provide information about spread and offer nothing about the other two characteristics. Moreover, one can use the density function estimates to derive nonparametric estimates of distribution functions, standard summary indices, and Lorenz curves, if required. For these reasons we use kernel density estimation here to evaluate how the income distribution changed in the United States and Germany during the expansion years of the 1980s for individuals in our subgroups.

In their simplest forms, kernel estimators are smoothed histograms. Data in a neighborhood around a point are used to estimate the distribution of a variable of interest (e.g., income) over a population. However, while histograms restrict observations to any one neighborhood group, kernel estimators theoretically allow an observation to be included in an infinite number of neighborhood groups, which results in a smoothing of the distribution shape. In practice, an observation is included in a finite number of groups, where the number of groups is equal to the sample size. The idea underlying kernel density estimation is a viewing window that slides over the data; the estimate of the density depends on the number of observations that fall within the window as it passes along the income scale.

In all estimates, weighted adaptive bandwidth kernel estimators are used with the Epanechnikov kernel function. Kernel estimators are well established in the statistics and econometrics literatures; an excellent reference on kernel estimators is Silverman (1986). The specifics of the methodology employed here may be found in Burkhauser, Crews, Daly, and Jenkins (1997).

Measuring Economic Outcomes across the Business Cycle

Although most economists take for granted that any examination of changes in the income distribution over time will be sensitive to the years being considered, research in this area has frequently failed to distinguish between changes associated with movements in the business cycle and changes that occur between two similar points in the business cycle (Burkhauser, Crews, and Daly 1997). While there are no formal rules for choosing comparison years, Figure 1 illustrates the potential problem with selecting analysis years randomly. Figure 1, which is taken from the *Economic Report of the President* (1991, 1997), shows median real family income in the United States over the past 25 years based on data from the United States *Current Population Survey*. A comparison of median real family income in 1979 and 1993 leaves the impression that 1980s left the median American family worse off.[4] However, the top panel of Figure 2, which charts the changes in real Gross Domestic Product (GDP) and quarterly unemployment rate for the United States, shows that 1979 is a peak year and 1993 is a trough year of two different business cycles. Looking peak-to-peak (1979 to 1989) in Figure 1, a very different impression emerges. Median real family income rose during this period, increasing by almost $3,000. This simple exercise confirms the common sense notion that income distribution comparisons are sensitive to business cycle fluctuations and underscores the importance of careful year selection.

As shown in Figure 2, the United States economy experienced a serious recession in the early part of the 1980s, with unemployment peaking at post-World War II highs in 1982. This was followed by substantial economic growth and falling unemployment rates for the rest of the decade. Like the United States, Germany, shown in the bottom panel of Figure 2, experienced a recession in the early 1980s as well as a strong economic recovery through the rest of the decade. However, the unemployment rate, which was below that of the United States at the start of the decade, was higher throughout the second half of the decade.

Because business cycle troughs and peaks in the two countries occurred over slightly different years, in each country, we use the years that mark the deepest part of the recession and the highest point of the subsequent peak rather than comparing the same calendar years in each country. We chose our trough and peak years based on macroeconomic indicators of real gross domestic product, real personal income, and the unemployment rate. For the United States, the period of observation is 1983 to 1989. For Germany, the analysis covers 1984 to 1991.

Data

The data used in both the cross-sectional and longitudinal analyses are from the United States *Panel Study of Income Dynamics* (PSID) and the 1997 Syracuse University English Language Public Use File of the *German Socio-Economic Panel* (GSOEP).

The PSID is a representative sample of the United States population first followed in 1968. We use the 1984 and 1990 waves of the PSID, which provide income information for years 1983 and 1989 respectively—the trough and peak years of the 1980s business cycle in the United States—for both our cross-sectional and longitudinal analyses. The PSID contains information on approximately 19,750 individuals over this period. In the cross-sectional analyses, the data samples for 1984 and 1990 contain all observations in the PSID that have nonzero sampling weights. Thus, there are individuals in the 1984 sample who are not present in the 1990 sample, and vice versa. The longitudinal sample is comprised of the 14,925 individuals who are in both the 1984 and 1990 waves of the PSID. In the longitudinal case, the 1990 sampling weights are used in all estimations. (See Hill 1992 for a fuller discussion of the PSID weighting procedures).

The GSOEP is a representative sample of the German population first followed in 1984. We use the 1985 and 1992 waves of the GSOEP—the trough and peak years of the 1980s business cycle in Germany—which provide income information for years 1984 and 1991 respectively, for both our cross-sectional and longitudinal analyses. The GSOEP contains

information on approximately 13,700 individuals over this period. The cross-sectional analyses and longitudinal samples of the GSOEP used here are constructed similarly to those of the PSID. Since 1990 the GSOEP has included a representative sample of households living in the reunited eastern states of Germany. However, in these analyses we restrict our sample to individuals living in the western states of Germany. For a more detailed discussion of these data see Wagner, Burkhauser, and Behringer (1993).

Measuring Economic Well-Being

Although we will measure the economic well-being and position in the income distribution of individuals, most people share resources with other coresident individuals and have access to income that does not flow directly to them. For this reason a broader unit, such as a family or a household, is used to collect information on income from which individual income is derived. There is much disagreement about who should be included in the income-sharing unit definition.

