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Personal Assessments of Minimum Income and Expenses: What Do They Tell Us about
'Minimum Living' Thresholds and Equivalence Scales?

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Abstract

Subjective minimum income (MIQ) and minimum spending (MSQ) are the study focus. Basic Needs Module (1995) data from the U.S. Survey of Income and Program Participation are analyzed. A regression intersection approach is used to estimate household thresholds. MIQ thresholds are higher than MSQ thresholds. Both are higher than U.S. official poverty thresholds, and thresholds based on a National Academy of Sciences (NAS) methodology. Subjective threshold based equivalence scales imply greater economies of scale than those in the other two measures but are similar to behavioral scales. This finding suggests that families make trade-offs to meet their minimum needs.

1. Introduction

Economic well-being or welfare can be defined in terms of inequality, poverty, sufficiency or insufficiency, or social exclusion or inclusion along some continuum. Each of these concepts can in turn be operationalized in various ways using different measurement tools. Most often income, expenditures, net worth, and the possession of and access to certain commodities within a society are studied. Gordon and colleagues (2000), among others (e.g., Callan and Nolan 1991), have identified and discussed major approaches used to measure poverty and related concepts. These include:

1. Consensual/ social indicators
2. Social exclusion
3. Subjective measures
4. Income thresholds
5. Budget standards

Often researchers and policymakers use these measures as complements rather than as substitutes, as each may present a somewhat different but equally important dimension of one's situation in society.

Societal norms on what constitutes a minimum standard or level of living can be reflected through personal assessments using household survey data. For example, household survey respondents answer questions with respect to their own household, a household similar to theirs, or a specific household (e.g., a family of two adults and two children). Such measures are often referred to as subjective. The literature in which different subjective-based measures of economic well-being appear has grown dramatically from their early beginnings in the 1960's (e.g., Van Praag 1968). Recent (since the mid-1990's) citations in the economics and social policy literature include applications or discussions of subjective-based measures that focus on: consumption adequacy (e.g., Andrews et al. 2001; Bickel et al. 2000; Gundersen and Oliveira

2001; Pradhan and Ravallion 2000); and poverty, income sufficiency, and social exclusion (e.g., Bellido et al. 1999; Middleton 2000; De Vos and Garner 1991; Garner and De Vos 1995; Gordon and Pantazis 1997; Gordon et al. 2000; Kot 2000; Townsend et al. 1997; Van den Bosch 2000; Vaughan 1996; Waldegrave and Frater 1996). Many other references appear in the literature but are not included here, as the list is quite exhaustive (see Gordon and Pantazis, 1997, and Gordon et al. 2000, for additional references).[1]

Different subjective approaches have been used to produce thresholds to identify those less well-off using measures. Thresholds used in this way are assumed to reflect of the level of economic resources that families of different sizes need to attain the same level of well-being. Gordon et al. (2000) suggest that the "simplest and arguably most democratic" approach to produce a subjective poverty threshold is to average responses to a minimum income question from the surveyed sample (p. 73). This approach has been followed for Britain (Townsend and Gordon 1991; 1996; Townsend et al. 1997) and Australia (Saunders and Matheson 1992). For several countries in Western Europe, Deleeck et al. (1992; as reported by Van den Bosch 1993) identified the poor using the responses to a minimum income question and an income evaluation question in combination. The data of households with a respondent reporting having some difficulty making ends meet with their incomes were used to derive the poverty line. Then a comparison of actual incomes and reported minimum incomes was used to derive poverty lines for different household types.

Other methods to estimate subjective thresholds have been proposed and used extensively. Early work was conducted by a group of Dutch researchers[2] (e.g., Goedhart et al. 1977; Hagenaars 1986; Hagenaars and De Vos 1988; Hagenaars and Van Praag 1985; Kapteyn et

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[1] Some of these are also discussed, for example, in Fisher (2001) and Veit-Wilson (1998) in general discussions of setting minimum adequacy or budget standards.

al. 1988; Van Praag 1968). Two separate approaches are presented in the literature. One is based on responses to a minimum income question and the other on personal evaluations of current income. Both approaches are model-based in the sense that a model is used to explain the inter-household variation in the responses to survey questions; individual responses alone are not used to determine the poverty line directly.[3] Because survey questions are used to elicit responses and because the thresholds are model-based, Kapteyn et al. (1988) have pointed out the importance of correct specification and robustness.

The approach examined in this study, the minimum income approach, is considered the more basic of the two approaches proposed by the Dutch. The underlying assumption of this approach is that only people who have incomes that are at the minimum know what the true minimum is. The estimation model reflects this assumption as a regression intersection method is used (outlined in the Section 3. Data and Methods). Subjective thresholds using this approach have been produced previously for the U.S. by Colasanto et al. (1984), using the 1981 Wisconsin Basic Needs Study (BNS), Danziger et al. (1984), using the 1979 Income Survey Development Program (ISDP), and De Vos and Garner (1991; Garner and De Vos 1995) using the 1982 Consumer Expenditure Survey (CE).

Over the years, concerns about subjective measures of well-being such as these have been voiced (e.g., Bradbury 1989; Callan and Nolan 1991; Citro and Michael 1995). Levels of estimated thresholds and the equivalence scales implicit in the thresholds have been at issue. Generally higher threshold levels than those based on expert budgets, for example, or those used

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[2] The original group of researchers is known as the "Leyden" group.
[3] See Van den Bosch (1993) for a brief review of the two model based approaches and the Deleeck et al. (1992) approach.

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to determine eligibility for social transfers have been reported. (For U.S. examples, see e.g., Colasanto et al. 1984; Danziger et al. 1984; De Vos and Garner 1991; Garner and De Vos 1995). Equivalence scales implicit in these thresholds suggest greater economies of scale than those reported for other measures (for scale comparisons , see: Atkinson et al. 1995; Buhmann et al. 1988; Citro and Michael 1995).

Another concern that has been raised is the previously reported wide variation in subjective thresholds across different studies. (Regarding estimates for the U.S., see Citro and Michael 1995). Given these reported differences, it is clear that systematic evaluations of subjective questions are needed. Morisette and Poulin (1991) conducted such a study using Canadian data collected from individuals participating in the Survey of Consumer Finances (SCF) in 1983, 1986, 1987, and 1988. They found that when the same question wording for assessing subjective minimum income was used over time in the SCF, there were no notable changes in the answers and resulting thresholds. "Minimum incomes were remarkably stable throughout the four years of the study" (p. 36). Also tested in the Canadian study were variations in question wording.

This study builds upon the Canadian work by examining alternative question wordings, controlling for questionnaire and time period effects. Two different versions of the minimum income question were included in a special Basic Needs Module of the U.S. Survey of Income and Program Participation (SIPP). Data were collected in 1995, during wave 9 of the 1993 panel (see Section 3. Data and Methods for details). The first question asks for the minimum income that the respondent thinks a family like his or hers needs to make ends meet (hereafter referred to as minimum or MIQ). The second asks for a minimum amount that the respondent would have to spend to provide for the basic necessities of his/her family (hereafter referred to as the

minimum spending questions MSQ). For this question only, basic necessities are defined as

barely adequate food, shelter, clothing, and other essential items required for daily living. These

are the latest data available from a federal household survey in the U.S. that includes such

questions. Subjective thresholds are produced using the methods of Goedhart et al (1977) and

Kapteyn et al (1988). The same basic approaches were used in whole or in part in the earlier U.S.

studies (Colasanto et al. 1984; Danziger et al (1984); De Vos and Garner 1991; Garner and De

Vos 1995).

