The Economic Status of the Aged

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This article discusses what is known about the economic status of the aged. Numerous complexities involved in the assessment of their status are discussed. Compared with most other recent assessments, this study finds a less favorable status for the aged relative to other age groups. The focus is on an examination of detailed age groups, rather than summary aged and nonaged groups—thus providing a more complete picture of age differences. More than most other assessments, this study stresses uncertainty about the relative status of the aged and emphasizes what we do not know. It stresses that better adjustments for differences in needs among age groups and other subgroups of the population are necessary. It emphasizes that consistency between the definition of resources and the specification of needs is essential. Also discussed is the vulnerability of the aged to economic risks.

Major findings include: Median cash income is highest for middle-aged family units and lowest for the oldest and youngest units. The poverty rate for aged persons is above the rates for other adult age groups, but below the rate for children. When noncash income is considered in addition to cash income, the income of the aged tends to improve relative to that of the nonaged, but serious measurement problems exist. When wealth is considered in addition to cash income, the economic status of the aged improves relative to that of the nonaged.

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The economic status of the aged has been a topic of great interest to researchers and policymakers for many years. The conventional wisdom formerly was that the economic status of the aged was low. In recent years that view has been replaced by the conventional wisdom that the aged are well off. The former view led to sentiment for increases in government assistance, while the latter view has led to sentiment for cutbacks.

Both views, however, are too simplistic. The assessment of the economic status of the aged is far more complex than most popular articles and many other analyses suggest. This article discusses what is known and what is not known about the economic status of the aged today. It looks at recent research and discusses the numerous complexities that are involved in making an accurate assessment of the aged's economic status.

Although several researchers have concluded, using broad aged-nonaged comparisons, that the aged are better off than the nonaged (for example, Hurd 1990), such broad comparisons are not the most meaningful ones to make. The comparisons examined usually are simple ones in which much important information is not taken into account and in which measures that are not the most appropriate are used. Comparing broad age groups is not the most useful comparison because much important detail is missed. The examination of detailed age groups, within both the aged and nonaged populations, presents a far more complete and somewhat different picture. Detailed age-income curves are far more useful than aged-nonaged ratios.

Also, means, rather than medians, often are used in the comparisons. Means, however, are affected by extreme values; medians generally are a much better measure of the status of a "typical" unit in the age group. The difference between means and medians usually is important empirically.

Another problem with the general conclusion that the aged are better off

than the nonaged is that there is more uncertainty about several aspects of the measurement of the economic status of the aged (and nonaged) than is generally conceded. Economic status is most appropriately assessed by comparing resources and needs, and there is uncertainty related to both of those aspects. There is uncertainty about the effect of noncash income on the economic status of the aged. The valuation of some types of noncash income is controversial, and the lack of consistency between valuations of noncash income and measures of needs is a problem that has received relatively little attention. The appropriate valuation of wealth is also controversial. In addition, there is great uncertainty about the general problem of appropriate measures of needs for the various age groups and for other groups. These sources of uncertainty substantially reduce the confidence with which conclusions about the economic status of the aged can be reached.

Compared with most other recent assessments of the economic status of the aged, this study shows a less favorable status for the aged relative to other age groups. This study emphasizes the examination of detailed age groups, rather than summary aged and nonaged groups. It also emphasizes uncertainty about the relative status of the aged and places more emphasis on what we do not know.

In contrast to several other recent summary studies, this article's emphasis is on the measurement of the economic status of the aged, rather than on an explanation of why their status is what it is. Although explanations are very important, the measurement aspects of this subject need to be given considerable attention.

One important point to remember is that the aged are not a homogeneous group. Analyses generally show wide differences between the subgroups of the aged that are best off and those that are worst off. Wide differences in economic status also are found within each subgroup of the aged. The general point about diversity in

well-being among the aged has been made by several researchers (for example, Quinn 1987), but the point warrants even more attention than it has received. Detailed age groups within the aged group are examined in this article whenever practical. Estimates for the aged group as a whole are discussed when those estimates are useful for summary purposes or when those are the only estimates available.

Another important point is that although the income of the aged has increased greatly (both absolutely and relative to other age groups) during roughly the past 20 years, it does not necessarily follow that the aged have more than they "should" have. Assessments of how much is "enough" or "fair" are very difficult to make and depend on value judgments. Needs related to particular stages of the life cycle are important here, as is the choice of the group(s) with whom the aged are compared. Also, it should be noted that at least some of the relative improvement in the economic status of the aged merely offsets the relative decline in their status from the end of World War II to about 1970 (Radner 1987a).

Measuring Economic Status

Before one can measure the economic status of the aged, certain technical choices have to be made, and these choices can have an important effect on the results of comparisons. The technical aspects involved include the choice of which age groups are compared, the definition of resources chosen, the definition of needs chosen, whether the mean or median is used to summarize the distribution, the choice of the age that separates the aged from the nonaged, the definition of the recipient unit chosen, whether units are weighted using person weighting or unit weighting, and (in multi-person units) the choice of whose age is used in age classifications. These aspects are discussed below.

The aged as a whole often are compared with the nonaged as a whole.

The use of more detailed age groups, within both the aged and nonaged groups, is preferable because much variation is hidden if summary age groups are used. The choice of the age groups to be compared has a great impact on the results of the comparisons.

As noted above, economic status is most appropriately assessed by comparing resources and needs. There are many problems associated with the definition and measurement of resources. Cash income, noncash income, and wealth are types of resources discussed here. Consumption as an alternative to resources is also discussed briefly.

The measurement of cash income has fewer problems than the measurement of other resources, but misreporting of income amounts and nonresponse in household surveys are important problems, as is adjustment for price change. The appropriate treatment of pension income is somewhat controversial. In this study, pension income is included when it is received. The appropriate treatment of capital gains and losses is also controversial. The measurement of interest income poses problems because definitions of income usually include nominal interest income, which includes an inflation premium that compensates for the decline in the real value of the interest-earning asset. Annual income generally is used, although shorter and longer time periods have been used in some cases. Taxes have been taken into account by some researchers.

The types of noncash income included in resources and the valuation of those types are both quite controversial. The inclusion or exclusion of noncash income associated with medical care is the most controversial and empirically the most important definitional issue. With regard to valuation, the cost to the provider is often used, although the value to the recipient has been used for some types of noncash income in some studies. The treatment of Medicare poses particular problems, because of the size of the program and therefore

its importance to well-being, the concentration of the benefits on the aged, and the nature of the benefits.

Medicare is usually measured as the insurance value of the benefits, but that valuation is controversial. In most cases, a specific type of noncash income cannot be used to meet other needs. For example, medical noncash income in general cannot be used to fully offset deficiencies in cash income (for example, to buy food). Some estimates of noncash income try to take this fungibility problem into account. Also, when Medicare (or any other type of noncash income) is included on the income side, the estimate of needs should be consistent with that inclusion. This consistency problem is very important, but it is rarely addressed.

The appropriate treatment of wealth is also controversial. Wealth is often included in assessments of economic well-being only as the cash return on assets. In some cases the annuity value of wealth is included, but that valuation produces the controversial result that, for a given amount of wealth (and income), the older you are the better off you are. Wealth also plays a role in protection against economic uncertainty (for example, large medical expenses). The definition of wealth discussed in this article generally excludes Social Security wealth, pension wealth, and human capital. Human capital, of course, is very important for the nonaged. Household survey and other estimates of wealth generally are considered less accurate than estimates of cash income.

In assessing economic well-being, if only resources are examined, then it is implicitly assumed that needs are the same for all units being compared. There is general agreement, however, that needs differ among different units, and many sets of scales that show differential needs ("equivalence scales") have been constructed to address this problem. For example, an equivalence scale might show that a family of four persons needs twice the income of a one-person family to be equally well off. Needs for broad

groups have been specified, but there is substantial controversy about the proper specification. For example, although equivalence scales are usually assumed to be unaffected by resource level, it is uncertain whether differential needs are the same for high-resource units as for low-resource units. None of the equivalence scales discussed in this article differ by resource level. It is very important for the needs specified to be consistent with the definition of resources used, particularly in the case of noncash income.

The needs issue as usually discussed has two aspects—equivalence among different types of units, and levels of needs. Equivalance scales are important in assessing the relative economic status of the aged, in part because aged units generally are smaller than nonaged units. Also, there might be life cycle differences in needs. For a unit of equal size, the aged sometimes are assumed to need less than the nonaged, but there is no general agreement that such a differential exists. Sometimes an aged-nonaged difference is associated with lower expenses assumed for retirement, although in that case perhaps different equivalence categories for aged retirees and aged workers should be used. An aged-nonaged difference is sometimes associated with relatively low housing costs for the aged. This housing cost difference results from the relatively high proportion of the aged living in owner-occupied, mortgage-free homes. Such a difference would also suggest the use of separate equivalence categories within the aged group. The proper treatment of medical needs, which are very important for the aged, is another controversial topic.

The same equivalence scale generally is used regardless of the definition of resources used. This is inappropriate conceptually and is likely to be an important problem empirically in some cases. For example, conceptually cash income should be compared with needs for cash income, while cash plus noncash income should be compared with needs for cash income

plus needs satisfied by noncash income. Inconsistencies between the income and needs sides can produce misleading results. It is possible, however, for inconsistently defined comparisons to produce better estimates than consistently defined ones.

Levels of needs are most frequently discussed in connection with the measurement of poverty. The official U.S. poverty thresholds incorporate assumptions about both equivalence and levels of needs. Those thresholds are often used to compute welfare ratios that show the income of the unit relative to the poverty threshold.

The poverty thresholds and the equivalence scales that are usually used can be interpreted as average (mean) needs. The distribution of some expenses (for example, medical expenses), however, can be highly skewed, or, more generally, have high variance. A relatively small number of units will face very large expenses, while most units will face much smaller expenses. For such expenses, mean needs are not typical needs. It could be asked how many aged units have sufficient income to cover high (or low) expenses from the distribution. It could also be asked how many aged units have sufficient assets (liquid or total) to cover high (or low) expenses. The role of insurance is important in this context. An important question for the assessment of the economic well-being of the aged is whether medical expenses (and other expenses that have distributions with high variance) are being taken into account properly on the needs side. It is important to specify correctly the average needs of the aged relative to the average needs of other age groups. It is also important, however, to specify the distribution of needs faced by the aged and to compare that distribution with the distributions of needs faced by other age groups.