The United States *Current Population Survey* (CPS) family definition used in Figure 1, is based on marriage or blood relationship. It is often used as the income-sharing unit in the United States income distribution literature (e.g., Burtless 1996b; Karoly 1996; Karoly and Burtless 1995), but the CPS household definition, based on common residence, is closer to what is used in most cross-national studies (e.g., Gottschalk and Smeeding 1997). Atkinson, Rainwater, and Smeeding (1995) argue that using the blood or marital relationship definition rather than the less restrictive common residence definition produces a bleaker picture of the income distribution because it categorizes a larger number of individuals as single-person sharing units even when they reside and share the benefits of living with others.[5] The PSID and GSOEP sharing-unit definitions fall somewhere between the narrow CPS family and broad CPS household definitions in that they include unmarried nonblood-related cohabitants in the "family" but exclude other unmarried nonblood-related residents. For convenience of discussion, we will use the word "household" to describe the PSID and GSOEP sharing units in our analysis, although they are not

exactly comparable to the CPS household definition. As do almost all other studies of income distribution, we also assume that household members equally share household income during the period they are together.[6]

While measures of income distribution are not affected by the cost-of-living index used, measures of economic well-being are. Boskin et al. (1996) offers the most systematic criticism of the United States Bureau of Labor Statistics's cost-of-living index, the CPI-X, which is used in most measures of economic well-being in the United States, and proposes alternative indices for the 1980s that are between 1.0 and 1.5 percentage points below the CPI-X index. While using alternative cost-of-living measures affects the magnitude of our results, they do not alter our major points.[7] Hence, we use the CPI-X index in this paper to remain consistent with the literature. We use the International Monetary Fund Consumer Price Index for Germany. All incomes are converted to 1991 monetary units.

Household income is defined as the sum of all income held by individuals residing in a single dwelling and is measured as post-tax and post-transfer money income. Pre-tax post-transfer family money income, including cash government transfers, is the most common yardstick for economic status in the United States. It is obtained by summing all sources of income for all household members during a calendar year. To obtain a more comprehensive income measure we added the cash value of food stamps in the United States and the imputed rental value of owner-occupied housing in each country. However, we are interested in making cross-national comparisons and, because taxes play a much larger role in Germany than in the United States, we look at household income net of income taxes and Social Security contributions in both countries.[8]

To account for the fact that $1,000 per week provides a higher standard of living for a single-person household than it does for individuals belonging to larger households, household income is adjusted by an equivalence factor. There is no universally accepted equivalence scale, but the scale used here is one commonly used by cross-national researchers. It has an elasticity with respect to household size of 0.5.[9] In all cases, income is adjusted for household size for the year in which the income is recorded.

Effects of the Business Cycle on Income in the United States

In previous work we have used kernel density estimates to show how the income distribution shifted over the 1980s business cycle using data from the *Current Population Survey* (CPS). Figure 3, which is based on Burkhauser, Crews, Daly, and Jenkins (1997), shows the income density function for the United States at the initial peak of the 1979 business cycle, at its trough in 1983, and at its new peak in 1989. The effects of the business cycle are profound. As the country shifted from boom to bust between 1979 and 1983, the *entire* income distribution—household size-adjusted pre-tax and post-transfer individual income—shifted to the left (that is, overall, people became poorer). By 1989, however, the picture had changed dramatically. Seven years of economic growth moved the entire distribution rightward (overall, people grew richer). Between 1983 and 1989, the population mass at lower real income levels fell and the mass of the population at higher income levels grew substantially. These three distributions of yearly income illustrate the profound effect that the business cycle had on the United States income distribution. Comparing the peak-trough-peak yearly distributions of the business cycle highlights the gains to individual economic well-being caused by growth and the losses to individual economic well-being caused by recession.

When peak-to-peak years 1979 and 1989 are compared in Figure 4 we find that there has been a squashing down in the middle of the distribution and a spread of mass into the two tails which is consistent with the increase in summary measures of income distribution found by others using these data. However, as Figure 4 also shows, the vast majority of the "lost" middle mass shifted to the right (people became richer) rather than to the left (people became poorer). More precisely, 90 percent of the loss in the middle mass shifted right, whereas only 10 percent shifted left. The asymmetric middle mass slide to the right unquestionably increased inequality but did so through disproportionate increases in economic well-being. Inequality did not increase through the "immiseration" of the middle via a large slide to the left.[10]

In this paper we are interested in comparing the income distribution and economic well-being outcomes for persons living in working-age households in the United States and Germany over the upswing years of the 1980s business cycle.[11] As Figure 4 shows, economic growth improved the economic well-being of the vast majority of the United States population. For persons living in working-age households, this occurred through increases in both employment and wage earnings. In the tables and figures that follow, we explore how this occurred across various United States working age subgroups and compare their outcomes with their German counterparts.

We base our definition of working age on Social Security eligibility rules and the resulting retirement ages in the two countries. The German retirement system offers greater opportunity for early retirement than the United States system and the median retirement age in Germany is lower than in the United States. In the United States, while some employer pensions allow for early retirement prior to age 62, the earliest age of eligibility for Social Security retirement benefits is age 62. Hence, for the United States we concentrate on persons who live in

households whose head is aged 61 or younger.[12] In Germany, during this period, early Social Security retirement age could begin as early as the late 50s for those who were unemployed, but by age 60 more than one-half of workers were either retired or working part-time. Hence, we define younger working households in Germany as those having a head who is aged 59 or younger.

A serious criticism of United States economic policy over the 1980s was that economic growth not only failed to raise "all boats" but that the United States social safety net was not sufficiently strong to protect young nonworking households from suffering declines in their economic well-being. To examine outcomes during this period of economic growth for young nonworking households, we further divide the population into two groups: persons living in younger working households and persons living in younger nonworking households. We define working households as those in which either the head or the spouse worked at least 52 hours over the year. We define nonworking households as those in which neither the head or the spouse worked for 52 hours over the year.[13]

In the cross-sectional analyses using either the PSID or the GSOEP, a person's population subgroup assignment is defined in each year by the characteristics of the household in which the person lives in that year. Thus, the same individual could be included in the younger nonworking household group in a trough year and in the younger working household group in a peak year. For the longitudinal analyses, a person's population subgroup assignment is defined by the household characteristic of the household in which the person lived in the trough year.