Thresholds and implicit equivalence scales based on the MIQ and MSQ are compared to

those based on other approaches, such as the U.S. official poverty thresholds, an approach

recommended by the National Academy of Sciences Panel on Poverty Measurement and Family

Assistance, hereafter referred to as the NAS thresholds (Citro and Michael 1995), and relative

thresholds using the OECD Social Indicators scales (Jenkins and O'Higgins 1987). Subjective

threshold equivalence scales are relatively flatter than those in official poverty thresholds but are

in the range of those reported in the literature using econometric modeling of consumption and

expenditure behavior. Comparing the results from the MIQ- and MSQ- based measures leads us

to conclude that question wording matters. Asking about "income before taxes needed for

necessary expenses," not surprisingly, results in thresholds that are higher than when asking

about "barely adequate spending needs." Consistent with the finding of Morisette and Poulin

(1991), who analyzed essentially the same questions for Canada, the more specific question

wording of the MSQ results in thresholds that are substantially lower than those based on the

alternative MIQ. The thresholds based on the personal assessments of respondents result in

greater percentages of households below their respective thresholds of well-being when their

incomes are evaluated. Those most worse-off are single parent households. These results are

consistent with those observed using the official poverty thresholds and NAS measure, although the incidence is higher for the MIQ and MSQ measures.

An additional analysis is conducted to assess the stability of the MIQ measure over time. For this the coefficients from the earlier CE study are applied to the SIPP sample. Estimated thresholds are updated to 1995 dollars. A comparison of results based on the SIPP MIQ and the earlier CE MIQ coefficients applied to the SIPP sample are not only consistent but surprisingly similar.

The paper proceeds as follows. Section 2 summarizes the history of the collection of these data in the U.S. Section 3 describes the data and the intersection method used to produce the minimum living thresholds. Section 4 includes the regression results, estimated thresholds, implicit equivalence scales, and percentages of the population with incomes below the estimated thresholds. Section 5 includes a discussion of the findings, and recommendations for further research.

2. Background

This study began as an effort to develop a package of questions to measure personal well-being in the context of an ongoing national survey. The U.S. government had previously supported the collection of MIQ data with the Census Bureau's 1979 Research Panel of the Income and Survey Development Program (ISDP) and the Bureau of Labor Statistics (BLS) 1982 Consumer Expenditure Survey (CE). The MIQ had been added to the CE based upon the recommendation of the Expert Committee for the BLS Family Budget Revisions (Watts 1980). The committee recommended that a major effort be undertaken to evaluate and perfect a survey methodology that would permit a paradigm shift away from the notion that official experts can,

and should define what the populace needs in order to get along or prosper. Early efforts were met with resistance (Vaughan 1996).

In 1990, an interagency group of researchers gathered to consider how to develop a set of questions that could be used to assess the more general concept of "well-being" for the population (see Kominski and Short 1996; Stinson 1997a). By 1991, a formal proposal from the team was presented to the Office and Management and Budget (OMB) to include the questions in the SIPP, a Census Bureau survey. As part of the process, the OMB requested that the BLS and Census Bureau undertake a research plan to test and evaluate minimum income questions. The Census Bureau and BLS developed an evaluation program that included analyses of data collected using the SIPP and data collected through cognitive interviews. (For a discussion of the cognitive aspect of the evaluation, see Steiger et al. 1997; Garner et al. 1997; Stinson 1997a, 1997b, 1998.) This paper presents results from the evaluation process using the data collected in the SIPP.

3. Data and Methods

The data for this study are from the Survey of Income and Program Participation (SIPP) collected in 1995 from wave 9 of the 1993 panel. (See Section 3.2 for details.) Minimum income questions were included in the Topical Module on Basic Needs for this panel. The module included three sections with questions concerning the household's ability to meet expenses for specific commodities, perceptions of food adequacy within the household,[4] and evaluation of minimum income. Within the minimum income section, each household respondent was asked an income evaluation question and a question about either minimum income or minimum

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[4] Analyses of data from the first two sections of the module have been conducted by Bauman (1999), Andrews et al. (2001), Bickel et al. (2000), and Gunderson (2001), among others.

spending. A split sample design was used to collect the minimum income and spending data:

half of the SIPP respondents were asked the income question and the other half were asked the

spending question.

3.1 Questions of Interest

We began our study, just as Morisette and Poulin 1991 did, with the basic assumption

that the MIQ and MSQ are alternative question wordings that refer to some underlying minimum

level of living as perceived by household respondents. The specific SIPP questions follow:

The Minimum Income Question (MIQ)

*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 an individual like you?)*

The Minimum Spending Question (MSQ)

*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.*

As noted earlier, a split sample design was used so that only one half of the respondents would

be asked each of the questions. Each respondent was allowed to answer the question in terms of

a weekly, biweekly, or monthly amount, depending upon convenience. One respondent in a

household provided an answer to reflect his or her perception of the entire family situation.[5]

Telephone interviewing was used to collect the data, except where the respondent had no

telephone or requested a personal interview.

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[5] While each question refers to "family" income or spending, only one person in each household was asked one of
these questions. The MIQ and MSQ follow a battery of questions that deal with "household" material well-being.
For these reasons the analysis presented in this paper refer to household characteristics rather than family.

The MIQ asks for minimum income, given the expenses the respondent considers necessary for a family like theirs. The question leaves it up to the respondent to internally define "*expenses you consider necessary*." In contrast, the MSQ asks for spending for basic necessities and then defines those basic necessities as "*barely adequate food, shelter, clothing, and other essential items required for daily living.*" We hypothesized that thresholds based on the MIQ would result in thresholds higher than those based on the MSQ, as basic necessities are defined specifically for a relatively small set of items.

The questions asked in the SIPP are basically the same as those asked in a supplement of the Canadian 1988 Survey of Consumer Finances (SCF) for a statistics Canada study (Morisette and Poulin 1991). Variations in question wording to assess minimum income needs were examined with Canadian SCF data also collected in 1983, 1986, and 1987. In addition, questions concerning income satisfaction were asked; however, we do not focus on those results here but refer the interested reader to Morisette and Poulin (1991). The Canadian study was part of a project to evaluate low-income measurement methods in Canada. Morisette and Poulin reported that the MSQ resulted in substantially lower thresholds than those based on the MIQ. Thus, they concluded that question wording could substantially affect the level of minimum income required.

The major contribution of the Canadian study, with respect to this study, is the detailed and systematic analysis of the impact of alternative question wording. The SIPP MIQ is basically the same as the one used by Statistics Canada in the 1988 survey. The only difference is that the Canadians did not refer to "minimum income needs" in the non-family part of the question; they referred to "minimum needs" only. Morisette and Poulin (1991) reported that the data resulting from the most similar wording of the MIQ were "remarkably stable over time". They concluded

that such stability is reassuring and supports the use of the same type of survey instrument and question wording.

The 1988 Canadian question focusing on spending needs, which is the one most like the SIPP MSQ, evolved from successive restrictions on question wording. In the 1986 SCF, alternative MIQ wording referred to "the smallest yearly income a family the size of yours would need to meet absolutely necessary expenses." Still the focus was on income. However, in the 1987 and 1988 surveys, minimum income was replaced by spending for basic needs. Morisette and Poulin (1991) refer throughout their study to the spending question as an alternative wording to ascertain minimum income.

As noted, the basic wording of the SIPP MSQ is the same as that used by Statistics Canada in the 1988 survey, but the difference in wording may be important. The Canadian question asks for "how much *do you* have to spend" rather than the "how much *would you* have to spend". Respondents could interpret the Canadian MSQ in terms of what the respondent "spends for this barely adequate amount *now*." The SIPP MSQ asks the respondent to consider how much he or she *"would* have to spend." Such a difference in wording could result in different responses, as one's assumptions about one's own experience or some hypothetical experience is being asked about (Stinson 1997a).

