

Citation:

Garner, T.I. (2003), "A Comparison of Economic Well-Being Measures Using SIPP and CE Data: Personal Assessments of Expenditures and Income," *2003 Proceedings of the American Statistical Association, Government Statistics* [CD-ROM], Alexandria, VA: American Statistical Association: pp-pp.

A COMPARISON OF ECONOMIC WELL-BEING MEASURES USING SIPP AND CE DATA: PERSONAL ASSESSMENTS OF EXPENDITURES AND INCOME

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KEY WORDS: Economic Well Being, Subjective Poverty, Expenditures, Minimum Needs, Consumer Expenditure Survey, Survey of Income and Program Participation

INTRODUCTION

About 25 years ago, the potential of collecting personal assessments of economic well-being using federal household surveys was recognized.

¹ Minimum income levels and evaluations of personal income were first collected in a federal household survey in 1979 as part of the Bureau of the Census Research Panel of the Income Survey Development Program (ISDP). Around the same time, the Bureau of Labor Statistics (BLS) contracted with the Wisconsin Institute for Research on Poverty to study the BLS Family Budget Program (Watts 1980). The Expert Committee on Family Budgets recommended a basic shift toward a more populist or democratic framework than had previously been used. This framework would be based on the notion that ordinary people, as opposed to experts, know what they need in order to get along or prosper. The Committee made the recommendation that a new measure be developed that would result in stable and reproducible estimates of the levels reflected in popular concepts of these norms.²

Based on a recommendation of the Expert Committee on Family Budgets, a minimum income question was asked in the Consumer Expenditure Survey (CE) in 1982. The next time a minimum income question was asked in a federal household survey was in the Survey of Income and Program Participation (SIPP) Well-Being Module when data were collected in 1995. Also asked in this module was a question about minimum spending to meet basic needs. The minimum income question (MIQ) and minimum spending question (MSQ)

were the same as ones asked in the Survey of Consumer Finances conducted by Statistics Canada in the 1980's (Morissette and Poulin 1991). The Canadians introduced the minimum spending question as another version of the minimum income question. Minimum spending referred specifically to basic necessities and then defined these to include barely adequate food, shelter, clothing, and other essential items for daily living.

In the late 1990's, the BLS, in conjunction with the Census Bureau, conducted cognitive testing on what respondents think when asked subjective well-being questions like the MIQ and MSQ. Based on this cognitive work (see Stinson 1998), and earlier findings of Morissette and Poulin (1991), lower thresholds were expected from the MSQ as compared to the MIQ since the MSQ is more specific in defining basic needs than is the MIQ.

Garner and Short (2003a, 2003b) used the minimum income and spending data from the SIPP to produce personal assessment thresholds for the U.S. and to ascertain levels of economic well-being using household before tax money income in the SIPP. They reported that thresholds based on the SIPP minimum income question are higher than those based on the minimum spending question, consistent with the findings of Morissette and Poulin. One might consider the higher threshold to represent a "social minimum standard," while the lower would represent a "lower living standard." A range of thresholds such as represented by these two was preferred by the Expert Committee (Watts 1980).

This study is an extension of the earlier Garner and Short research with data from the CE, in addition to those from the SIPP being analyzed. As in the previous studies, personal assessment thresholds are derived using the intersection method first introduced by Goedhart et al. (1977), but the model is simplified compared to that used by Garner and Short earlier (2002a). As before, data from the Basic Needs Module of the U.S. Survey of Income and Program Participation (SIPP), 1993 panel-wave nine, are used to estimate regression coefficients that relate minimum income or spending and

¹ Vaughan (1996) provides an overview of the activities involving U.S. federal household surveys and the use of personal assessments of income needs and financial circumstances since the late 1970s.

² Other recommendations of the Expert Committee on Family Budget Revisions are reviewed by Johnson et al. (2001). These authors produce descriptive budgets derived from median total expenditures and compare them to budgets based on the earlier BLS family budget methodology.

actual before tax money household income. Thresholds based on the SIPP data are compared to before tax money income to determine income based poverty rates.

