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Abstract

German and United States data from the Luxembourg Income Study are used to compare the relative economic well-being of Germans and Americans in the 1980s. In our analysis we use both official equivalence scales and consumption-based country-specific equivalence scales developed for Germany and the United States by Merz et al. (1993). We verify previous studies that show that inequality and the incidence of poverty are greater in the United States than in Germany. Overall inequality and poverty levels are found not to be sensitive to the equivalence scale used. But the official German equivalence scales yields quite different results from those using all other scales with respect to the relative income and poverty levels of vulnerable groups within the population, especially older single people.

JEL: I30, I32, D30, D31

Keywords: *alternative equivalence scale, Germany, USA, distribution of income, inequality, poverty*

Zusammenfassung

Mikrodaten von Deutschland und den Vereinigten Staaten der Luxemburg Income Study (LIS) werden verwendet, um die relative ökonomische Wohlfahrt von Deutschen und Amerikanern in den 80er Jahren zu vergleichen. In unserer Analyse verwenden wir sowohl offizielle Äquivalenzskalen als auch auf Kosumausgaben basierende länderspezifische Äquivalenzskalen, die von Merz et al. (1993) für Deutschland und die Vereinigten Staaten entwickelt wurden. Frühere Studien bestätigend zeigen wir, daß Ungleichheit und Armut in den Vereinigten Staaten gößer sind als in Deutschland. Alle Personengruppen zusammen betrachtet wird ersichtlich, daß Ungleichheits- und Armutsniveaus nicht senitiv bezüglich der verwendeten Äquivalenzskalen sind. Allerdings ergibt die offizielle Deutsche Äquivalenzskala gegenüber allen anderen Skalen unterschiedliche relative Einkommens- und Armutsniveaus für bestimmte Bevölkerungsgruppen, wie bspw. ältere alleinlebende Personen.

JEL: I30, I32, D30, D31

Schlagwörter: *Alternative Äquivalenzskalen, Deutschland, USA, Einkommensverteilung, Ungleichheit, Armut*

RELATIVE INEQUALITY AND POVERTY IN GERMANY AND THE UNITED STATES USING ALTERNATIVE EQUIVALENCE SCALES

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RELATIVE INEQUALITY AND POVERTY IN GERMANY AND THE UNITED STATES USING ALTERNATIVE EQUIVALENCE SCALES

Our ability to compare the economic well-being of the population of one country with another, as well as the relative well-being of sub-groups within those populations, has been greatly enhanced by the development of micro-level data in most industrialized countries. For the last decade the Luxembourg Income Study (LIS) has made such data available to researchers. Yet as our data have become richer, the methodological problems that confront researchers interested in such cross-national comparisons have become clearer but no less complex.

One such problem is how to treat households of different sizes and compositions in cross-national income distribution studies. Equivalence scales are an integral part of most economic well-being comparisons, and they play a major role in the allocation of transfer payments within countries. The choice of an "official" equivalence scale is controversial even when it is used solely for within-country purposes, since the choice of scale can substantially affect the size and composition of the poverty population as well as the share of resources government programs provide to it. The choice of an official equivalence scale for cross-national comparisons is even more controversial, since it must account not only for differences across households of size and composition but also country-specific differences.

The choice of a cross-national equivalence scale is further complicated by the fact that, unlike national equivalence scales, which at least have some anchor in official government policy, no officially designated multi-national equivalence scale exists. Yet as multinational associations like the European Community become more integrated they will increasingly be drawn into cross-national comparisons that require an equivalence scale or scales for measurement purposes.

Alternative Equivalence Scales

With respect to cross-national comparisons, conventional wisdom holds that one should use an equivalence scale and then test the sensitivity of the basic results of the analysis with alternative scales (e.g., Förster 1990; Jenkins 1991; Atkinson, Gardiner, Vechêne, and Sutherland 1994; Hagenaars, de Vos and Zaidi 1994). In their study of the United States and Germany, Burkhauser, Duncan, Hauser, and Berntsen (1990) use each nation's official scale and test the sensitivity of their results by substituting the United States scale for the German scale and vice versa. While this is a reasonable subcomponent of the general strategy discussed above, it is an atheoretical strategy, since employing one nation's scale on another nation's people ignores differences in relative prices as well as in the provision of goods and services through the tax system, such as health care and education, between the two nations.

Extended Linear Expenditure System Equivalence Scales. In this paper we use an alternative strategy, which is based in economic theory, and demonstrate its value in measuring the economic well-being of populations in Germany relative to the United States as well as the relative well-being of vulnerable groups within those populations. Our country-specific constant-utility-based equivalence scales were developed from a complete demand system approach as specified by an extended linear expenditure system (ELES). The estimated multiple equation expenditure system takes into account a full market basket—food, clothing, body and health care, housing, and energy—with all its interdependencies and relative prices. These scales were developed by Merz, Gardner, Smeeding, Faik, and Johnson (1993). The German equivalence scale estimation is based on the West German Income and Consumption Survey (Einkommens- und Verbrachsstichprobe (EVS)). The United States equivalence scale estimation is based on the United States Consumer Expenditure Survey. These ELES scales explicitly allow national differences in consumption weights and goods prices to affect the resultant scales. While the

Merz et al. (1993) approach results in different equivalence scales for the United States and Germany, the scales are based on a consistent methodology, with adjustments for differences in scale economies determined by actual consumption patterns and not by expert judgments or political considerations.

Phipps and Garner (1994) provide a different example of a constant methodology approach by estimating equivalence scales for the United States and Canada using the Engle-based estimation technique employed by Statistics Canada. They find little statistical or practical difference between the resulting scales for the two nations. They use the LIS database to verify that both scales yield identical overall poverty rates for the United States and Canada. However, they do not compare their results to other equivalence scales and, more importantly, they do not examine how their scale affects subgroup differences in poverty rates.