Question wording in the 1982 CE MIQ differed slightly from that used in the SIPP MIQ. "Living where you do now and meeting the expenses you consider necessary, what would be the smallest income (before any deductions) you and your family would need to make ends meet?" With this question, the respondent was asked to answer the question in terms of where the respondent and his or her family lives *now*. It was left up to the respondent to define deductions while in the SIPP, before-tax income was specified. The respondent could answer the question

for different time periods, while for the ISDP (Danziger et al. 1984) and the Wisconsin BNS (Colasanto et al. 1984), monthly amounts were requested. The MIQ in the ISDP was slightly different from the CE question. "Very" smallest income was specified and the respondent was asked about minimum income without any qualifiers such as deductions or taxes. The Wisconsin BNS question is like the ISDP question in the sense that the "very" smallest income was asked, but the minimum income was to be "after taxes." Higher thresholds would be expected when based on current living conditions versus allowing the respondent to consider moving or making other changes in the family's expenditure patterns. Resulting equivalence scales would also likely reflect more current spending patterns.

3.2 Survey Design of the Survey of Income and Program Participation

With the SIPP 1993 panel survey, household members were interviewed at four-month intervals over a three-year period for a total of nine interview waves.[6] The reference period for most items covered in the interview consists of the 4 months immediately before the month of the interview. The number of eligible households in wave 1 of the 1993 SIPP panel was 21,823. The final sample participating in wave 9, the wave of households that was to be asked questions in the Basic Needs Module, includes 17,572 households. Reductions in sample were due to non-interviews that result for other reasons. Non-interviews occurred for known eligible households, while others resulted when some or all members of a household left the original household and could not be traced or moved further than 100 miles from an existing SIPP PSU and could not be interviewed by phone. The final sample includes new households resulting from splits of the original households. The actual sample loss rate by wave 9 has been estimated to be about 26.5

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[6] A wave is defined as one round of interviews for a panel.

percent of the original eligible households (U.S. Census Bureau 1998), not the 19.5 percent based

on the sample participating in the survey by wave 9.

In addition to sample non-response, there is also non-response for the topical module and

specific item non-response. For households in wave 9, approximately half were assigned to the

MIQ sub-sample (50.4 percent) and half were assigned to the MSQ sub-sample (49.6 percent).

However, as seen in Table 1, not all households answered the minimum question assigned to

their half-sample. Six of the households did not answer either the minimum income or spending

question resulting in a reduced sample of 17,566.

Table 1. Sample Distribution by Assignment (total sample n=17,566a)

	Minimum Income Sample	Minimum Spending Sample
Half Sample	**8853**	**8713**
Observations with minimum values reported (extreme outliers omitted)	**6353**	**6311**
Observations for regression-intersection model	**6338**	**6295**

[a] Six households assigned to the Basic Needs Module did not answer the MIQ or MSQ.

Previous research reveals that individuals who leave the sample in later stages of SIPP

panels have a certain profile. Huggins and Winters (1995) reported that people who leave the

SIPP sample over time are more likely to be classified as poor than those who remained in the

sample for the entire panel period. Thus, the U.S. Census Bureau has concluded that, "sample

attrition may affect SIPP estimates of income and poverty, and estimates of benefits for some

means-tested assistance programs" (U.S. Census Bureau 1998, p.51). Tin (1996) reported that

estimates of food stamps and Supplementary Security Income (SSI) benefits are affected by

attrition, while benefit data for Aid to Families with Dependent Children (AFDC), General

Assistance, and Special Supplemental Nutrition Program for Women, Infants, and Children

(WIC) are not. The Census Bureau's Quality Report goes on to state, "Although weighting

adjustments are used in an attempt to compensate for attrition, it appears that they are not

entirely successful" (U.S. Census Bureau 1998, p.51). If the respondents in wave 9 of the 1993

SIPP panel represent fewer lower income households, as has been the case for earlier panels, the

implication is that the estimated thresholds will likely result in overestimates of true minimum

income and spending when the intersection method is used. Total sample attrition bias is not

addressed in the estimates presented here. The discussion section suggests possible biases that

result from this omission.

3.3 The Intersection Method and Corrections

The regression-based intersection method, upon which the computation of the thresholds

is based, is presented next. Procedures to account for potentially not considering all sources of

household income are applied (see Kapteyn et al. 1988; Homan 1988; De Vos and Garner 1991).

Sample selection due to item non-response to the MIQ and MSQ is addressed but not accounted

for in this study. In this sense, the complete model varies somewhat from the specification used

by De Vos and Garner (1991) in which a correction for sample selection was made.

Explanatory variables account for the fact that families with different characteristics

require different amounts of money to make ends meet. Even if a variable has a significant effect

it does not mean that the effect should be used as a differentiating factor for a poverty line;

however, such variables are included to obtain unbiased estimates of the differentiating effects.

The intersection method of producing subjective minimum thresholds was first

introduced by Goedhart and colleagues (1977). The threshold (Y^*) is calculated as the

intersection of the relationship:

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

with the line $Y_{\min} = Y$ for different values of z_n. We assume that the error term, ε, satisfies the

classical assumptions for simplicity. Y_{min} represents the answer to a question about the minimum

income that the respondent thinks is needed for the family to make ends meet, or some variation

of that question. Previous research indicates that a log-linear model fits data such as these fairly

well. An underlying assumption for the intersection approach to estimate a minimum income-

based threshold is that only those who have incomes that are 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:

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

As the error term, ε, is not observable, there are different possible choices to deal with

the term. One could produce the mean prediction and include a term to account for Jensen's

inequality or one could assume a median prediction as is done for this study.[7] Kapteyn et al.

(1988) used the median prediction equation (2) as did other researchers (Colasanto et al. 1984;

Danziger et al. 1984; De Vos and Garner 1991; Garner and De Vos 1995). The median is chosen

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[7] In email communication on April 1, 2002, Kapteyn said he and his co-authors never referred to the threshold as the median prediction although that is what was being produced. He agreed that if one prefers a prediction based on the mean, another specification would be necessary since the predicted value of the expectation is not equal to the expectation of the predicted value, based on Jensen's inequality (see Greene 1997, pp. 67, 119). When logs are used, the function is concave and the expectation of the function is less than or equal to the function of the expectation: $E[\log(y)] \leq \log(E[y])$. If an unbiased prediction of the subjective threshold were preferred, the expectation of the predicted threshold would be:

$E\{Y^* \mid z\} = \exp\left[\frac{a_0 + a_2 z_2 + \dots a_n z_n}{1 - a_1}\right] \exp\left[\frac{\sigma^2}{2(1 - a_1)}\right]$. Thanks are extended to Kapteyn for discussing the issues surrounding this

point and clarifying the specification.

as the measure of central tendency for the subjective threshold as it is more robust to outliers than the mean. This relationship is presented in Figure 1.

Figure 1. The Subjective Line Based on the Regression Intersection Approach
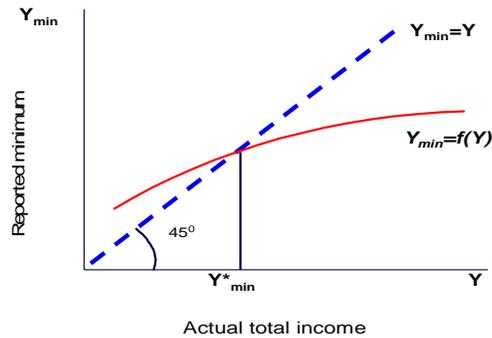
Although most minimum income data to date are for cross-sections, this approach was originally designed for use with panel data (Kapteyn et al. 1988). By using panel data, it would be possible to test whether people gravitate toward some true minimum over time. It is expected that respondents who are above the true minimum would find that over time they have a better idea of what their true minimum is and would respond accordingly. For those below the true minimum, over time they would realize that they are actually underestimating their true income needs. Alternative thresholds for different family types and for different regions of the country, for example, could be derived using the same intersection approach. An example of these is in Figure 2.

