INCOME-WEALTH MEASURES OF ECONOMIC WELL-BEING FOR AGE GROUPS

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INTRODUCTION*

This is an exploratory paper that examines the use of income-wealth measures for the analysis of the distribution of economic well-being. Economic status is ordinarily analyzed using data on income, but it is clear that wealth is also an important factor. In recent years several data sources that contain information on both income and wealth have become available. This follows a period in which such data were rare. This increase in available data has sparked some renewed interest in assessments of economic status that consider both wealth and income.

The best way of using income and wealth data together is controversial and probably depends on the use to which the estimates will be put. This paper discusses several ways in which income and wealth data have been used together in the analysis of economic status. Because the emphasis here is on age groups, with the focus on the aged, measures that are appropriate for the comparison of age groups are needed. Economic status in the current period, rather than from a longer (e.g., lifetime) perspective, is emphasized. Estimates produced using selected measures are presented and compared. Data from the Census Bureau's 1984 Survey of Income and Program Participation (SIPP) are used. The focus here is on households that are not wealthy. Thus, the accuracy of the estimates of the upper tail of the wealth distribution, which is generally considered to be a problem in SIPP and other household surveys, is not an important concern in this paper.

INCOME-WEALTH MEASURES

Measures Used

In the analysis of the distribution of economic well-being, the most widely-used income-wealth measure is the conversion of wealth into an annuity and the summing of that annuity and current money income excluding property income. In this measure, the stock of wealth is converted into a constant annuity income stream (e.g., Murray 1964, Weisbrod and Hansen 1968, Taussig 1973, Moon 1977, Wolfson 1979). This type of annuity will be referred to as the "usual" annuity. The interest rate and the time period for which the annuity will continue must be specified to compute the factor that is applied to current wealth to obtain the annuity value. The time period chosen has usually been the expected remaining lifetime of the unit. Where the unit is larger than one person, this time span often takes into account the expected remaining lifetimes of both the unit head and spouse of the head.

A modified version of the usual annuity method has also been used. In this version the annuity allows the unit to reach the same

indifference curve as the unit's optimal consumption path, rather than the highest constant consumption path. Some researchers have used this type of annuity in conjunction with estimates of future earnings (Nordhaus 1973, Irvine 1980), while others have combined it with current income (Beach 1981).

Several other measures have also been used. In looking at current potential consumption, wealth and income have been summed (e.g., David 1959, Steuerle and McClung 1977). In this case, ordinarily a subset of total wealth is used. Home equity is usually excluded because it is not considered to be readily available for current consumption.

An arbitrary fraction of wealth has been added to income to illustrate the effects of different weighting of wealth relative to income (Steuerle and McClung 1977). Income flows have also been converted to stocks of wealth (e.g., Hurd and Shoven 1983). Imputed rent from equity in owner-occupied homes has been included in income by many researchers (e.g., Wolff 1987). Amounts of wealth have been compared with poverty income gaps for poor consumer units and the number of consumer units for whom wealth would make up the gap for 1 year, 2 years, etc., has been computed (Projector and Weiss 1966).

Wealth and income have also been considered jointly in a two-dimensional classification (e.g., Habib, Kohn and Lerman 1977; Radner 1984; Wolff 1987). For example, Radner and Vaughan (1987) examined the percentage of each age group that had both relatively low income and relatively low wealth.

Criticisms of the Usual Annuity Measures

The usual annuity measure is by far the most frequently used income-wealth measure. Several researchers have commented on problems associated with this measure. Projector and Weiss (1969) emphasized that life-cycle patterns of spending and saving should be taken into account in a measure that sums the annuity value of wealth and current income. Although young units generally have little wealth currently, this wealth can be expected to increase as they age. Such life-cycle increases are ignored by a measure of this type. Thus, such a measure is considered to be inappropriate for the comparison of age groups.

