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Session Organizers: Thesia Garner, Bureau of Labor Statistics, Washington, DC, USA, Jean-Yves Duclos, Université Laval, Sainte, Foy, Canada and Lars Osberg, Dalhousie University, Halifax, Canada. E-Mail: garner_t@bls.gov, Jyves@ecn.ulaval.ca and Lars.Osberg@dal.ca

Discussant: Andrew Sharpe

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THE LEVY INSTITUTE MEASURE OF ECONOMIC WELL-BEING UNITED STATES, 1989-2001

Edward N. Wolff, Ajit Zacharias, and Asena Caner

For additional information please contact:

Edward N. Wolff
New York University, Department of Economics
269 Mercer Street, 7th floor
New York, NY 10003.
edward.wolff@nyu.edu
Phone: 212-998-8917 Fax: 212-995-4186

Ajit Zacharias
The Levy Economics Institute of Bard College
P.O. Box 5000
Annandale-on-Hudson, NY 12504
zacharia@levy.org
Phone: 845-758-7734 Fax: 845-758-1149

Asena Caner
The Levy Economics Institute of Bard College
P.O. Box 5000
Annandale-on-Hudson, NY 12504
caner@levy.org
Phone: 845-758-7715 Fax: 845-758-1149

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Introduction

Economic well-being refers to the command or access by members of a household over the goods and services produced in a modern market economy during a given period of time. Traditionally, household money income is used as a measure that reflects such command.

In a welcome and significant shift, the U.S. Census Bureau began placing its "experimental measures of income" on par with gross money income (MI) in its annual reports (DeNavas-Walt et al. 2003). The Bureau's most comprehensive measure, which we refer to as extended income (EI), is a better approximation of a household's command over commodities than MI, which is the most widely used official measure. EI is an after-tax measure of income. It expands the definitions of income from work and income from wealth. Furthermore, it has a better accounting of the government's role in household economic well-being.

The EI and MI measures seek to estimate the command over commodities. Although commodities are of critical importance, they form only a portion of the entire set of goods and services available to households. The state plays a crucial role in the direct provisioning of the "necessaries and conveniences of life" (to use Adam Smith's famous expression), such as public education and highways. Nonmarket household work, such as childcare, cooking, and cleaning, also provides the necessaries and conveniences of life.

The Levy Institute Measure of Economic Well-Being (LIMEW) is a more comprehensive measure than the two official measures. In this paper we describe the methodology and data sources for the LIMEW, provide estimates of the measure for all households in the United States and for households in some key demographic groups. We also provide estimates of overall economic inequality. We compare our findings based on the LIMEW with those based on the official measures. We discuss some policy implications in the concluding section.

Components of the LIMEW

The LIMEW is constructed as the sum of the following components (*see* Table 1): base money income; employer contributions for health insurance; income from wealth; net government expenditures (transfers and public consumption, net of taxes); and household production[1].

Table 1: A Comparison of the LIMEW and Extended Income (EI)

LIMEW	EI
Money income (MI)	Money income (MI)
Less: Property income and Government cash transfers	*Less*: Property income and Government cash transfers
Equals: Base money income	*Equals:* Base money income
Plus: In-kind compensation from work	*Plus*: In-kind compensation from work
Employer contributions for health insurance	Employer contributions for health insurance
Plus: Income from wealth	*Plus*: Income from wealth
Annuity from nonhome wealth	Property income and realized capital gains (losses)
Imputed rent on owner-occupied housing	Imputed return on home equity
Less: Taxes	*Less*: Taxes
Income taxes [1]	Income taxes
Payroll taxes [1]	Payroll taxes
Property taxes [1]	Property taxes
Consumption taxes	
Plus: Cash transfers [1]	*Plus*: Cash transfers
Plus: Noncash transfers [1, 2]	*Plus*: Noncash transfers
Plus: Public consumption	
Plus: Household production	
Equals: LIMEW	*Equals*: EI

Note: (1) The amounts estimated by the Census Bureau and used in EI are modified to make the aggregates consistent with the NIPA estimates. (2) The government-cost approach is used: the Census Bureau uses the fungible value method for valuing Medicare and Medicaid in EI. The main difference between the two methods is that, while the fungible value method assigns an income value for a benefit according to the recipient's level of income, the government-cost approach assigns an income value for a benefit irrespective of the recipient's income.

[1] For details regarding the data sources and methods used to estimate these components, see the Appendix.

Base money income is simply gross money income less the sum of property-type income (interest, dividends, and rents) and government cash transfers (e.g., Social Security benefits). Earnings make up the overwhelming portion of base money income and the remainder consists of pensions and other small items, such as interpersonal transfers and workers' compensation paid by the private sector.

The first item added to base money income is employer contributions to health insurance. Although small relative to other components of the LIMEW, this item is by far the most important in-kind compensation for work that can be considered a part of current income, at least in the United States.

The second item added to base money income is imputed income from wealth. In the official gross money income measure, property-type income consists of the actual receipts of interest, dividends, and rent. From our perspective, the actual, annual property income is an incomplete measure of the economic well-being derived from the ownership of assets. Real assets, such as houses, typically last for several years and yield services to their owners, thereby freeing up resources otherwise spent on housing. Financial assets in the form of bank and nonbank balances, and accumulated balances in private welfare and social insurance funds, can, under normal conditions, be sources of economic security in addition to property-type income.

Our approach to the valuation of income from wealth is different from the methods suggested in the literature (e.g. Weisbrod and Hansen 1968) in two significant ways. First, we distinguish between home and nonhome wealth. Housing is a universal need and home ownership frees the owner from the obligation of paying rent, leaving an equivalent amount of resources for consumption and asset accumulation. Hence, benefits from owner-occupied housing are reckoned in terms of the replacement cost of the services derived from it (i.e., a rental equivalent).[2] Second, we estimate the benefits from nonhome wealth using a variant of the standard lifetime annuity method.[3] We calculate

[2] This is consistent with the approach adopted in most national income accounts.

[3] Our rationale for employing this method is that it is a better indicator of the resources available to the wealth holder on a sustainable basis over the expected lifetime compared to the bond-coupon method.

an annuity based on a given amount of wealth, an interest rate, and life expectancy. The annuity is the same for the remaining life of the wealth holder and the terminal wealth is zero. (In the case of households with multiple adults, we use the maximum of the life expectancy of the head of household and spouse in the annuity formula.) We modify the standard procedure by accounting for differences in portfolio composition across households. Instead of using a single interest rate for all assets, we use a weighted average of asset-specific and historic real rates of return,[4] where the weights are the proportions of the different assets in a household's total wealth.

The third item that we add to base money income is net government expenditures—the difference between government expenditures incurred on behalf of households and taxes paid by households. Our approach to determine expenditures and taxes may be called the social accounting approach (Hicks 1946, Lakin 2002, pp. 43–46, Adema 2001, p. 19).

Government expenditures included in the LIMEW consist of cash transfers, noncash transfers, and public consumption. These expenditures, in general, are derived from the National Income and Product Accounts (NIPA Tables 3.12 and 3.15). Government cash transfers are considered to be, in their entirety, part of the money income of recipients. Our approach to the valuation of noncash transfers involves the appropriate average cost incurred by the government (e.g., in the case of medical benefits, the average cost for the elderly differs from that for children). The other type of government expenditure that we include in our measure of well-being is some public expenditures ("public consumption"). When allocating these expenditures to the household sector, we attempt to follow, as much as possible, the general criterion that a particular expenditure must be incurred directly on behalf of that sector and expands its consumption possibilities. In distributing expenditures among households, we build on earlier studies that employ the government-cost approach (e.g., Ruggles and Higgins 1981).

[4] The rate of return used in our procedure is real total return (the sum of the change in capital value and income from the asset, adjusted for inflation). For example, for stocks, total real return would be the inflation-adjusted sum of the change in stock prices plus dividend yields.

The final step in constructing net government expenditures is concerned with taxes. Our objective is to determine the distribution of actual tax payments by households in different income and demographic groups in an accounting sense rather than incidence in a theoretical sense. We align the aggregate taxes in the ASEC (imputed by the Census Bureau) with their NIPA counterparts, as for expenditures. The bulk of the taxes paid by households falls in this group—federal and state personal income taxes, property taxes on owner-occupied housing, and payroll taxes (employee portion). Our estimated total tax burden on households also includes state consumption taxes, which were not aligned with a NIPA counterpart. Taxes on corporate profits, on business-owned property, and on other businesses, as well as nontaxes, were not allocated to the household sector because we assumed that they were paid out of business sector incomes.

The final item that we add to base money income is the imputed value of household production. Three broad categories of unpaid activities are usually included in the definition of household production: (1) core production activities, such as cooking and cleaning; (2) distribution activities, such as shopping for groceries and for clothing; and (3) childcare activities, such as caring for babies and reading to children. These activities are considered as "production", since they can be assigned, generally, to third parties apart from the person who performs them, although third parties are *not* always a substitute of the person, especially for the third activity.[5]

Our strategy for imputing the value of household production is to value the amount of time spent by individuals on household production using the replacement cost based on average earnings of domestic servants or household employees (Kuznets, et al 1941, pp. 432–433; Landefeld and McCulla 2000). We recognize that the efficiency and quality of household production are likely to vary across households. Therefore, we modify the replacement-cost procedure and apply to the average replacement cost a discount or premium that depends on how the individual (whose time is being valued) ranks in terms of a performance index. The index seeks to capture certain key factors (household income, educational attainment, and time availability) that affect efficiency and quality differentials.

[5] The third-party principle is sometimes ambiguous in the case of such personal care activities as shaving (see Organisation for Economic Co-operation and Development 1995: 11).