Consumption, instead of resources, is sometimes used in assessing the distribution of economic well-being. Service flows from owner-occupied homes and consumer durables (such as automobiles) ordinarily are included

in estimates of consumption, while saving is excluded. For many aged units, consumption may provide a different picture of economic status than cash income does. Some aged units draw down assets to finance consumption: those assets generally are not included in income. Some aged units save substantial amounts: those amounts are not included in consumption. The treatment of medical expenditures in consumption is very important for the aged. Higher medical expenditures generally should not be interpreted as making the unit better off. Assets may be drawn down to pay for medical expenses.

The choice of a measure of central tendency of the distribution (median or mean) is another aspect of measurement that is very important. The distinction between median and mean has received less emphasis than it should receive. As noted earlier, this choice is often important empirically. The median generally is preferable because it is more representative of typical units in the distribution.

The definition of who is "aged" can also be important. Age 65 traditionally has been used as the dividing line between aged and nonaged, and that age is used in this article. Other age cutoffs, sometimes as young as age 55, have also been used. In general, the younger the age at which the aged-nonaged cutoff occurs, the better off the aged are measured to be relative to the nonaged.

The choice of the income recipient (or asset-holding) unit can likewise affect the comparisons. The resources of all persons in the unit generally are summed. If aged and nonaged persons share a unit (household, family, or consumer unit), then resources received or held by aged and nonaged persons are summed. The question of whether all persons in a unit have equal access to the unit's resources is important here. Family units (families plus unrelated individuals) are used in many of the studies discussed. In that definition, the many aged unrelated individuals are considered to be one-person units

regardless of whether they live alone. It is important for the equivalence scale used to be consistent with the recipient unit used.

In the case of multi-person units, there is a choice between unit and person weighting. In unit weighting, each unit (for example, household) is counted once, regardless of the number of persons in the unit. In person weighting, the unit is counted once for each person (of any age, child or adult) in the unit. For example, a four-person household would be counted four times. Unit weighting often approximates counting each economic decision-making unit once, while person weighting assigns equal weight to each person's well-being. The issue of the distribution of economic well-being within the multi-person unit is more important in the case of person weighting. Compared with unit weighting, person weighting often raises aged-nonaged income ratios, primarily because person weighting effectively assigns a higher weight to young (relatively low income) families with children.

Whose age is used to determine aged status can also be important. The age of the person and the age of the family or household head have been used. When the age of the head is used, aged persons living in units with a nonaged head are excluded from the aged group.

Most of the comparisons discussed in this article are confined to estimates for the United States. International comparisons have also been made. In one section of this article, the economic status of the U.S. aged is compared with the economic status of the aged in several other countries, based on the economic status of the aged relative to other age groups within each country.

An annual time period, rather than a longer (for example, lifetime) or shorter period, usually is used in the discussions in this article. Measures of central tendency of the distribution (usually medians) are generally used in the comparisons here. An examination of percentages below specified thresholds (such as poverty

thresholds) is the only aspect of inequality discussed. The composition of income is another important topic that is not discussed.

Also discussed is a different aspect of economic status—vulnerability to economic risks. Selected types of risks, such as large medical expenses, are examined. Life events, such as the loss of a spouse, that produce risk of adverse economic change are not discussed.

Diversity Among the Aged

The income of the aged has been examined using several different definitions of recipient units and different socioeconomic groups. Median cash income (not adjusted for differential needs) of households with an aged householder was $16,855 in 1990, but there was a wide range of incomes around that median. At the extremes of the distribution, 7 percent of all aged households had incomes below $5,000, but 8 percent were between $50,000 and $100,000, and 2 percent had incomes of $100,000 or more (Bureau of the Census 1991a).

The income of the aged varies by demographic group and by detailed age group, and within each of those groups. In 1990 the median income (not adjusted for differential needs) of aged married couples ($23,352) was far above the medians for nonmarried men ($10,893) and nonmarried women ($8,746) (Grad 1992). The median for aged white married couples and nonmarried persons ($14,542) was much higher than the median for aged black units ($6,987) or the median for aged units of Hispanic origin ($7,879).

The median for aged black nonmarried women was $5,481, and the median for aged nonmarried women of Hispanic origin was $5,700. The median for aged couples and persons in the 85 or older age group ($8,668) was less than half the median for those in the 65-69 age group ($18,352) (Grad 1992).

It is important to note that, for the aged, differences among detailed age groups often are related to differences in composition by type of unit. On

average, the older aged age groups contain relatively more unmarried persons (primarily widows) anu smaller units. After adjustment for size of unit, however, substantial income differences remain among family units (families and unrelated individuals) in detailed age groups (Radner 1991). For example, after adjustment for size of unit using the equivalence scale implicit in the poverty thresholds, the median cash income of the 85 or older age group was only 55 percent of the median for the 65-69 age group in 1990.

In 1990, 12.2 percent of aged persons were officially classified as poor (Bureau of the Census 1991b).[1] As in the case of median incomes, poverty rates vary greatly among subgroups of the aged. In 1990, the poverty rate for aged white persons was 10.1 percent, while for aged black persons it was 33.8 percent, and for aged persons of Hispanic origin it was 22.5 percent. Aged black females had a poverty rate of 37.9 percent in that year (Bureau of the Census 1991b).

Wealth is an important resource for the aged. Median net worth (not adjusted for differential needs) of households with a householder aged 65 or older was $73,471 in 1988 (Bureau of the Census 1990). When home equity was excluded, median net worth was $23,856. As in the case of income, wealth ranges widely around the median. Seventeen percent of aged households had net worth of less than $10,000; 26 percent were between $100,000 and $250,000; and 14 percent had net worth of at least $250,000 (Bureau of the Census 1990).

Median net worth differed greatly among subgroups of the aged based on race, Hispanic origin, and type of household. Median net worth of aged white households in 1988 was $81,648, while the median for aged black households was $22,210. The median for aged households of Hispanic origin was $40,371. Aged households headed by a married couple had median net worth of $124,419 ($45,890 excluding home equity). Aged households headed

by unmarried males had median net worth of $48,883 ($15,914 excluding home equity), while aged households headed by unmarried females had median net worth of $47,233 ($10,693 excluding home equity) (Bureau of the Census 1990).

Aged Compared with Other Age Groups

Cash Income Before Taxes

In 1990, median cash income of family units, adjusted for differential needs, was highest for the middle age groups and lowest for the oldest and youngest age groups (table 1 and chart 1). These estimates use Current Population Survey (CPS) data, the equivalence scale implicit in the poverty thresholds, and family unit weighting.[2,3]

The median for the group aged 85 or older was the lowest of any age group shown. The relative median for that age group (that is, the median for the group divided by the median for all ages) was 0.53. The relative median for the 65-69 age group, which was the highest for any aged group, was 0.97. The median for the 85 or older group

was 39 percent of the median for the peak age group (45-49), and the median for the 65-69 age group was 70 percent of the median for the peak age group. Within the aged group, the older the age group the lower the median. The median for each aged group was below the median for each age group in the 30-64 age range.

The differences in medians are large within both the aged and nonaged groups. Within the nonaged group, the median of the 20-24 age group was 43 percent of the median for the 45-49 age group. Within the aged group, the median for the 85 or older group was 55 percent of the median for the 65-69 age group.

Although much important information is lost in the process, the estimates for detailed age groups can be summarized in the aged-nonaged income ratio.[4] The ratio of aged to nonaged median cash income of family units was 0.725 in 1990. That estimate was made using CPS data, the equivalence scale implicit in the poverty thresholds, and family unit weighting.

The aged-nonaged ratio can vary substantially if different measurement choices are made. Using data for 1983, Radner (1986) examined aged-nonaged

Table 1.—Median family unit income adjusted for unit size and age, and relative median, by age of unit head, 1990

Age of unit head	Median	Relative median
All ages[1]	$19,174	1.00
Under age 65	20,401	1.06
65 or older	14,782	.77
20-24	11,241	.59
25-29	17,588	.92
30-34	19,176	1.00
35-39	20,845	1.09
40-44	22,815	1.19
45-49	26,305	1.37
50-54	25,983	1.36
55-59	24,884	1.30
60-64	20,527	1.07
65-69	18,506	.97
70-74	15,591	.81
75-79	13,476	.70
80-84	11,500	.60
85 or older	10,220	.53

[1] Includes units with age of head 15 or older.

Source: Tabulations from the March 1991 Current Population Survey.

ratios of median incomes for several measurement choices. When family unit income and family unit weighting were used, the aged-nonaged ratio was 0.53 with no adjustment for differential needs, 0.71 with the poverty threshold equivalence scale applied (the estimate shown above for a different year), and 0.82 with the per capita adjustment for needs applied.

When person weighting (that is, each person is counted once using the sample weight) is used, the 1983 ratios of medians are higher—0.56 when no adjustment is applied, 0.81 when the poverty threshold scale is applied, and 0.96 when the per capita scale is applied. Person weighting tends to raise the ratio primarily because large young families, which on average have relatively low incomes, in effect receive higher weights.[5]

It should be noted that, for one- or two-person units, the poverty threshold equivalence scale assumes that aged units need less income than nonaged units. The scale value for aged units is 8 percent less than the nonaged scale value for one-person units and 10 percent less for two-person units. These differentials raise the aged-nonaged ratio above what it would be if there were no differentials. The 1990 aged-nonaged ratio of medians falls from 0.725 to 0.665 when the aged differential is eliminated.[6]

The per capita adjustment for needs is too extreme because it does not take into account family-size related economies of scale or age-related (that is, adult vs. child) differences in needs. The per capita adjustment usually produces higher aged-nonaged ratios than more moderate adjustments, primarily because large families, which are almost all nonaged, have their incomes reduced relatively more using the per capita scale.[7]

It has been shown above that even when the income definition is held constant and medians are used, large differences among aged-nonaged ratios are possible when adjustments for needs vary. The choice between means and medians also affects these ratios. Means, which are affected more than

medians by extreme unrepresentative amounts, generally produce higher ratios. For family unit income and family unit weighting, with the poverty threshold equivalence scale used, the 1990 aged-nonaged ratio was 0.842 using means and 0.725 using medians. Thus, the difference associated with the choice between median and mean is similar in magnitude to the difference associated with the choice between the poverty threshold scale and per capita adjustments for differential needs.