Changes in Economic Well-Being in the United States and Germany

In Table 1 we use cross-sectional data and longitudinal data from the trough and peak years of the 1980s business cycle to compare changes in economic well-being and income inequality for the entire population and for the working age population and its subgroups.[14] Our cross-sectional results for the United States population are similar to those of other researchers (e.g., Karoly and Burtless 1995; Karoly 1993; Daly, Crews, and Burkhauser 1997; Burkhauser and Poupore 1997). Economic growth following recession brought substantial increases in average economic well-being. In the United States, median household size-adjusted income rose by $1,578, an increase of 9.01 percent between 1983 and 1989.[15] Our cross-sectional results for Germany are also consistent with past research (e.g., Burkhauser, Holtz-Eakin, and Rhody forthcoming; Burkhauser and Poupore 1997). In Germany, median real income increased by 18.86 percent between 1984 and 1991.[16]

Increases in overall economic well-being during the trough-to-peak years of the 1980s business cycle are shown to have yielded greater inequality in household size-adjusted income measured by the 90/10 ratio—i.e., the household size-adjusted income of the person at the 90th percentile relative to that of the person at the 10th percentile. In both countries these measures increased. However, the increase in the cross-section was greater in the United States, about 10 percent, than in Germany, about 8 percent. Furthermore, Germany had much lower income inequality than the United States throughout the period.[17]

Our cross-sectional results for the working-age populations in the United States and Germany mirror those of their entire population, although the increase in median household size-adjusted income is slightly higher over the period than for the overall population in both countries. However, when we disaggregate the working-age population into persons living in working

households and persons living in nonworking households substantial differences are found between the two in the cross-sections. While median household size-adjusted income rose by 9.70 percent in the United States for persons in working households, the median household size-adjusted income of nonworking households fell by 10.36 percent. Hence, during the upsurging of the United States business cycle, the median income of persons living in working households increased ($18,940 to $20,778) as did the proportion of persons living in such households (92.74 to 93.63), but those who lived in nonworking households were clear losers both relative to the population as a whole and absolutely. In contrast, in Germany both persons living in working households and those living in nonworking households gained during the economic recovery of the 1980s, although the gains to persons living in nonworking households were smaller, at 12.7 percent, than the gains for those living in working households who saw a 19.1 percent rise in income.

Persons living in nonworking households are a diverse group in both countries. They include those receiving social insurance benefits as well as those dependent on social welfare benefits. This helps explain the fact that income inequality within this subgroup is greater in both countries than it is for the population as a whole or for persons living in working households. Cross-sectional comparisons show that within the nonworking household population, the 90/10 ratio increased dramatically in the United States from trough to peak years but fell in Germany.

The cross-sectional results reported in Table 1 are consistent with previous findings based on cross-sectional data. However, one's image of the 1980s changes dramatically when we focus on longitudinal data over this same period. To be included in the PSID and GSOEP longitudinal samples, a person had to be observed in both trough and peak years; hence, the number of observations in the longitudinal sample in the trough year in both countries is smaller than in the

cross-sectional trough year sample. This reflects attrition both because of death and nonresponse.[18] Despite these problems, cross-sectional and longitudinal comparisons of the total population in the two countries between trough and peak years are similar. Among persons observed in these years, income inequality and average economic well-being rose using either cross-sectional or longitudinal data. The increase in household size-adjusted median income in the cross-sectional comparisons in the United States was 9.01 percent. The increase in median income in the longitudinal comparisons is 6.26 percent. In Germany the two values are 18.86 and 20.77 respectively.

It is in the subgroup comparisons that important differences are found between the cross-sectional and longitudinal views of household size-adjusted income in both the United States and Germany. In the United States, when the same people are followed in the younger working household group, their average real household size-adjusted income is shown to rise at a substantially higher rate—from 1983 to 1989, median income in the longitudinal sample rose by 11.42 percent while median income in the cross-sectional sample increased by 9.70 percent. But this difference in the magnitude of growth pales before the change in both size and direction of the growth observed among nonworking households. It is this dramatic difference that makes it important for analysts to clearly identify which questions cross-sectional and panel data are being called upon to answer.

While the median household size-adjusted income of persons living in nonworking households in 1983 is 10.36 percent lower than that of such persons in 1989, the actual fate of the 1983 cohort of nonworking households is much brighter. The real household size-adjusted median income of persons who were living in nonworking households in 1983 rose by 43.13 percent over the upswing years of the 1980s business cycle. In this case the much improved

economic outcomes of nonworking households who gained employment is masked by cross-sectional comparisons which include a mixture of new nonworkers and those who remained out of work over the entire period.

In Germany the difference in outcomes using cross-sectional and longitudinal data go in the same direction as in the United States. The median income of both working and nonworking households is shown to be much brighter when longitudinal data are used. Like the United States, growth in economic well-being between trough and peak years was actually greater for those who were not working in the trough period, a gain of 75.6 percent in median income, than for those who were working, a gain of 23.3 percent.

Changes in the Income Distribution: Cross-Sectional versus Longitudinal Views

In Table 1 we provided summary measures of economic well-being (mean and median) and income distribution (90/10 ratio) and showed how they are affected by the use of cross-sectional and longitudinal data. Here we use kernel density estimations for that purpose. In Figures 5a and 5b we show the kernel density estimates of the cross-sectional distribution of income among persons living in younger working households in the United States and Germany. In both countries the distribution in the peak year (1989 in the United States and 1991 in Germany) is lower and to the right of the distribution for the trough year (1983 in the United States and 1984 in Germany), with less density in the left tails and more in the right. Thus, persons living in younger working households are shown to experience an overall improvement in their economic well-being during the expansion period of the 1980s business cycle. Increased income inequality among working households can also be seen in the two figures as a result of a widening of the distribution and a lowering of its height in the peak-year densities. These figures

are consistent with the findings in Table 1 but provide a clearer overall picture of the entire distributions. However, Figure 5b demonstrates a limitation of the summary statistics in Table 1. The distribution of income among persons in German younger worker households in 1984 was bimodal, a characteristic not discernable from summary measures. By 1991 the distribution lost the second mode and became somewhat uniformly distributed between 20,000 DM and 33,000 DM.