Level and Composition of Well-being

The picture regarding economic well-being is substantially altered according to the LIMEW compared to the official measures. By construction, MI and EI have average values less than the LIMEW. The median values of the official measures amount to approximately 60 percent of the LIMEW in 2001 and approximately 65 percent in 1989 (*see* Table 2). The three measures also show different rates of change. The most favorable rate of increase is given by the LIMEW (13.2 percent), followed by EI (6.0 percent) and MI (2.1 percent).

Table 2 also shows two measures that are related to the LIMEW. As noted in the introduction, EI and MI are measures that seek to estimate the magnitude of the command over commodities. If we exclude public consumption and household production from the LIMEW, we arrive at a similar measure: LIMEW−C. EI is particularly suited to be compared with LIMEW−C because both estimates are post-tax, post-transfer measures of economic well-being. The addition of public consumption to LIMEW−C results in a "post-fiscal income" (PFI) measure that reflects the effect of net government expenditures, which includes public consumption in addition to transfer payments net of taxes. Similar to the LIMEW, these measures also show much higher percentage increases between 1989 and 2001, as compared to the official measures.

An advantage of the information base constructed for the LIMEW is that it allows us to estimate the hours spent on total work (paid work plus housework) by the average household. Our estimates are shown in the last line of Table 2. They indicate that the median annual hours of work in 2001 (4,639) was 5.4 percent or 238 hours more than in 1989, an increase of about six weeks of full-time work (using a 40-hour work week). Therefore, the reported increase in economic well-being was accompanied by a considerable increase in total hours of work.

The differences in the picture of well-being that is conveyed by the various measures are due to their individual components (e.g., public provisioning is included in the LIMEW, but not in the official measures) and the manner in which the components are included in the measure (e.g., income from nonhome wealth is included as a lifetime

annuity in the LIMEW, but as the sum of property income and realized net capital gains in EI). As it turns out, the differences in the level of mean values across the measures are similar to the differences in the median values. However, as shown in Table 3, the rate of change in the mean values of the measures between 1989 and 2001 is much closer (14.2 percent for MI and EI, and 16.9 percent for the LIMEW) than the rate of change of the median values outlined at the beginning of this section.

In an accounting sense the percentage change in an income measure can be expressed as the sum of the contributions by the individual components. As shown in Table 3, base income—the sum of base money income and employer contributions for health insurance—is the only identical component in concept and amount for both the LIMEW and EI. In the LIMEW, base income accounted for 10.2 percentage points of the total change (16.9 percentage points), whereas in EI its contribution exceeded the total change (14.2 percentage points), but it was offset by the negative contributions from income from wealth and net government expenditures (transfers, net of taxes). While the contribution of net government expenditures in the change was negative in both measures, the effect was smaller in the LIMEW owing to the inclusion of public consumption. In contrast to EI, the component reflecting income from wealth in the LIMEW showed a strong positive contribution to the change in economic well-being. Finally, household production, which has no counterpart in EI, also contributed positively to the change in the LIMEW.

The composition of the LIMEW for various years is shown in Figure 1. Notable year-to-year fluctuations exist for the income from wealth component: after falling from 19.9 percent in 1989 to 17.8 percent in 1995, it surged to 23.7 percent in 2000 before retreating to 20.7 percent in 2001. The fluctuations largely reflect movements in stock prices, particularly the bull market of the late 1990s and the stock market collapse in 2001. Net government expenditures peaked at 3.4 percent in 1995 and bottomed at –0.3 percent in 2000. Although positive in 2001, it was still below its 1989 level, as a percentage of the LIMEW and in absolute terms (*see* Table 3), because of a higher tax burden. The share of household production fell from 22.5 percent in 1989 to 20.4 percent in 2000, before rising to 21.5 percent in 2001.

Disparities in Economic Well-Being

The extent of disparities among households grouped according to salient social and economic characteristics and how these disparities change over time depend on the yardstick used for measuring well-being. Each bar in Figure 2A represents a ratio of mean values using the LIMEW, EI, and MI. In 2001 the racial disparity between nonwhites and whites[6] is less using the LIMEW (0.83), as compared to EI (0.78) and MI (0.76).[7] This finding, however, does not imply that there is no disparity. Nonwhites remain far behind whites, given the mean difference of $17,152 in the LIMEW (as compared to $12,609 in EI). A review of the components of the LIMEW and EI gives us an idea about the reasons behind the different disparities.

As shown in Figure 2B, nonwhites are at a disadvantage in terms of income from wealth, which is more in the LIMEW (the ratio of nonwhite to white mean values is 0.39) than in EI (0.51). In the LIMEW, this disadvantage is offset to a considerable extent by the lead of nonwhites in the public consumption component. Furthermore, in the LIMEW, there is virtual parity between the two racial groups with respect to government transfers (nonwhites receive only 75 percent of the amount of whites in EI) and household production.

According to the LIMEW, racial disparity in 1989 was notably higher than in 2001, but the official measures show a much smaller difference (*see* Figure 2A). The LIMEW and EI show the same degree of disparity in 1989, but, compared to 2001, nonwhites had a bigger disadvantage according to the LIMEW in terms of income from wealth (0.21), as compared to EI (0.45) (not shown in Figure 2A). The huge gap created by this component was not offset to the same degree, as in 2001, by the equalizing effects of government transfers, public consumption, and household production.

Similarly, the disparity between families with a single female householder and with a married couple is less according to the LIMEW than the official measures mainly due to the more comprehensive accounting of government expenditures in the LIMEW

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[6] "Whites" consist only of non-Hispanic whites, while "nonwhites" include everyone else.

[7] The ratios of median values are, in general, close to the ratios of mean values. In 2001, they are 0.88 for the LIMEW, 0.77 for EI, and 0.75 for MI. We prefer to use the ratio of means because it allows us to decompose the overall racial difference into individual components.

(*see* Figure 3A). In 2001 the ratio of mean values for the two family types in the LIMEW is 0.65, as compared to 0.55 in EI and 0.49 in MI.[8] At the mean, the gap between the two family types is $42,832, as measured by the LIMEW, and $31,662, as measured by EI. As shown in Figure 3B, the mean value of government transfers received by families with a single female householder is 139 percent that of married couples according to the LIMEW (94 percent according to EI). This component, therefore, has a larger equalizing effect in the LIMEW. Public consumption is another equalizing factor that reduces disparity in the LIMEW (with a ratio of 1.38).[9]

Other household groupings, such as by age, also show that economic disparity may differ substantially between the various measures. The disparity between the elderly and the average household is greatest according to MI (0.60) and the smallest according to the LIMEW (0.95) (*see* Figure 4A).[10] The hump shape of the age-income relationship (i.e., the 35–64 age group is better off, while the youngest and oldest age groups are worse off, compared to the average) appears to be indifferent to the measure.

According to the LIMEW, the elderly appear to be almost on par with the average household, in contrast to EI. The difference mainly stems from the manner in which income from wealth is reckoned in the two measures (*see* Table 1). The LIMEW includes the annuity value from nonhome wealth as income, which can be quite high for the elderly owing to a greater amount of accumulated wealth and a shorter remaining life expectancy. As a result, the wealth advantage of the elderly is more prominent in the LIMEW (179 percent of the average household) than in EI (133 percent) (*see* Figure 4B).

Also according to the LIMEW, the elderly were slightly better off than the average household in 1989, but the situation reversed in 2001. The deterioration is mostly due to changes in income from wealth and government transfers. In 1989 the mean values for the elderly were 227 percent and 268 percent of the average household, respectively

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[8] The ratios of median values are similar. In 2001, they are 0.68 for the LIMEW, 0.55 for EI, and 0.46 for MI.

[9] It is interesting to note that, while the disadvantage of single female householder families was the same in 2001 and 1989, single male householder families have fallen further behind married couples in 2001, as compared to 1989, by all three income measures.

[10] The ratios of median values in 2001 are 0.84, 0.77, and 0.55 according to the LIMEW, EI, and MI, respectively.

(results not shown). In 2001, the corresponding figures were 179 percent and 264 percent. The elderly to average household ratios were more or less the same for the other components.

Economic Inequality

The official measures and the LIMEW indicate that the distribution of economic well-being, as measured by the Gini coefficient,[11] was more unequal in 2001 than in 1989 (*see* Figure 5). The official measures show a greater increase between the two years (4.2 percentage points in EI and 3.7 in MI) than the LIMEW (2.0). A comparison between 1995 and 2001, however, shows that inequality in the distribution of the LIMEW grew by a much larger extent (2.3 percentage points) than either MI (0.6) or EI (1.9). While MI, the most widely used official measure, suggests that inequality has hardly changed in the second half of the 1990s, the other measures point toward an increase in inequality.

As noted earlier, LIMEW−C, EI, and MI are measures that approximate the magnitude of the command over commodities. Our estimates demonstrate that the level of inequality shown by the LIMEW−C is substantially higher than that by EI (by 5.4 percentage points in 2001). With the exception of 1995, the LIMEW−C shows the highest degree of inequality, suggesting that the official measures might understate inequality in the distribution of the command over commodities. In the period from 1995 to 2001, the growth in inequality was also the highest using the LIMEW−C measure (3 percentage points).

Public consumption and household production are relatively more equally distributed. Hence, their inclusion in an income measure generally lowers the degree of inequality. PFI, our measure that includes public consumption in addition to the command over commodities, has a higher level of inequality than EI, surprisingly, and the difference is considerable (1.8 percentage points in 2001). What is not a surprising is the much lower degree of inequality in PFI than in MI. Similarly, the degree of inequality

[11] The Gini coefficient is an index that ranges from zero (perfect equality) to one (maximal inequality). Here we report values that are 100 times the Gini coefficient. We also estimate the Atkinson measures of inequality, but they are not reported here because our arguments about the level and changes in inequality seem to be valid with either inequality measure.

in the LIMEW, which also includes household production, is, surprisingly, not that different than in EI in 1995 or 2001, but is conspicuously higher in 1989 and 2000. As expected, the LIMEW shows more equality in distribution than does MI.