In this article, medians are considered to be preferable to means, and the per capita adjustment and no adjustment are considered to be inferior to more moderate adjustments for needs, such as the poverty threshold scale. Thus, whenever possible, medians and moderate equivalence scales are used in the discussion. In some cases, however, researchers have used other measures, and their results should be interpreted with these differences in mind.

Income data obtained from household surveys suffer from errors in the data that produce net underestimates of total cash income. Those underestimates, which are usually called "underreporting," differ among age groups, with the aged showing a higher percentage of underreporting of total income than other age groups. The effect of underreporting of income on the relationship between income and age has been examined by combining different microdata sources and utilizing independent control aggregates of income types (Radner 1983). Using 1983 income data from the CPS and a crude adjustment for underreporting based on detailed 1972 estimates, it was found that the aged-nonaged ratio of medians for family units (adjusted for unit size) rose from 0.71 before adjustment for underreporting to 0.85 after adjustment (Radner 1986).

In another estimate, cash income data for 1983-84 from the Survey of Income and Program Participation

Chart 1.—Median family unit income, by age of head, 1990

Median income
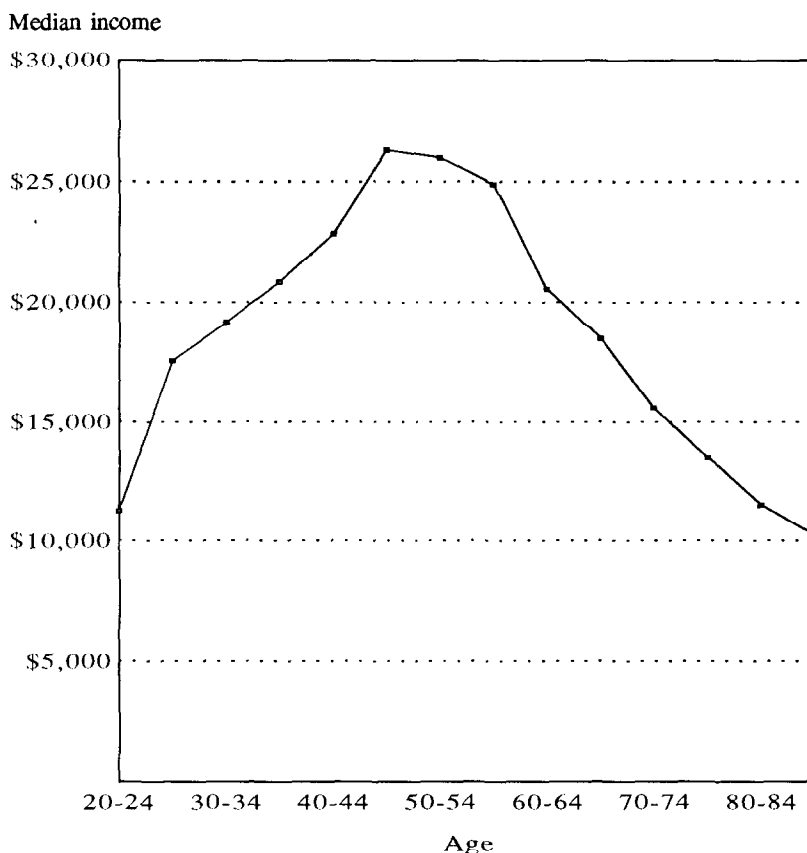
(SIPP) have been adjusted for underreporting using income tax data and independent control totals (Crystal and Shea 1990). In these estimates, the ratio of mean household income of aged persons to mean household income of nonaged persons rose from 0.939 (after adjustment for differential needs using the poverty threshold equivalence scale) to 1.028 after the adjustment for underreporting was also applied.[8] The Radner and Crystal-Shea estimates show that adjustments for underreporting would raise the estimated money income of the aged relative to that of the nonaged, although the amount of the increase can vary.[9]

Other Definitions of Resources

Definitions of income that are limited to cash income types generally are considered incomplete. Several types of noncash income have been included by some researchers to examine the well-being of age groups. In most cases, taxes have been deducted. Wealth has also been considered.

Estimates including noncash income.—When noncash income is considered in addition to cash income, the economic status of the aged generally improves relative to that of the nonaged. The amount of the improvement, however, is uncertain and depends on several technical measurement choices, such as the types of noncash income included and the valuation of those income types. Both of those measurement aspects are controversial. The inclusion of Medicare has a large positive impact on the measured status of the aged.

In trying to take account of noncash income in an appropriate manner, it is essential to consider the needs side as well as the income side. This argument for consistency between the income and needs sides has been made primarily in connection with the measurement of poverty (Bureau of the Census 1986, Shoven 1989, Radner 1990c). But this argument is relevant for the analysis of the distribution of income (or economic well-being) in general.

Imputed rent on owner-occupied homes and Medicare are the two types of noncash income usually considered that have the greatest impact on the economic status of the aged. The inclusion of imputed rent improves both the absolute and relative status of the aged in part because a relatively high proportion of the aged own their own homes. The valuation of that type of noncash income is relatively noncontroversial, although several different estimating methods have been used.[10] The inclusion of Medicare also improves the absolute and relative status of the aged. The inclusion of Medicare, and its valuation if included, however, are controversial.

Discussions of the valuation of Medicare generally have been confined to the income side. The insurance value of Medicare is usually added to income.[11] The aged, however, have a greater need for medical care than other age groups, and this difference on the needs side is generally not considered directly in the valuation. The appropriate specification of such needs has received little attention.[12]

Depending on the valuation method used, subgroups of the aged that have greater need for medical care may be assigned higher income values for Medicare. If the value of Medicare is included in income and medical needs are underestimated, then groups that are "sicker" (that is, have greater medical needs) could be estimated to be "richer." This result can occur because needs are underestimated while income (including Medicare) is measured fully. The aged as a group are relatively "sicker" than the nonaged are and therefore could be estimated to be relatively "richer" on this basis. Also, if the needs side is ignored, changes over time in medical care needs could lead to incorrect estimates of improved (worsened) economic status resulting from increased (decreased) medical needs and therefore more (less) Medicare noncash income. For a given level of needs, however, persons with Medicare are better off than those who are without it.

Assume, for purposes of assessing the economic well-being of the aged at a specific time, that there are only two kinds of medical needs—those paid for with cash and those paid for by Medicare. If the value of Medicare is included in income, then the needs side should include all medical needs, including those that are paid for by Medicare.[13] For most types of comparisons, if the value of Medicare is not included in income, then the needs side should include only those medical needs that are not paid for by Medicare. It is not appropriate to include the value of Medicare in income, but to include on the needs side only those medical expenses that are not paid for by Medicare. Such a treatment biases the measured economic status of the aged upward.[14]

The ratio of the needs of the aged to the needs of other age groups is not likely to be the same for needs associated with cash income and needs associated with cash plus noncash income.[15] If those ratios differ, either the poverty threshold equivalence scale is incorrect for use with cash income plus the value of Medicare, or it is incorrect for use with cash income, or both. The poverty threshold equivalence scale is not likely to be correct for both definitions of income, even though that scale has been used in conjunction with both definitions of income. Other equivalence scales would also be expected to have this limitation. Also, the method used to value Medicare and the specification of needs should be consistent.

Several estimates that include noncash income are discussed in this section. The types of noncash income included and the valuation methods used differ among these estimates.

• *Bureau of the Census.*—The income of aged households can be compared with the income of all households using comprehensive estimates produced by the Bureau of the Census (Bureau of the Census 1991c). These estimates are based on CPS data for 1990, augmented with information from several other data sources.[16] Aged households were defined as households

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containing at least one person who is aged 65 or older. Estimates for several definitions of income, including a comprehensive one that takes account of several taxes and several types of noncash income, were shown. Income was not adjusted for household size or for other differential needs.

When income was defined as cash income before taxes, the ratio of median income for aged households to the median for all households was 0.603 (table 2). When several types of taxes (Federal and State income taxes and Social Security employee and self-employment taxes) were subtracted and realized capital gains and selected types of noncash income (government noncash benefits, which are primarily Medicare, and health insurance supplements to wages) were added, that ratio rose to 0.783. Those changes caused the median for aged households to rise by $3,638, while the median for all households fell by $2,223. When imputed rent on owner-occupied homes was also included in the definition of income, the ratio rose to 0.830.[17] That addition raised the median for aged households by $2,890, while the median for all households increased by $1,895. The net effect of all of the adjustments was to raise the median income of aged households by $6,528 (36 percent) and to decrease the median income of all households by $328 (1 percent).

It should be noted that the ratios shown here would be lower if the medians for these aged households were compared with the medians for nonaged households, rather than all households. It should also be noted, however, that adjustment for differences in household size would tend to raise the adjusted income of aged households relative to the adjusted income of all households because aged households generally are smaller.

The effects of more detailed components of the change in the definition of income can be derived from the published estimates if means are used. Nonaged households can also be separated from all households. When cash income before taxes is used, the ratio of the mean for aged households to the mean for nonaged households is 0.646 (table 3). The addition of realized capital gains (increase in mean of $763 for aged households and $1,291 for nonaged households) has a very small effect, reducing the ratio to 0.645. The subtraction of Federal and State income taxes and payroll taxes ($3,487 for aged households and $9,083 for nonaged households) has an important effect, raising the ratio to 0.716. Aged households paid an average of 12.8 percent of their cash income (including capital gains) in those taxes, while nonaged households paid an average of 20.1 percent. The addition of government noncash transfers excluding Medicare (for example, Medicaid and food stamps) ($287 for aged households and $444 for nonaged households) reduces this after-tax ratio slightly to 0.715. When imputed rent on owner-occupied homes is also added ($3,417 for aged

households and $2,004 for nonaged households), the ratio rises to 0.771. The further addition of employer health insurance supplements ($378 for aged households and $1,761 for nonaged households) reduces the ratio to 0.745, a small decline. Finally, the addition of Medicare ($3,006 for aged households and $80 for nonaged households) raises the ratio to 0.824.[18] Taken together, all of these changes raised the mean income of aged households by $4,364 (17 percent) and lowered the mean income of nonaged households by $3,503 (9 percent).