Figures 6a and 6b present the kernel density estimates for persons living in younger nonworking households. In the United States, the distribution shifts to the left and narrows, bunching just below the $5,000 level. In contrast, in Germany the distribution becomes bimodal, with one mode to the left of the peak of the 1984 density and one mode to the right. Hence, while median income and the 90/10 ratio appear to show unambiguous improvement in both economic well-being and income distribution in Germany over the period, the kernel density estimates show a bunching of a subset of the population at a lower level than in 1984.

We now turn to longitudinal views of changes in income distribution. Figure 7a shows the distribution of household size-adjusted income in 1983 and in 1989 for persons in the United States who were living in working households in 1983. The results are not much different from those in Figure 5a. The distribution shifts to the right, indicating that the income of all working households improved over the upswing of the 1980s business cycle, but the gains were disproportionate and led to a substantial spread in the distribution. The story is much the same for workers in Germany shown in Figure 7b, except that the 1984 distribution shows a weaker bimodal tendency than the cross-sectional distribution estimate (Figure 5b).

It is in the distribution of persons living in nonworking households in the United States that the longitudinal figure (Figure 8a) provides the most stark contrast to the cross-sectional

picture presented in Figure 6a. While the distributional peaks in the two years are approximately the same in Figure 8a, the 1989 peak is at a much lower level. There is a substantial decrease in the mass in the left region of the distribution and a substantial spreading of the distribution to the right.

Cross-sectional and longitudinal views of nonworking households provide very different perspectives on the United States in the 1980s. Declines in the economic well-being of those in nonworking households in the 1980s found in cross-sectional comparisons should not be used to suggest that people who were in such households at the start of the recovery became worse off over the rest of the decade.

The longitudinal view of change in the economic well-being of persons living in nonworking German households is shown in Figure 8b. Like their United States counterparts, these individuals experienced substantial gains in economic well-being that are understated in the cross-section. The estimated density for 1984 is nearly bimodal with a second peak at about 24,000 DM, while the 1991 distribution is clearly unimodal with a very thick right tail even as far out as 40,000 DM. These characteristics of the distributions are not apparent from the summary measures in Table 1, thus again the value of kernel density estimation is demonstrated.

Changes in Economic Well-Being and Income Distribution by Educational Attainment

In this section we focus on the economic well-being and income distribution of persons living in working households in the United States and Germany. As we saw in Table 1 and in our kernel density estimates, the economic well-being of working households improved in both the United States and Germany over the upswing in the 1980s business cycle. In Table 2 we

disaggregate our sample of persons living in working households by the head's educational attainment to show who among this population fares the best over the period.

Education in Germany and the United States

Cross-national comparisons of the economic rewards of education are perilous because educational systems vary across countries. While the simplest method of quantifying educational attainment across countries is to sum a person's years of schooling, this method fails to capture the substantial difference in the characteristics of that education.

In Germany, following four years of primary education that begins at age six, students are tracked along one of three alternative secondary school paths.

The basic German secondary school vocational track, called *Hauptschule*, requires five additional years of schooling and is designed to prepare students for further training in retail sales, semiskilled office work and low-level trades. Most *Hauptschule* graduates enter an apprenticeship program that combines on-the-job training with part-time vocational schooling. Some *Hauptschule* graduates transfer to *Realschule*, a more advanced secondary school track.

Realschule generally requires six years of education beyond primary school and is more rigorous than *Hauptschule*. Students are trained for positions in social services, industry, administration and agriculture that do not require the more advanced *Gymnasium* level training. After completing *Realschule*, students may enter apprenticeships with part-time vocational schooling that are similar in design to those available to the *Hauptschule* graduate. Full-time vocational school is another common choice among graduates. It is also possible for exceptional students to transfer to *Gymnasium*, the most advanced of the three secondary schooling tracts.

Successful completion of entrance exams is usually required to attend *Gymnasium*. Students who choose this track are held to the highest educational standards and it is common for

students to repeat a year of education. *Gymnasium* requires nine years of education beyond primary school. *Gymnasium* graduates enter either university or professional schools.

In addition to the early tracking of German students along distinct career paths, the German educational system more fully integrates classroom and on-the-job training following secondary school for nonuniversity-bound graduates. All sectors of the economy take part in apprenticeship programs designed by employers' associations, unions, and the government to match the skills of labor with the demands of the labor markets. Certificates are awarded to students who successfully complete an apprenticeship program.[19]

In comparison, the United States system does not offer the specific educational tracking that is offered in Germany. The educational system in the United States provides six years of primary education, followed by three years of middle school education, and three years of secondary school that is referred to as high school. Vocational training is offered as an option during high school. Noncollege-bound students who complete high school have few formal education-based links to apprenticeship programs. However, post-secondary schooling is available from two-year junior colleges that provide some vocational training as well as college preparation courses and from four- year colleges and universities.

In Table 2, we use a measure of education that has been created for the purpose of cross-national comparisons.[20] The measure consists of three categories that attempt to disaggregate the German educational system at the level of relative human capital investment that at least ordinally match the categories of less than high school, high school, and greater than high school in the United States.

In Germany, the less than high school education category was assigned if the head reported that the highest education received was lower secondary school (*Hauptschule*),

intermediate secondary school (*Realschule*), or less. The head was assigned a high school education if he or she reported that the highest level of education attained was upper secondary school (*Gymnasium*), a certificate of aptitude for specialized short-course higher education (*Fachhochschulreife*), an apprenticeship (*Lehre*) or specialized vocational school (*Berufsfachschule*). Finally, the head was assigned a greater than high school education if he or she reported that the highest level of education completed was from one of the following: a school of health care (*Schule der Gesundheit*), a specialized college of higher education (*Fachhochschule*), a technical university usually requiring practical training as part of studies (*Technische Universität*), a university degree, or civil service training.