Compared to the LIMEW, MI overstates inequality because it is a pretax measure that does not fully account for government transfers and excludes public consumption and household production. EI, on the other hand, requires a more complex comparison with the LIMEW: the degree of inequality is similar in 1995 and 2001, but quite different in 1989 and 2000 (when the LIMEW is higher). What accounts for the different pattern?

The overall degree of inequality in an income measure can be expressed in terms of the "contributions" of its individual components (Lerman 1999). A component's contribution can be calculated as the product of its concentration coefficient and its share of total income (Yao 1999, pp.1252–53).[12] To highlight the roles of components, it is convenient to divide their contribution by the overall degree of inequality and express the result as a percentage of total inequality. Table 4 shows the estimated shares of the major components in the overall inequality of the LIMEW and EI.

First, consider the difference in the composition of inequality of EI between 1989 and 1995. The shares of income from wealth and net government expenditures are lower (in absolute value) in 1995 and in tandem, and the share of base income is higher. The same pattern holds for EI in 2000 and 2001. Next, we observe similar compositional change between 1989 and 1995 for the inequality in the LIMEW. However, the compositional change between 2000 and 2001 is a decline for the income from wealth component, in favor of base income, net government expenditures, and household production.

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[12] The concentration coefficient is similar to the Gini coefficient. The Gini coefficient is the area between the Lorenz curve and the 45-degree line multiplied by 2, while the concentration coefficient is the area between the concentration curve and the 45-degree line multiplied by 2. The Lorenz curve plots the cumulative proportion of income on the vertical axis and the cumulative proportion of households on the horizontal axis, with the cumulative proportions calculated after ordering households according to income (starting from the lowest and ending with the highest). Suppose we plot the cumulative proportion of a component of income (e.g., wages), keeping the same ordering of households on the horizontal axis. The curve connecting all points plotted is the concentration curve for wages.

What appears to be common between the LIMEW and EI, in terms of compositional change between years, is a shift in favor of base income and away from income from wealth. However, similar changes were accompanied by diametrically opposite changes in overall inequality. Inequality in EI was higher in 1995 and 2001 than it was in 1989 and 2000, respectively. The converse is true for the LIMEW.

This kind of outcome occurs when the same component has very different incremental effects on inequality between two income measures. The incremental effect of a particular component is the percentage change in overall inequality that would occur if every household's income from that component were to change by 1 percent, other things remaining the same.[13] If the incremental effect of a component increases inequality, we expect inequality to be higher than it would otherwise be if the component's share in inequality were to increase. The incremental effects were similar for all years and, therefore, only 2001, the latest year for which estimates are available, is shown in Table 5.

The incremental effects of the base income and income from wealth components on inequality are strikingly different in the LIMEW and EI. Base income has a large positive effect on inequality in EI (16.6 percent) but a small negative effect (-1.2 percent) in the LIMEW. Conversely, income from wealth has a large positive effect on inequality in the LIMEW (16.0 percent) but a much smaller effect in EI (5.7 percent).

Changes in the share of other components in the two measures further reinforced the opposing effects on inequality from the compositional change in favor of base income and against income from wealth. There was a reduction in the share of net government expenditures in the inequality of EI in later years (i.e., the share in 1995 and 2001 was lower than in 1989 and in 2000, respectively). As shown in Table 5, net government expenditures have a strong negative incremental effect on inequality in EI (-22.2 percent) and, therefore, the reduction in the share of these expenditures in inequality contributed inequality being higher in 1995 and 2001, as compared to 1989 and 2000, respectively. Net government expenditures has a smaller negative incremental effect on the inequality in the LIMEW (-12.8 percent). An increase in the share of net government expenditures

[13] The incremental effect of a component is calculated as the difference between the share of that component in inequality and its share in income.

in 2001 relative to 2000 contributed, therefore, to the decline in inequality. Household production (excluded from the EI), with its small negative incremental effect (-2.0 percent) contributed to lower inequality of the LIMEW in 1995 and 2001, as compared to 1989 and 2000, respectively.

The closer look at the composition of inequality and the incremental effects of individual components suggests that, although the LIMEW and EI display approximately the same degree of inequality in 2001, there are very different implications. Policy considerations are often informed by the incremental effect of variables, and the two measures are significantly different in this respect, as discussed above. Earnings, which make up the overwhelming portion of base income, are the decisive factor shaping the overall level of inequality in EI, but they represent a much smaller portion of inequality in the LIMEW. The difference suggests that considering economic inequality to be shaped, basically, by earnings inequality may be misleading. Wealth inequality also plays an important role.

Net government expenditures considerably reduce the overall level of inequality in the LIMEW and EI (the share of net government expenditures is negative and large, *see* Table 4). However, the effect of net government expenditures is much larger in EI (-38.5 percent in 2001), as compared to the LIMEW (-11.9 percent). The same relationship also holds with respect to the incremental effects on inequality noted earlier (*see* Table 5). Thus, the share and the incremental effect of net government expenditures in inequality appear to be overstated in EI relative to the LIMEW.

Furthermore, the incremental effect of taxes and expenditures on the degree of inequality are different in the LIMEW and EI. The EI suggests that taxes and expenditures have similar incremental effects. In contrast, the LIMEW suggests that expenditures have a markedly higher incremental effect in reducing inequality than taxes.

The main difference between the two measures with regard to income from wealth is the treatment of nonhome wealth. As shown in Table 5, the incremental effect of imputed income from housing wealth has a broadly similar effect in both measures (-1.9 percent in EI and 0.4 percent in the LIMEW). At the margin, therefore, it does not seem to matter for inequality whether the advantage from homeownership is reckoned as in EI or as in the LIMEW. In contrast, the inequality-enhancing effect of imputed income

from nonhome wealth in the LIMEW is twice that in EI (15.6 percent, as compared to 7.5 percent). Thus, whether or not nonhome wealth is treated as a lifetime annuity on net worth, as in the LIMEW, or by current realized income from assets, as in EI, has a substantial impact on inequality.

Conclusion

The picture of economic well-being is crucially dependent on the yardstick used to measure it. Although gross money income (MI), the most widely used official measure, may be suitable for certain purposes, it is an incomplete measure in several important ways. The elevation of more comprehensive measures to a status that is on par with MI in the official scorecard of the economic well-being of U.S. households is a sure indication that academic discussion and policy making will be increasingly informed by such measures.

The LIMEW is different in scope from the official measures. Our measure recognizes that economic well-being depends on public and self provisioning, in addition to the command over commodities. In contrast, the official measures are restricted to measuring the latter. Because we believe that these components are important, we have developed a set of estimates that reflect their effect and significance. The LIMEW differs from the official measures also in its methods, especially in our treatment of income from wealth and noncash transfers (*see* Table 1). These differences are more than formulaic; they are the result of alternative concepts of economic well-being (Wolff, Zacharias, and Caner 2004, 7:9; Wolff and Zacharias 2002).

The differences in scope and method lead to substantially different findings regarding economic well-being. The median U.S. household appears to be much better off in 2001 than in 1989 according to our measure relative to the official measures. However, the increase in well-being was accompanied by a considerable increase in the total annual hours worked by the median household. While mean values of the LIMEW and official measures display similar rates of change, the median values of the LIMEW show a much faster growth rate than the comparable values of the official measures. This discrepancy between rates of change in mean and median values likely reflects the fact that the LIMEW includes public consumption and household production, which are large

in magnitude and relatively equally distributed compared to other components of the LIMEW and the official measures.

Disparities among population subgroups are generally lower according to the LIMEW (e.g., the racial gap in well-being in 2001 appears to be much smaller). The narrowing of the racial gap also appears to occur at a higher rate. The lower racial gap relative to EI is traceable, mainly, to the large amount of public consumption by nonwhites and to the near parity in household production. Disparities are generally lower among age groups and households grouped by income in the LIMEW than either MI or EI. The elderly, in particular, are much better off because of greater income from wealth. Our results suggest that the relevant problem, both analytically and in terms of public policy, is to investigate the forces behind the disparities, which we plan to address in future research.

The differences with respect to which components are selected and how they are included in the measure of well-being also play a crucial role in the analysis of overall economic inequality. While two income measures might show the same degree of inequality (e.g., the LIMEW and EI in 2001), the structure of inequality can be radically different. Our analysis of the incremental effects of individual components on inequality suggests that base income (earnings, primarily), has a large inequality-enhancing effect for EI and a small inequality-reducing effect for the LIMEW. In sharp contrast, the incremental effect of income from wealth on increasing inequality is much higher in the LIMEW than EI. Similarly, while net government expenditures have an inequality-reducing effect for both measures, the EI overstates the effect, as compared to the LIMEW. A more important observation from a policy standpoint, perhaps, is the asymmetric incremental effect of taxes on inequality between the two measures: Taxes have a large negative effect that is similar to government spending in EI, while government spending appears to have a much larger inequality-reducing effect than taxes in the LIMEW.

Several issues related to economic well-being require further research and evaluation. We hope that our analysis will lead to further academic and policy research and will stimulate a rethinking of public policies that affect well-being.

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Appendix: Sources and Methods

Introduction

Our main data source is the public-use datafiles developed by the U.S. Bureau of the Census from the Current Population Survey's Annual Social and Economic (ASEC) Supplement, which is the most comprehensive source of annual information regarding household income, housing tenure, receipt of noncash transfers, and a number of key demographic characteristics of U.S. households. The number of households was 59,941 in 1989 and 78,265 in 2001. The ASEC contains either partial or no information on imputed income from wealth, government transfers, public consumption, taxes, and household production. Therefore, we impute values for these components based on additional information.