In summary, among the noncash income types estimated by the Bureau of the Census, only imputed rent on owner-occupied homes and Medicare had important impacts on the aged-nonaged ratio. The addition of Medicare, however, is very controversial. It is important to note that these estimates were not adjusted for household size or other sources of differential needs.

Table 2.—Median incomes for all households and for aged households, 1990

Definition of income	Aged households	All households	Ratio of aged to all
1. Cash income before taxes	$18,062	$29,943	0.603
2. Definition 1 minus taxes plus selected noncash income types	21,700	27,720	.783
3. Definition 2 plus imputed rent	24,590	29,615	.830

Source: Bureau of the Census (1991c), table 1.

Table 3.—Mean incomes for aged and nonaged households using alternative definitions of income, 1990

Definition of income	Aged	Nonaged	Ratio of aged to nonaged
1. Cash income before taxes	$26,403	$40,847	0.646
2. Definition 1 plus capital gains	27,166	42,138	.645
3. Definition 2 minus taxes	23,679	33,055	.716
4. Definition 3 plus government noncash income excluding Medicare	23,966	33,499	.715
5. Definition 4 plus imputed rent	27,383	35,503	.771
6. Definition 5 plus employer health insurance supplements	27,761	37,264	.745
7. Definition 6 plus Medicare	30,767	37,344	.824

Source: Derived from Bureau of the Census (1991c), table 1.

• *Congressional Budget Office.* —The income of age groups for 1989 has been examined by the Congressional Budget Office (CBO) using CPS data and an income definition that takes account of several types of taxes and noncash income (U.S. Congress 1991).[19] Important differences from the Bureau of the Census estimates discussed above include the CBO's use of an adjustment for differential needs and exclusion of Medicare and imputed rent on owner-occupied homes from the definition of income.

CBO's estimates used family units (families plus unrelated individuals), the age of the unit head, and person weighting. A size of family unit adjustment was made using the equivalence scale implicit in the poverty thresholds, but no aged-nonaged differential was included. Income was defined as cash income minus Federal income and payroll taxes plus the estimated cash value of food stamps, school lunches, and government housing benefits.

In 1989, the ratio of the mean income of family units with an aged head to the mean for all family units (the relative mean) using this comprehensive definition of income was 0.94. This ratio was higher than that obtained when cash income before tax was used as the definition of income (0.88). Using the comprehensive definition of income, the relative mean for aged units (0.94) was below the relative means for the 50-64 and 35-49 age groups (1.24 and 1.06, respectively) and above the relative mean for the under 35 age group (0.79).

When the mean of the middle income quintile was used as an approximation of the median, the aged-all ages ratio was 0.87 using the comprehensive definition of income and 0.78 using cash income before taxes. Using the comprehensive definition of income, the relative mean of the middle quintile for the aged (0.87) was below the relative means for the 50-64 and 35-49 age groups (1.26 and 1.11, respectively) and above the relative mean for the under 35 age group (0.80).

• *Smeeding.* —In another study that used a comprehensive definition of resources, the incomes of aged and nonaged households were compared for 1979 taking into account cash income, several types of noncash income, and several types of taxes (Smeeding 1989). Important differences between the Smeeding and Bureau of the Census estimates include adjustments by Smeeding for differential needs and underreporting of income. Important differences between the Smeeding and CBO estimates include Smeeding's inclusion of Medicare and imputed rent in the definition of income and an adjustment for income underreporting. Also, Smeeding's estimates were for an earlier year.

Smeeding's data were primarily from the CPS. His estimates included health, food, and housing benefits, employment-related benefits, and imputed rent on owner-occupied homes. Noncash income was generally valued at the cost to the provider. He took into account differences in needs through the use of several alternative equivalence scales, and he examined the effects of underreporting of income and the use of the recipient value of noncash income, although all of these adjustments were not applied simultaneously.

When the poverty threshold equivalence scale was used, the aged-nonaged ratio of means was 0.80 for a comprehensive definition of resources.[20] For the estimates that incorporated the poverty threshold scale, the ratio rose from 0.64 for cash income to 0.74 for cash income after tax, and to 0.83 when noncash benefits were added. The ratio fell to 0.78 when discretionary employment-related benefits (for example, employer pension contributions) were added, and rose to 0.80 when imputed rent and rent-free housing were added. Thus, the subtraction of taxes raised the ratio by 10 points, while the net effect of including noncash income was an increase of only 6 points. Adjustments for underreporting of income (which increased the aged-nonaged ratio substantially) and for recipient valuation of noncash income (which decreased the ratio slightly) were not included in those estimates. On balance, those two adjustments raised the aged-nonaged ratio substantially. Using Smeeding's estimates, Hurd (1990) calculated that those two adjustments raised the aged-nonaged ratio to 0.99.

Smeeding's results are quite sensitive to the equivalence scale used. For example, for the comprehensive definition of income discussed above, the aged-nonaged ratio of means was 1.04 using a constant utility equivalence scale, rather than the 0.80 obtained using the poverty threshold scale.[21,22] Based primarily on his estimates that used equivalence scales other than the poverty threshold scale, Smeeding concluded that, on average, the aged were better off than the nonaged. The ratio of aged to nonaged mean cash incomes has risen since 1979, thus suggesting a rise in the ratios using more comprehensive definitions of resources.

In-kind medical benefits played an important role in the relatively high status found for the aged by Smeeding. The valuation of those benefits, however, is controversial. As in the other estimates discussed in this article that include Medicare, an adjustment for differential needs that explicitly reflected the inclusion of Medicare was not applied.

Also, if medians rather than means had been used, the relative status of the aged would have been somewhat lower. If the mean of the middle three quintiles were used as an approximation of the median (the closest approximation possible from the estimates shown), the aged-nonaged income ratios would be about 10 percent lower than the values shown. For example, the aged-nonaged ratio for the comprehensive definition that includes imputed rent (using the poverty threshold scale) would fall from 0.80 to 0.73. Thus, the choice of the mean rather than the median was as important as several of the adjustments to the data that were performed.

Estimates including wealth.—Two sets of estimates that include both cash income and wealth are summarized in this section. The estimates differ in the types of wealth included and the valuation methods used. Both of the estimates discussed exclude Social Security wealth, pension wealth, and human capital.

The topic of combining income and wealth into a single measure is very controversial, and no fully satisfactory method of combining them exists at this time. The role of wealth in the economic status of the aged is related, at least in part, to the ability to pay for large uncertain expenses (for example, medical expenses), but that relationship has not been explored comprehensively. The general question of the measure of needs that should be used in conjunction with a measure of resources that includes wealth has received little attention.

Crystal and Shea (1990) examined the economic status of the aged using data for 1983-84 from the Survey of Income and Program Participation (SIPP) and a measure of resources that included cash income and the annuitized value of assets. Adjustments were made for differential needs and underreporting of some income and asset types. The adjustment for differential needs used the poverty threshold equivalence scale. The annuity value of financial assets and the annuity value of 70 percent of home equity were added to income. The 70-percent figure was an approximation of the fungible portion of home equity. The expected remaining lifetime of each person and a real interest rate of 2 percent were used in the calculation of the annuity values. Property income was excluded from the definition of income when the annuity value of wealth was added.

These adjustments improved the relative economic status of the aged substantially. The ratio of mean household income of aged persons to mean household income of nonaged persons was 0.652 when unadjusted cash income was used, 0.939 when the

poverty threshold equivalence scale adjustment was applied, 1.028 when the adjustment for underreporting was also applied, and 1.239 when the annuity value of assets was also added. If medians had been used instead of means, these ratios would have been somewhat lower (see below). Also, the choice of a person basis, including children in the estimates, gave a large weight to the relatively low incomes of young families. The use of different weighting would probably have produced lower ratios. As noted earlier, the annuity valuation of assets is controversial because it implies, for a given amount of assets, that "older is better" (Projector and Weiss 1969, Radner 1990b).

Detailed age groups were also shown. For both unadjusted income and fully adjusted income (including the annuity value of assets), the mean generally rose as age increased and then fell, but the decline was much smaller for fully adjusted income. Mean income for the 65-74 age group was 29 percent below the mean for the 55-64 age group when unadjusted income was used, but only 7 percent lower when fully adjusted income was used. The decline in mean income from the 65-74 age group to the 75 or older age group was 23 percent when unadjusted income was used and only 3 percent when fully adjusted income was used. The "older is better" characteristic of the annuity valuation of assets played a role in the smaller declines as age increased.

When the annuity value of net worth was added to cash income adjusted for differential needs and underreporting (and property income was subtracted), the mean income of the 65-74 age group rose 15 percent and the mean income of the 75 or older age group rose 37 percent. In contrast, the means of the under 18 age groups fell (2 percent for both the under 7 and the 7-17 age groups) because property income exceeded the annuity value of net worth for those age groups.[23]

The choice between median and mean was important in these estimates. If the mean of the middle quintile is

used as an estimate of the median, the ratio of the estimated median fully adjusted income of the 65-74 age group to the estimated median of the 45-54 age group (the group that had the highest estimated median) is 0.846, whereas the ratio of means was 0.938. The ratio of the estimated median of the 75 or older age group to that of the 45-54 age group is 0.799, while the ratio of means was 0.908. Thus, when estimated medians rather than means are used, the age-income curve shows much more of a decline from the middle age groups to the aged groups.