As the MSQ refers to minimum spending, an additional exercise is conducted to compare estimated MSQ thresholds with actual expenditures. This is the first time such an exercise like this has been conducted. Such a comparison is not possible with the SIPP as expenditure data are not collected in that survey. Income data are not necessary for the estimation of the CE MIQ or MSQ thresholds; only the coefficient on income is necessary. This is an advantage as the income data in the CE are not fully complete, and missing data in the CE are not imputed while they are in the SIPP.

For this exercise, estimated SIPP based coefficients are applied to a sample of CE respondents and then weighted to derive population based thresholds. Since the SIPP and CE are designed to both represent the same U.S. population, the estimated thresholds should be the same. Differences would result due to differences in the samples and weights. CE quarterly Interview data for 1995 are used.

Personal assessment or subjective thresholds and poverty rates are produced for the total population for 1995. (Results for demographic groups are available from the author.) For comparison, thresholds and poverty rates based on the official poverty measure are also presented using both the SIPP and CE.

DATA and METHODS

Data from the U.S. Survey of Income and Program Participation (SIPP) and the Consumer Expenditure Survey Interview (CE) data are used for the study. First, SIPP data are used to estimate the relationship between minimum income and minimum spending and total before tax household income. Total before-tax household income is used for the estimation as this is the income that is compared to the official poverty thresholds which are used for comparison. Also the MIQ is asked with respect to before tax money income. The CE MIQ and MSQ thresholds are derived by applying the SIPP estimated coefficients that result from regression of minimum income and minimum spending on before tax money income and other demographic characteristics.

Two assumptions underlie the approach of applying the SIPP-estimated coefficients to the CE sample to derived MIQ and MSQ thresholds for the CE population. First, the SIPP

and CE samples are drawn from the same U.S. population and there is no bias resulting from systematic attrition in SIPP (see Garner and Short 2003a for a discussion concerning this issue). Second, the relationships between minimum income and minimum spending and each of the explanatory variables in the MIQ and MSQ models are the same in both samples.

The SIPP data were collected from the 1993 panel of households using the Topical Module on Basic Needs, the last in a series of nine modules. Data were collected from October 1995 through January 1996. Household characteristics refer to the data collection period and total before tax money income is for the previous four months. Thus income would be reported as income for the last four months beginning in June 1995 for those interviewed in October 1995, and December 1995 for those interviewed in January 1996. The MSQ was asked of only half of the SIPP respondents to the Topical Module. The other half were asked a MIQ.

The minimum income question (MIQ) follows:

To meet the expenses you consider necessary, what do you think is the minimum income, BEFORE TAX, a family like yours needs, on a yearly basis, to make ends meet (If you are not living with relatives, what are the minimum income needs, BEFORE TAX, of a individual like you?)

The minimum spending question (MSQ) follows:

In your opinion, how much would you have to SPEND each year in order to provide the BASIC necessities for your family? By basic necessities I mean barely adequate food, shelter, clothing, and other essential items required for daily living?

The reference period for the MIQ and MSQ varied depending upon the preferences of respondents. The majority of respondents answered the MIQ in annual dollar values (67.8 percent) while most responding to the MSQ answered in monthly (38.3 percent) or annual (53.7 percent) dollar values.

Data were collected from households; however, the MIQ and MSQ refer to a family

situation. A household is defined in the SIPP as all the people who are living in a housing unit. A housing unit is defined as a living quarters with its own entrance and cooking facilities. A family, in contrast, is composed of all persons who are related by marriage, adoption, or other legal arrangement.