Figure 2. Subjective Thresholds for Different Family Types

$Y_{min}=Y$

Y_{min}

III

II

I

Reported minimum

I   One adult
II Two adults
III Two adults,
    one child

45^0

Y_1^* Y_2^* Y_3^* Y

Actual total income
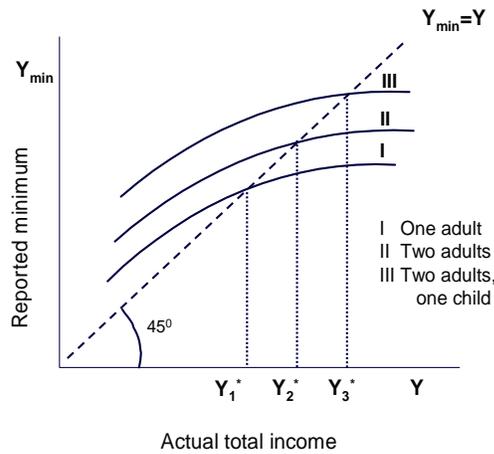
Another assumption underlying the approach is that every respondent gives the same meaning to the wording used in the MIQ. In other words, the expression "necessary…minimum," for example, is supposed to have the same welfare connotation for all respondents. Variations in responses would be expected when households have differing needs, for example a family of two adults would be expected to report a lower minimum income than a family of three adults. Differences in responses could also result when they face different prices, for example, if prices for necessary commodities were lower in the South than in the Northeast. Thresholds would increase when the average income of the entire population increases, just as with a relative measure. This is in contrast to the approach of estimating the threshold using simple average responses to the minimum income question (this is the approach that has been used by Saunders and Matheson 1992; Townsend and Gordon 1991; Townsend et al. 1996, 1997).

3.4 Specification of Model and Explanatory Variables

In many of the earliest models using the intersection approach, family size was the only differentiating variable, aside from income, included to determine variations in the thresholds. However the possible role of other household characteristics has been acknowledged and examined in later studies (e.g., Colasanto et al. 1984, Danziger et al. 1984, Hagenaars 1986, Kapteyn et al. 1988, Kapteyn et al. 1985, De Vos and Garner 1991, and Garner and De Vos 1995). Several variables expected to influence responses to the MIQ and MSQ are included. The variables could reflect true cost differences or may reflect perceived differences based on how the respondent sees his or her household's situation relative to others in his or her reference or comparison group. The socio-demographic variables selected for this study are the same as those used by De Vos and Garner (1991) for the Consumer Expenditure Survey MIQ analysis. This was done to facilitate comparison with these earlier findings. It should be noted that significance alone of a characteristic in the model should not be taken to imply that thresholds should be differentiated on the basis of the characteristic. However, inclusion of such variables is designed to obtain unbiased estimates of other differentiating effects.

Income is included in natural logarithmic form[8] and enters the model as before-tax money income. Rather than including household size as a continuous variable, household size is accounted for using several dummy variables represented by number of persons and number of earners. The advantage of this approach is that not all differences between households are forced into the logarithmic household size function as in earlier studies (e.g., Kapteyn et al. 1988). A disadvantage is that the effect of family size is not directly observed and several variables need to be considered together. Other household characteristics include the presence of other persons

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[8] The same approach could be applied if the model were linear in income. However, as we use the same approach and basically the same model as De Vos and Garner (1991), income is included in logarithmic form.

in the household in addition to the main breadwinner and spouse, the maximum age of others in the household, and region of residence. Reference person characteristics include working status, age, educational attainment, marital status, gender, and whether the person is not working due to disabled.

Perceived minimal needs can differ based on the actual and relative costs of goods and services in the area in which a household resides, and the availability of alternatives one might use to meet one's minimal needs. For example, if basic housing in the West were more expensive than basic housing in the Midwest, differences in reported minimums from region to region would be expected. Differences in urbanization can also influence the costs of meeting minimal needs. Urban dwellers may have more housing options than those living in rural[9] areas and greater variation in prices might result. Whether a household owns a home outright or has a mortgage can also influence the reported minimum economic needs. Renter versus owner status can be considered in future models using the SIPP, and whether the household has a mortgage.[10]

Dutch researchers (e.g., Kapteyn et al. 1988; Homan 1988) have reported that respondents only know approximately the level of their actual incomes. Thus, when answering the MIQ, respondents are likely to use *estimates* of their actual household incomes as frames of reference. They *anchor* their answers to an estimate of their actual income. For example, in answering the MIQ, a respondent could say, "I would minimally need about half of my current

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[9] While there is no official definition of "rural" in the SIPP, rural is defined here to be consistent with the definition for the CE as much as possible and is defined using the variable "mst_cbur" in the internal SIPP file. The codes for this variable are 1 for central city and 4 for rural. All other areas are groups together and are considered for this study to be suburban.

[10] The Basic Needs Module does not contain information concerning whether a household or family has a mortgage or not. However, this information is available in another SIPP module and can be used in future analysis.

income." These researchers have also surmised that respondents often neglect the incomes of some of the components of household income when answering the MIQ, for example the income of a child or income from welfare or benefit transfers. As noted in the methods section, a household's reported minimum income level is assumed to strongly depend on the level of the household's actual income. If respondents use an estimate of their actual income as a reference point for their minimum income, not accounting for all their income could bias downward their reported minimum incomes. Previous researchers (Homan 1988, Kapteyn et al. 1988) have proposed methods to deal with this concern. The basic tenet underlying these methods is that respondents underestimate their minimum incomes by the same percentage as they underestimate their actual incomes. To deal with this potential bias, minimum income is adjusted by a percentage that is the same as the percentage that an estimate of actual income, or *anchor* income (as referred to by Homan, 1988), is to actual income. The same approach was applied by De Vos and Garner (1991; Garner and De Vos 1995).

Anchor income enters the MIQ equation as the natural log of anchor income (lnY_{anc}). Anchor income is defined as the actual household income the respondent has in mind when answering an overall income question without reference to individual sources. The method proposed allows for a fraction of a household member's actual income to be counted in anchor income. Specifically when an income component, say for a child, represents a small proportion of total income, a weight less than one would be estimated for this income component in the anchor income estimation. Although member-level income data are available in the SIPP and are used to create total household income, the importance of individual member and non-specific member incomes is tested by including an estimate of anchor income in the MIQ regression model. (See the Appendix.)

For estimation of the MSQ model, we assumed a relationship between the dollar amount needed for minimum spending and actual income. However, anchor income is not included in this model as we had no *a priori* reason to believe that the respondent would consider an estimate of actual income as his or her reference point when answering the MSQ. However, if a respondent anchors minimum spending as a function of what is saved versus spent out of actual household income, anchor income might be a useful concept for this estimation as well. It is more likely that the anchor respondents consider when answering the MSQ is their actual spending. If this is the case, then an adjustment similar to the one for minimum income might prove useful.[11]

In earlier studies (e.g., Kapteyn et al. 1988; De Vos and Garner 1991; Garner and De Vos 1995), an additional term is included in minimum income models to account for potential sample selection bias arising from non-response to the MIQ.[12] However for this study, no term to account for sample selection is included in the estimation of the MIQ or MSQ models. The SIPP sample suffers from sample selectivity due to attrition as well as non-response to the questions under study. Any estimation method using a sample selection correction factor and data from wave 9 of the 1993 panel would not yield unbiased estimates for the total population. Thus, we chose not to correct for the partial sample selectivity due to MIQ and MSQ non-response at this time. All results presented are conditional on the fact that positive MIQ and MSQ responses were given. Caution is urged in interpreting the results, as the minimum income and spending

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[11] Various researchers examine responses to total spending questions and sub-aggregate category total spending question (e.g., Battistin et al. 2000; Browning et al. 2002; and Winter 2002). These studies reveal severe underreporting of household expenditures the more aggregated the spending. These results suggest that accounting for anchor total expenditures would be useful in future analyses of the MSQ if total expenditure and MSQ data are available from the same survey. This is not the case with the SIPP; total expenditure data are not collected. Whether other spending information that is available in the SIPP could be used in the estimation, can be examined in the future.