Radner (1989c, 1990a, 1990b) has examined the economic status of age groups using several definitions of resources in which both cash income and wealth were included. Data from the 1984 SIPP were used and the poverty threshold equivalence scale was applied. Estimates including two definitions of wealth—financial assets and net worth—were shown. Methods that incorporated the annuity value of wealth, as well as simpler methods, were considered. The measures considered included nonproperty income plus the annuity value of wealth, nonproperty income plus one-third of wealth, and several other methods (Radner 1990b). Medians of the combined income-wealth measures for the aged were below the medians for the 45-64 age groups for all methods examined. In general, the relative status of the aged improved when wealth was taken into account. When financial assets were used, the impact of the inclusion of wealth on the relative status of the aged was much smaller than when net worth was used as the definition of wealth. Some extreme treatments of wealth improved the relative economic status of the aged greatly.

When financial assets were used, the relative median (that is, the median for the group, relative to the median for all units) for aged households, which was 0.76 for total money income, rose to 0.91 when one-third of wealth was added to nonproperty cash income. The relative median for the aged group rose to 0.80 when the annuity value of

wealth was added. When net worth was used, the relative median for aged households rose to 1.18 when one-third of net worth was added, and it rose to 0.95 when the annuity value of wealth was added. Relative medians for the 75 or older age group were lower than for the 65-74 age group, but rose more in percentage terms when wealth was taken into account.

Radner (1989a, 1989b), among others, has examined wealth alone as an indicator of economic well-being for age groups. On average, the wealth of the aged far exceeds the wealth of the nonaged, regardless of whether net worth or financial assets is used as the definition of wealth.

Median net worth of all households was $35,752, based on data for 1988 from SIPP (Bureau of the Census 1990)(table 4). That figure was less than half of the median of $73,471 for aged households. The relationship between age of householder and median net worth shows a sharp rise from the under 35 age group to the 55-64 age group. The median for the aged group is higher than for all groups except the 55-64 age group. An examination of detailed age groups within the aged group shows that median net worth actually peaked in the 65-69 age group and was higher in the 70-74 age group than in any nonaged age group. The median for the 75 or older age group was substantially lower than for the other two aged age groups. It should be noted that earlier wealth survey data generally show a peak before age 65 (Radner 1989b).

In 1988, median net worth excluding home equity was $9,840 for all households, far below the median of $23,856 for aged households. Median net worth excluding home equity rises from the under 35 age group to a peak in the 70-74 age group, before falling in the 75 or older age group.

In summary, the inclusion of wealth in the definition of resources improves the relative status of the aged. The appropriate valuation of wealth for this purpose, however, is controversial. The valuation used has an important effect on the improvement in the status of the aged.

Poverty

In 1990, 13.5 percent of all persons, 13.7 percent of nonaged persons, and 12.2 percent of aged persons were officially classified as poor (Bureau of the Census 1991b). Much attention has been given to the fact that the poverty rate for aged persons is below the poverty rate for nonaged persons. The rate for aged persons, however, is above the rate for other adults (see table 5).

The comparison between aged and nonaged poverty rates is very sensitive to the characteristics of the poverty measure used. The particular result found depends on a controversial aspect . of the thresholds, the differential between aged and nonaged thresholds. For units of one or two persons, aged units are assumed to need less income than nonaged units. If the nonaged poverty thresholds were used for both

the nonaged and aged, then in 1990 the poverty rate for aged persons would be 14.4 percent, which is above the poverty rate for nonaged persons.

Although the poverty rates were not very different for the aged and nonaged groups as a whole, there were large differences by age within those broad groups. Within the nonaged group, poverty rates ranged from a low of 7.3 percent for the group aged 45-49 to a high of 24.0 percent for children under 5 years of age (table 5). The poverty rate for the 65 or older age group was higher than for each age group in the 30-64 age range. Within the aged group, poverty rates ranged from a low of 8.4 percent for the group aged 65-69 to a high of 20.2 percent for the group aged 85 or older.

The general pattern by age showed high percentages at young and old ages, with lower percentages in the middle age groups (chart 2). The percentages fell without exception as age rose until the lowest value was reached in the group aged 45-49; the percentages rose in the 50-54, 55-59, and 60-64 age groups. The 65-69 group showed a decline; its percentage was below those for the groups aged 55-59 and 60-64. This relationship resulted in part from the aged-nonaged differential in the official poverty thresholds. Beginning with age 70, the percentage poor again rose as age increased. The percentages for the groups aged 80-84 and 85 or older were higher than for all groups in the 15-79 age range. The highest percentages although, were for the groups under 10 years of age.

Many persons have family unit income that is not very far above the poverty threshold. When persons with income below 125 percent of the poverty threshold or below 150 percent of the poverty threshold in 1990 are examined, the pattern is similar to the pattern for poverty—percentages are high at young and old ages, with relatively low percentages in the middle age groups (table 5 and chart 2). Relatively more aged than nonaged persons, however, are not far above the poverty threshold. The percentage of aged persons below 125 percent of the

Table 4.—Median net worth of households, by age of householder, 1988

Age of householder	Total	Excluding home equity
All ages......................	$35,752	$9,840
Under 35........................	6,078	3,258
35-44...........................	33,183	8,993
45-54...........................	57,466	15,542
55-64...........................	80,032	26,396
65 or older.....................	73,471	23,856
65-69	83,478	27,482
70-74	82,111	28,172
75 or older...................	61,491	18,819

Source: Bureau of the Census (1990), table E.

poverty threshold (19.0 percent) was above the percentage of nonaged persons (17.9 percent); the percentage of aged persons below 150 percent of the poverty threshold (26.3 percent) was farther above the percentage of nonaged persons (22.2 percent). In both measures, the 85 or older age group had the highest percentage of any age group (30.4 percent were below 125 percent of the threshold and 39.8 percent were below 150 percent of the threshold). As in the case of poverty rates, there was a wide range in percentages within the nonaged and aged groups in both of these measures.

It has also been argued that the general level of the poverty thresholds is too low because growth in real income has been ignored in the updating of the thresholds over time (for example, Ruggles 1990).[24] As noted above, if 125 or 150 percent of the official thresholds is used as the threshold, then a higher percentage of aged persons than nonaged persons is below that higher threshold.[25]

Several researchers recently have taken wealth into account in the measurement of poverty. Alternative poverty rates that took both income and wealth into account were estimated using data from the 1983 Survey of Consumer Finances (Wolff 1990). Two methods were used in this research. In the first method, fungible net worth was converted into an annuity that was added to money income (excluding property income). That sum was then compared with the official poverty thresholds. Using a 3 percent interest rate for the annuity, the poverty rate for aged families fell by 11.5 percent and the rate for nonaged families fell by 2.5 percent compared with the official rate. The results were very similar when imputed rent was also added to income. Higher interest rates produced larger reductions in poverty.

In the second method, a joint threshold of income and net worth was used. The official income threshold was used, and several wealth thresholds were examined. When median net worth was used as the wealth threshold and families had to be below both the

Table 5.—Percentage of persons poor or near poor, by age, 1990

| | Percentage of age group below— | | |
Age of person	Poverty threshold	125 percent of poverty threshold	150 percent of poverty threshold
All ages.....................	13.5	18.0	22.7
Under 65.....................	13.7	17.9	22.2
65 or older..................	12.2	19.0	26.3
Under 5......................	24.0	29.5	35.0
5-9..........................	21.3	27.0	32.8
10-14........................	18.7	24.1	29.1
15-19........................	16.4	21.3	26.0
20-24........................	15.8	21.0	26.6
25-29........................	12.8	17.2	21.8
30-34........................	11.4	15.5	19.6
35-39........................	9.1	12.3	15.8
40-44........................	7.7	10.4	13.4
45-49........................	7.3	9.7	12.3
50-54........................	8.4	10.8	13.4
55-59........................	9.0	12.1	15.4
60-64........................	10.3	14.8	18.9
65-69........................	8.4	13.4	18.7
70-74........................	11.3	17.3	24.3
75-79........................	13.3	21.5	30.0
80-84........................	17.5	26.8	36.9
85 or older..................	20.2	30.4	39.8

Source: Tabulations from the March 1991 Current Population Survey.

Chart 2.—Percentage of persons poor or near poor, by age, 1990

Percent

-■- 100% of threshold + 125% of threshold ＊ 150% of threshold
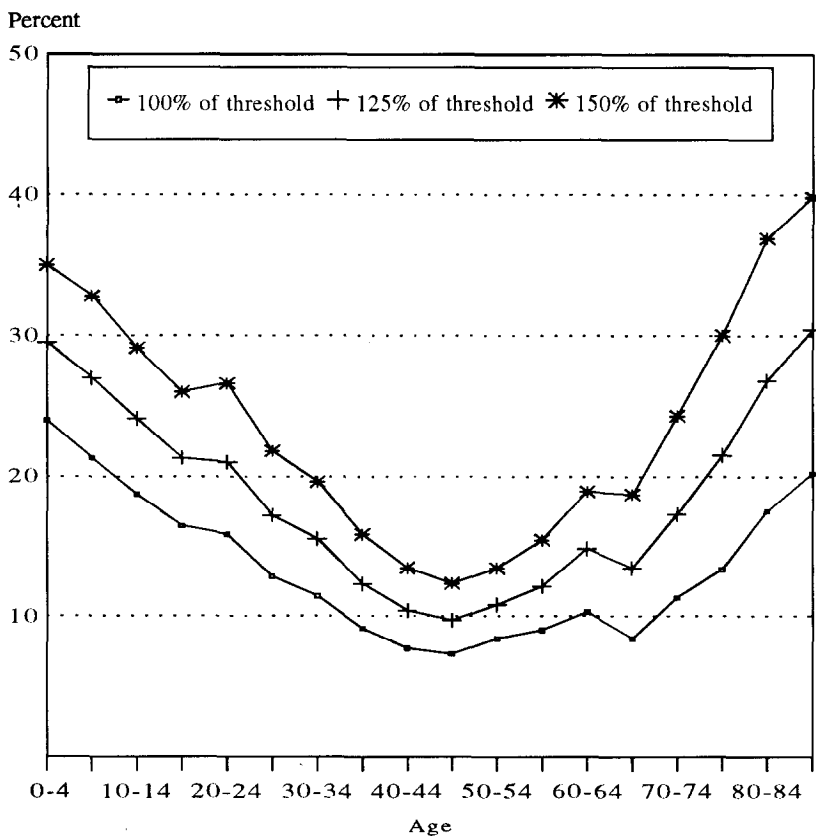
income and wealth thresholds to be considered poor, the poverty rate for aged families fell by 23.2 percent and the rate for nonaged families fell by 12.9 percent.