Official Equivalence Scales. The official United States equivalence scale was developed by Orshansky (1965) in her attempt to determine poverty lines for different types of households in the United States. The scale is based on the cost of providing a minimally adequate diet for households of different sizes and ages who live in different locations as calculated in 1955 by the U.S. Department of Agriculture. Based on data from the 1961 Consumer Expenditure Survey, Orshansky established that food purchases equaled one-third of total expenditures for the median income household in the United States. She then multiplied the cost of the minimal food budget by three for each household type to establish its poverty line. These poverty thresholds were later simplified to vary solely by household size and age. In 1969 the U.S. Bureau of the Budget adopted these thresholds and the equivalence scale embedded in them for use in all official United States measures of poverty.

While the Orshansky equivalence scale continues to be used in all United States government statistics regarding poverty, its use is not without controversy. Critics argue, for

instance, that the substantial variations in its scale economies across family size are unreasonable. They also argue that changes since the 1960s in the relative price of food and in the share of food expenditures in household budgets make the official equivalence scale obsolete. They urge that more recent data be used to estimate a new equivalence scale. (For an example of this criticism see Ruggles 1990.)

Most studies of relative economic well-being and poverty in the United States use the equivalence scale embedded in the official United States poverty lines in their analysis. Furthermore, these official poverty lines are a major factor in determining eligibility for various government programs as well as for allocation of federal funds to state and local governments. We will use this official United States scale in our analysis.

Germany has no official poverty lines or equivalence scales. However, the German government has recognized the concept of a "socio-cultural minimum income level" (House of Representatives document 10/6055, 10) and uses its public welfare programs to prevent households from falling below that minimum. The German public welfare law (BSHG) sets forth the guidelines for determining a person's "basic needs." According to the BSHG (§ 22 BSHG as well as the accompanying statutes) benefits for dependents living in a welfare beneficiary's household are determined by a "progressive reduction" method. Hence, German public welfare benefits can be considered "poverty" thresholds, and the rules governing the level of benefits for different types of families provide an implicit equivalence scale.

Operationally, welfare benefits are based on the concept of the cost of a "basket of goods" necessary to satisfy basic needs. As in the United States, the expert opinion of nutritionists was used to determine the contents of a basket of food necessary for basic needs, but other goods were also included. Since 1970, the costs of the goods in the basket are determined by average prices in the state in which the family lives. No explicit empirical analysis was used to

determine the equivalence scale, however. Since 1971 the scale has changed only once, in 1991. Past cross-national studies of economic well-being and poverty in Germany have used this implicit equivalence scale (e.g., Hauser and Nouvertne 1980; Burkhauser et al. 1990; Hauser and Fischer 1990). We will use this "official" German scale in our analysis.

A Single International Equivalence Scale. Researchers interested in comparative cross-national research on income distribution and poverty must choose which equivalence scale or scales to employ. Using one scale for all nations appears to be the dominant choice in the literature (e.g., Buhmann et al. 1988; Smeeding, O'Higgins, and Rainwater 1990).

In these studies a class of parametric equivalence scales is often used in which the scales share a common functional form and for which parametric variations change the scale rates for households of different sizes. The scale developed in Buhmann et al. (1988), which has a single parameter (e), the elasticity of the scale rate with respect to household size, is an example of this class of scale. The Buhmann et al. (1988) scale is characterized by the following equation:

$$EI = D/S^{e} \qquad (1)$$

where equivalized income (EI) equals total disposable household income (D) divided by household size (S) raised to the power (e). Scale economies can be thought of as a function of (e). At one extreme, where (e) equals 1, no economies of scale exist and a family of two requires twice as much disposable income as a family of one to reach the same level of equivalized income. At the other extreme, where e equals 0, economies of scale are perfect so that a household of two, or for that matter a household of any number, can live exactly as well as a household of one with no addition in their disposable income.

Recent international studies on income inequality and poverty sponsored by the OECD (e.g., Förster 1990; Atkinson et al. 1994), and the Statistical Office of the European Commission (Hagenaars et al. 1994) and the Ruggles (1990) study of the United States use this type of

exponential equivalence scale. The value of (e) they chose varies slightly from .5 to .55. An (e) in this range will yield an equivalence scale in the middle of the range of possible choices, but none of these authors provides a theoretical or behavioral justification for their choice. To represent the common international scale approach we adopt a value of e equal to .5 and call it the International Experts scale in this paper. (See Coulter, Cowell, and Jenkins (1992), and Jenkins and Cowell (1994) for fuller discussions of the use of parametric equivalence scales.)

Comparing Equivalence Scales. Table 1 compares the equivalence scale values developed by Merz et al. (1993) for Germany and the United States with the official scales of the United States and Germany and the International Experts scale. The scale values are reported for household sizes of one to six. In the bottom row of Table 1, we use the Buhmann et al. (1988) procedure to estimate the elasticity of each of our scales with respect to household size.[1] The official German scale has by far the highest elasticity (e = .81) and hence the smallest implied scale economies. The other scales fall much closer together, with the official United States scale closest to the official German scale. The two ELES scales have the lowest (e) values and hence the greatest overall economies of scale.

While the official United States scale is closer to the official German scale than any other scale in overall elasticity, these two official scales are still substantially different. The most striking difference between the official German and United States scales is at the two-person level. The official United States scale implies considerably greater economies of scale than does the official German scale. In the United States it is presumed that a two-person household requires only 28 percent more income than a one-person household to keep both its members at the same level of economic well-being they would have if they were living alone, while in Germany it is presumed that a two-person household requires 81 percent more income to do so. The differences in economies of scale continue at larger household sizes.

Differences in official equivalence scales of the magnitude reported in Table 1 can have important effects on measuring economic well-being. If each country uses its official scale, the income requirements of larger size households will be reported to be consistently larger in Germany than in the United States. This is particularly troublesome for studies that compare the economic well-being of children relative to older people in the two countries. Because children are more likely to live in larger households than older people, the smaller the economies of scale implied by an equivalence scale the worse off children will appear relative to older people. The official German scale will make children appear much worse off than the United States scale. Because the underlying assumptions are not held constant between these two scales, it is difficult to decide which—if either—is more appropriate for cross-national comparisons. And since the choice of scale may influence the outcome, it is difficult to distinguish between differences in the relative well-being of older people and children caused by differences in resources and those caused by inappropriate variations of the economies of scale in one or both of the countries.