The component of the LIMEW that is also part of the official definition of money income is called "base money income"—money income less property income (the sum of dividends, interest, and rent) less government cash transfers, as reported in the ASEC. Roughly 95 percent of base money income consists of earnings. Another component of the LIMEW that is taken directly from the ASEC (though not included in the official measure of income) is the imputed value of employer contributions to health insurance. Our estimation of the remaining five components of the LIMEW is briefly described below.

Imputed Income from Wealth

Our data source for household wealth is the 1989, 1995 and 2001 waves of Survey of Consumer Finances (SCF), conducted by the Federal Reserve Board. For these years the survey collected data for 3,134 and 4,442 households, respectively. We use marketable wealth (or net worth) as our wealth concept, which is defined as the current value of all marketable or fungible assets less the current value of debts. Total assets are the sum of (1) the gross value of owner-occupied housing; (2) other real estate owned by the household; (3) cash and demand deposits; (4) time and savings deposits, certificates of deposit, and money market accounts; (5) government bonds, corporate bonds, foreign bonds, and other financial securities; (6) the cash surrender value of life insurance plans; (7) the cash surrender value of pension plans, including IRAs, Keogh, and 401(k) plans; (8) corporate stock and mutual funds; (9) net equity in unincorporated businesses; and (10) equity in trust funds. Total liabilities are the sum of mortgage debt, consumer debt (including auto loans), and other debt.

Home and nonhome wealth are treated separately in the imputation process. In the case of home wealth, imputed rent is the replacement cost of services derived from owner-occupied housing. We estimate this amount by distributing the total amount of imputed rent on nonfarm, owner-occupied housing in the GDP[14] to homeowners in the SCF based on the (gross) value of their houses. In the case of nonhome wealth, we estimate the constant lifetime annuity flow generated by each nonhome wealth component using average total real rates of return for each component from 1960 to 2000. In the next step we calculate the weighted sum of the annuity flows for each household with the portfolio shares of the components serving as weights. The annuity amount calculated is such that nonhome wealth is exhausted at the end of the wealth-holder's life.[15]

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[14] NIPA table 8.21, line 172.

[15] In the case of households with multiple adults, life expectancy is the maximum of life expectancies of the head of household and spouse. Information on remaining lifetimes is taken from the tables on vital statistics (U.S. Census Bureau 2002, Table 93).

Following our estimation of imputed rents and annuities from nonhome wealth using the SCF, we assign these estimates by statistical matching to the households in the ASEC. Each household record in the SCF is matched with a household record in the ASEC, where a match represents a similar unit. The strata variables used in the matching procedure are race of the household head (white versus nonwhite), homeownership status of the household (owner or buyer versus renter), family type (married couple, single male, or single female), and age of the household head (age differences within a range of two, five, and ten or more years). Within these strata, records are matched by minimizing a distance function based on education and occupation of the household head and total income and size of the household. The weights of the distance function are the coefficient estimates from an OLS regression of net worth that includes, as regressors, all of the variables mentioned above.

Government Transfers

Government transfers in the LIMEW are "NIPA consistent," in the sense that, in aggregate, they are equal to the appropriate NIPA benchmarks, after adjusting for differences in definition and coverage.[16]

Transfers for which actual or imputed amounts are reported in the ASEC are aggregated across recipients and compared against the benchmarks.[17] Any discrepancy between the ASEC total and the NIPA benchmark for a given transfer payment is distributed across recipients according to the distribution of that payment in the ASEC.

Transfers for which there are no actual or imputed amounts reported in the ASEC can be divided into two categories: those where recipients are identified in the ASEC itself, and those where we imputed recipiency. The first category consists of the noncash component of public assistance; the Women, Infants, and Children (WIC) program; and employment and training. Noncash public assistance is distributed

[16] For details on adjustments and specific data sources, see Wolff, Zacharias, and Caner (2004).

[17] The only exception to this procedure was educational assistance, for which we lacked information to split the NIPA amount between recipients residing in households and student-housing. Hence, no modification was made to the amount reported in the ASEC.

across households according to the number of "cases" per household (the sum of those reporting cash public assistance, of children receiving publicly assisted childcare, and of those reporting receipt of transportation assistance). Expenditures on WIC are distributed equally among the recipients. Expenditures on employment and training are distributed equally among those receiving job training or attending school to get the General Equivalency Diploma (GED). The second category consists of military-related transfers (veterans' life insurance, medical payments for retired and active armed forces personnel and their dependents at nonmilitary facilities), and payments to nonprofit institutions. Potential beneficiaries from military-related transfers are identified using demographic information from the ASEC, and these expenditures are divided equally among the beneficiaries. Payments to nonprofit institutions are assumed to be incurred on behalf of the entire population and distributed equally.

All of the transfers discussed in the previous paragraph (with the exception of the noncash component of public assistance, which did not exist at the time) had to be distributed on the basis of imputed recipiency in 1989 and 1995, because the survey did not ask recipiency questions. To identify the potential WIC beneficiaries, we approximated the federal eligibility criteria (families with income up to 185 percent of the poverty-line and with children under 6 years of age) and divided the expenditures equally among them. Expenditures on employment and training were divided equally among adults receiving cash public assistance and those in training, but wanting a regular job.

Public Consumption

Estimates of public consumption by households were constructed in three steps: (1) obtaining total expenditures by function and level of government; (2) allocating total expenditures between the household sector and other sectors of the economy; and (3) distributing expenditures allocated to the household sector among households.

Expenditure by Function and Level of Government

The expenditure category used here is government consumption expenditures and gross investment (the same as that on the product side of the NIPA). To group

expenditures according to purpose, we adopted the functional classification in NIPA with minor modifications.

We distributed the NIPA aggregate of state and local expenditures for each function among the states using the interstate distribution of these expenditures in the Annual Survey of Government Finances (ASGF) conducted by the U.S. Bureau of the Census in 1989 and 2000. Care was taken to ensure that the expenditure concept and the groupings of the functions in the ASGF conform as closely as possible to the NIPA expenditure and function concepts.

Allocation of Expenditures to the Household Sector

We started by constructing a schema of 44 functions by level of government (federal versus state and local).[18] Then, we grouped these functions into three categories. The first involved activities that do not expand the potential amenities available to the household sector. General public service, national defense, law courts and prisons are prominent examples. The second category included functions that are assumed to expand amenities directly only to the household sector, such as income security and recreation and culture.

The third category consisted of functions that can potentially serve both the household and nonhousehold sectors, such as economic affairs and housing and community services. Costs incurred in the performance of these functions are allocated to the household sector in accordance with the extent that they are "responsible" in generating such costs. Our judgment regarding the extent of responsibility is based on the available empirical information, as much as possible. A prominent example of this type of function is highways (included under economic affairs), where approximately 60 percent of expenditures were estimated to occur on behalf of households.

Distribution of Allocated Expenditures among Households

After determining government expenditures allocated to the household sector (i.e., "public consumption") by function, we distributed them among households. We attempted to follow the same principles of direct usage and cost responsibility that were employed in splitting total government expenditures between the household and

[18] For more detail, see Wolff, Zacharias, and Caner (2004).

nonhousehold sectors. Two major categories of public consumption are distributed among households: those distributed equally across persons (such as public health and hospitals, police and fire) and those distributed according to household-level, or person-level, characteristics (such as elementary and secondary education, highways).

The second group of expenditures account for the bulk of public consumption (nearly three-quarters). The person-level or household-level characteristics used in the distribution procedures, and their corresponding functions, are listed below:

- *Amount and type of income*: agriculture.
- *Type of income received (including receipt of noncash transfers)*: public housing, administrative costs of Medicare, disability, retirement income (Social Security), welfare and social services, and unemployment compensation.
- *Shares in consumption expenditures*: energy, pollution control and abatement, postal service, liquor stores, water supply, sewerage and sanitation.
- *Enrollment in public educational institutions*: education.
- *Patterns of vehicle ownership and transportation usage*: transportation and parking.
- *Employment status*: occupational safety and health.

Information on the type and amount of income, as well as the employment status of individuals, is obtained directly from the ASEC. All other characteristics were imputed to individuals or households in the ASEC sample from information gathered from external sources.[19]

Taxes

The estimated household tax burden in the LIMEW consists of federal and state individual income taxes, property taxes on owner-occupied housing, payroll taxes (employee portion), and state and local consumption taxes (excise and sales). All taxes, apart from consumption taxes, have imputed values in the ASEC and were aligned with their NIPA counterparts by distributing for each tax the discrepancy between the NIPA

[19] A full discussion of the imputation procedures is available in the unpublished manuscript by Edward N. Wolff and Ajit Zacharias, "The Levy Institute Measure of Economic Well-Being," October 2002.

and ASEC aggregate among households according to the share of each household in the ASEC aggregate.[20]

State and local consumption taxes are calculated on the basis of estimates published by the Institute on Taxation and Economic Policy (McIntyre, et al. 2003). The publication contains average state tax rates for "General Sales–Individuals" and "Other Sales and Excise–Individuals" differentiated for households in each quintile of the household income distribution and in selected portions of the top quintile. We assigned these average tax rates to households in the corresponding positions in the ASEC household income distribution. The resulting tax aggregates were lower than the NIPA counterparts. Since we had no independent estimate of the household shares in the NIPA totals, it was impossible to align the household consumption tax burden with any portion of the NIPA.

Household Production

Our data sources for household production are the Americans' Use of Time Project (AUTP) conducted in 1985 and the Family Interaction, Social Capital, and Trends in Time Use Study (FISCT) conducted during the 1998–99 period. Both surveys were undertaken at the Survey Research Center, University of Maryland. These surveys used the time-diary method and collected time use, demographic, and economic data for 5,358 and 1,151 individuals, respectively. The list of activities allowed us to estimate the total time spent on paid work and on the three main household production activities: core production (such as cooking and cleaning), distribution (such as shopping for groceries), and childcare (such as caring for babies and reading to children).