In research that is related to the measurement of poverty, a two-dimensional income-wealth measure was used to identify the lower part of the distribution of economic well-being. The proportion of households in each age group that had both low income and low wealth was examined by Radner (1984, 1990a, 1990b) and by Radner and Vaughan (1987). In one version of this measure, the bottom portion of the distribution was defined as those households with total money income less than one-half of the median total money income (for all ages) and with wealth less than one-half of the median wealth (for all ages). Both income and wealth were adjusted for household size (Radner 1990b). Estimates were shown using financial assets and net worth as the definitions of wealth. In 1984, 15.4 percent of aged households had low income and low financial assets, and 13.4 of aged households had low income and low net worth. For both definitions of wealth, the percentage of households that had low income and low wealth was higher for the aged than for the 35-64 age groups, and lower for the aged than for the under 25 and 25-34 age groups (Radner 1990b). When a three-dimensional classification was used, 8.3 percent of aged households had low income, low financial assets, and no equity in an owner-occupied home. This percentage was lower than the percentages for the age groups under age 45 and higher than the percentages for the 45-64 age groups.

In summary, the poverty rate for aged persons is above the rate for other adult age groups, but is below the rate for children. Relatively more aged persons than nonaged persons are near-poor.

International Comparisons

In recent years the economic status of the aged relative to the nonaged

has been compared for the United States and several other industrialized countries, primarily in Western Europe.

Several papers that compared the relative incomes of the aged in different countries have used the microdata from the Luxembourg Income Study (LIS). In those data, the definitions of income, recipient unit, and socioeconomic characteristics were made as comparable as the basic data permitted (Smeeding, Rainwater, and Simpson 1989). Cash income was used as the principal definition of income for these studies. Although the definitions of cash income in those data are quite comparable across countries, it should be noted that cash income could account for different proportions of a comprehensive income definition (for example, cash plus noncash) in different countries. Thus, using comparable definitions of cash income might not produce good comparative estimates of economic well-being in different countries. This problem, of course, exists for other international comparisons that use cash income. The LIS data, however, are a significant improvement over published data that are not very comparable.

The relative economic status of the aged was compared for six countries—Canada, Norway, Sweden, the United Kingdom, West Germany, and the United States—using microdata for about 1980 from the LIS (Smeeding, Torrey, and Rein 1987). Mean after-tax income adjusted for family size and composition was used in the income comparisons. For each country, relative means for age groups were computed by dividing the mean for the age group by the mean for all ages for that country. The relative mean adjusted income of the U.S. aged (0.94) was the highest of any of these countries. The U.S. relative mean for the 65-74 age group (0.99) was the second highest—Norway had a relative mean of 1.01. The U.S. relative mean for the 75 or older age group, however, was the highest (0.84). Poverty rates for the U.S. aged obtained using a relative poverty measure were substantially higher than the rates for four other

countries; only the rate for the United Kingdom was higher.

Using LIS data for the 1979-83 period, Coder, Rainwater, and Smeeding (1989) compared the relative economic status of the aged and children in 10 countries: Australia, Canada, Israel, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, the United States, and West Germany. The study used adjusted disposable income—cash income net of income and payroll taxes, and adjusted for family size using an equivalence scale that was derived from the scales for several countries. For each country the income distribution was separated into four sections based on percentages of the country's adjusted median income. The four sections were: (1) below 50 percent of the median ("poor"); (2) from 50 to 62.5 percent ("near poor"); (3) from 62.6 to 150 percent ("middle class"); and (4) above 150 percent ("well-to-do").

The United States had the third highest percentage poor for the aged (24.6 percent), behind the United Kingdom and Israel. When the poor and near poor were combined, the United States had the fifth highest percentage for the aged (36.1 percent), behind the United Kingdom, Australia, Israel, and Canada. In the Netherlands, only 6.6 percent of aged persons were poor or near poor.

In a paper that examined a more recent time period, the economic status of the aged in Australia, Canada, and the United States in the 1985-87 period was compared using LIS data (Coder, Smeeding, and Torrey 1990). The ratio of aged to all ages median family income adjusted for unit size was highest in the United States. The proportion of the aged who were poor (using a threshold that was 50 percent of median family income after adjustment for unit size), however, was higher in the United States than in the other two countries.

In an earlier study, the relative income of the aged in the United States was compared with the relative income of the aged in Canada, Israel, and

Norway (Radner 1985). Published data were used for Norway and Israel and published data and special tabulations were used for the United States and Canada. The data were for the 1979-81 period. Income was defined primarily as cash income before taxes, although the definitions for the different countries were not identical.

When relative mean incomes before adjustment for size of unit were examined, the United States relative mean and median for the 65 or older age group were the highest of the countries examined. Relative mean income per capita for the aged was 0.94 for the United States, about the same as the values for Israel and Norway, but slightly above that for Canada. Adjustments for size of unit that were more detailed than the per capita adjustment produced lower relative means, but the United States values were still above those for Canada, the only other country for which similar estimates were available.

When the 65 or older age group was compared with the 55-64 age group, the United States and Canada showed very similar values for all income measures.[26] The ratios for mean income per capita were roughly similar for all four countries.

In summary, comparisons of the income of the aged relative to the nonaged for several Western industrialized countries show that the aged in the United States generally are at least as well off as the aged in those other countries. Poverty among the aged, however, generally is higher in the United States than in these other countries.

Uncertainty and Vulnerability

In this section, a different aspect of economic well-being—one that concerns risks—is discussed.[27] Estimates of risks such as inflation and large medical bills are examined. The ability to cope with such risks financially, which relates to vulnerability, is also discussed.

In recent years there has been increased interest in the ability of the aged to cope with unexpected financial shocks on the resource side (for example, unexpectedly high inflation) and/or relatively rare large expenses (for example, some medical expenses).[28] These issues involve risks in an uncertain future; usual assessments of economic well-being are made on the basis of actual outcomes in the past (for example, income last year).[29]

Uncertainty is an important concern on the needs side. Income is usually compared with average needs. The distributions of some types of expenditures (for example, medical expenses) among the population are very skewed. Relatively few persons have very large expenses. Such large but uncertain expenses can be viewed as a dimension of needs that differs from average needs.[30] Thus, it is useful to ask how many units could pay for certain large uncertain expenses (for example, by drawing down assets) if those units were faced with such expenses. Analogously, it could be asked how many units could pay for the typical low expenses out of their income, but not the high expenses.[31]

Hurd and Shoven (1985, 1983) assessed the vulnerability of the aged to inflation using data on wealth for 1969, 1975, and 1979 from the Retirement History Study.[32] Because home equity, Social Security, Medicare, and Medicaid, which were very important resources for the aged, were assumed to be fully protected against inflation, the aged as a group were only slightly vulnerable to inflation in these estimates. High-wealth households were more vulnerable than low-wealth households.

It should be noted, however, that low-wealth households had very little wealth to be protected against inflation. This illustrates the point that not being very vulnerable to inflation (or to some other risk) does not necessarily mean being well off. The level of well-being could be very low, but not subject to that risk.

There was substantial dispersion in the vulnerabilities. Some households would actually have gained from inflation, while others would have had losses that were far higher than the median loss. Full indexing of Social Security made the aged much less vulnerable than if there had been no indexing, and it reduced the dispersion in the risk.

Another example of research concerning vulnerability found that aged households whose cash income was between the poverty threshold and twice the poverty threshold are more vulnerable to selected economic risks than those with lower or higher ratios to the poverty threshold (Smeeding 1986). The reason for this vulnerability was the nature of the distribution of nonmoney income. Data from the CPS and other sources were used in this analysis.

Three sources of economic uncertainty were specified: (1) risk of large medical bills (measured by reliance on Medicare as the only subsidized health insurance);[33] (2) risk of unexpected housing cost increases (measured by lack of in-kind housing income); and (3) risk of adverse changes in Social Security benefits (measured by reliance on Old-Age and Survivors Insurance as the primary source of money income). The first two risks, as specified, were on the needs side; they were a mixture of differential average needs and risk of large expenses. Average medical or housing costs were higher and there was risk of large unexpected expenses for households that had those sources of uncertainty. The third risk primarily involved the resource side. Social Security benefits could fall in nominal and real terms as a result of the death of a spouse, or they could fall in real terms (but not in nominal terms) due to less than full protection against inflation.[34] None of these sources of uncertainty compares uncertain expenses with available assets.

Households that had two or more of these sources of uncertainty and income between the poverty threshold and twice the poverty threshold were called " 'tweeners." In 1979, about 20 percent of aged households had income between the poverty threshold and twice the poverty threshold and had

two or more of those sources of uncertainty. About 60 percent of the aged households in that income group had two or more sources of uncertainty. Households below the poverty threshold more often received means-tested noncash benefits, while higher income households often had the resources to protect themselves from these risks.

It should be noted that households with income greater than twice the poverty threshold (or below the threshold) can be vulnerable to the risks discussed. Also, the three risks are not all of the same type. It is useful to make a distinction between usual expenses (for example, housing costs) that are higher for some groups than for others and large uncertain expenses that constitute a risk. In addition, the case for the uncertainty of the inflation protection of Social Security benefits, at least relative to some other income types, is not clear.

The argument that the 'tweeners are economically more insecure than the poor raises an important issue. The 'tweeners may be worse off than the poor in terms of one aspect of economic well-being (risk), but they may be better off than the poor in terms of another aspect (level of living). Perhaps the most important point is that both the poor and the 'tweeners (and perhaps many with incomes above those of the 'tweeners) either suffer from a low standard of living, are quite vulnerable to substantial economic risks, or both. The results of this study point out that a satisfactory way of combining information on level of living with information on vulnerability to economic risks to produce a single measure of economic well-being has not been found.