For a given amount of current wealth, the usual annuity measure has the property that the shorter the expected remaining lifetime, the higher the annuity value of that wealth. That is, for given amounts of current income and current wealth, the older the unit is, the better off it is considered to be. This property is present when comparing persons of different ages at the same time or comparing the same person at different times. Taussig (1973) cited this property as a problem for the annuity-based estimates that he presented and he suggested that

it is best to use such measures within narrow age groups.[1]/

Desirable Properties of a Measure

In the usual comparisons of economic well-being that are based on current income, it is ordinarily assumed that if one unit has more income than another unit, then the unit with more income is better off (assuming identical needs). If the two units have identical income, then they are equally well off. Analogous properties for a current period income-wealth measure are suggested here.

Confining the analysis to the current period means that life-cycle factors are not considered. For example, prospects for future income have no effect on the measure. Also, the fact that the aged have had more time to accumulate wealth than other age groups have had is not taken into account. Ordinary comparisons of income also do not take life-cycle factors into account.

Three properties are suggested. Identical needs are assumed. First, if two units have identical amounts of current income and identical amounts of current wealth, then they should have identical values of the income-wealth measure.[2]/ Second, if two units have identical amounts of income but one has more wealth than the other, then the unit having the higher amount of wealth should have a higher value of the income-wealth measure. Third, if two units have identical amounts of wealth, but one has more income than the other, then the unit having the higher amount of income should have a higher value of the income-wealth measure.

Income-wealth measures that use expected remaining lifetimes (whether or not in an annuity formulation), or that use differing lengths of time for different units in other ways, do not have these three properties. Measures that consider only income or only wealth also do not have all three properties. Thus, other measures should be used for a current period analysis if these properties are accepted.

ESTIMATES

The relative positions of different age groups using different measures are examined in this section. This is essentially a sensitivity analysis that examines the differences produced when various income-wealth measures are applied. The emphasis is on current economic well-being. Two of the measures have the three properties mentioned above, while the others do not have at least one of those properties.

Data

The estimates in this paper were made using data from Wave 4 of the 1984 SIPP.[3]/ That wave contained information from interviews conducted in September-December 1984. The estimates shown here are based on information for 18,701 households. Households are classified according to the age of the householder, the person (or one of the persons) in whose name the residence is owned or rented.

The estimates in this paper use financial assets as the definition of wealth. Thus, several asset types that are important to economic well-being are excluded here. The most important of

these is home equity, which is the largest asset for many households. The use of financial assets here can be viewed as a first step in a more comprehensive current period analysis.[4]/

The definition of financial assets used in this paper includes passbook savings accounts, money market deposit accounts, certificates of deposit, interest-earning checking accounts, money market funds, U.S. government securities, municipal and corporate bonds, stocks and mutual fund shares, U.S. savings bonds, IRA and Keogh accounts, regular checking accounts, mortgages held for sale of real estate, amount due from sale of business or property, other interest-earning assets, and other financial assets. The reference date for amounts of assets was the last day of the month preceding the interview.

Several problems with the SIPP wealth data should be mentioned. The SIPP estimates of financial assets appear to suffer from substantial underreporting and there is general agreement that the SIPP estimates of the upper tail of the wealth distribution are not very good. Also, item nonresponse rates were high for amounts of many financial assets. Missing amounts were imputed by the Census Bureau. Nonresponse rates for asset ownership were low.

The income estimates used here are 4-month amounts that have been annualized (by multiplying them by three). The amounts are for the May-November 1984 period. Income is defined to be money income before taxes or other deductions. The definition includes wages and salaries, nonfarm and farm self-employment income (both measured as the salary or other income received from the business by the owner, rather than as net profit), interest, dividends, rent, royalties, Social Security and railroad retirement benefits, Supplemental Security Income payments, unemployment compensation, veterans' benefits, workers' compensation, Aid to Families with Dependent Children, government and private pensions, alimony, income from estates and trusts, and other income types. Lump-sum and one-time payments, such as inheritances or insurance settlements, are included. Capital gains or losses are excluded, as are accrued interest on IRA's, Keogh plans, and U.S. savings bonds. A concept that will be used in this paper, nonproperty income, excludes interest, dividends, rent, and royalties from total money income.[5]/

The amounts of income and financial assets used in this paper have been adjusted to take into account differential need associated with differences in household size and age of householder. Each household's income and financial assets were divided by the appropriate scale value from an equivalence scale based on the scale implicit in the U.S. poverty thresholds. A one-person household (all ages) was used as the base for the scale.[6]/

Medians

Relative medians by age of householder (using all ages as 1.00) are shown in Table 1. All amounts have been adjusted for household size.