Our imputations are based on the AUTP data for 1989 and the FISCT data for 1995, 2000 and 2001. We statistically matched each adult record in the time-use survey to an adult record in the ASEC. Men and women were matched separately, because the effects of match variables on the time spent on household production vary significantly by sex. The strata variables used in the matching procedure are the dummy variables for being employed and for being a parent. Within these strata we match records by

[20] For more detail, see Wolff, Zacharias, and Caner (2004).

minimizing a distance function based on the number of children under five and dummy variables for marital status, unemployment, age, education, retirement, being a homemaker (for women). The weights of these variables in the distance function are the coefficient estimates in a Tobit regression of weekly hours of housework on all the variables listed above. Weekly hours were calculated by multiplying the reported daily hours by 7 and applying "day weights" available from the time-use surveys to adjust the reported hours for the day of the week that the respondent filled out the time diary.

To impute the value of household production, we used the average hourly wage rate for private household employees, which was calculated from the annual file that was created by merging the Current Population Survey's monthly outgoing rotations files. The wage rate was defined as usual weekly earnings divided by usual weekly hours of work.

Research suggests that differences in the quality and efficiency of housework are correlated with household-level characteristics (such as wealth) and characteristics of household members (such as the influence of parental education on childrearing practices, e.g., Yeung and Stafford 2003). We attempted to capture these differences by constructing for each adult in the ASEC a performance index that consists of years of education, household income, and time availability for housework.[21] The hourly wage rate of private household employees was multiplied by this index to derive an estimate of hourly replacement cost for each adult's housework. The annual value of household production for each adult was then calculated as the product of the individual's hourly replacement cost and annual hours of housework. Finally, the imputed value of household production at the household level was derived by summing the imputed values for all adults in the household.

[21] Years of education and household income are available in the ASEC. We calculated time available for housework by deducting weekly hours of rest (assumed to be 56) and usual weekly hours of work from the total hours in a week. Although the latter variable is available in the ASEC, we used the imputed amount from the time-use survey in the calculation to ensure that the weekly hours spent on all activities do not exceed the total hours in a week.

Table 2. Economic well-being and work

Median values (dollar amounts in 2001 $)

	1989	1995	2000	2001
Levy measures				
LIMEW	63,590	66,028	70,559	72,014
PFI[1]	55,962	57,616	61,659	62,616
LIMEW-C[2]	40,227	41,620	44,292	44,645
Official measures				
Money income	41,310	39,510	43,195	42,198
Extended income	40,742	40,884	43,882	43,199
Addendum:				
Total annual work hours[3]	4,401	4,659	4,727	4,639
Paid work hours	2,080	2,340	2,340	2,340
Unpaid work hours	2,087	2,054	2,040	2,030

Percentage change

	1989-95	1995-2000	2000-01	1989-2001
Levy measures				
LIMEW	3.8	6.9	2.1	13.2
PFI[1]	3.0	7.0	1.6	11.9
LIMEW-C[2]	3.5	6.4	0.8	11.0
Official measures				
Money income	-4.4	9.3	-2.3	2.1
Extended income	0.3	7.3	-1.6	6.0
Addendum:				
Total annual work hours[3]	5.9	1.5	-1.9	5.4
Paid work hours	12.5	0.0	0.0	12.5
Unpaid work hours	-1.6	-0.7	-0.5	-2.7

Note: The LIMEW is the sum of base income, income from wealth, net government expenditure (sum of transfers and public consumption, net of taxes), and the value of household production. EI equals: money income (MI) plus realized net capital gains, less federal and state income taxes, less payroll taxes, plus the value of employer contributions to health insurance and noncash transfers, plus the annual return from converting one's home equity into an annuity, net of property taxes. Income from wealth in the LIMEW is the sum of the imputed rental cost of home and lifetime annuity from non-home wealth. Income from wealth in EI is the sum of property income, net realized capital gains and the return on home equity. Net government expenditure in the LIMEW equals the sum of transfers and public consumption less taxes.Net government expenditure in EI is transfers less taxes. There are valuation differences with respect to taxes and transfers in the two measures (see Table 1).

[1] PFI equals LIMEW less the value of household production.

[2] LIMEW-C equals LIMEW less the value of household production and public consumption.

[3] Total work hours is the sum of hours of paid work and hours of housework. Weekly hours of housework and paid work are imputed from the same data source, the time use survey conducted in 1998-99 for three years: 1995, 2000 and 2001. Estimates of housework and paid work for 1989 are imputed from the time-use survey conducted in 1985. Annual hours of paid work is calculated by multiplying the imputed weekly hours of paid work with the weeks worked per year reported in the ASEC and annual hours of housework is obtained by multiplying weekly hours of housework with 52.

Source: Authors' calculations

Table 3. Contribution to the change in economic well-being, 1989 to 2001.
(All dollar amounts are mean values in 2001 dollars)

	LIMEW			Extended income (EI)		
	1989	2001	Contribution to change (in percent)	1989	2001	Contribution to change (in percent)
Base income	45,047	53,185	10.2	45,047	53,185	17.1
Income from wealth	15,961	19,383	4.3	8,662	8,567	-0.2
Net gov. expenditure	1,019	867	-0.2	-6,129	-7,399	-2.7
Transfers	7,137	8,695	1.9	5,699	6,559	1.8
Public consumption	7,343	9,157	2.3			
Taxes	-13,461	-16,986	-4.4	-11,829	-13,958	-4.5
Household production	18,053	20,160	2.6			
Total	80,080	93,595	16.9	47,579	54,353	14.2
Addendum:						
Money income	50,981	58,213	14.2			

Note: See Tables 1 and 2 for definitions.
Source: Authors' calculations

Table 4. Shares of income components in inequality by income measure (percent)

	LIMEW				Extended income (EI)			
	1989	**1995**	**2000**	**2001**	**1989**	**1995**	**2000**	**2001**
Base income	53.2	58.7	51.8	55.6	111.1	112.0	112.4	114.4
Income from wealth	37.1	31.4	42.0	36.7	26.1	21.8	23.8	21.4
Net gov expenditure	-11.4	-11.2	-11.4	-11.9	-37.3	-33.9	-36.2	-35.8
Household production	21.0	21.1	17.7	19.5				
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Addendum:								
Gini coefficient x 100	*38.9*	*38.6*	*42.5*	*40.9*	*36.9*	*39.2*	*40.8*	*41.1*

Note: See Tables 1 and 2 for definitions.

The contribution of a given income component (k) is calculated as the product of its concentration coefficient (C_k) and its share in total income (S_k^y), with appropriate modification to allow population weighting. The share of an income component in inequality (S_k^I) is calculated as the contribution of that component divided by the overall Gini coefficient. Let the population weight of the i^{th} household be w_i and their total number in the sample be equal to n. Also, let y_{ki} denote the amount of income component k for the i^{th} household and y_i its total income. Then,

$C_k = 1 - \sum_{i=1}^{n} p_i(2Q_{ki} - s_{ki})$, where $p_i = w_i \Big/ \sum_{i=1}^{n} w_i$, $s_{ki} = y_{ki}w_i \Big/ \sum_{i=1}^{n} y_{ki}w_i$, and, $Q_{ki} = \sum_{j=1}^{i} s_{kj}$.

The share of an income component in total income is calculated as: $S_k^y = \sum_{i=1}^{n} y_{ki}w_i \Big/ \sum_{i=1}^{n} y_i w_i$. It should be noted that the households in the sample are sorted in an ascending order before C_k is calculated. The incremental effect referred to in the text is calculated as ($S_k^I - S_k^y$).

Source: Authors' calculations

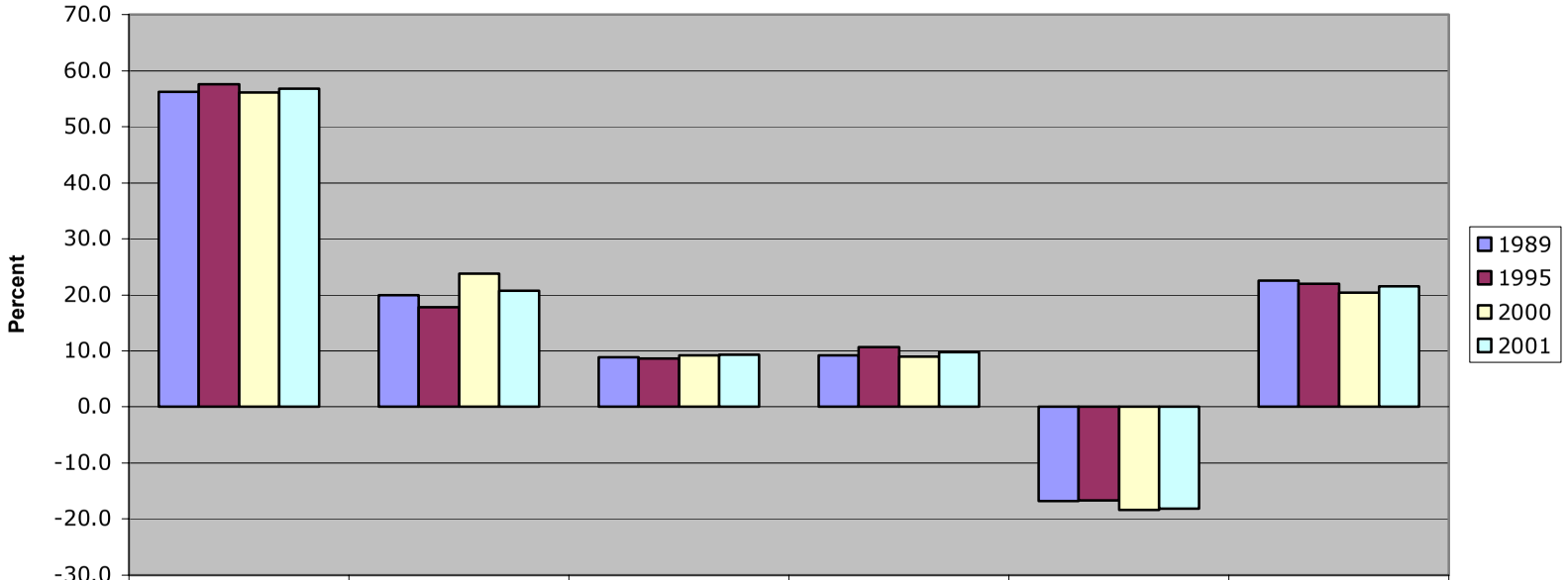
Table 5: Incremental effects of the components of income on inequality, by income, 2001

	LIMEW	EI
Base income	-1.2	16.6
Income from wealth	16	5.7
Net gov. expenditure	-12.8	-22.2
Household Production	-2	
Gov Expenditures	-11.5	-12.2
Taxes	-1.4	-10.1
Home Wealth	0.4	-1.9
Nonhome wealth	15.6	7.5

Note: See Tables 1, 2 and 4 for definitions and formulas.