[12] Kapteyn et al. (1988) found sample selection to be important in their analyses of Dutch data, while De Vos and Garner (1991) did not in their analysis of minimum income from the CE data.

responses, actual incomes, and demographic characteristics may differ from those for the whole

population even after applying population weights.

4. Results

The MIQ and MSQ sample characteristics are first presented followed by the results of

the OLS regression models. The regression results are used to produce minimum thresholds,

equivalence scales (defined later) and the percentages of households below the thresholds (or

"poverty" rates). Population weighted thresholds and equivalence scales are based on

households who participated in wave 9 of the SIPP and who provided usable MIQ and MSQ

data. However, poverty rates are produced for the population represented by all households

participating in wave 9. Alternative thresholds, equivalence scales, and rates are presented for a

CE-based measure, a relative measure, and a version of the NAS Panel (Citro and Michal 1995)

threshold currently being used in experimental poverty measurement research (Short 2001).[13]

Alternative thresholds are described in the Thresholds Section (4.3). Implicit equivalence scales

from this study are compared to other subjective scales reported for the U.S. A comparison to

those reported for other countries could be made; however, economic systems and government

assistance in different countries often differ and thus likely influence answers to personal

subjective assessments regarding financial needs (See De Vos and Garner 1991). However, given

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[13] The NAS based experimental poverty measure assumes that the threshold and income or resources measure are defined consistently. We are not making that assumption in this study and use the threshold to compare it to before-tax money income without the adjustments recommended by the Panel. We follow a similar approach for the other thresholds in that we compare before tax money income to each set of estimated and alternative thresholds. Before-tax money income is compared to official poverty thresholds by the Census Bureau using data from the Current Population Survey data to produce official poverty statistics.

that the wording for the two SIPP questions are from the Canadian study of Morisette and Poulin (1991), limited comparisons to the Canadian findings are presented.

4.1 Sample Description

Descriptive statistics for the samples upon which the MIQ and MSQ regression models are based are presented in Table 2.[14],[15] The samples are similar with a few exceptions. Statistically significantly higher minimum incomes are reported at $29,313 as compared to minimum spending of $21,318. This is expected given the wording of the two questions. There are other statistically significant differences between the two samples, but the differences are not large. The MIQ sample is statistically more likely to include households represented by single not working individuals and singles greater than age 64, households with more than two people and no earners, and households living in the Western region of the U.S. The MSQ sample includes a statistically greater percentage of households with the oldest other person in the household being in the 6 to less than 12 years of age group. Other sample characteristics do not differ statistically for the two samples.

4.2 Regression

The OLS regression coefficients for the MIQ and MSQ models are presented in Table 3. Comparing results from the MIQ and MSQ models tells us about differences in the two questions. Both MIQ and MSQ models do a somewhat reasonable job of explaining the variation in responses, although the MIQ model is somewhat better. Adjusted R^2's are 0.325 and 0.235 respectively.

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[14] Weighted sample means are present in Appendix Table 2.

[15] Examination of 1995 CE data reveal that consumer units with reference persons who are greater than 64 are almost four times as likely to be owners as renters. Two-person consumer units are three times as likely to be owners versus renters (U.S. BUREAU OF LABOR STATISTICS 1997).

Table 2. Sample Means and Standard Deviations of Variables Included in Regressions of Ln(Y$_{min}$)

	SIPP MIQ (n=6338)		SIPP MSQ (n=6295)		
	Mean	**Standard Deviation**	**Mean**	**Standard Deviation**	**Difference in means**
Total Income (Y)	$43,980	$54,547	$45,794	$108,077	
Reported minimum (Y$_{min}$)	$29,313	$20,702	$21,318	$15,337	**
Ln (Y$_{min}$)	10.049	0.770	9.745	0.722	**
Ln (Y)	10.352	0.896	10.366	0.890	
Ln (Y$_{anc}$)	10.321	0.894	.	.	
Single, working	0.137	0.344	0.131	0.337	
Single, not working	0.116	0.320	0.107	0.309	*
1 parent, working	0.272	0.445	0.277	0.448	
1 parent, not working	0.037	0.189	0.041	0.199	
2 people, 2 earners	0.132	0.339	0.132	0.339	
2 people, 0 earner	0.083	0.275	0.086	0.280	
>2 people, >2 earners	0.049	0.217	0.051	0.220	
>2 people, 2 earners	0.048	0.215	0.050	0.218	
>2 people, 1 earner	0.034	0.181	0.033	0.178	
>2 people, 0 earner	0.013	0.112	0.009	0.096	*
2 others[a]	0.187	0.390	0.191	0.393	
3 others[a]	0.083	0.275	0.084	0.277	
4 or more others[a]	0.050	0.217	0.048	0.214	
Age of reference person	48.700	17.000	48.500	16.800	
Age^2 of reference person	2663.700	1816.600	2632.400	1790.900	
Single >= 65[b]	0.101	0.301	0.091	0.287	**
2 people >= 65[b]	0.114	0.318	0.115	0.319	
Oldest <6[c]	0.068	0.252	0.068	0.252	
Oldest 6<12[c]	0.088	0.284	0.098	0.298	*
Oldest >=18[c]	0.261	0.439	0.254	0.435	
Low education	0.075	0.264	0.071	0.257	
High education	0.508	0.500	0.507	0.500	
Black	0.094	0.292	0.091	0.287	
Work disability of reference person	0.047	0.212	0.048	0.213	
Female, married	0.086	0.281	0.089	0.284	
Female, widowed	0.099	0.298	0.092	0.289	
Female, divorced/separated	0.115	0.319	0.110	0.313	
Female, never married	0.073	0.260	0.070	0.256	
Northeast	0.196	0.397	0.196	0.397	
Midwest	0.255	0.436	0.256	0.438	
West	0.219	0.414	0.205	0.404	**
City	0.378	0.485	0.373	0.484	
Rural	0.240	0.427	0.244	0.430	

[a]Number of others in the household other than the head and spouse.
[b]Age of reference person in household.
[c]Maximum age of others in the household other than the head and spouse.
**Significantly different (p=0.05).
*Significantly different (p=0.10).
Source: 1993 Survey of Income and Program Participation, authors' calculations.