In contrast to the large difference between the official scales of Germany and the United States, the empirically derived ELES scales developed by Merz et al. (1993) imply a much smaller difference in economies of scale between German and United States households. Using the ELES scales, a two-person household in the United States requires 49 percent more income than a one-person household, and a similar household in Germany requires 48 percent more income. These values lie between the official equivalence scale values for the two countries. For larger families, the ELES scales continue to be much closer to one another than the official scales. Overall, the German ELES scale has an (e) value of .38, which is slightly smaller than the United States ELES scale value of .40 and reflects slightly scale economies. This is in contrast to the much lower economies of scale implied by the official German scale relative to the official United States scale. The International Experts scale with its e value of .5, implies

greater scale economies than either official scale but lower scale economies than either of the ELES scales. Below we show the sensitivity of aggregate and group well-being in Germany and the United States to differences in these scales.

Data. The data used in this study are taken from the Luxembourg Income Study (LIS) database. The LIS project has brought together household surveys of income for several nations and made them comparable. LIS procedures for standardizing datasets are explained in Smeeding, O'Higgins, and Rainwater (1990), and deTombeur, Milne, Warner, Gornick, and Randell (1994). Here we use the LIS database for the United States (1986) and West Germany (1984). The United States survey is the same database (the Current Population Survey) on which official United States poverty figures are based; the German survey is taken from the German Socio-Economic Panel (GSOEP). (For a fuller discussion of the GSOEP see Wagner, Burkhauser, and Behringer 1993.)

The income measure is the same for both nations: is household disposable income—labor earnings, property income, and all government cash transfers—minus income and payroll taxes. The household definition (all related and unrelated members of a housing unit sharing common living and eating arrangements) is also the same. The income from each household record is weighted by the number of persons living in the household. This allows us to approximate individual income in our analysis. Households are also designated by size (single, couple only, or larger), by age of head, and by presence of children (parents living with household members aged 18 or under) or absence of children (couples without children). Single-parent households are those with only one adult (aged 19 to 64) plus children.

Results

The Sensitivity of Aggregate Measures of Economic Well-Being. Table 2 shows the sensitivity of traditional aggregate measures of inequality and poverty in the two countries to the

equivalence scale used. Regardless of the scale chosen, the United States is found to have greater inequality and higher poverty rates than Germany.

Inequality, as measured by a Gini coefficient in row one, is found to be highest in both countries using the official German scale. The official United States scale yields aggregate results next closest to the official German scale. Using the International Experts and ELES scales produces lower measured inequality. An alternative measure of inequality that is much more sensitive to the extremes of the distribution—the ratio of the income of the person at the 90th percentile to the income of the person at the 10th percentile—is found in row two. The pattern of results is approximately the same. Inequality is larger using the official country scales than either the International Experts or ELES scales.

It appears that the relatively low scale economies implied by both the official German and United States scales increase inequality relative to the International Experts and ELES scales. But while we have found differences in aggregate measures of inequality linked to the choice of scale, the magnitude of the differences is quite small. Hence, from a cross-national perspective, the differential in inequality between the United States and Germany is approximately the same across all scales.[2]

Aggregate poverty rates are also only slightly affected by the choice of equivalence scale. Far more important is the point in the income distribution at which poverty is defined. When a person is declared in poverty if he or she lives in a household whose size-adjusted income is below 40 percent of the median person's size-adjusted household income—approximately the absolute poverty line in the United States—then the rate of poverty is calculated, depending on the scale used, as between 12.5 and 12.8 percent in the United States and between 2.6 and 3.1 percent in Germany. When the poverty line is raised to 60 percent of the median person's

household-size-adjusted income, the rates double to between 23.7 and 24.1 percent in the United States and quadruple to between 12.4 and 13.7 percent in Germany.

The importance of the scale elasticity on the aggregate poverty rate is best seen in Figure 1. Here we use equation 1 to show how aggregate poverty rates change as we move from perfect scale economies (e=0) to zero scale economies (e=1) using our data from the United States and Germany. In this figure, poverty is defined as 50 percent of median income, but our results hold using a 40 percent or 60 percent of median income definition. Aggregate poverty is substantially higher in the United States at any value of (e). But the value of (e) does affect overall poverty rates. We find a U-shaped relationship between poverty rate level and (e) as discussed in Coulter et al. (1992) although the U-shape is much more pronounced in Germany. The United States scale elasticity minimum poverty value is .75. The German scale elasticity minimum poverty value is .70. As can be seen in Figure 1, the official German scale value is furthest from the other values and is the only elasticity value of the five discussed that is on the upper side of the U. Despite rather substantial differences in scale elasticity among our equivalence scales, aggregate measures of poverty in the United States and Germany using these values are not greatly affected by the researcher's choice of scale.

The Sensitivity of Relative Measures of the Economic Well-Being of Vulnerable Groups. Table 3 shows the median household-size-adjusted income of vulnerable groups relative to the median person's household-size-adjusted income in the United States and Germany. We include such groups as the aged and single parents because social policy is often directly concerned with protecting their economic well-being. Here the equivalence scale chosen has a much more profound effect on the outcome. Using the official United States equivalence scale, the median person living in a household headed by an older person (aged 65 and older) in the United States has only 89.9 percent of the household-size-adjusted income of the median person,

while the median person living in a household with a younger head (aged 64 and younger) has 101.8 percent. In contrast, using the official German equivalence scale in Germany, the household-size-adjusted income of the median person living in a household with an older head is actually slightly higher than the household-size-adjusted income of the median person living in a household with a younger head (101.7 versus 99.6 percent of the household-size-adjusted income of the median person). But the differences reported using the official United States and the official German scales in their own countries has much more to do with the differences between the official equivalence scales used than with differences in the income of older and younger households. When the official German scale is used in the United States (column 2) a person living in the household of an older person is found to have approximately the same household-size-adjusted income as the median person (98.0 percent), and when the United States scale is used in Germany (column 6), a person living in the household of an older person is now reported to have only 88.8 percent of the median person's household-size-adjusted income.

Using the International Experts and ELES scales produces the quite surprising result that the median older person in the United States and in Germany are approximately equally well-off relative to the median person in their respective countries, with approximately 85 percent of the median person's household-size-adjusted income using the International Experts scale and 82 percent of the median person's household-size-adjusted income using the ELES scale.