The CE sample for which thresholds are estimated include consumer units interviewed in the last calendar quarter of 1995 and/or first quarter of 1996. In the CE Interview, expenditures for the three months prior to the interview are collected during a single interview. Thus, the earliest reference period for the entire sample would be the three months prior to October 1995 or July 1995. The last set of interviews, conducted in March 1996, would refer to expenditures beginning in December 1995 and ending in February 1996. These time periods were selected as they overlap, although not perfectly, the reference period for the SIPP Topical Module. For this study, as for official publication of expenditures, quarterly reports of expenditures are assumed to be independent. As most of the sample's expenditures refer to 1995, results are assumed to be for 1995, the same as for the SIPP.

Expenditure data are collected from consumer units. Consumer units are defined slightly differently from households and families. A consumer unit comprises all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements, a person living alone or sharing a household with others but who is financially independent, or two or more persons living together who use their income to make joint expenditure decisions. (See BLS 1997 for a more specific definition). For the time period under study, 96 percent of all consumer units (CU population weighted) were also households with no other consumer units present.

The intersection method is used to estimate the coefficients using the SIPP data with the resulting coefficients applied to the CE sample, and then weighted for the population. When one solves for the intersection, the income variable cancels out of the equation and only the income coefficient remains. Thus, no income data are needed from the CE when the coefficients are applied to produce the MIQ and MSQ thresholds.

The intersection method of producing subjective minimum thresholds was first introduced by Goedhart et al. (1977). The threshold (Y^*) is calculated as the

intersection of the relationship:

$$\ln(Y_{\min}) = a_0 + a_1 \ln(Y) + a_2 z_2 + a_3 z_3 + \dots + a_n z_n + \varepsilon \quad (1)$$

with the line $Y_{\min} = Y$ for different characteristics, z_n . The error term, ε , is assumed to satisfy the classical assumptions for simplicity. For this study, Y_{\min} represents the answer to questions about the minimum income or spending dollar amount that the respondent thinks is needed for the family to make ends meet, or some variation of that question. And Y is total household before tax income. Previous research indicates that a log-linear model fits data when Y_{\min} represents the answer to a question about minimum income fairly well. In a plot of minimum income and spending by total before-tax household income from the SIPP, the log-linear relationship also holds.

An underlying assumption for the intersection approach to estimate a minimum income and spending-based thresholds is that only those who have income that is at the minimum know what the "true" minimum is. Since that minimum is not known for a society *a priori*, data are collected from a sample representing the whole population. The predicted threshold based on equation (1) and the intersection of $Y_{\min} = Y$ is:

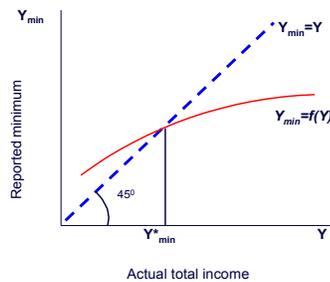
$$Y^*(z_2 \dots z_n) = \exp \left[\frac{a_0 + a_2 z_2 + \dots + a_n z_n}{1 - a_1} \right] \quad (2)$$

As the error term, ε , is not observable, there are different possible choices to deal with the term. The assumption here is not to include an error term with the result being a median prediction (see Garner and Short 2003a for a discussion of this issue.) Kapteyn et al. (1988) used the median prediction equation (2) as did other researchers using U.S. data (see Garner and De Vos 1995 for references). The median is chosen as the measure of central tendency for the subjective threshold as it is more robust to outliers than the mean and the median is the midpoint of the distribution, thus, making it perhaps more relevant for poverty discussions than the mean. This relationship is presented in Figure 1.

An assumption underlying the approach is that every respondent gives the same meaning to the wording used in the MIQ and MSQ. In other words, the expression "necessary to make ends meet" and "basic necessities," for example, is supposed to have the same welfare connotation

for all respondents. Variations in responses would be expected when households have differing needs. Differences in responses could also result when they face different prices. Thresholds would increase when the average total before-tax income of the entire population increases; an income coefficient closer to one reflects a more relative measure. The regression intersection approach allows one to control for differences in responses due to reference group effects. Differences due to differing needs and prices would remain.