Table 3. Results of Regression (1) with No Correction for the Effect of Selective Non-Response

	SIPP MIQ (n=6338)		SIPP MSQ (n=6295)	
	Coefficient	Standard Error	Coefficient	Standard Error
Intercept	6.762**	0.142	7.005**	0.143
Log (Y)	-0.733**	0.012	0.205**	0.012
Log (Y_{anc})	1.000	0.000		
Single, working	-0.084**	0.040	-0.084**	0.040
Single, not working	-0.209**	0.061	-0.217**	0.060
1 parent, working	0.157**	0.043	0.136**	0.043
1 parent, not working	-0.041	0.059	0.090	0.057
2 persons, 2 earners	0.027	0.038	-0.006	0.038
2 persons, 0 earner	-0.007	0.045	-0.016	0.044
>2 persons, >2 earners	-0.028	0.054	-0.033	0.053
>2 persons, 2 earners	0.082	0.052	-0.002	0.051
>2 persons, 1 earner	0.041	0.057	0.034	0.056
>2 persons, 0 earner	-0.036	0.081	-0.068	0.091
2 others[a]	0.042	0.030	0.048*	0.029
3 others[a]	0.046	0.037	0.089**	0.037
4 or more others[a]	0.006	0.044	0.117**	0.045
Age of reference person[b]	0.231**	0.035	0.217**	0.035
Age^2 of reference person[b]	-0.237**	0.037	-0.174**	0.037
Single >= 65[c]	-0.068	0.062	-0.099*	0.061
2 persons >= 65[c]	-0.096**	0.046	-0.136**	0.045
Oldest <6[d]	-0.032	0.041	-0.011	0.041
Oldest 6<12[d]	-0.017	0.035	0.021	0.034
Oldest >=18[d]	-0.051*	0.027	-0.058**	0.027
Low education	-0.135**	0.033	-0.078**	0.033
High education	0.184**	0.018	0.141**	0.018
Black	0.032	0.029	-0.054*	0.029
Work disability of reference person	-0.119**	0.044	-0.042	0.044
Female, married	0.019	0.030	0.057*	0.030
Female, widowed	-0.097**	0.034	-0.123**	0.037
Female, divorced/separated	-0.135**	0.027	-0.165**	0.028
Female, never married	-0.166**	0.034	-0.095**	0.035
Northeast	0.170**	0.023	0.156**	0.023
Midwest	-0.031	0.021	-0.014	0.021
West	0.040*	0.023	0.042*	0.023
City	0.022	0.018	0.000	0.019
Rural	-0.079**	0.021	-0.101**	0.021
Adjusted R^2	0.325		0.235	

[a]Number of others in the household other than the head and spouse.
[b]The estimated Age coefficient and standard error have been divided by 10. The estimated Age^2 coefficient and standard error have been divided by 1000.
[c]Age of reference person in household
[d]Maximum age of others in the household other than the head and spouse
**Significantly different from 0 (p=0.05)
*Significantly different from 0 (p=0.10)
Source: 1993 Survey of Income and Program Participation, authors' calculations.

As expected, income is a significant variable when one responds to either question. For the MIQ model, the coefficient corrected for anchor income is 0.267. This is essentially the same as the income coefficient estimate when anchor income is not considered (results not shown). Thus, in the case of the SIPP, the anchor income correction added little to the explanatory power of the model. This is not surprising given that total household income was computed as the sum of member-level and non-member specific household income sources. Although not all of these income components received a weight of 1.0 in the anchor income estimation, the effect on minimum income was not significant. This is similar to the results of Kapteyn et al. (1988) when total income was based on member specific incomes as opposed to estimates of total household income.

When comparing the income coefficients it is clear that minimum spending varies less with total household income than does minimum income. This could indicate a consensus concerning the level of necessary income to meet one's basic needs for barely adequate food, shelter, clothing, and other essential items required for daily living as opposed to a family's general necessary expenses. In addition, the role of income may partially be taken over by other variables like the presence of others in the household in the MSQ model to a greater extent than in the MIQ model.

Household size/working variables for singles and lone parents, age of others in the household than the reference person and spouse, Northeast, West, (South is the omitted reference region) and rural are important household predictors in explaining variations in responses to the MIQ. Additional important variables include reference person age, age squared, education, disability as a reason for now working, and gender/marital status. Similar patterns are shown in the MSQ model with the addition of the presence of two, three, and four or more persons in the household, and Black. Simple t-tests (not shown) reveal that the coefficients for all but one of

the variables in the MIQ model are statistically significantly different from those in the MSQ model. The one that is not different is for single, working.

For the coefficients that are statistically significant in both models, the ones that have the greatest effect on minimum income as compared to minimum spending are: one parent working, age and age squared, low and high education, disabled reference person, female never married, and Northeast. Only in the MSQ model are the coefficients for others in the household and race statistically significant. Blacks report statistically significantly lower minimum spending needs than non-Blacks.

The variables accounting for age represent similar trends for the MIQ and MSQ samples. Minimum income and spending peak and then level off as age increases with minimum income decreasing faster than minimum spending with increases in age. Households composed of two people with an older reference person report income and spending needs that are lower than those of other households. This is not surprising since it is quite likely that these households own their own homes outright and have lower income and spending needs for housing per se.[16] When considering others in the household than the reference person and spouse, significantly lower spending amounts are likely for households in which the other person(s) is greater than 17 years of age. These individuals may be more independent, like college students living away from home, and require less support from the primary household.

The findings for education are consistent with those reported earlier by De Vos and Garner (1991). Households with reference persons who have less education report needing less for income and spending than those with higher education. As noted by the earlier authors, this

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[16] The published CE coefficients are corrected for sample selection. Thus, to compare conditional thresholds using the CE with the conditional thresholds produced using the SIPP MIQ, the inverse Mill's ratio and lambda coefficient were included in the estimation of the CE SIPP thresholds. . Thus, the CE SIPP thresholds are expected to differ from the earlier CE thresholds due to three reasons, other than price differences. (1) The CE selection factor is

effect is related to reference group effects. Higher educated reference person households may have assumed a higher standard of living than those with lower education. This is likely to be reflected in their responses for minimal income and spending requirements.

The role of gender and marital status is consistent across the MIQ and MSQ models. Households headed by women who are married report having greater spending needs than do male-headed households. In contrast all other female-headed households report needing less than male-headed households based on responses to the MIQ or MSQ.

Geographic variations in income needs are reflected in the coefficients for the region and urbanization variables. The signs of the relationships between the geographic variables and reported income minimums are the same for both models. Households living in the Northeastern and Western regions of the U.S. reported higher minimum income and spending than those in other areas. The comparison group is the South. These results are consistent with the finding that interarea prices for shelter faced by households living in the Northeast and West are higher than those faced by households living in the South and Midwest (see Kokoski et al. 1994*).

The reported minimum income and spending of households in rural areas are lower, holding all else constant, than those in more urbanized areas. Again this may reflect price and current expenditure differences, as well as differences in income. Housing often accounts for the largest expenditure for households and could easily result in different reported minimum monetary needs for people living in urban versus and rural areas. Households in urban areas spent an average of one-third of their total expenditures on housing in 1995, while those in rural areas spent less at a little over one-fourth of their total spending (U.S. Bureau of Labor Statistics, 1997). Households living in rural areas are four times as likely to be owners as

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included in the estimation of the thresholds so conditional thresholds result. (2) The SIPP population differs as reflected in the 1995 sample weights. (3) And general economic conditions differ.

opposed to renters, while those living in more urban areas are only 1.5 times as likely to be owners. In addition, homeowners living in rural areas are less likely to have a mortgage, leading to lower average out-of-pocket spending for housing (U.S. Bureau of Labor Statistics 1997). Other factors could include the fact that some households in rural areas can produce their own food, thus lowering what they might need for food spending, for example. Bartering, particularly for food, may also be more of an option for these households thereby reducing monetary income and spending needs.

The results from the MIQ model are fairly similar to those from the earlier U.S. study (De Vos and Garner 1991) although the fit of the earlier model was better than for the SIPP-based models. Morissette and Poulin (1991) also report a better overall fit of their model specification for the MIQ as opposed to the MSQ.

Next, estimated thresholds based on the MIQ and MSQ are presented along with implicit equivalence scales, and percentages of households below the estimated thresholds. These are compared to statistics based on the U.S. official poverty threshold, a relative threshold, and a threshold currently being used in experimental poverty measurement research at the BLS and Census Bureau, as noted earlier.