Another consequence of the substantial difference in implied economies of scale between two-person and one-person households in the official German scale and the other scales can be seen by looking at the relative economic well-being of older single people relative to older couples. Older single people in the United States are dramatically less well off than the median person using the official United States equivalence scale, with only 56.9 percent of the median person's household-size-adjusted income. This relative value rises by less than one percentage

point using either the International Experts or ELES scales but increases to 82.9 percent using the official German scale. In Germany we get a similar dramatic difference between the rosy picture painted by using the official German scale (103.4 percent of the median person) and the starker picture painted by using the other three scales (72.1 to 74.2 percent of the median person's household-size-adjusted income). Clearly the official German scale measures the relative well-being of single people profoundly differently from the other scales and is the major source of the variation among different measures of the relative well-being of older people found in this table.

Differences in relative well-being within younger groups are far smaller across scales. Once again the very low economies of scale in the official German scale yield different results from those using the other three scales. Younger households with children are found to be less well off and younger households without children better off using the official German scale than using the other scales. While the relative economic well-being of single older people is profoundly influenced by the choice of equivalence scale, this is not the case with respect to single parent households. In the United States, the range of outcomes across scales for single parent households is quite small, 38.3 to 39.9 of the median person's income, and in Germany it is only somewhat greater, 59.2 to 68.2.

Table 4 shows how the prevalence of poverty within vulnerable groups is influenced by the choice of equivalence scale. As was seen in Table 2, overall poverty rates are not greatly influenced by choice of scale, but small overall differences in poverty rates conceal far greater differences within vulnerable groups. Using the official United States equivalence scale, the incidence of poverty in the United States is higher among people living with older heads of households than among people living with younger heads of households (21.3 percent versus 17.5 percent). This remains the case using the International Experts or ELES scales. Using these

same scales in Germany results in similar findings, although the absolute levels of poverty are much lower for both young and old. But when the official German measure is used in either Germany or the United States, people living with older household heads experience less poverty than those living with younger household heads. In the United States the poverty rates are 15.5 versus 18.2 percent, and in Germany they are 5.6 versus 5.9 percent.

As was the case in Table 3, the consequences of using the official German equivalence scale rather than any of the other scales can best be seen among single older people. These people have extremely high poverty risks in both the United States and Germany using equivalence scales other than the official German scale. When the official German scale is used, older single persons have lower poverty risks than younger people as a group, and when the official German scale is used in Germany, older single Germans are found to have lower poverty risks that any group except young households without children!

Differences among younger groups across equivalence scales are less dramatic but follow the same pattern. Importantly, regardless of equivalence scale used, those living in single-parent households are most likely to live in poverty in both the United States and Germany. However, using the official German scale yields high incidence of poverty among single-parent families than the official United States scale. Using the International Experts and ELES scales yield even higher poverty rates.[3]

The importance of scale elasticity on the poverty rates of vulnerable groups is best seen in Figure 2. Here we use equation 1 to show how the poverty rates of older (aged 65 and over) and younger (aged 18 to 64) household heads change as we move from perfect scale economies (e=0) to zero scale economies (e=1) using our data from the United States and Germany. In this figure, poverty is defined as 50 percent of median income but the results also hold using a 40 percent or 60 percent of median income definition. Because older headed households are

primarily made up of one or two persons, they are on average smaller than younger headed households and the choice of equivalence scale now becomes critical to one's perspective of the relative well-being of these two age groups.

The poverty rate of older headed households is extremely sensitive to the equivalence scale choice. Old age poverty drops dramatically in both the United States and Germany as scale economies fall. Because younger headed households have a distribution of household sizes, that mirrors the overall population, their poverty rates follow the U-shaped pattern of the aggregate population in Figure 1.[4] In both countries the poverty rate of older headed households falls below that of younger headed households at higher (e) values. The crossover (e) value in the United States is .70; it is .75 in Germany. As can be seen in Figure 2, the official equivalence scale for Germany is beyond the crossover point and, hence, shows older headed households to be better off than younger headed households.

Table 5 abstracts from the substantial differences in the incidence of poverty found in the United States and Germany and concentrates on the characteristics of the poverty populations in the two countries. It is in this table that the impact of alternative equivalence scales on the composition of the poverty population is best seen. Using the official United States equivalence scale, people living in the United States in households headed by an older person make up 16.5 percent of the poverty population. This share rises modestly to 17.6 and 18.4 percent when the International Experts and ELES scales are used. In contrast, when the German scale is used the share of older people in poverty in the United States falls to 11.7 percent. Using the official German scale in Germany, people living in households headed by an older person make up 16.5 percent of the poverty population, a percentage equal to that found in the United States using the United States scale. But when any of the other scales is used in Germany, the share of the poverty population who live in households headed by an older person dramatically rises to

between 25.6 and 32.7 percent. Single older people make up a very small share of the poverty population using the official German scale but a much higher share using any of the other scales. The share of older couples is much less affected by the scale used.

Among younger people the importance of scale differences is relatively unimportant in the United States, but it is quite important in Germany. Households with children make up a substantially larger share of the poverty population in Germany using the German scale. More than 40 percent of the poverty population is married couples with children, using the German scale, while only 7 percent of the poverty population is single younger people. These shares are substantially different using any other scale, with two-parent households making up from 18.1 to 27.3 percent using the other scales and single younger people making up from 20.6 to 22.3 percent using the other scales.

Clearly the very low economies of scale implied by the official German scale substantially increase the likelihood that large families, even large families with two parents, will be considered poor. In the United States the much larger population of single-parent households dampens this outcome, but when the official German scale is used in the United States, the share of the poverty population made of households with children rises, as does the share of two-parent households.[5]

Conclusions

The official equivalence scales used in Germany and the United States imply much greater differences in the economies of scale in German and United States households than are found using the consumption-based country-specific equivalence (ELES) scales developed for Germany and the United States by Merz et al. (1993). The ELES scales, which are economic theory-based, are close to the International Experts cross-country equivalence scale adopted by a number of

recent studies. Using LIS micro-data on the United States and Germany we have shown that, despite substantial differences in the economies of scale implied by these equivalence scales, aggregate income inequality and poverty is substantially higher in the United States than in Germany and this difference is not greatly affected by the choice of scale used.