Table 2 focuses on persons living in younger working households over the trough-to-peak years of the 1980s in the United States and Germany. The first four rows repeat values found in Table 1. In the remainder of the table we disaggregate our sample by the educational status of the head.

In the United States the cross-sectional results are familiar. Median household size-adjusted income fell for those with less than a high school education even during a major economic recovery. Gains to high school graduates were positive but small, however, gains to persons in the highest educational category were nearly three times that of high school graduates. Income distribution as captured by the 90/10 ratio increased overall for working households as well as within all three educational groups. In Germany, while the gains to all education groups were positive, the lowest education group also had the smallest gain.

In both countries, the longitudinal data show much larger gains across all educational groups. In the United States, median household size-adjusted income for people living in working households headed by a less than high school graduate increased by 8.60 percent over the period

compared to 9.93 percent gains for high school headed households and 13.51 percent for more than high school headed households. In Germany the gains across educational levels were much more uniform with the lowest education group actually increasing at slightly higher rates than the other two education classes.

Cross-sectional comparisons of the economic well-being of persons in working age families in the trough-to-peak years of the 1980s business cycle understate the actual gains in median household size-adjusted income of persons who lived in such households over the period. Using longitudinal data we show that on average all our educational subgroups gained over the period. However, the gains to persons living in the lowest educational attainment subgroup in the United States were much smaller than those of the other groups. While the gains of the least educated subgroup in Germany were quite close to those in the other subgroups.

It is important to recognize that our analysis has focused entirely on values of household size-adjusted income for individuals living in households of working age. Many labor market studies focus on the wage earnings of workers and do not put wage earnings in the context of household income. Conventional wisdom in the United States is that male labor earnings fell in the United States during the 1980s. To show that such results are consistent with the findings in this paper, in Table 3 we show the 90/10 ratio in labor earnings as well as the mean and median labor earnings of men aged 25 to 50 by educational attainment for the trough and peak years of the 1980s business cycle, using both cross-sectional and longitudinal data for the United States and Germany. The patterns are remarkably similar to Table 2. In the cross-section, real median labor earnings fall slightly over our period of economic upswing in the United States, while those workers without a high school degree experience the greatest declines. Only the most highly educated experience gains. In contrast, in the longitudinal comparisons all three educational

groups gain although workers with the most education gain the most. In Germany all education groups gain over the period and the longitudinal gains are greater than in the cross-section.

Conclusions

While inequality grew and the middle of the income distribution shrank between the two peaks of the 1980s business cycle in the United States, this was not caused by the immiseration of the middle class. As was true of other periods of growth in the United States, most Americans gained. The vast majority of the drop in the middle of the distribution was the result of the middle sliding to the right (people becoming richer). Germany experienced the same phenomena during their 1980s business cycle.

Cross-sectional comparisons of persons living in working-age households show substantial gains in median household size-adjusted income in the United States and Germany during the upswing of the 1980s business cycle. However, in the United States persons living in younger nonworking households experienced absolute losses in real median income, while in Germany persons in both working and in nonworking households experienced real increases. The German social welfare system provides much greater protection against economic loss than does the United States social welfare system.

However, it is important to note that cross-sectional snapshots of vulnerable groups at different times in the business cycle may not represent the actual experience of these groups over time, as evidenced by our longitudinal findings that the median income gains were greater among younger nonworking households than among working households during the upswing years of the 1980s business cycle.

Kernel density estimates show that the increase in income inequality in both the United States and Germany over these years was the result of a spreading of the distribution and a

lowering of the middle peak of the distribution, but that most of the spread was toward the right. We found little evidence of growth in the left portion of the distribution—real income grew for most people but at disproportional rates.

While we show that the rewards of growth were spread more widely during the upswing in the United States business cycle than is commonly recognized, inequality nonetheless did increase and the rewards to growth to persons in younger nonworking households or in households headed by a person with a low level of education relative to other households was substantially less in the United States than in Germany. German tax and transfer policy played a much more powerful role in insuring that the returns to growth were more equally shared than did United States policy. What remains to be seen is if the German commitment to wealth sharing can be sustained over the business cycle of the 1990s.

Endnotes

1. See Levy and Murnane (1992) and Karoly (1993) for a review of this literature.

2. See Burkhauser, Crews, Daly, and Jenkins (1996, 1997), DiNardo, Fortin, Lemieux (1996), Ginther (1995), and Jenkins (1995) for examples of analyses of income and earnings distributions using kernel density estimation.

3. For a fuller discussion of political and economic changes in Germany over this period, see Smyser (1993).

4. Danziger and Gottschalk (1995), Burtless (1996a, 1996b), and Karoly (1996), comparing these years, have characterized the 1980s as a decade in which "the rich got richer and the poor got poorer."

5. Burkhauser, Crews, Daly, and Jenkins (1996) verify this claim using data from the CPS. While they found qualitatively similar overall results using the two definitions, the proportion of individuals in the lower tail of the distribution was larger using the CPS family-based definition.

6. Jenkins (1991a) makes a strong case for studying the within-household distribution of 6.income. Lazear and Michael (1988) attempt to do so with respect to adults and children in a given household.

7. Burkhauser, Crews, and Daly (1997) show the effect of using the CPI-X index rather than one which does not overadjust for inflation on the "crossover" point—the percentile at which income in period $t + x$ is first equal to income in period t—in across year cross-sectional economic well-being comparisons.