4.3 Thresholds

In this section, household-population weighted thresholds for 1995, based on the MIQ and MSQ models, are presented. In each case, the estimated thresholds use the positive income and spending reports of participants in wave 9 of the 1993 SIPP panel. To produce sample thresholds, the average sample characteristics are used along with the estimated coefficients. These sample thresholds are then weighted to produce conditional (based on positive minimum income or spending responses) thresholds for the population. In this regard, the resulting

thresholds are more comparable to those presented by the Morissette and Poulin (1991) for

Canada and Danziger et al. (1984) and Colasanto et al. 1984) for the U.S., than those presented

by De Vos and Garner (1991). The first three sets of researchers did not correct for possible

sample selection bias but the latter did. Once the correction was made by De Vos and Garner

(1991), the remaining coefficients were used in the estimation of the thresholds. In that study,

correcting for sample selection versus not resulted in little difference in the total population and

conditional thresholds as the coefficient on the correction factor was not statistically significant.

An alternative set of MIQ thresholds are produced using the coefficients from the

previously reported CE coefficients for the U.S. (De Vos and Garner 1991) but using the SIPP

MIQ sample and population weights. Using the earlier CE MIQ coefficients provides a way to

examine the effects of using basically the same methodology,[17] a different survey instrument and

sample, and an earlier time period. The CE thresholds are based on coefficients derived from an

estimation of the MIQ using data collected in 1982 but updated to 1995.[18] The thresholds are

referred to as CE MIQ SIPP. It is likely that the 1995 CE MIQ thresholds will differ from the

MIQ SIPP not only because respondents are conditioned differently in the CE and SIPP,[19] but

also because the economic situation differed during the two survey periods. Such a direct

comparison has not previously been conducted.

Other alternative thresholds include those used for official poverty measurement, a

relative poverty measure, and a NAS based measure. In the SIPP data file, official poverty

thresholds are assigned to all households. For this study, average official thresholds are presented

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[17] The predicted thresholds based on the 1982 CE coefficients and 1995 SIPP sample are price updated using the All Items Consumer Price Index-Urban for 1995 (Index value is 152.4 with 1982-84=100.0).
[18] CE respondents are conditioned to think more about expenditures while SIPP participants are conditioned to think more about income.
[19] These are referred to as OECD Social Indicators or OECE poverty threshold scales (see Atkinson et al. 1995 and Buhmann et al. 1988 with reference to Jenkins and O'Higgins 1987).

for the total sample population and for differing household types. These will differ from those

presented in tables of official poverty thresholds due to population weighting in the SIPP.

The relative household threshold computed and compared is based on one-half the

median of before-tax monetary income per adult equivalent. The scale used in early OECD

publications[20] is applied with weights of 1.0 for the first adult, 0.7 for each additional adult, and

0.5 for each child. This person-weighting is used for this study as it is the same as that used in

the De Vos and Garner (1991) study. More recently, the square root of family size has been used

often in OECD publications (See Atkinson et al. 1995). For this study, household relative

thresholds are obtained by multiplying the number of equivalent adults in each household by

median household adult equivalent income times 0.50.

The NAS-based threshold that we use was produced as part of a joint BLS-Census Bureau

experimental poverty measurement project. We refer to these thresholds as "NAS-3" since we

use a three-parameter equivalence scale to account for differences between adults and children

and single parents and others (see Johnson et al. 1997; Short et al. 1999; Short 2001). In contrast,

the NAS Panel recommended a two-parameter scale ((Citro and Michael 1995).

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[20] Income statistics are shown for the MIQ weighted sample only. They differ only slightly for the MSQ weighted sample.

Table 4. Weighted Means of Household Income and Alternative Thresholds by Household Size for Selected Sample: 1995

(SIPP Sample Household Population Weighted)

Household Size	Sample Size	SIPP MIQ Threshold	Confidence Interval[b]		Sample Size	SIPP MS(Threshold	Confide
1 person	1,604		$16,738	$15,987	$17,489	1,495	$11,503	$11,00
1 person, >= 65[a]		640	11,715	10,918	12,510	571	9,363	8,74
1 person, < 65[a]		964	19,634	18,550	20,717	924	12,629	11,95
2 people	2,013		22,103	21,213	22,994	2,027	14,458	13,82
2 people, >= 65[a]		597	16,969	15,820	18,118	598	13,070	12,22
2 people, < 65[a]		1,416	24,116	23,033	25,198	1,429	14,995	14,27
3 people	1,050		25,785	24,611	26,958	1,066	15,796	15,03
4 people	988		29,469	28,092	30,845	1,024	18,250	17,36
5 people	448		27,926	26,044	29,807	443	18,821	17,57
6 people or more	235		25,389	22,894	27,884	240	18,125	16,43
Total	6,338		$22,930			6,295	$14,989	

Household Size	Actual Before Tax Income	Official[d]	NAS-3	Relative[e]
1 person	$23,377	$7,595	$7,190	$8,438
1 person, >= 65[a]	16,686	7,340	7,190	$8,438
1 person, < 65[a]	27,235	7,741	7,190	$8,438
2 people	43,917	9,793	10,197	14,205
2 people, >= 65[a]	35,583	9,219	10,138	14,345
2 people, < 65[a]	47,184	10,018	10,220	14,151
3 people	49,922	11,837	14,354	19,076
4 people	55,621	15,223	16,282	23,465
5 people	57,815	17,925	18,544	28,243
6 people or more	51,893	22,121	22,736	37,083
Total	$42,530	$11,391	$12,055	$16,714

[a] Age of reference person

[b] 90 % confidence intervals.

[c] Based on SIPP MIQ sample characteristics, 1982 coefficients from the De Vos and Garner 1991 study with correction in prediction equation, and All Items CPI-U 1995 (Index value 152.4 with 982-84=100).

[d] Official poverty thresholds are for families but are used for households in this study.

[e] Based on one-half the median income per adult equivalent (adult equivalents based on 1.0 for first adult, 0.7 for each additional adult, and 0.5 for each child) in MIQ sample

Source: 1993 Survey of Income and Program Participation, authors' calculations.

According to the NAS Panel, the experimental threshold should represent a dollar amount for a basic set of commodities that includes food, clothing, shelter, and utilities, and a small additional amount to allow for other needs (e.g., household supplies, personal care, non-work-related transportation). To produce a set of thresholds for the population, a basic threshold is first developed for a reference family composed of two adults and two children. Data from the CE are used. Thresholds for different family types are derived from the base threshold using parameters that are to account for differences in economies of scale and the number of adults and children in the household.

In Tables 4 and 5, estimated MIQ and MSQ thresholds are shown along with the alternative thresholds specified to measure poverty in this study. The upper panels in each table include results for the MIQ and MSQ thresholds, while the lower panels include average actual before-tax money income for households and the alternative thresholds. Before-tax money income is used as it is the official income for poverty measurement in the U.S. Table 4 includes thresholds and incomes for households differentiated by household size and if the reference person is greater than 64 years of age or not. All households are represented in Table 4. Table 5 presents thresholds for selected household composition types. The household composition groupings in Table 5 represent 88 percent of the weighted sample.[21]

As seen in Table 4, the 1995 MIQ thresholds for households, both the SIPP MIQ and CE SIPP, are on average relatively high compared to the alternative thresholds that have been used for poverty measurement in the U.S. (those in the lower panel). The average MIQ thresholds are

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[21] Income statistics are shown for the MIQ weighted sample only. They differ only slightly for the MSQ weighted

Table 5. Weighted Means of Household Income and Alternative Thresholds by Household Composition for Selected Sample: 1995
    (SIPP Sample Household Population Weighted)