Source: Authors' calculations

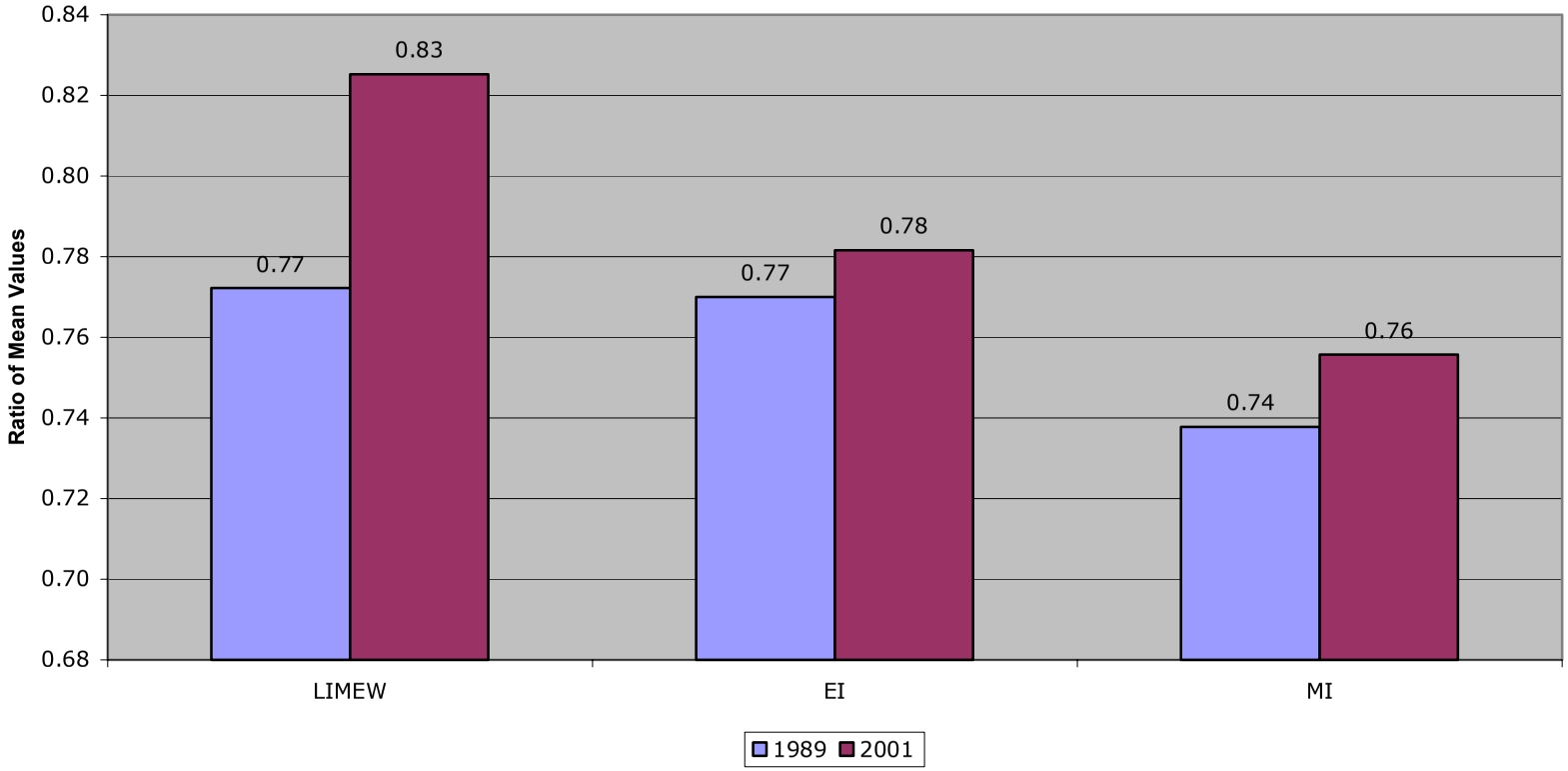
Figure 1: Composition of the LIMEW, 1989-2001



	Base income	Income from wealth	Government transfers	Public consumption	Taxes	Household production
1989	56.3	19.9	8.9	9.2	-16.8	22.5
1995	57.6	17.8	8.6	10.7	-16.6	22.0
2000	56.1	23.7	9.2	9.0	-18.4	20.4
2001	56.8	20.7	9.3	9.8	-18.1	21.5

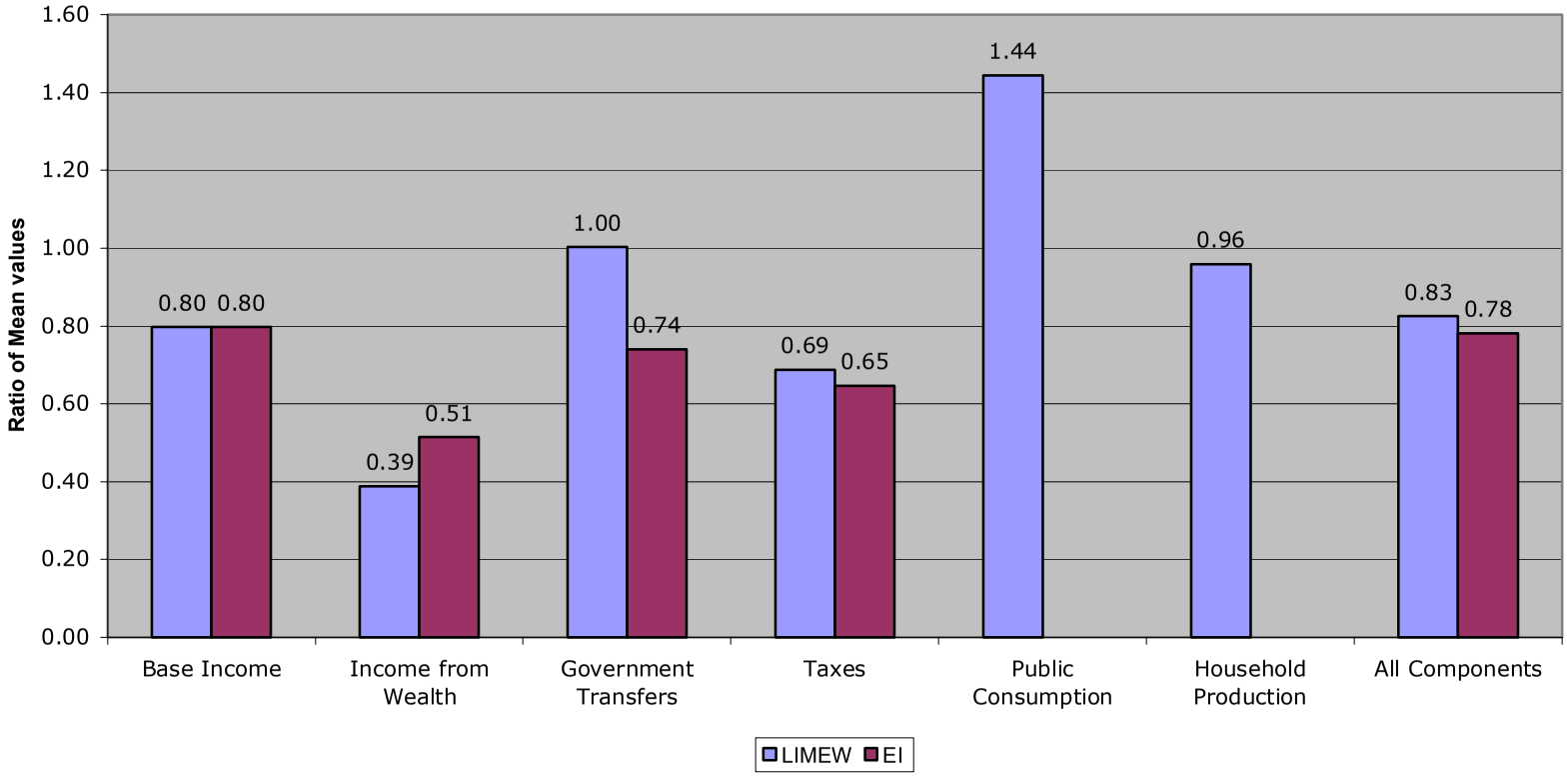
Source: Authors' calculations

Figure 2A: Disparities by Race
Nonwhite / White Ratios of the Mean Values of the LIMEW, EI and MI