8. The tax burden for families in the GSOEP was computed using tax calculation routines 8.developed by Johannes Schwarze of the Deutshes Institut für Wirtschaftsforschung. A detailed discussion of the simulations is found in Schwarze (1995). For the United States we used the tax routine provided in the PSID data. In both the United States and Germany our tax models ignore local and state taxes on property or income. Sales taxes are also ignored. Tax-adjusted values for both these datasets are available in the Syracuse University Panel Study of Income Dynamics and German Socio-Economic Panel Equivalent File. See Burkhauser, Butrica, and Daly (1995) for a detailed discussion of these data.

9. Equivalence scales contain assumptions about the returns to shared living. Many equivalence scales, even complicated ones, can be approximated well by a single parameter scale (see Buhmann, Rainwater, Schmaus, and Smeeding 1988). An equivalence scale with an elasticity with respect to household size of 1 (the per capita scale) implies no economies of scale. An elasticity of 0 (i.e., with no adjustments to household income) implies an infinite number of individuals can live as well on a given

household income as a single-person household with that income. An elasticity of 0.5 (the square-root scale) assumes that the true economies of scale lie directly between these two extremes. See Burkhauser, Smeeding, and Merz (1996) for a discussion of the sensitivity of different equivalence scales in cross-national comparisons. The household elasticity implicit in the United States Bureau of the Census poverty scale is 0.56 (Buhmann et al. 1988). While most poverty studies in the United States use the Census poverty scale, it has been severely criticized (see, for example, Citro and Michael 1995). Other recent studies using the square-root equivalence scale are Burkhauser, Crews, and Daly (1997), Burkhauser, Crews, Daly, and Jenkins (1996, 1997), Karoly and Burtless (1995) , and Atkinson, Rainwater, and Smeeding (1995).

10. Burkhauser, Crews, Daly, and Jenkins (1996) report similar findings for the United Kingdom. Burkhauser and Crews (1997) compare cross-sectional results from the CPS and the Panel of Income Dynamics (PSID) for the 1980s business cycle and show similar results. Most recently, Daly and Burkhauser (1997) show that when 1989 is compared to 1995, a near peak year of the not yet completed 1990s business cycle and the most recent year of CPS data available at that time, the phenomenon of a "shrinking" middle mass primarily spilling out to the right continued to occur over the 1990s business cycle.

11. In other analyses we have made comparisons between American and German persons living in older and younger households over this period. See, for instance, Crews and Burkhauser (1997).

12. For a discussion of the transfer from work to retirement in the United States, see Quinn and Burkhauser (1994). For a discussion of the retirement process in Germany, see Jacobs and Schmähl (1989).

13. This definition is arbitrary, based on one hour per week. Any cutoff is controversial, and the higher the cutoff value the more likely it is that we will include legitimate part-time employed households in the nonworking population. However, increasing our cutoff to five or ten hours per week does not change our results significantly.

14. In Burkhauser, Crews, Daly, and Jenkins (1996) we use kernel density estimation to compare changes in the income distribution and economic well-being in the United States and the United Kingdom over the peak-trough-peak years of the 1980s business cycle using cross-sectional data. Ideally we would like to evaluate Germany over the full peak-trough-peak years. Unfortunately, the first year of GSOEP income data is for 1983, so it is only possible to perform trough-to-peak comparisons between the United States and Germany.

15. As can be seen in Figure 3 much of this growth is the result of business cycle recovery from the serious recession of 1982-1983. Burkhauser, Crews, Daly, and Jenkins (1996) show that on average economic growth did occur over peak-to-peak and trough-to-trough comparisons of the United States business cycle of 1979 (peak) to 1983 (trough) to 1989 (peak) to 1992 (trough) for the overall population as well as for persons living in younger or older households using cross-sectional data from the CPS.

16. The number of years of economic growth in Germany was larger than in the United States. Our purpose here is not to compare changes in absolute economic well-being between the two countries. Rather it is to compare how the relative economic well-being of persons living in different types of households changed in the two countries over this growth period.

17. Other measures of income inequality, such as the Gini and Theil (0) coefficient, also show that household size-adjusted income inequality in Germany rose slightly during the growth years of the 1980s but that the level of inequality in Germany was substantially lower than in the United States during all years. For examples of other comparisons of United States and Germany income inequality, see Daly, Crews, and Burkhauser (1997), and Burkhauser and Poupore (1997).

18. Despite the fact that our longitudinal subsample is restricted to those who are still in the sample in the peak year, there is little difference between average economic well-being and the 90/10 ratio of our longitudinal subsamples and our cross-sectional samples in the initial year of our comparisons.

19. For a more detailed description of the German educational system, see Couch (1994) or O'Connor (1994).

20. This variable was developed by Ken Couch and is available on the Syracuse University Equivalent Data File for the years of our analysis. See Burkhauser, Butrica, and Daly (1995).

Table 1. Summary Measures of Household Size-Adjusted Income and Income Inequality for Persons by Age and Work Status of Head Using Cross-Sectional and Longitudinal Data from the United States and Germany