Figure 1. The Subjective Line Based on the Regression Intersection Approach



The approach followed in this study is only one that has been used by researchers when estimating thresholds based on personal assessments of individuals in households or families. See Vaughan (2003) for an approach based on medians without controlling for reference group effects.

RESULTS

Regression results (contact author for details) reveal that the MIQ model fits the data better than the MSQ model. The adjusted R^2 s are 0.335 and 0.24 respectively. Responses to the MIQ are more sensitive to income than are responses to the MSQ as revealed by the $\ln(Y)$ coefficient. As expected, needs increase as the number of children increases. They are also greater with increases in the age of the reference person, for owners, and for households living in what are considered higher costs areas (the Northeast and West).

The SIPP and CE weighted samples are quite similar with the distributions of households and consumer units by characteristics. However there are a few differences. The population means suggest, however, that applying the SIPP-based model coefficients to the CE is a useful exercise.

Annualized expenditure outlays and total before tax money income means are

presented in Table 1, along with official poverty thresholds, and the MIQ and MSQ thresholds (medians). For official poverty, each SIPP household and CE consumer unit were assigned the unit's official threshold based on the age of the reference person in single and couple families, and the numbers of people and children for other households.

Table 1. Annualized CE Outlays, SIPP Before Tax Money Income, and Estimated Median Minimum Value Thresholds
(Population Weighted Consumer Units or Households)

	Annual Estimate
Consumer Expenditure Survey	
Total Expenditure Outlays	\$30,417
Food, Shelter, Utilities, Clothing	14,930
MIQ Thresholds Using SIPP Coefficients	21,663
MSQ Thresholds Using SIPP Coefficients	14,723
Official	11,527
Survey of Income and Program Participation	
Before Tax Money Income-MIQ Sample	\$42,344
Before Tax Money Income-MSQ Sample	43,932
MIQ Threshold	22,185
MSQ Threshold	15,210
Official based on MIQ Weighted Sample	11,355
Official based on MSQ Weighted Sample	11,460

The MSQ thresholds are about 68-69 percent of the MIQ thresholds. This is slightly higher than the ratio found in the work of Morissette and Poulin (1991) for Canada. Vaughan (1993, 2003) estimates that the Gallup poverty threshold (also a median) is about 72 percent of the Gallup get-along threshold.³ The Gallup thresholds are based on and are not model-based. The MIQ thresholds are about 90 percent higher than the official poverty threshold while the MSQ is only about 30 percent higher.

CE total expenditure outlays are on average 70 percent of before tax money income from the SIPP. Bundle one (food, shelter and utilities for primary residence, and apparel)

³ The Gallup poverty question is: "People who have income below a certain level can be considered poor. That level is called the 'poverty line.' What amount of weekly income would you use as a poverty line for a family of four (husband, wife, and two children) in this community?" The Gallup get-along question is: "What is the smallest amount of money a family of four (husband, wife and two children) needs each week to get along in this community?" The get-along question was asked in Gallup Polls from 1947-89 and again in 1992. The Gallup poverty question was asked in 1989 and 1992 (Vaughan 1993, 2003; Citro and Michael 1995).

expenditures represent about half of all expenditure outlays.

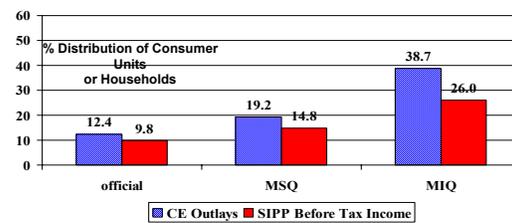
The CE MSQ threshold is not statistically significantly different than expenditure outlays for bundle one; the ratio is 1.01. The ratio of the CE MSQ to SIPP MSQ threshold is 1.03.