However, we have also found that small differences in the aggregate mask substantial differences in the relative economic well-being and incidence of poverty within vulnerable groups in these populations. Older people, especially single older people, are reported to be substantially better off using the official German equivalence scale than they are using the other three measures. The share of the poverty population made up of older people is also greatly reduced in both countries using the official German scale. Furthermore, virtually all of the differences in well-being of older persons in the United States and Germany relative to younger persons found when comparing results using each country's official equivalence scale on its people disappear when any common measure is used.

The official German equivalence scale also results in substantially lower economic well-being of households with children relative to households without children, even when two parents are present. In fact, two-parent households dominate the poverty ranks using the official German scale. This is much less the case when any of the other scales is used.

These results suggest that the choice of official equivalence scale in Germany and the United States can substantially alter the composition of the poverty population and the relative well-being of young and old. But for researchers willing to use common and consistently estimated consumption-based equivalence scales, the differences in economies of scale implied by these official scales are greatly reduced, and the remaining country differences in the ELES scales have a much smaller impact on economic well-being than those implied by the official scales. Ultimately all equivalence scales require assumptions on the part of the researcher, but

it is difficult to believe that the dramatic differences in equivalence scales implied by the official United States and German scales are real. Our research suggests that the official German scale is out of line with other measures of economies of scale for Germany or other countries and should be reevaluated.

Endnotes

1. To estimate our (e) values, we simply empirically estimate equation (1) using OLS regressions for each of the equivalence scales with the values reported in Table 1.
2. This need not be the case. Atkinson et al. (1994) report that measured poverty in Great Britain relative to measured poverty in France is quite sensitive to the equivalence scale used.
3. In the appendix we repeat the work done in Table 4 but shift the poverty line down to 40 percent and up to 60 percent of the median person's household-size-adjusted income. While the absolute size of the incidence of poverty within our age and household type cells changes, the pattern of impacts on those cells caused by changes in the equivalence scale does not. The official German scale continues to yield substantially different results than those found using the other three scales.
4. Coulter et al. (1992) show that a U-shaped curve will occur if the reduction in average income due to an increase in (e) offsets the fall in individual income in the lower regions of the income distribution for some (e) values but not all. For older headed households who are dominated by small household sizes, their adjusted household income falls less steeply than the average income household at all (e) values from 0 to 1 but for younger headed households this is not the case and we get a U-shaped relationship.
5. In the appendix we repeat the work reported in Table 5 but shift the poverty line down to 40 percent and up to 60 percent of the median person's household-size-adjusted income. The same patterns emerge. The official German scale implies that older people in general and those younger people living in smaller size households make up a far smaller share of the poverty population than do the other three scales.

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TABLE 1

ALTERNATIVE EQUIVALENCE SCALE VALUES FOR THE UNITED STATES AND GERMANY

Number of People in Household	Official Scales		ELES Scales[c]		International Experts Scale[d]
	United States[a]	Germany[b]	United States	Germany	
1	100	100	100	100	100
2	128	181	149	148	141
3	157	244	181	173	173
4	201	308	199	189	200
5	238	371	201	198	224
6	268	435	200	193	245
Elasticity of Scale (e)[e]	.56	.81	.40	.38	.50

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.

[b]Equivalence scale embedded in German public welfare law (BSHG) since 1991.

[c]Equivalence scale developed by Merz et al. (1993). Note that the equivalence values fall between 5 and 6 persons because these are composite values of households of the same size but different family types.

[d]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).

[e]Elasticity of scale with respect to household size. Based on $EI = D/S^e$.

TABLE 2

AGGREGATE MEASURES OF ECONOMIC WELL-BEING IN THE UNITED STATES AND GERMANY USING DIFFERENT EQUIVALENCE SCALES

Well-Being Measure	United States				Germany			
	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]	Official United States Scale[a]	Official German Scale[b]	International Experts Measure[c]	ELES Scale[d]
Gini	0.347	0.359	0.340	0.336	0.256	0.260	0.250	0.251
90/10 Ratio	6.12	6.21	5.85	5.77	3.15	3.13	3.01	3.04
Poverty Line (in percentage)								
at 40 percent of median income	12.8	12.5	12.8	12.5	3.0	2.6	2.9	3.1
at 50 percent of median income	18.2	17.9	18.2	18.2	6.3	5.8	6.4	6.8
at 60 percent of median income	24.1	24.0	23.7	23.7	12.4	13.6	12.5	12.6
Elasticity of Scale (e)[e]	.56	.81	.50	.40	.56	.81	.50	.38

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.

[b]Equivalence scale embedded in public welfare law (BSHG) since 1991.

[c]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).

[d]Equivalence scale developed by Merz et al. (1993).

[e]Elasticity of scale with respect to household size. Based on $EI = D/S^e$.

Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

TABLE 3

MEDIAN HOUSEHOLD-SIZE-ADJUSTED INCOME OF VARIOUS GROUPS RELATIVE TO THE MEDIAN PERSON IN THE UNITED STATES AND GERMANY, USING DIFFERENT EQUIVALENCE SCALES
(percentage)

Age of Head and Household Type	United States				Germany			
	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]
Aged 65 and Older	89.9	98.0	85.0	81.4	88.8	101.7	85.4	82.1
Single	56.9	82.9	57.8	57.0	72.3	103.4	74.2	72.1
Couple	110.4	113.7	101.7	94.9	95.8	96.9	89.2	82.7
Aged 64 and Younger	101.8	100.2	102.2	102.7	102.6	99.6	102.6	104.0
All Parents	89.4	83.9	91.7	94.8	91.8	84.3	93.9	98.7
Single Parent	39.9	38.3	39.0	39.3	68.2	64.9	63.5	59.2
Two Parents	94.9	89.3	96.1	98.6	89.5	83.0	90.1	92.3
All Non-Parents	134.9	145.6	129.0	122.9	121.6	125.4	117.5	113.3

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.
[b]Equivalence scale embedded in German public welfare law (BSHG) since 1991.
[c]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).
[d]Equivalence scale developed by Merz et al. (1993).
Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