	United States						Germany					
	Cross-Sectional[a]			Longitudinal[b]			Cross-Sectional[c]			Longitudinal[d]		
	1983	1989	Percent Change	1983	1989	Percent Change	1984	1991	Percent Change	1984	1991	Percent Change
	All Persons											
90/10 Ratio	6.17	6.77		5.81	6.74		3.30	3.55		3.23	3.48	
Mean Income	20,509	23,351	13.86	21,253	23,767	11.83	27,763	33,123	19.31	27,460	33,812	23.13
Median Income	17,518	19,096	9.01	18,271	19,414	6.26	25,154	29,897	18.86	25,284	30,536	20.77
Sample Size (individuals)	19,510	19,753		14,925	14,925		13,731	11,296		8,817	8,817	
	Persons Living in Younger Working-Age Households[e]											
90/10 Ratio	6.39	6.92		5.87	6.57		3.23	3.42		3.20	3.48	
Mean Income	20,705	23,894	15.40	21,446	25,309	18.01	28,654	34,395	20.04	28,038	35,236	25.67
Median Income	17,958	19,807	10.30	18,457	20,829	12.85	26,086	31,319	20.06	25,709	32,269	25.52
Sample Size (individuals)	16,911	16,897		13,107	13,107		11,616	9,146		7,686	7,686	
Population Proportion	73.90	71.16		85.24	75.24		75.07	71.75		78.52	78.52	
	Persons Living in Younger Working Households[f]											
90/10 Ratio	5.23	5.57		4.98	5.85		2.95	3.08		2.95	3.23	
Mean Income	21,800	24,044	14.88	22,504	26,377	17.21	30,012	35,755	19.1	29,281	36,374	24.2
Median Income	18,940	20,778	9.70	19,454	21,675	11.42	27,135	32,312	19.1	26,874	33,137	23.3
Sample Size (individuals)	15,238	15,573		11,875	11,875		10,810	8,663		7,230	7,230	
Proportion of All Working Age Persons	92.74	93.63		93.24	93.24		91.83	93.35		92.02	92.02	
	Persons Living in Younger Nonworking Households[g]											
90/10 Ratio	22.75	113.54		11.12	6.89		8.92	6.72		8.15	5.83	
Mean Income	6,709	6,992	4.22	6,837	10,581	54.76	13,398	14,864	10.9	13,695	22,105	61.1
Median Income	5,133	4,601	-10.36	5,490	7,858	43.13	11,279	12,707	12.7	11,314	19,870	75.6
Sample Size (individuals)	1,673	1,324		1,232	1,232		806	483		456	456	
Proportion of All Working Age Persons	7.26	6.37		6.76	6.76		8.17	6.65		7.98	7.98	

Table 1. Continued

[a]Post-transfer post-tax household size-adjusted income per individual in 1991 dollars based on cross-sectional data from the *Panel Study of Income Dynamics* (1984, 1990).

[b]Post-transfer post-tax household size-adjusted income per individual in 1991 dollars based on the longitudinal data from the *Panel Study of Income Dynamics* (1984, 1990). Sample restricted to individuals observed in both years.

[c]Post-transfer post-tax household size-adjusted income per individual in 1991 deutsche marks based on cross-sectional data from the *German Socio-Economic Panel* (1985, 1992).

[d]Post-transfer post-tax household size-adjusted income per individual in 1991 deutsche marks based on longitudinal data from the *German Socio-Economic Panel* (1985, 1992). Sample restricted to individuals observed in both years.

[e]Head of household is aged 61 or younger for United States households and aged 59 or younger for German households. In the longitudinal analyses, the age of the household head is for the initial year.

[f]Persons who live in a working-age household in which neither the head or spouse has worked at least 52 hours in the year. In the longitudinal analysis this need be true only in the initial year.

[g]Persons who live in a working-age household in which neither the head or spouse has worked 52 hours in the year. In the longitudinal anlaysis this need be true only in the initial year.

Source: Authors' calculations based on the *Panel Study of Income Dynamics* (1984, 1990) and the *German Socio-Economic Panel* (1985, 1992).

Table 2. Summary Measures of Household Size-Adjusted Income and Income Inequality for Persons Using Cross-Sectional and Longitudinal Data from the United States and Germany, Worker Households by Education Level

	United States						Germany					
	Cross-Sectional[a]			Longitudinal[b]			Cross-Sectional[c]			Longitudinal[d]		
	1983	1989	Percent Change	1983	1989	Percent Change	1984	1991	Percent Change	1984	1991	Percent Change
	Persons Living in Younger Working Households[e]											
90/10 Ratio	5.23	5.57		4.98	5.85		2.95	3.08		2.95	3.23	
Mean Income	21,800	25,044	14.88	22,504	26,377	17.21	30,012	35,755	19.1	29,281	36,374	24.2
Median Income	18,940	20,778	9.70	19,454	21,675	11.42	27,135	32,312	19.1	26,874	33,137	23.3
Sample Size (individuals)	15,238	15,573		11,875	11,875		10,810	8,663		7,230	7,230	
	Persons Living in Younger Working Households: Head Has Less Than High School Education[f]											
90/10 Ratio	5.50	7.11		5.03	6.63		2.82	2.95		2.77	3.01	
Mean Income	15,643	15,008	-4.06	16,394	17,323	5.67	27,218	30,829	13.3	24,981	32,565	30.4
Median Income	13,750	12,361	-10.10	14,177	15,396	8.60	24,950	27,575	10.5	22,845	29,243	28.0
Sample Size (individuals)	4,001	2,514		2,903	2,903		4,778	3,576		3,110	3,110	
Proportion of All Working Age Persons	18.89	12.57		17.81	17.81		27.41	27.13		26.73	26.73	
	Persons Living in Younger Working Households: Head Has High School Education[g]											
90/10 Ratio	4.34	4.70		4.31	5.07		2.74	2.91		2.66	3.01	
Mean Income	19,195	19,962	4.00	19,877	22,140	11.39	28,994	34,186	17.9	28,403	34,466	21.3
Median Income	17,049	17,679	3.70	17,667	19,422	9.93	25,977	31,560	21.5	26,053	32,228	23.7
Sample Size (individuals)	6,004	6,240		4,648	4,648		4,369	3,667		2,975	2,975	
Proportion of All Working Age Persons	37.52	37.05		36.92	36.92		52.94	51.34		52.80	52.80	
	Persons Living in Younger Working Households: Head has More than High School Education[h]											
90/10 Ratio	4.71	4.83		4.66	5.25		2.79	2.78		2.63	3.35	
Mean Income	26,779	31,301	16.89	27,724	34,400	24.08	36,667	45,766	24.8	36,788	45,803	24.5
Median Income	23,248	25,389	9.21	24,133	27,393	13.51	33,711	40,794	21.0	33,810	41,959	24.1
Sample Size (individuals)	5,132	6,633		4,256	4,256		1,637	1,371		1,133	1,133	
Proportion of All Working Age Persons	43.59	50.38		45.27	45.27		19.66	21.53		20.47	20.47	

Table 2. Continued

[a]Post-transfer post-tax household size-adjusted income per individual in 1991 dollars based on cross-sectional data from the *Panel Study of Income Dynamics* (1984, 1990).