Relative medians for age of householder groups are shown for five measures. The first measure includes only income and consists of total money income before taxes (TMI). This is the definition of resources ordinarily used in the

Table 1.--Relative medians of alternative measures, by age of householder, 1984

Age of householder	Relative Medians				
	TMI	FA	NPI +FA	NPI+ ANFA	NPI+ FA/c
Under 25	.79	.15	.65	.79	.73
25-34	.99	.29	.83	.98	.92
35-44	1.09	.73	.98	1.08	1.02
45-54	1.28	1.49	1.23	1.25	1.25
55-64	1.15	4.12	1.39	1.12	1.22
65 and over	.76	5.90	1.16	.82	.87
65-74	.84	6.04	1.25	.86	.95
75 and over ····	.63	5.54	1.04	.71	.74
All ages	1.00	1.00	1.00	1.00	1.00
Median ($1,000)	14.6	1.7	19.1	14.8	16.0

Note: All amounts have been adjusted for household size.

TMI - total money income
FA - financial assets
NPI+FA - nonproperty income plus financial assets
NPI+ANFA - nonproperty income plus the annuity
   value of financial assets
NPI+FA/c - nonproperty income plus 1/c times
   financial assets (where c - 10 for the
   first $6,000 of financial assets and
   c - 3 for financial assets above
   $6,000)

analysis of income. The second measure includes only wealth and consists of financial assets (FA).

The other three measures combine income and wealth in various ways. One measure sums nonproperty income and financial assets (NPI+FA). Another measure sums nonproperty income and the annuity value of financial assets (NPI+ANFA). The expected remaining lifetime of the householder and an assumed real interest rate of 5 percent were used in computing the annuity.7/ The factor applied to financial assets varied from about one-twentieth for the youngest units to about one-fifth for the oldest units.8/ The assumption that the interest rate was a real rate produced an annuity that was fixed in real terms.9/ The final measure sums nonproperty income and a fraction of financial assets (NPI+FA/c). The fraction is 1/c, where c - 10 for the first $6,000 of financial assets and c - 3 for the excess of financial assets over $6,000.10/ A smaller fraction is added in for the first $6,000 in order to allow for asset amounts set aside for contingencies. In this formulation, $5,400 (roughly the poverty threshold for one person in 1984) of the first $6,000 of financial assets is excluded. The fractions and cutoff amount used are arbitrary and merely serve to illustrate this type of measure. This formulation, which is a variation of the single fraction approach that has been used, produced results that were not very different from those obtained using a fraction of one-third for all financial assets. Using a fraction of one-third is equivalent to using an annuity of 3.3 years for all age groups (with a 5-percent interest rate).

The NPI+FA and NPI+FA/c measures have the three properties discussed above. The NPI+ANFA measure does not have these properties. Property income is excluded from income in all three measures. Annuity methods make this exclusion and

the exclusion is made for the other two measures here in order to simplify the comparisons.

The three measures differ in the amount of wealth that is considered to be available for consumption in the current period. The NPI+FA measure assumes that all financial assets are available in the current period. The NPI+ANFA measure assumes that only the amount of financial assets that is consistent with drawing down those assets by a constant (real) amount over the expected remaining lifetime of the unit is available in the current period. The NPI+FA/c measure assumes that only one-tenth of the first $6,000 and one-third of the remainder of financial assets is available in the current period. The one-tenth fraction reflects an assumption that some amount is not "available" in the current period because it is being held to finance contingency spending. In contrast to the income-wealth measures, TMI includes only the income flow from the assets.11/

The pattern of median TMI, adjusted for household size, by age, is a familiar one. Amounts are relatively low at the two age extremes and relatively high in the middle age groups. Median TMI peaks in the 45-54 age group and is lowest in the 75 and over age group (Table 1). The relative median for the 75 and over age group (0.63) is roughly half of the relative median for the 45-54 age group (1.28). The two aged age groups have lower relative medians than all other age groups except the youngest one.