In a continuation of the same line of research, economic risk among the aged was examined by Holden and Smeeding (1990) using data from the 1984 SIPP. They identified five sources of risk: (1) lack of satisfactory insurance for acute health care (measured as Medicare's being the only subsidized acute health insurance),

(2) lack of assets to pay for long-term care (measured as insufficient financial resources to cover 2 years in a long-term-care facility),[35] (3) Social Security benefits as a constraint on Medicaid eligibility (measured as ineligibility for Supplemental Security Income even if all income other than Social Security benefits ceased), (4) high housing costs (measured as housing costs above the accepted maximum percent of income), and (5) chronic disabilities (measured as high costs of living due to physical disability). It should be noted that these five sources do not all represent the same type of insecurity. For example, source (2) compares a large uncertain expense with available resources. Sources (4) and (5) appear to be mixtures of higher average needs and risks of large expenses.

Holden and Smeeding found that 35 percent of aged persons faced at least two of these sources of insecurity, and 14 percent faced at least three sources. Among poor aged persons, 43 percent faced at least two sources and 23 percent faced at least three sources. Among the "lower middle class" aged (defined as having a ratio of income to the appropriate poverty threshold— "welfare ratio"—of 1.00 to less than 2.00), 61 percent had at least two sources, and 28 percent had at least three sources. Because the lower middle class had higher percentages than the poor did, Holden and Smeeding concluded that the lower middle class suffered from more insecurity than the poor did. Eligibility for Medicaid played a very important role in that difference. Fewer middle and upper class aged persons (those with a welfare ratio of 2.00 or greater) faced insecurity—22 percent had two or more sources, and only 6 percent had three or more sources.

Del Bene and Vaughan (1992) focused on one type of risk—expenses for acute health care. They examined the ability of the aged to pay for selected medical expenses taking both income and assets into account. Data from the 1984 SIPP and health expenditure estimates from other data sources were used. For aged persons

whose only health insurance was Medicare (about 20 percent), the amounts of contingency assets (essentially financial assets) held were compared with costs for acute care services to estimate how many could pay for those costs. Of these Medicare-only persons, 39 percent had contingency assets of less than $500. About 19 percent of Medicare enrollees faced out-of-pocket expenses for Medicare-covered services of $500 or more. About 50 percent of Medicare-only persons had contingency assets of less than $1,500. Roughly 4 percent of Medicare enrollees faced out-of-pocket expenses that were at least that high. The percentages with low amounts of contingency assets fell as the person's family welfare ratio rose. Average hospitalization costs also were compared with amounts of contingency assets.

Some methods of taking both income and wealth into account in a single measure of economic well-being are also related to the ability to pay for large uncertain expenses (Radner 1990b). For example, as discussed earlier, the number of households with both low income and low wealth was examined by Radner (1990b). The effect on the economic status of the aged of adding one-third of wealth to income was also examined. A method of valuation of wealth that converts wealth into an annuity that is then added to income is more consistent with comparisons with average needs than with ability to pay for large uncertain expenses.

Summary and Conclusions

Although several researchers have concluded, using broad aged-nonaged comparisons, that the aged a.⌄ better off than the nonaged, such broad comparisons are not the most meaningful ones to make. The examination of detailed age groups within both the aged and nonaged groups presents a far more complete and somewhat different picture.

Also, means, rather than medians, often are used in the comparisons.

Means, however, are affected by extreme values; medians generally are a much better measure of the status of a "typical" unit in the age group. The difference between means and medians usually is important empirically.

Another problem with the general conclusion is that there is more uncertainty about several aspects of the measurement of the economic status of the aged than is generally conceded. Those aspects include the effect of noncash income, the measurement of differential needs among groups, and the relationship between noncash income and needs. These sources of uncertainty substantially reduce the confidence with which conclusions about the economic status of the aged can be reached. Compared with most other recent assessments of the economic status of the aged, this study, which used medians and detailed age groups and emphasized uncertainty about the accuracy of available estimates, showed a less favorable status for the aged relative to other age groups.

This article discussed several fundamental points about assessing the economic status of the aged. First, assessments of how much the aged "should" have depend on value judgments. Although the economic status of the aged has improved greatly during roughly the past two decades, it does not necessarily follow that the aged have more than they "should" have. At least some of that relative improvement in the economic status of the aged merely offset the relative decline from the end of World War II to about 1970. Second, the way comparisons of age groups are framed and the technical choices made can affect the conclusions reached. For example, who is compared with whom is very important, as are the definitions of resources and recipient units, the adjustments for differential needs, and the measure of central tendency (median or mean) of the distribution that are chosen.

A summary of the major findings follows:

(1) There is great diversity in economic status within the aged group. Subgroups of the aged differ substantially in economic status. Married couple units have a higher median than unrelated individuals, and the "young old" have a higher median than the "old old." Also, within each subgroup there is substantial diversity in economic status. Differences in wealth within the aged group are large. Poverty rates for subgroups of the aged differ greatly.

(2) Looking at the entire age range, in a given year median cash income is highest for middle-aged units and lowest for the oldest and youngest units. Thus, the median cash income of the aged is below the medians for the middle age groups. Technical measurement choices, such as the method of adjustment for different needs of different groups, affect the shape of the age-income relationship somewhat, but the basic pattern is the same for all moderate specifications that have been used. When family unit income adjusted for differential needs using the equivalence scale implicit in the poverty thresholds is used, the median for each detailed aged age group is below the median for each age group in the 30-64 age range. Existing estimates would be improved if better adjustments for differential needs were available.

(3) When detailed age groups are combined into summary aged and nonaged groups, the level of the aged-nonaged ratio of cash incomes depends greatly on the technical measurement choices made. The ratio of aged to nonaged medians of family units, with income adjusted for differential needs using the equivalence scale implicit in the poverty thresholds, was 0.725 in 1990. That ratio would rise somewhat if an adjustment were made to improve the accuracy of the income information used. The ratio would fall if aged and nonaged needs were assumed to be the same for each size of unit.

(4) When noncash income is considered in addition to cash income, the income of the aged tends to improve relative to that of the nonaged, but serious measurement problems exist. The amount of improvement depends on several technical measurement choices, such as the types of noncash income included and the valuation of those income types. Both of those measurement aspects are controversial. The inclusion and valuation of Medicare are particularly problematic. The inclusion of Medicare has a large positive impact on the measured status of the aged. A very important problem, the need for consistency between the income definition used and the adjustment for differential needs used, has received little attention. This problem is particularly significant in the case of Medicare. When taxes are taken into account, the income of the aged rises relative to that of the nonaged.

(5) When wealth (excluding Social Security wealth, pension wealth, and human capital) is considered in addition to cash income, the economic status of the aged improves relative to that of the nonaged. Some methods of taking wealth into account improve the relative status of the aged substantially, while other methods improve it very little. The valuation of home equity is very important here. The whole topic of combining income and wealth into a single measure, however, is very controversial and no fully satisfactory method of combining those items into a single measure exists at this time. The role of wealth in the economic status of the aged is related, at least in part, to the ability to pay for large uncertain expenses (for example, medical expenses), but

that relationship has not been explored comprehensively. The general question of the measure of needs that should be used in conjunction with a measure of resources that includes wealth has received little attention.

(6) The poverty rate for aged persons is above the rates for all other adult age groups, but below the rate for children. Within the aged group, the poverty rate is much higher for the "old old" than for the "young old." Relatively more aged persons than persons in other age groups are slightly above the official poverty threshold. The appropriate level for the poverty thresholds is controversial, particularly because the official thresholds are not adjusted for increases in living standards over time. If the poverty thresholds were raised, relatively more aged persons than nonaged persons would be added to the poverty group. The aged-nonaged poverty threshold differential, which reduces the relative number of aged persons who are classified as poor, is also controversial.

(7) Comparisons of the cash income of the aged relative to other age groups for several countries show that the U.S. aged in a relative sense generally are at least as well off as the aged in other Western industrialized countries. Poverty rates for the aged, however, tend to be higher in the United States than in those other countries.

(8) The aged (and other age groups) are subject to substantial economic risks that are not easily taken into account in the usual measures of economic status. Acute health care expenses and long-term care expenses are the most frequently cited risks for the aged. These risks are an important aspect of needs that has not been explored in detail in assessing economic status. As

noted above, the role of wealth in the economic status of the aged is related to those risks.

Our understanding of the distribution of economic well-being would be enhanced if more were known about several aspects of the measurement of economic status. Those aspects include adjustments for differential needs, the treatment of noncash income, the treatment of wealth, and the estimation of vulnerability to economic risks.

The adjustment for differential needs has an important effect on measured relative economic status. Medical needs are higher for the aged than for the nonaged and this difference is usually not explicitly taken into account. The specification of needs should be consistent with the definition of resources used.

The treatment of noncash income has been controversial for some time. A better understanding of the valuation of such income is important. The need for consistency between the definition of resources used and the specification of needs generally has been ignored.

The appropriate way (or ways) to take wealth into account is also controversial. The valuation of wealth, especially for the aged, is related to the issue of needs. Some aged persons attempt to protect themselves against possible medical (or other) expenses of uncertain size using their wealth.

Uncertainty and vulnerability to economic risks is another important topic. The relationship of this topic to economic well-being requires further study. Uncertainty is an ex ante concept that differs considerably from the actual outcomes that are ordinarily assessed. This uncertainty can occur on the income side, the needs side, or both.

In addition to the problems mentioned above, there are problems related to the appropriate way or ways of combining different aspects of economic well-being. The combination of income and wealth into a single measure of economic well-being is a topic that requires much more exploration. It can be argued that no existing measure takes both income and

wealth into account in a satisfactory manner. Similarly, it would be useful to integrate measures of level of living (which have received a substantial amount of attention at the poverty level) and measures of vulnerability to risk (which have been studied relatively little). This integration would involve the combination of average needs and the distribution of needs into a single measure. Such a combined measure does not exist at the present time.