[b]Post-transfer post-tax household size-adjusted income per individual in 1991 dollars based on longitudinal data from the *Panel Study of Income Dynamics* (1984, 1990). Sample restricted to individuals observed in both years.

[c]Post-transfer post-tax household size-adjusted income per individual in 1991 deutsche marks based on cross-sectional data from the *German Socio-Economic Panel* (1985, 1992).

[d]Post-transfer post-tax household size-adjusted income per individual in 1991 deutsche marks based on longitudinal data from the *German Socio-Economic Panel* (1985, 1992). Sample restricted to individuals observed in both years.

[e]Head of household is aged 61 or younger for United States households and aged 59 or younger for German households. In the longitudinal analyses, the age of the household head is for the initial year. The head or spouse has worked 52 hours or more in the year.

[f]Head of household has less than high school education in the United States or its equivalent in Germany.

[g]Head of housheold has a high school education in the United States or its equivalent in Germany.

[h]Head of household has greater than a high school education in the United States or its equivalent in Germany.

Source: Authors' calculations based on the *Panel Study of Income Dynamics* (1984, 1990) and the *German Socio-Economic Panel* (1985, 1992).

Table 3. Summary Measures of Male (Aged 25 to 50) Labor Earnings by Educational Attainment

	United States						Germany					
	Cross-Sectional[a]			Longitudinal[b]			Cross-Sectional[c]			Longitudinal[d]		
	1983	1989	Percent Change	1983	1989	Percent Change	1984	1991	Percent Change	1984	1991	Percent Change
All Working Men Aged 25 to 50[e]												
90/10 Ratio	6.82	5.35		6.06	5.36		3.35	3.09		2.99	2.55	
Mean Labor Earnings	31,024	32,654	5.3	32,589	38,885	19.3	49,519	54,368	9.8	48,552	60,802	25.2
Median Labor Earnings	28,150	27,819	-1.2	29,134	31,612	8.5	42,623	49,565	16.3	42,623	53,629	25.8
Sample Size (individuals)	3,165	3,596		2,409	2,418		2,551	2,055		1,722	1,721	
Men Aged 25 to 50 with a Less Than a High School Education[f]												
90/10 Ratio	12.50	9.37		10.93	7.17		2.73	6.06		2.52	2.22	
Mean Labor Earnings	20,320	20,766	2.2	21,832	22,942	5.1	43,816	44,923	2.5	40,059	52,721	31.6
Median Labor Earnings	18,373	16,164	-7.8	19,685	21,075	7.1	39,384	44,154	12.1	38,142	48,551	27.3
Sample Size (individuals)	655	469		439	438		1,014	702		680	659	
Proportion of All Working Age Persons	14.37	10.14		14.58	14.58		24.38	23.78		24.78	24.78	
Men Aged 25 to 50 with a High School Education[g]												
90/10 Ratio	6.33	4.57		5.00	4.00		3.04	2.65		2.63	2.33	
Mean Labor Earnings	26,306	26,127	-0.7	28,249	31,182	10.4	48,252	50,321	4.3	48,044	54,967	14.4
Median Labor Earnings	24,934	24,236	-2.8	26,247	29,505	12.4	40,984	48,144	17.5	42,514	50,725	19.3
Sample Size (individuals)	1,214	1,415		908	907		1,082	967		729	748	
Proportion of All Working Age Persons	34.34	34.67		35.12	35.12		53.56	53.06		52.03	52.03	
Men Aged 25 to 50 with Greater Than a High School Education[h]												
90/10 Ratio	5.81	5.25		5.00	5.13		3.90	3.23		3.25	3.18	
Mean Labor Earnings	37,230	38,968	4.7	38,750	48,889	26.2	59,105	73,024	23.5	58,837	82,056	39.5
Median Labor Earnings	32,808	33,193	1.2	34,121	40,058	17.4	55,792	67,439	20.9	53,607	73,140	36.4
Sample Size (individuals)	1,271	1,673		1,049	1,051		446	369		309	310	
Proportion of All Working Age Persons	51.29	55.19		50.31	50.31		22.06	23.16		23.18	23.18	

Table 3. Continued

[a]Yearly labor earnings of all those with positive earnings in a given year in 1991 dollars based on cross-sectional data from the *Panel Study of Income Dynamics* (1984, 1990).

[b]Yearly labor earnings of all those with positive earnings in a given year in 1991 dollars based on longitudinal data from the *Panel Study of Income Dynamics* (1984, 1990). Sample restricted to individuals observed to have earnings in both years.

[c]Yearly labor earnings of all those with positive earnings in a given year in 1991 deutsche marks based on cross-sectional data from the *German Socio-Economic Panel* (1985, 1992).

[d]Yearly labor earnings of all those with positive earnings in a given year in 1991 deutsche marks based on longitudinal data from the *German Socio-Economic Panel* (1985, 1992). Sample restricted to individuals observed to have earnings in both years.

[e]All males aged 25 to 50 with positive labor earnings. In the longitudinal analyses, the age is for the initial year.

[f]Male has less than a high school education in the United States or its equivalent in Germany.

[g]Male has a high school education in the United States or its equivalent in Germany.

[h]Male has greater than a high school education in the United States or its equivalent in Germany

Source: Authors' calculations based on the *Panel Study of Income Dynamics* (1984, 1990) and the *German Socio-Economic Panel* (1985, 1992).

Figure 1

Figure 2

Figure 3

Figure 4

Figure 5a

Figure 5b

Figure 6a

Figure 6b

Figure 7a

Figure 7b

Figure 8a

Figure 8b

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