TABLE 4

MEASURES OF THE PREVALENCE OF POVERTY WITHIN VARIOUS GROUPS IN THE UNITED STATES AND GERMANY USING DIFFERENT EQUIVALENCE SCALES
(poverty line equals 50 percent of the median person's household-size-adjusted income)
(percentage)

Age of Head and Household Type	United States				Germany			
	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]
Overall	18.2	17.9	18.2	18.2	6.3	5.8	6.4	6.8
Aged 65 and Older[e]	21.3	15.5	23.6	24.8	9.0	5.6	10.3	12.9
Single	41.7	16.6	41.5	41.7	15.1	4.0	13.9	15.1
Couple	10.3	9.7	11.8	14.3	5.5	5.5	8.4	11.7
Aged 64 and Younger[e]	17.5	18.2	17.3	17.2	5.7	5.9	5.5	5.5
All Parents	21.1	23.2	20.5	19.7	5.6	7.7	5.0	4.4
Single Parent	58.8	59.9	61.5	63.5	27.7	30.3	34.1	37.6
Two Parents	15.6	17.4	14.3	13.4	5.6	7.7	5.1	4.0
All Non-Parents	10.9	9.1	11.5	12.6	5.8	3.6	6.2	7.0

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.
[b]Equivalence scale embedded in German public welfare law (BSHG) since 1991.
[c]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).
[d]Equivalence scale developed by Merz et al. (1993).
[e]The age categories, **Aged 65 and Older** and **Aged 64 and Younger**, are all-inclusive and hence sum to 100 percent. Subcategories within these age groups are not all-inclusive and therefore do not sum to age category totals.
Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

TABLE 5

MEASURES OF THE DEMOGRAPHIC CHARACTERISTICS OF THE POVERTY POPULATION IN THE UNITED STATES AND GERMANY USING DIFFERENT EQUIVALENCE SCALES
(poverty line equal 50 percent of median person's household-size-adjusted income)
(percentage)

Age of Head and Household Type	United States				Germany			
	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]
Aged 65 and Older[e]	16.5	11.7	17.6	18.4	25.6	16.5	27.9	32.7
Single	8.9	3.6	8.8	8.8	14.5	4.2	13.3	13.4
Couple	3.2	3.0	3.6	4.4	6.8	7.4	10.3	13.3
Aged 64 and Younger[e]	83.5	88.3	82.4	81.6	74.4	83.5	72.1	67.3
Single Parent	21.1	21.9	22.1	22.7	5.6	6.7	6.9	7.1
Two Parent	30.2	34.5	27.7	25.8	27.3	40.9	24.8	18.1
Single without children	10.1	7.0	9.9	10.1	22.3	7.0	20.6	20.7
Couple without children	4.0	3.9	4.6	5.4	5.2	5.7	6.6	7.6

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.

[b]Equivalence scale embedded in German public welfare law (BSHG) since 1991.

[c]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).

[d]Equivalence scale developed by Merz et al. (1993).

[e]The age categories, **Aged 65 and Older** and **Aged 64 and Younger**, are all-inclusive and hence sum to 100 percent. Subcategories within these age groups are not all-inclusive and therefore do not sum to age category totals.

Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

TABLE A-1

MEASURES OF THE PREVALENCE OF POVERTY WITHIN VARIOUS GROUPS IN THE UNITED STATES AND GERMANY USING DIFFERENT EQUIVALENCE SCALES
(poverty line equals 40 percent of median person's household size adjusted income)
(percentage)

Age of Head and Household Type	United States				Germany			
	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]
Overall	12.8	12.5	12.8	12.5	3.0	2.6	3.1	2.9
Aged 65 and Older	13.3	8.5	14.2	15.0	5.2	2.8	4.7	5.8
Single	25.5	7.4	24.3	25.5	8.2	1.3	5.6	8.2
Couple	5.5	4.8	7.7	9.1	2.7	2.7	3.7	3.9
Aged 64 and Younger	12.8	13.1	12.5	12.1	2.5	2.6	2.5	2.5
All Parents	15.3	16.7	14.7	13.8	2.2	3.2	2.2	1.9
Single Parent	50.3	52.3	51.9	52.3	16.8	16.8	19.8	21.2
Two Parents	9.7	11.0	9.0	8.3	2.1	3.4	2.1	1.6
All Non-Parents	8.2	6.5	8.5	9.0	3.0	1.8	2.8	3.3

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.
[b]Equivalence scale embedded in German public welfare law (BSHG) since 1991.
[c]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).
[d]Equivalence scale developed by Merz et al. (1993).
Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

TABLE A-2

MEASURES OF THE DEMOGRAPHIC CHARACTERISTICS OF THE POVERTY POPULATION IN THE UNITED STATES AND GERMANY USING DIFFERENT EQUIVALENCE SCALES
(poverty line equals 40 percent of median person's household-size-adjusted income)
(percentage)

Age of Head and Household Type	United States				Germany			
	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]
Aged 65 and Older[e]	14.1	9.2	15.0	16.2	30.0	18.3	28.4	32.2
Single	7.7	2.3	7.4	7.9	16.8	3.0	12.0	16.2
Couple	2.4	2.1	3.4	4.1	7.1	8.1	10.1	9.7
Aged 64 and Younger[e]	85.9	90.8	85.0	83.8	70.0	81.7	71.6	67.8
Single Parent	25.5	27.3	26.5	27.3	7.2	8.3	8.9	8.9
Two Parent	26.5	30.9	24.9	23.5	22.0	40.6	23.1	16.4
Single without children	11.5	7.6	11.4	11.9	22.5	7.7	20.0	21.7
Couple without children	4.2	4.1	4.7	5.3	5.4	6.0	7.7	9.0

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.

[b]Equivalence scale embedded in German public welfare law (BSHG) since 1991.

[c]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).

[d]Equivalence scale developed by Merz et al. (1993).

[e]The age categories, **Aged 65 and Older** and **Aged 64 and Younger**, are all-inclusive and hence sum to 100 percent. Subcategories within these age groups are not all-inclusive and therefore do not sum to age category totals.

Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

TABLE A-3

MEASURES OF THE PREVALENCE OF POVERTY WITHIN VARIOUS GROUPS IN THE UNITED STATES AND GERMANY USING DIFFERENT EQUIVALENCE SCALES
(poverty line equals 60 percent of median person's household-size-adjusted income)
(percentage)

Age of Head and Household Type	United States				Germany			
	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]
Overall	24.1	24.0	23.7	23.7	12.4	13.6	12.5	12.6
Aged 65 and Older	30.1	23.1	32.0	33.6	19.6	11.4	20.1	22.8
Single	52.6	28.5	52.2	52.6	32.9	9.6	30.1	32.9
Couple	16.1	14.3	19.0	23.0	12.3	12.0	14.5	17.9
Aged 64 and Younger	23.2	24.1	22.4	22.2	10.9	14.1	10.9	10.5
All Parents	27.7	30.7	26.1	25.2	12.7	19.3	11.9	10.2
Single Parent	66.6	66.6	67.1	69.1	40.6	42.3	46.5	54.1
Two Parents	21.6	24.6	20.4	19.3	12.9	20.4	12.4	10.6
All Non-Parents	14.8	12.0	15.6	16.6	8.6	7.6	9.7	10.8

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.
[b]Equivalence scale embedded in German public welfare law (BSHG) since 1991.
[c]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).
[d]Equivalence scale developed by Merz et al. (1993).
Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

TABLE A-4

MEASURES OF THE DEMOGRAPHIC CHARACTERISTICS OF THE POVERTY POPULATION IN THE UNITED STATES AND GERMANY USING DIFFERENT EQUIVALENCE SCALES
(poverty line equals 60 percent of median person's household-size-adjusted income)
(percentage)

Age of Head and Household Type	United States				Germany			
	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]	Official United States Scale[a]	Official German Scale[b]	International Experts Scale[c]	ELES Scale[d]
Aged 65 and Older[e]	16.9	13.0	18.3	19.2	27.3	14.4	27.8	31.2
Single	8.4	4.6	8.5	8.5	16.2	4.3	14.6	15.9
Couple	3.7	3.3	4.5	5.4	7.7	6.8	9.0	11.0
Aged 64 and Younger[e]	83.1	87.0	81.7	80.4	72.7	85.6	72.2	68.8
Single Parent	18.0	18.1	18.5	19.0	4.2	4.0	4.8	5.5
Two Parent	31.5	36.1	30.4	28.6	32.2	46.2	30.7	26.1
Single without children	9.9	6.4	9.8	10.0	16.0	5.8	15.3	15.7
Couple without children	4.3	4.1	5.8	6.0	4.4	4.0	5.5	7.6

[a]Equivalence scale embedded in U.S. Bureau of Census (1989) poverty line.

[b]Equivalence scale embedded in German public welfare law (BSHG) since 1991.

[c]Equivalence scale developed by several analysts and used in various studies undertaken on behalf of the Office of Economic Cooperation and Development (Förster 1990; Atkinson, Rainwater, and Smeeding 1994), as well as the Statistical Office of the European Community (Hagenaars et al. 1994), and by Ruggles (1990).

[d]Equivalence scale developed by Merz et al. (1993).

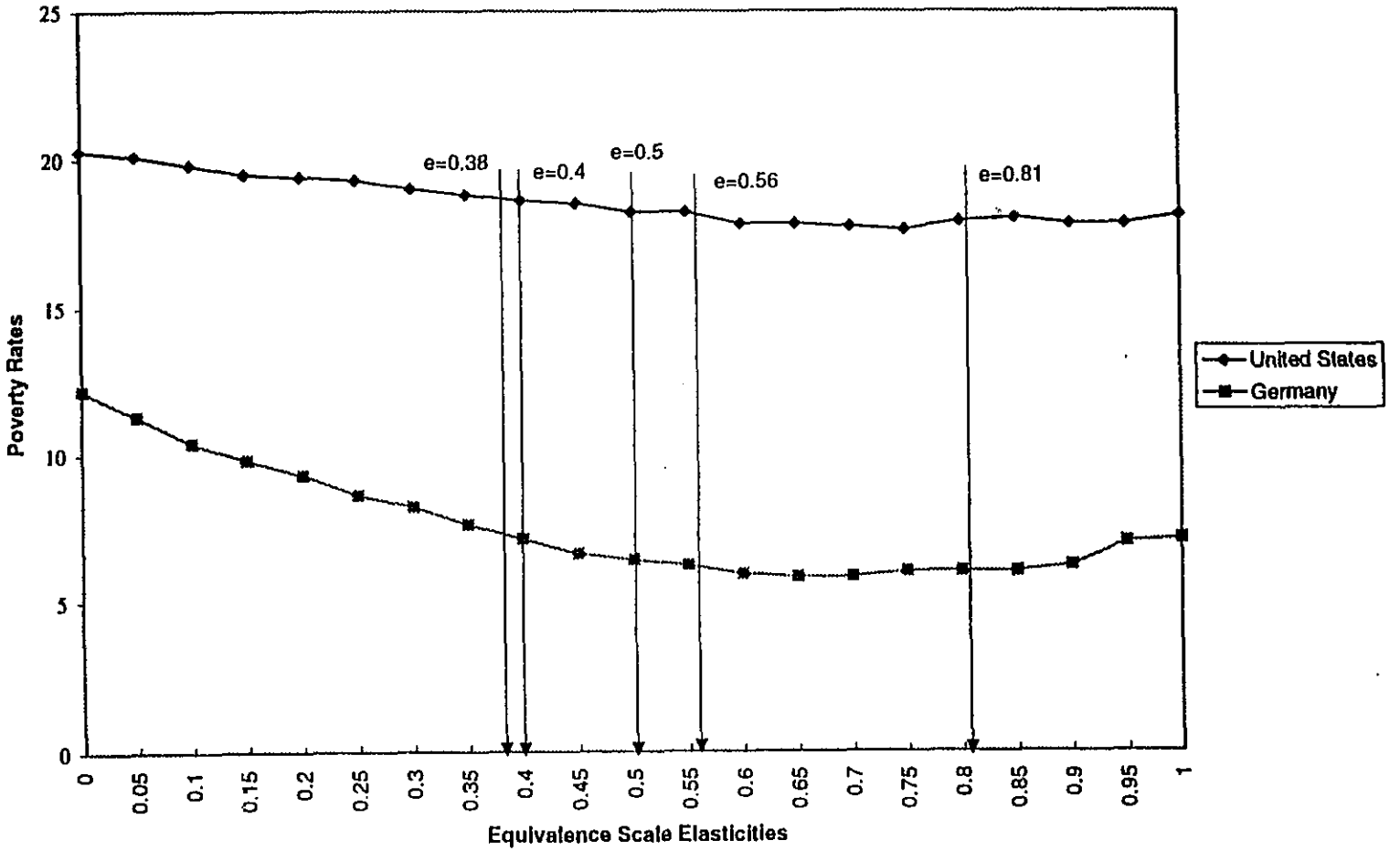
[e]The age categories, **Aged 65 and Older** and **Aged 64 and Younger**, are all-inclusive and hence sum to 100 percent. Subcategories within these age groups are not all-inclusive and therefore do not sum to age category totals.

Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

FIGURE 1

SENSITIVITY OF AGGREGATE POVERTY RATES IN GERMANY AND THE UNITED STATES TO THE CHOICE OF EQUIVALENCE SCALE[a,b]

(poverty line equals 50 percent of the median person's household-size adjusted income)



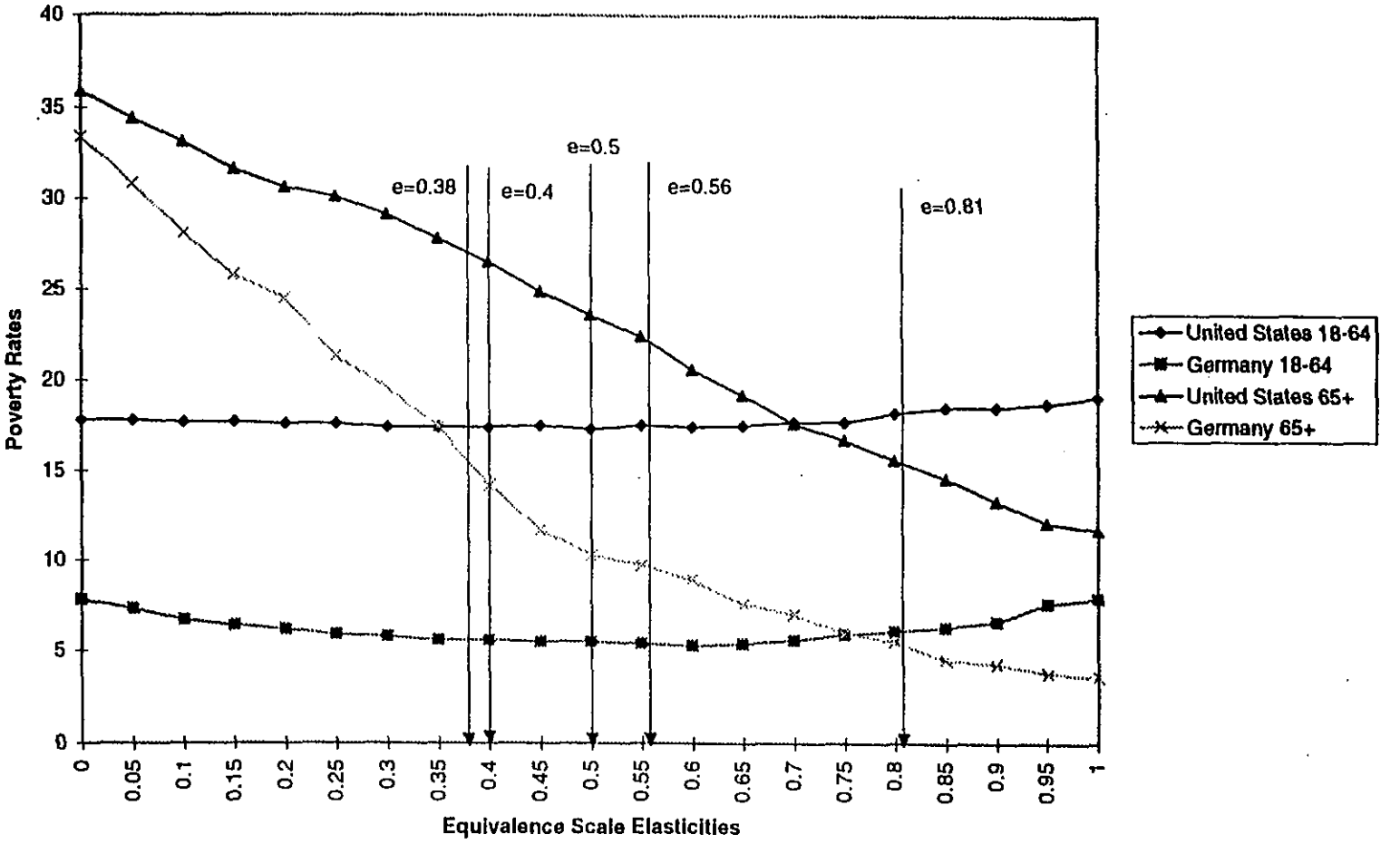
[a]The equivalence scale elasticities reported in this figure are based on the Buhmann et al. (1988) parametric value of scale rates for households of different sizes characterized by the equation EI = D/S^e.

[b]Highlighted (e) values in this figure correspond from lowest to highest to ELES Germany, ELES United States, International Experts Scale, Official United States and Official Germany.

Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

FIGURE 2

SENSITIVITY OF POVERTY RATES FOR MEMBERS OF HOUSEHOLDS HEADED BY OLDER AND YOUNGER PERSONS TO THE CHOICE OF EQUIVALENCE SCALE[a,b]
(poverty line equals 50 percent of the median person's household-size adjusted income)



[a]The equivalence scale elasticities reported in this figure are based on the Buhmann et al. (1988) parametric value of scale rates for households of different sizes characterized by the equation EI = D/S^e.

[b]Highlighted (*e*) values in this figure correspond from lowest to highest to ELES Germany, ELES United States, International Experts Scale, Official United States and Official Germany.

Source: Luxembourg Income Study database version of the 1986 United States Current Population Survey and the 1984 German Socio-Economic Panel.

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