Thresholds for two-adult two-child consumer units, with the reference person less than age 65, and the children less than 18, are often used as the reference family for the derivation of thresholds for consumer units with other sizes and number of children present. For this consumer unit type, official thresholds are about 83 percent of the MSQ threshold. The MSQ threshold is 99.5 percent of the threshold based on a basic needs budget for the same family type with one working parent produced by Renwick⁴ (1998; also see Renwick and Bergmann 1993), 91 percent of the Gallup poverty threshold, and 81 percent of the Renwick threshold for the family with two working parents. The MIQ threshold is 99.8 percent of the Gallup get-along threshold. The MIQ threshold is 73 percent of the Prevailing Family Standard,⁵ based on the Expert Committee on Family Budgets recommendations (Watts 1980), and reported by Johnson et al. (2001) in 1995 dollars. The MIQ is 82 percent of the mean of the market basket based budgets across the U.S. reported by Bernstein et al. (2000) in 1995 dollars.⁶

Percentages of consumers units from the CE and households from the SIPP below various thresholds are presented in Figure 2. The before tax income measure of resources, compared to the different thresholds results in lower rates than obtained using CE outlays. This is not surprising as the money income measure

accounts for more than the CE expenditures outlays measure.

Figure 2. CE Outlays or SIPP Before Tax Money Income Less than Threshold: 1995



Using the SIPP, MIQ and MSQ poverty rates are higher than when the official threshold is used along with before tax money income. Higher rates result in all cases when the CE outlays data are used.

Implicitly the MIQ and MSQ thresholds are adjusted for differences in the costs of living by region. This is because consumer units would be expected to respond to the MIQ and MSQ based on the cost of living they face in their immediate area. Consumer units and households living in the Northeast are worse off relative to those living in other regions when the MIQ and MSQ thresholds are assumed. This is in contrast to official poverty results that indicate the highest poverty for the South. Higher thresholds are indicated for the Northeast and West by the results from the SIPP and CE, and are reflected in the published experimental measures that have been accordingly adjusted for prices (see Short et al. 1999).

CONCLUSION

Differences in economic well-being result if one uses expenditure outlays as opposed to income, and when different well-being thresholds are assumed. Higher well being results with SIPP income as opposed to CE expenditure outlays. Higher well being also results if official poverty thresholds are assumed. However, official thresholds have been criticized as inadequate. This is supported by the results presented using the MIQ and MSQ for both the SIPP and CE weighted samples. These results reveal that minimum spending needs appear to reflect, on average, what consumers actually spend on food, shelter, utilities, and clothing.

In order to better understand the relationship between spending needs and actual spending, it is recommended that the MSQ be asked in the CE. This would enable the estimation of the regression of minimum spending on total spending.

⁴ Renwick and Bergmann (1993) used a categorical approach to define a poverty budget which they referred to as a basic needs budget (BNB) and produced these for 1989. Renwick (1998) updated the BNBs to 1996. The BNBs are based on adequacy standards.

⁵ The Prevailing Family Standard would be the median expenditures of two-parent families with two children. Johnson et al. (2001) produced these using an expenditures outlays definition. The budget did not include the payment of income taxes or allocations for savings. The median expenditure for this family in 1995 dollars is \$38,789.

⁶ These authors identified items that they deemed necessary for a working family to maintain "a safe and decent standard of living" (p.4) and produced a budget for a two-parent two-child family living in Baltimore. Family budgets were also presented for various states, and regions. The simple average of the budgets presented for two-parent two-child families is \$34,470 in 1995 dollars.

ACKNOWLEDGEMENTS

Special appreciation is extended to Kathleen Short of the Census Bureau for her work with the SIPP data. Appreciation is also extended to Patricia Ruggles, discussant for the JSM session and to Denton Vaughan and Dan Weinberg for providing helpful comments and suggestions. I thank Linda Stinson, Clyde Tucker, and others within the Bureau of Labor Statistics for their guidance in exploring the “whys” and “hows” of minimum income and spending. All views expressed in this paper are mine and do not reflect the views or policies of the BLS or the views of other staff therein. I accept responsibility for all errors.

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