Several important topics were not discussed in this article. One area that would benefit from more attention is longitudinal comparisons. We need to know more about how the aged got to their present level of economic well-being. For example, of the aged who are currently poor, how many were poor when they were younger? Cross-section comparisons cannot provide answers to such questions. Longitudinal data should be exploited even more than they have been so far. The relationship between life events (for example, widowhood) and economic status also requires more exploration, as does the volatility of income.

There is much that is not known about the economic status of the aged. Further research on this topic is very important. Of particular importance is the question of the proper measurement of the needs of the aged and of other age groups and consistency between the specification of those needs and the measure of resources used.

Notes

[1] The official estimates of poverty are computed by comparing family unit cash income before tax with the official poverty thresholds. In 1990, the weighted average poverty threshold for an aged unrelated individual was $6,268, and the threshold for a two-person aged family was $7,905 (Bureau of the Census 1991b).

[2] For a description of the Current Population Survey and definitions of its concepts, see Bureau of the Census (1991a).

[3] The threshold for one-person units (all ages) was used as the base for the equivalence scale. Weighted average thresholds were used. See Bureau of the Census (1989), table A-2, for the thresholds used.

[4] An age-income curve implicitly assigns equal weight to each age group shown. Different age groups typically contain different numbers of units. Values for summary age groups, therefore, cannot be derived from the points on the curve in a simple way.

[5] See Danziger and Taussig (1979) for a discussion of person weighting and unit weighting. The use of person weighting emphasizes the importance of the assumption that each person in a family has equal economic well-being. This assumption is used, for example, when poverty rates for persons are computed. Do the family head, an infant, and an aged person living with the family head always have equal economic well-being? The question is discussed relatively little in the literature. This issue goes beyond the question of equal access to the income of the family to the question of whether persons of different ages transform income into economic well-being at the same rate.

[6] In the computation that omits the aged differential, the nonaged equivalence scale values were used for all ages.

[7] Many other equivalence scales have been used by researchers. See Buhmann et al. (1988) for comparisons of many different scales.

[8] The Crystal-Shea estimate of the aged-nonaged income ratio before adjustment for underreporting (0.939) was substantially above the Radner estimate (0.71) primarily because Crystal-Shea used means, rather than medians, and person weighting, rather than unit weighting.

[9] There are also issues regarding the appropriate definition of total cash income. Capital gains, both realized and unrealized,

are excluded from the definition of income used in this section. Pension benefits are included when received, rather than as accrued. Nominal interest income is included in total income. Part of the nominal interest rate, however, is an inflation premium that adjusts for the decline in the real value of the interest-earning asset (Jump 1980). If only real interest income were included, then the ratio of aged to nonaged total income would be expected to decline somewhat because interest income is more important to the aged than to the nonaged (Radner 1987b). Estimates that take taxes into account are discussed in the next section.

[10] Some researchers have raised the question of the aged being "overhoused." That is, for many reasons (for example, transactions costs of various kinds), some aged persons might remain in a larger house than they now "need." In that case, imputed rent on that house might overstate the value of the service flow.

[11] The recipient value of noncash income has also been used. The recipient value of cash income, however, is rarely considered. If pre-tax income is used, then tax-free income types are worth more than taxable types. In an after-tax definition, the uncertainty of receipt or the uncertainty of the size of the amount to be received could affect the recipient's valuation. Frequency of receipt could also be important.

[12] Total needs of the group is the most relevant variable, since higher medical needs might be offset by lower other needs for the aged.

[13] Perhaps actual expenses could be used if those expenses were reflected appropriately on the needs side. If the same large amounts were added to both the resource side and the needs side, however, the ratio of resources to needs would move toward 1.0. Also, the inclusion of all medical needs could affect equivalence of units of different sizes if economies of scale in the added medical needs differ substantially from economies of scale in other needs.

[14] This appears to be the treatment that is used when the value of Medicare is added to income and the official poverty thresholds (or the equivalence scale implicit in those thresholds) are used to represent needs. The insurance value of Medicare is equal to a substantial fraction of the poverty threshold. For aged unrelated individuals, the insurance value of Medicare, which

differs among States, is more than 30 percent of the poverty threshold in every State and is more than half the poverty threshold in 12 States (Bureau of the Census 1991c).

If both cash income and Medicare are considered, the introduction of the Medicare program in 1966 produces a measured increase in the economic status of the aged. This is true whether medical needs are underestimated or measured fully, as long as those needs are measured consistently for the periods compared. The level of the measured economic status of the aged, however, will be too high if needs are underestimated.

In some types of comparisons, it is appropriate to include all needs, but only cash income. For example, one might want to perform a sensitivity analysis and compare the economic status of the aged when Medicare is excluded and included, holding (total) needs constant.

[15] For the measurement of poverty, using the same threshold when the value of Medicare is included and excluded from income is inappropriate because levels of needs, not just ratios of needs, are involved.

[16] These estimates are preliminary because tax data for 1989 were used.

[17] Imputed rent was estimated by applying a rate of return to estimated home equity. The rate applied was the average rate of return on high-grade municipal bonds (7.25 percent in 1990). Property taxes were then subtracted to obtain the estimate of imputed rent.

[18] Medicare and Medicaid benefits are not counted in income if the unit is unable to meet (or is just able to meet) basic food and housing requirements. For higher income units, Medicare and Medicaid are valued at the mean government outlay for units in a given risk class. Partial value is used for units that are not in either of those two groups (Bureau of the Census 1991c).

[19] The estimates shown here were derived from estimates prepared by the Congressional Budget Office that appear on pages 1192, 1210, 1212, and 1213 of the Ways and Means Committee Print (U.S. Congress 1991).

[20] This definition is Smeeding's "Total income 1."

[21] When a constant utility equivalence scale was used, the ratio was 0.84 for cash income before tax. In the constant utility

equivalence scale used, the aged are estimated to need far less than the nonaged (van der Gaag and Smolensky 1982). For example, according to this scale, an aged female one-person unit needs only 48 percent as much income as a female one-person unit aged 35-54. The aged-nonaged differentials in this scale appear to be unreasonably large. Use of this scale inflates the income of the aged relative to the nonaged.

[22] Although Smeeding found that the ratio using the poverty threshold scale was much lower than the ratio using the constant utility scale, Danziger et al. (1984) found that the aged-nonaged ratio using the poverty threshold scale was slightly higher than the ratio using the constant utility scale. The estimated scales used appear to differ somewhat. If the difference in scales is the cause of the difference in the ratios, then the results are highly sensitive to the estimation of the scale.

[23] It appears that the person's age (rather than the householder's age) was used in the annuity calculations. Thus, children had their (household) net worth annuitized over a very long expected remaining lifetime, producing a low annuity value and exaggerating the "older is better" effects.

[24] Weicher (1987) has argued that the general level of the thresholds is too high because the Consumer Price Index for Urban Consumers, which is used to adjust the thresholds for price change, rose too rapidly as a result of an inappropriate treatment of housing.

[25] Experimental estimates of poverty rates using a broader definition of income and the official thresholds show lower poverty rates than the official rates (Bureau of the Census 1991c). These estimates are controversial, in part because the thresholds were not adjusted to reflect noncash income. Also, the methods of valuation of some types of noncash income are controversial. When taxes, capital gains, and several types of noncash income (including Medicare and Medicaid, but excluding imputed rent) were taken into account, the 1990 poverty rate for aged persons fell to 9.5 percent from the official rate of 12.2 percent.

[26] Because relative medians (means) using the all ages median (mean) as the base can be affected by the age distribution in a country, comparisons of the aged with other specific age groups are useful.

[27] Interest in this topic, for both the aged and nonaged, has been increasing in recent years. For example, see Institute for Research on Poverty (1991).

[28] There has also been some interest in the degree of uncertainty associated with particular types of income. Boskin and Shoven (1987) hypothesized that a dollar of Social Security benefits is worth more than a dollar of other income types to the recipient because the Social Security benefit is more certain than the other types are. It is interesting to note that Smeeding (1986) considered reliance on Social Security benefits to be a source of economic risk (discussed later in the text).

[29] The volatility of income is an aspect of uncertainty that is not discussed in this article. In a recent report (Bureau of the Census 1991d), change in income from 1987 to 1988 for the same persons has been examined using data from the Survey of Income and Program Participation.

[30] The distribution of expenditures faced can be altered by the purchase of insurance. The use of average needs implicitly assumes that everyone is insured against these large expenses. Many persons, however, are not insured. For example, most aged persons do not have long-term care insurance. Also, many younger persons do not have health insurance.

[31] This discussion is in terms of an uncertain future. The distribution of needs can also be used in analyzing actual outcomes in the past. For example, instead of comparing a unit's income with average needs for a given year, the unit's income could be compared (at least conceptually) with the unit's actual needs in that year.

[32] Three measures of vulnerability were examined. The first two measures reflected vulnerability to a price level shock (interest rates and the rate of inflation unchanged). The third measure reflected vulnerability to an inflation rate shock (long-run expected rate of inflation and nominal interest rates rise). The first two indexes of inflation vulnerability were defined as nominal assets (for example, bonds, private pension wealth, bank accounts) less nominal liabilities, divided by total net worth. The second measure differed from the first only by a shift in the treatment of common stocks. In the third measure, the immediate fall in real wealth as a fraction of total wealth for a one-point increase in inflation was calculated. In that measure, the sensitivity of the asset value to inflation depended on the maturity of the asset.

[33] Smeeding mentions Medicaid, Veterans' Administration health coverage, and employer-subsidized health insurance as other sources of subsidy. According to Smeeding, the Medicare-only aged group generally is vulnerable to the risk of high medical bills because that group is unlikely to have purchased adequate supplementary insurance.

[34] Loss of a spouse usually changes measured needs, as well as Social Security benefits.

[35] There is a substantial probability that the estimates of the amounts of assets held are underreported in the survey. Generally, a comparison between underreported asset values and cost amounts that were not underreported would bias upward the estimates of the number of units at risk.

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