The pattern of median FA by age is very different from the pattern for TMI. The median rises with age to a peak in the 65-74 age group, then falls somewhat for the 75 and over age group. The medians for the under 25 and 25-34 age groups are quite low. The two aged age groups have the highest medians of any age group. This examination of the age patterns for TMI and FA makes it clear that, compared with the TMI pattern, measures that combine TMI and FA will tend to show improved economic status for the aged relative to the other age groups. It should be noted that median FA ($1,700) is much lower than median TMI ($14,600).

As expected, the economic status of the aged relative to other age groups is improved greatly when the definition of resources is changed from TMI to NPI+FA. The median of NPI+FA rises with age to a peak in the 55-64 age group, then falls. This peak is one age group later than the peak for TMI. The decline in the 75 and over age group from the peak in the 55-64 age group is small compared with the decline from the peak for TMI. The relative median for the 75 and over group is 1.04 for NPI+FA compared with 0.63 for TMI. The two aged age groups have higher medians than the three youngest age groups.

The NPI+ANFA measure would be expected to show the relative economic status of the aged to be lower than the NPI+FA measure showed because the relative weight assigned to financial assets in NPI+ANFA is much lower. On the other hand, the lower expected remaining lifetime of the aged applied in NPI+ANFA would be expected to make the aged relatively better off. The results show that the relative weight differences between the two measures are much stronger than the differences produced by the expected remaining lifetime differences among age groups.

Using the NPI+ANFA measure, the median rises with age to a peak in the 45-54 age group, then falls. The peak is in the same age group as it was for TMI. The lowest median is found in the 75 and over age group, and the relative median for that age group is only 0.71. As is the case for TMI, the two aged age groups have lower medians than all the age groups in the 25-64 age range. The relative medians for NPI+ANFA are quite close to the relative medians for TMI except in the 75 and over age group, where the NPI+ANFA relative median is higher. That group has the shortest expected remaining lifetime.

When the NPI+FA/c measure is used, it is expected that the aged would not appear to be as well off as using NPI+FA because the relative weight for wealth is lower in the NPI+FA/c measure. The relationship between the NPI+FA/c and NPI+ANFA measures is uncertain in terms of effects on the aged.

As is true for the other measures, the median for the NPI+FA/c measure rises with age, then falls. The peak is reached in the 45-54 age group. The relative medians for the 65-74 age group (0.95) and the 75 and over age group (0.74) are above the NPI+ANFA values, but far below the NPI+FA values. The median for the 75 and over age group is below all medians in the 25-64 age range, while the median for the 65-74 age group is below all medians in the 35-64 age range.12/

The Lower Part of the Distribution

The previous section examined relative medians for different measures of economic status. It is also important to consider more than just a measure of central tendency of the distribution. In this section the proportion of each age group that is in the bottom of the distribution using alternative measures of economic status is discussed.

In addition to the income-wealth measures shown in the previous section, a two-dimensional income-wealth classification is used here. In this low-income and low-financial assets (LILFA) measure, the bottom portion of the distribution is defined to be those households that have total money income that is less than one-half median total money income (for all ages) and financial assets that are less than one-half median financial assets (for all ages).13/ Both income and financial assets are adjusted for household size in these comparisons. The two-dimensional classification does not produce a complete ordering of households by size of income-wealth as the other three income-wealth measures do. The two-dimensional classification can, however, identify a portion of the joint distribution such as the portion with both low income and low wealth.14/ In the LILFA measure, quite low amounts of financial assets can disqualify a household from being in the bottom of the income-wealth distribution because median financial assets, and, therefore, one-half the median, are quite low. The LILFA measure does not have the second and third properties suggested earlier for a current period income-wealth measure.