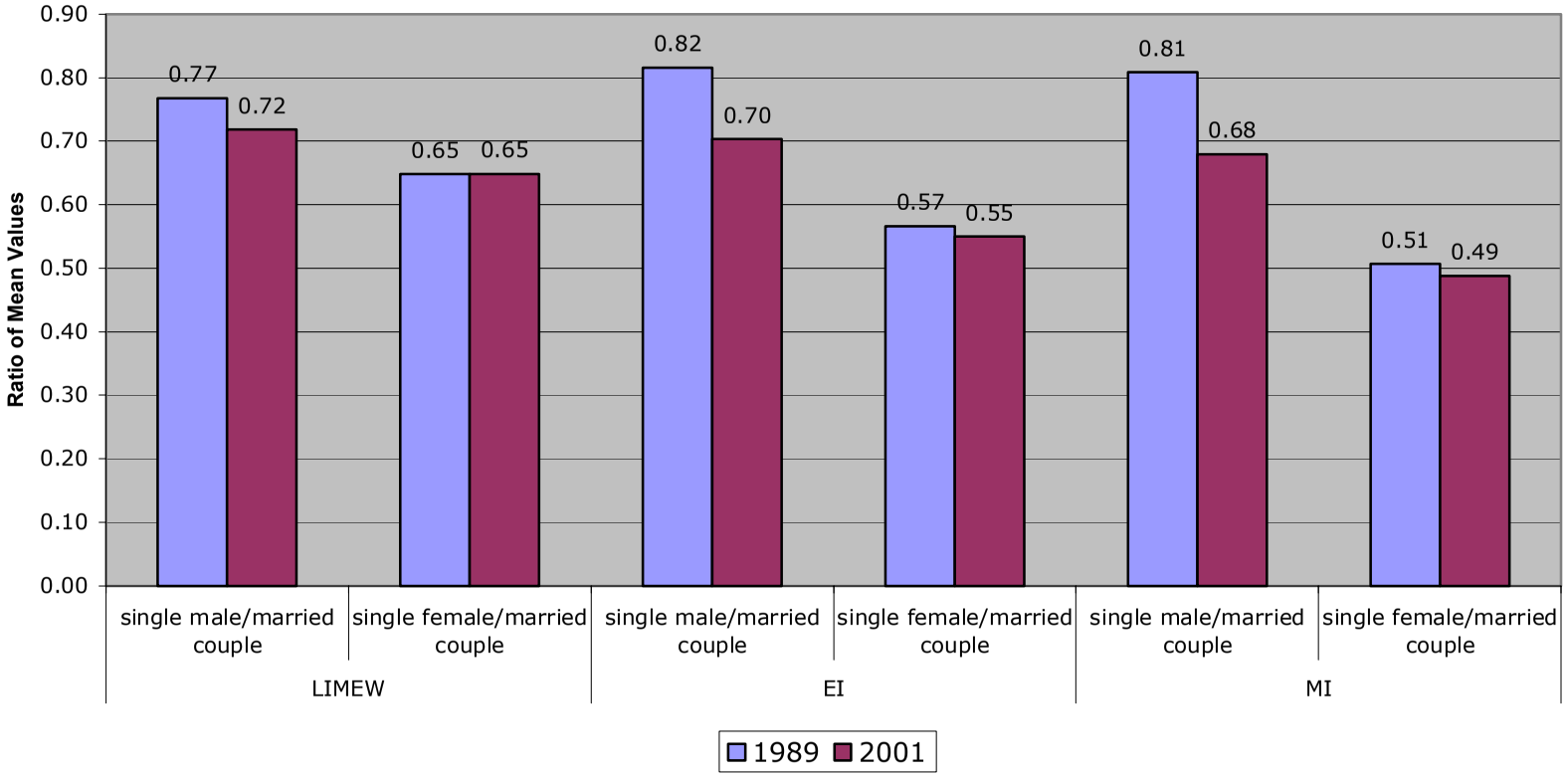
Source: Authors' calculations

Figure 2B: Nonwhite / White
Ratios of the Mean Values of Components in EI and the LIMEW, 2001



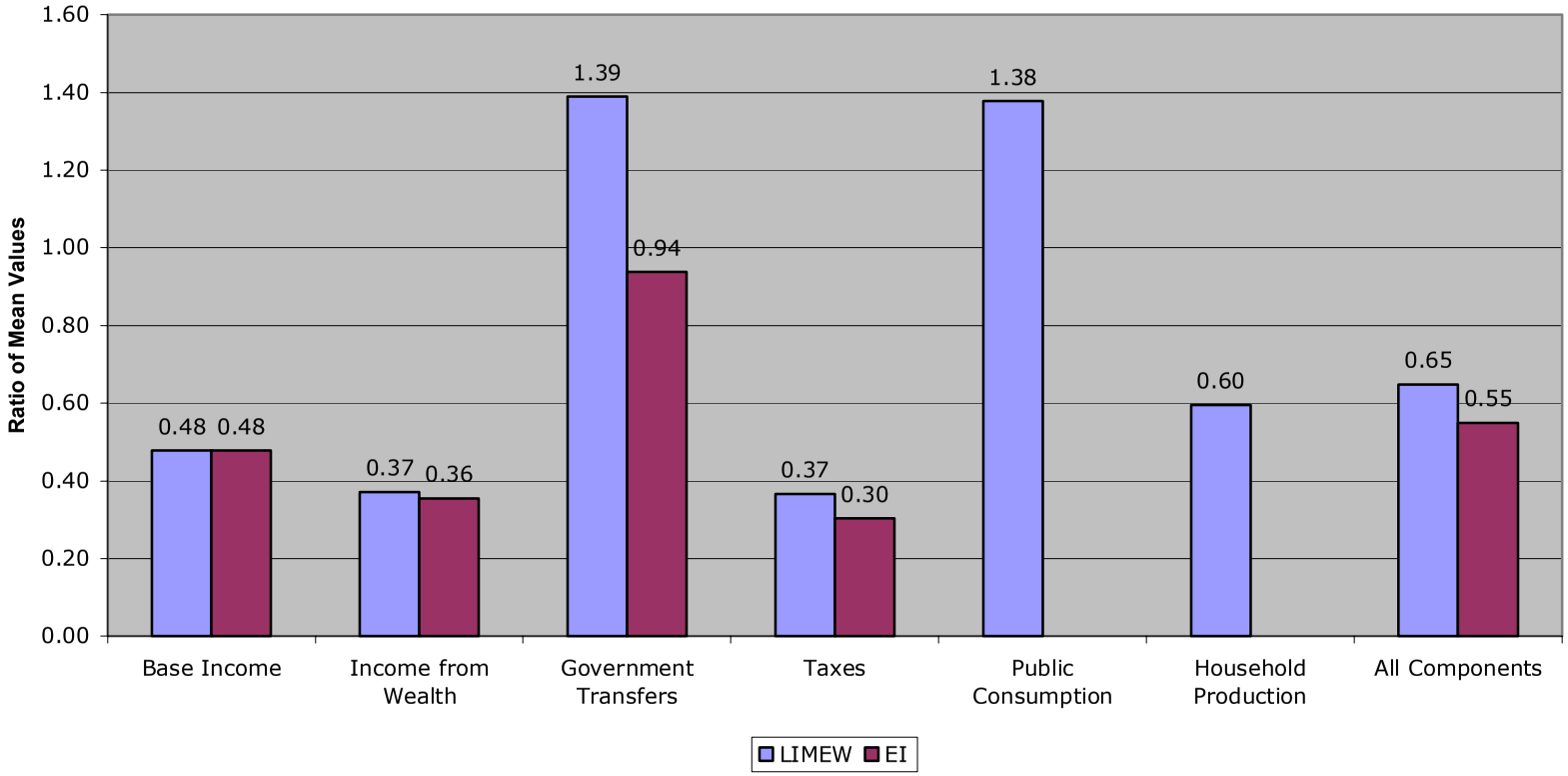
Source: Authors' calculations

Figure 3A: Disparities by Family Type
Ratios of the Mean Values of the LIMEW, EI and MI