The comparisons between LILFA and the other measures are carried out by tabulating the weighted number of households of all ages that have both low income and low financial assets as defined above and then identifying that weighted

number of households at the bottom of the distribution using each of the other measures. The low-income and low-financial assets group consisted of 13,293,000 households (15.2 percent of all households). Thus, the bottom 13,293,000 households using each of the other measures was identified.

The percentage of each age group that is in the bottom of the distribution is shown in Table 2. The age pattern for LILFA shows high percentages at young ages that decline to a low in the 45-54 age group (11.7 percent) and rise in the older age groups. The 75 and over age group has 16.4 percent in this bottom group, while the under 25 age group has 25.3 percent. This pattern is similar to patterns found earlier by Radner (1984, 1989a, 1989b) and Radner and Vaughan (1987) using a slightly different formulation and, in some cases, earlier data.15/

Table 2.--Percentage of households in each age group in the bottom of the all ages distribution, for alternative measures, 1984

Age of householder	TMI	NPI +FA	NPI+ ANFA	NPI+ FA/c	LILFA
Under 25	22.4	24.5	22.6	23.7	25.3
25-34	15.0	16.7	15.1	15.8	17.7
35-44	13.1	13.9	13.4	13.8	13.9
45-54	11.1	12.0	11.7	11.4	11.7
55-64	13.2	12.5	13.8	12.2	12.6
65 and over	19.9	16.6	18.6	18.4	15.4
65-74	15.8	15.0	15.6	15.5	14.6
75 and over	25.8	18.8	23.0	22.6	16.4
All ages	15.3	15.3	15.3	15.3	15.2

Note: All amounts have been adjusted for household size.

   LILFA - low income and low financial assets (less than 1/2 median total money income and less than 1/2 median financial assets)

   See table 1 for other definitions.

All of the other income-wealth measures show a similar pattern of high percentages at young ages followed by a decline to a low in the 45-54 age group and then a rise in the older age groups. The amounts of the rise and fall, however, do differ among the measures. The TMI measure also shows a similar general pattern.

The similarity of these patterns reflects the fact that many households have no financial assets or very small amounts of those assets. If the amounts are zero or very small, then the method used to take them into account will not make very much difference. About 15 percent of all households and 12 percent of aged households had no financial assets (Radner 1989a).

For this part of the distribution, the LILFA measure makes the aged relatively better off (i.e., shows a lower percentage) and the young worse off than using the other measures shown. The NPI+ANFA measure makes the aged relatively worse off and the young relatively better off than using the other measures. If TMI were included in the comparisons, TMI would have the lowest percentages for the four age groups under age 55 and the highest for the 65-74 and 75 and over age groups.

It is also of interest to examine the percentage of "married" and "other" aged households that are in the bottom of the distribution. A household is considered to be "married" if the householder is married with spouse present. All other households are in the "other" category. For all of the measures, the other group shows a far higher percentage in the bottom of the distribution than the married group does, with relatively small differences among measures. For the 65 and over age group, the percentage is in the 7-8 percent range for married households and in the 22-29 percent range for other households. Differences between the 65-74 and 75 and over age groups are relatively small.

SUMMARY AND CONCLUSIONS

This paper examined several methods in which data on both income and wealth were used in the assessment of economic well-being. Desirable properties for a current period income-wealth measure were suggested. Estimates of the economic well-being of age groups using several measures were presented and compared in order to examine the sensitivity of the results to the choice of measure. Data from the 1984 SIPP were used.

For every income-wealth measure examined, the median rose as age increased, then fell. The relative economic status of the aged improved when the measure of resources was changed from income to a combined income-wealth measure. The amount of improvement depended on the income-wealth measure used. The improvement was small when the measure that included the annuity value of financial assets was used. The improvement was large when financial assets and income were summed. The other income-wealth measures showed less change than the latter, but more than the former.

The percentages of households that were in the bottom of the distribution were relatively high for the young and old age groups, and relatively low for the middle age groups for each income-wealth measure.

This is an exploratory paper that has examined several aspects of the very complex problem of combining data on income and wealth into a single measure of current economic well-being. Several less than satisfactory current period income-wealth measures were compared here. No generally acceptable measure was suggested.