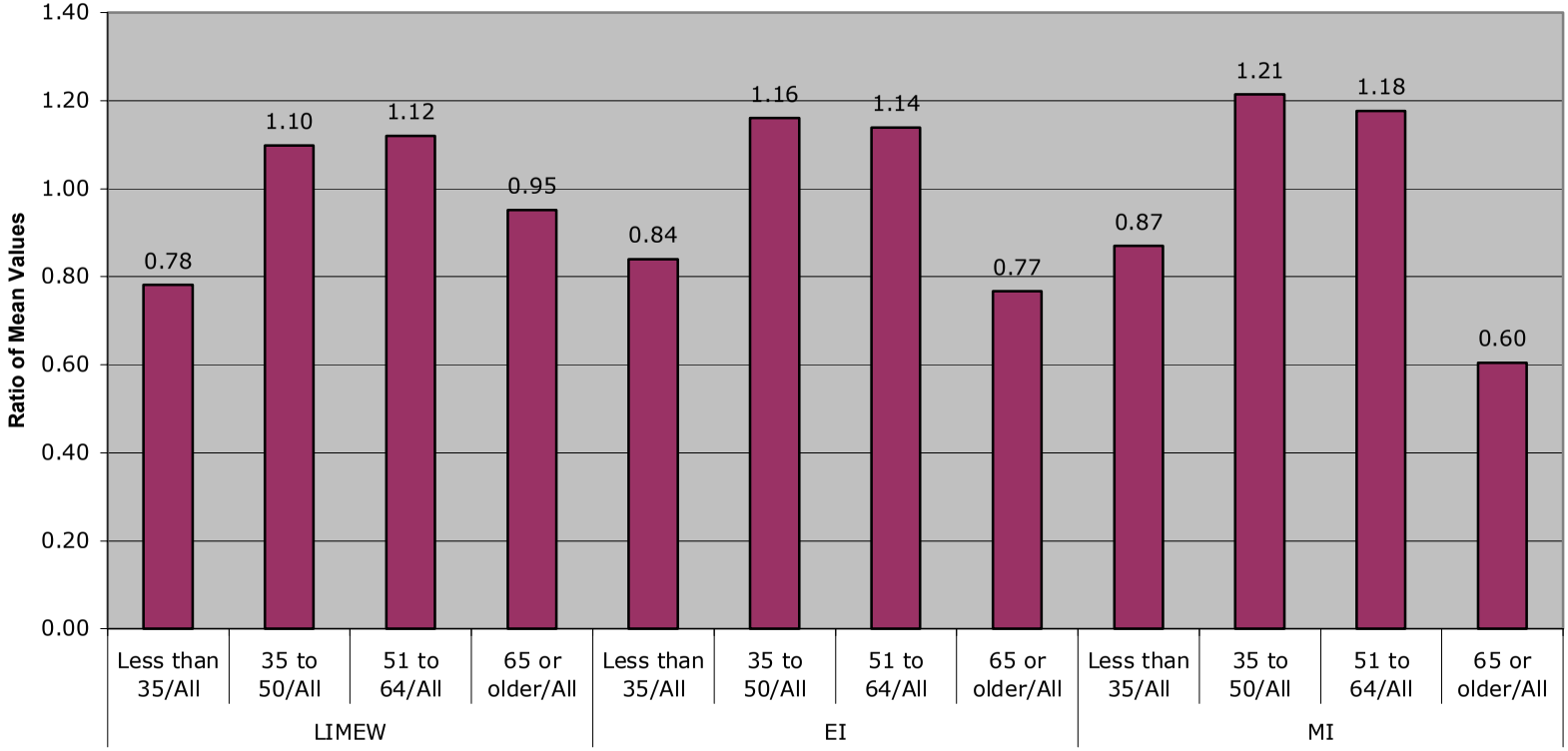
Source: Authors' calculations

Figure 3B: Families with a Female Householder / Married Couple Families
Ratios of the Mean Values of Components in EI and the LIMEW, 2001



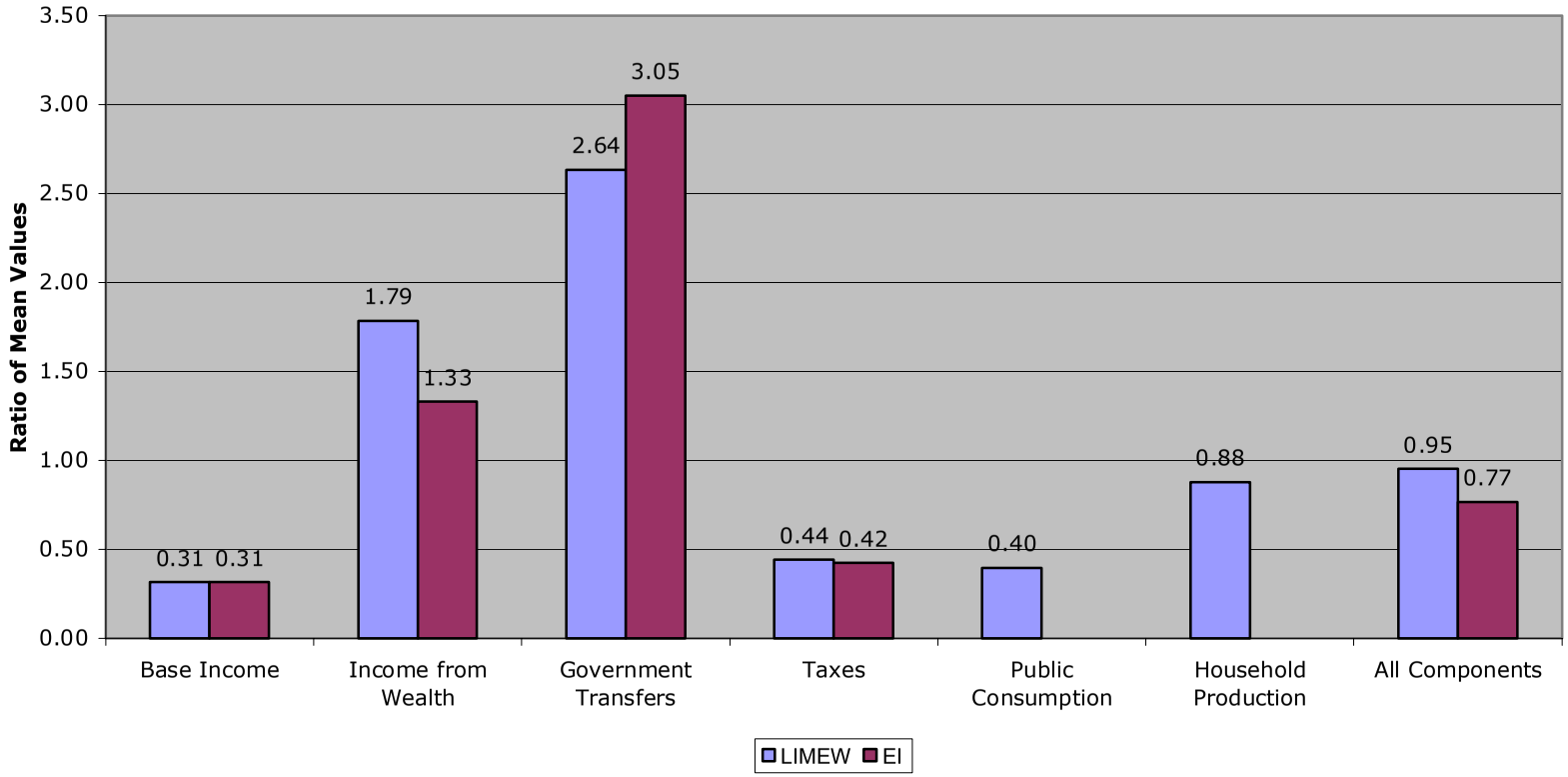
Source: Authors' calculations

Figure 4A: Disparities by Age
Ratios of the Mean Values of the LIMEW, EI and MI, 2001



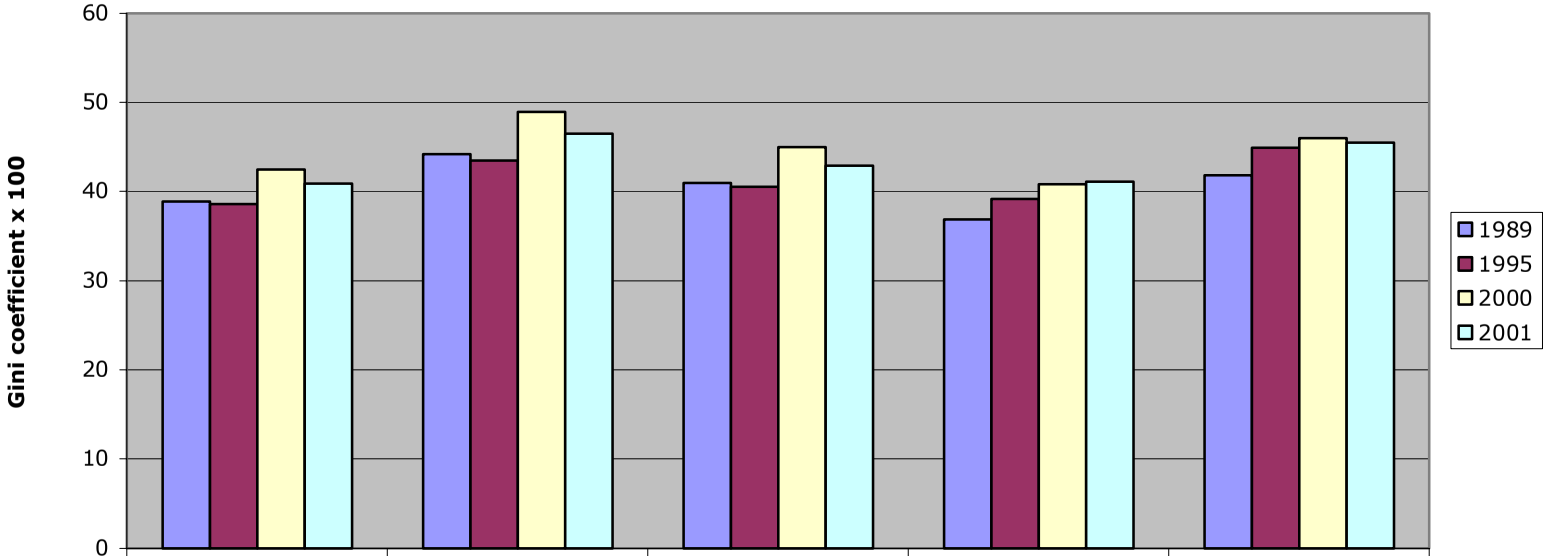
Source: Authors' calculations

Figure 4B: Elderly / All
Ratios of the Mean Values of Components in EI and the LIMEW, 2001



Source: Authors' calculations

Figure 5: Economic inequality by income measure



	LIMEW	LIMEW-C	PFI	EI	MI
1989	38.9	44.2	41.0	36.9	41.8
1995	38.6	43.5	40.5	39.2	44.9
2000	42.5	48.9	45.0	40.8	46.0
2001	40.9	46.5	42.9	41.1	45.5

Note: The LIMEW is the sum of base income, income from wealth, net government expenditure (sum of transfers and public consumption, net of taxes), and the value of household production. The LIMEW-C is the LIMEW less the value of public consumption and household production. PFI is the LIMEW less the value of household production. EI equals: money income (MI) plus realized net capital gains, less federal and state income taxes, less payroll taxes, plus the value of employer contributions to health insurance and noncash transfers, plus the annual return from converting one's home equity into an annuity, net of property taxes.
Source: Authors' calculations