The treatment of income-wealth measures for age groups was quite limited here. The definition of wealth was confined to financial assets, although other asset types, particularly home equity, are clearly very important. Possible differences in levels of need among age groups were ignored. For example, the aged face a significant probability of large medical expenses and may try to accumulate assets to protect against that contingency. Also, a current period perspective is only one of several possible approaches. Life-cycle issues are ignored. For example, the aged have had much more time to accumulate wealth than the young have had.

A better understanding of the issues involved in combining income and wealth into a single measure is needed before satisfactory income-wealth measures can be constructed. The data (e.g., SIPP) are now available to explore different possibilities for new and better income-wealth measures.

FOOTNOTES

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1. Another issue is the possible inconsistency between the annuity formulation and people's actual behavior. The existing evidence suggests that many people do not draw down their assets after retirement. Also, purchase of annuities is relatively rare. Several researchers (e.g., Murray 1964, Weisbrod and Hansen 1968) stated that the annuity method was appropriate as a measure of potential consumption regardless of people's actual behavior.

2. It is assumed here that all types of income are treated identically and all types of wealth are treated identically.

3. See U.S. Bureau of the Census (1986b) for more information about definitions and the data.

4. Home equity is included in other research on income-wealth measures currently being carried out by the author. One possibility being explored is different treatments for different types of assets.

5. There is a relatively minor inconsistency between the definitions of financial assets and nonproperty income used. Rent and royalties are excluded from nonproperty income (i.e., are included in property income) even though they are not returns on assets that are included in financial assets. This inconsistency occurred because those income types were not shown separately in the household data on the SIPP file, but were included in a summary property income item that was used.

6. The scale values used were: one person (under age 65), 1.023; one person (age 65 or older), 0.943; two persons (under age 65), 1.323; two persons (age 65 or older), 1.190; three persons, 1.568; four persons, 2.010; five persons, 2.381; six persons, 2.692; seven persons, 3.050; eight persons, 3.403; and nine persons or more, 4.026. These values were derived from the weighted thresholds in table A-2 in U.S. Bureau of the Census (1986a).

7. The annuity value of \$1 of financial assets was computed as: $r/[1-(1+r)^{-n}]$, where r is the interest rate and n is the expected remaining lifetime. Expected remaining lifetime for single years of age (ignoring sex) was used. For purposes of the general comparisons in this paper, taking into account the sex of the householder and the age of the spouse was an unnecessary complication. The expected remaining lifetime values were taken from National Center for Health Statistics (1987).

8. For example, at the 5-percent interest rate used here, the factor applied to the wealth of a household with 10 years expected remaining

lifetime (roughly 75 years old) is 0.130, while the factor applied to the wealth of a household with 50 years expected remaining lifetime (roughly 25 years old) is 0.055.

9. The real rate of interest on 6-month Treasury bills was roughly 5 percent in 1984.. The rate used here is merely for purposes of illustration; other rates could be used. The higher the interest rate used, the higher the annuity value.

10. The split between over and under $6,000 was made after adjusting for household size.

11. The nominal flow, rather than the real flow, is included in the usual definition of income.

12. The inclusion or exclusion of property income can make a substantial difference in the results for the aged.

13. If property income is excluded from income to avoid counting both the asset and the income from that asset, the pattern by age group is very similar to the pattern shown here.

14. Such a measure does not have to be confined to two dimensions. For example, a three-dimensional measure (e.g., income, financial assets, home equity) could be used. This possibility is being explored by the author in further research.

15. The other formulation used the household's relative positions in the income distribution and in the wealth distribution. To be counted in the bottom of the distribution, the household had to be in the bottom 20 percent of the (all ages) income distribution and the bottom 40 percent of the (all ages) wealth distribution (in both cases after adjustment for household size). In the 1984 SIPP the income cutoff was 49 percent of the median and the financial assets cutoff was 43 percent of the median using that formulation. The results using that formulation are close to the results shown here. Several of the papers cited used data from the 1979 Income Survey Development Program, which was similar to SIPP.

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