Household Type	Sample Size	SIPP MIQ Threshold	Confidence Interval[b]		Sample Size	SIPP MSQ Threshold	Confidence Interval[b]		CEMIQ SIPP[c]
One adult, no children, head>=65[a]	640	$11,715	*$10,918*	*$12,510*	571	$9,363	*$8,741*	*$9,984*	$12,221
One adult, no children, head <65[a]	964	19,634	*18,551*	*20,717*	924	12,629	*11,953*	*13,306*	17,527
Two adults, no children, head>=65[a]	597	16,969	*15,820*	*18,119*	597	13,069	*12,226*	*13,913*	20,586
Two adults, no children head<65[a]	1,262	24,048	*22,851*	*25,245*	1,295	15,017	*14,236*	*15,799*	23,244
Three adults, no children	451	23,082	*21,512*	*24,651*	447	14,374	*13,381*	*15,367*	27,835
One adult, one child	154	24,633	*22,778*	*26,489*	135	14,790	*13,712*	*15,867*	21,666
One adult, two children	118	24,997	*23,202*	*26,791*	134	15,410	*14,402*	*16,417*	23,415
Two adults, one child	481	28,583	*26,965*	*30,202*	485	17,283	*16,278*	*18,287*	24,304
Two adults, two children	630	31,511	*29,822*	*33,200*	661	19,217	*18,196*	*20,239*	26,826
Two adults, three children	260	30,407	*28,079*	*32,735*	265	19,710	*18,278*	*21,143*	28,220
Total	5,557				5,514				

Household Type	Actual Before Tax Income	Poverty Thresholds Official[d]	NAS-3	Relative[e]
One adult, no children, head>=65[a]	$16,686	$7,340	$7,190	$8,438
One adult, no children, head <65[a]	27,235	7,741	7,190	8,438
Two adults, no children, head>=65[a]	35,583	9,219	10,138	14,345
Two adults, no children head<65[a]	50,280	10,001	10,138	14,345
Three adults, no children	59,687	11,789	15,514	20,252
One adult, one child	23,459	10,150	10,850	12,658
One adult, two children	20,763	11,466	12,881	16,877
Two adults, one child	48,693	11,985	13,655	18,565
Two adults, two children	55,766	15,101	15,514	22,784
Two adults, three children	61,336	17,692	17,282	27,003

[a] Age of reference person
[b] 90 % confidence intervals
[c] Based on SIPP MIQ sample characteristics, 1982 coefficients from the De Vos and Garner 1991 study with correction in prediction equation, and All Items CPI-U for 1995 (Index value 152.4 with 1982-84=100).
[d] Official poverty thresholds are for families but are used for households in this study.
[e] Based on one-half the median income per adult equivalent (adult equivalents based on 1.0 for first adult, 0.7 for each additional adult, and 0.5 for each child) in MIQ sample
Source: 1993 Survey of Income and Program Participation, authors' calculations.

approximately twice as large as the average household threshold based on the current official measure. The SIPP MIQ threshold is 137 percent of the relative threshold and the CE SIPP threshold is 135 percent of the relative. In contrast, the MSQ threshold is 90 percent of the average total relative threshold, but it is 132 times as large as the average official poverty line for the U.S. The average NAS-3 threshold is only slightly higher than the average official threshold so the relationship to the MIQ and MSQ thresholds is similar to that reported for the official threshold.

The average total MIQ threshold, $22,930, is about 54 percent of average household income in 1995. The average MSQ threshold is $14,989, that is 35 percent of household income.

The MIQ thresholds increase as household size increases from one to four people, while the MSQ thresholds increase as household size increases from one to five. The decrease in threshold levels for larger households is likely due to the relatively smaller number of households upon whom these thresholds are based. A similar pattern was reported by Garner and DeVos (1995) using the 1982 CE data. The difference in the maximum threshold level for the MIQ relative to the MSQ thresholds is perhaps related to the specificity of the MSQ question.

The relationship between the MIQ threshold and the official threshold is similar to the comparison between the "Get-Along" threshold and the official threshold for a family of four (husband, wife and two children). [22] Vaughan (1993) reported that the 1989 "Get-Along" threshold for this family is about 173 percent of the official poverty threshold for a family of four. Citro and Michael (1995, p. 139, Table 2-4) reported that the 1992 "Get-Along" threshold is about 176 percent of the official threshold. For this study, the MIQ SIPP two adults with two

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[22] The Gallup Poll asked samples of adults the following question for most years between 1946 and 1989: "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?" For most years, weekly amounts were annualized on the basis of a 52-week year. Then thresholds were produced. The NAS Panel requested that Gallup ask the "Get-Along" question in their August 1992 poll.

children threshold is 209 percent of the official poverty threshold (Table 5). In contrast, the MSQ

based threshold is only 127 percent of the official threshold.

   To compare the relative magnitudes of average MSQ thresholds to MIQ thresholds, ratios

are computed. These are presented in Table 6. As evidenced from the previous tables, MIQ

thresholds are consistently higher than those based on the MSQ. For one-person households, the

MSQ threshold is approximately 69% of the MIQ threshold. The ratio is lowest for households

composed of three people (61.3 %) and highest for six-person households (71.9%). Morisette and

Poulin (1991) report ratios of the MIQ to MSQ thresholds that range from a low of 58 % for a

one-person family to 64.5 % for a family with six members. In contrast to the SIPP ratios

thresholds, the MIQ to MSQ ratios for Canadian families consistently increase as household

(family) size increases.

Table 6. Ratios of MSQ to MIQ Thresholds: Canada and U.S.

Household Size[b]	Canada[c] 1988 SCF	U.S.[c] 1995 SIPP
1 person	0.583	0.687
2 persons	0.606	0.654
3 persons	0.620	0.613
4 persons	0.631	0.619
5 persons	0.639	0.674
6 persons	0.645	0.719

[a] Threshold based on the intersection method. Final thresholds produced for population of reporters.
[b] Thresholds for families were produced for Canada while those for households were produced for the U.S.
[c] Source: Canadian Survey of Consumer Finances, Morisette and Poulin 1991.
[d] Source: 1993 Survey of Income and Program Participation, and authors' own calculations.

   After comparing the MIQ and MSQ thresholds to those found in earlier work, we

conclude that question wording matters as well as does context. Requesting information about

income before -vs. after-tax can have an effect on the estimates and question specificity. It is not

surprising that asking about spending for barely adequate commodities would result in lower thresholds than when less restrictive question wording, like for minimum income, is asked. Rather than the MSQ being considered as providing just a different question wording for the MIQ, minimum spending and minimum income are likely to be different concepts as are actual income and total expenditures. Both are related, but the underlying concepts differ. With regard to context, when questions appear in an income survey, like the SIPP, or an expenditure survey, like the CE, responses are likely to be conditioned regarding the focus of the survey instrument.

4.4 Equivalence Scales

Comparing the implicit equivalence scales from the MIQ and MSQ thresholds with others allows us to evaluate the set with regard to how households of varying sizes and compositions account for their needs. Equivalence scales are generally presented as currency amounts, or ratios of amounts, needed by families or households of different size and/or structure.[23] In the MIQ case, income amounts for different family or household types are used and in the MSQ case, spending amounts are used.

To understand how equivalence scales are interpreted, an example based on the scale used to produce the relative thresholds presented in Table 4 is considered. For example, a one-person household would need one unit of income or spending to maintain a given level of living compared to a two-person family composed of two adults who would need 1.7 times as much as a single adult, and a three-person family with two adults and one child who would need 2.2 times as much as a single adult. All equivalence scales for this study are computed relative to the thresholds for one-person households.

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[23] Currency units are usually used for developed countries. However, for developing countries, quantity units could serve as the basis of the scale.

Table 7 presents the equivalence scales implicit in the thresholds using data from the 1995 SIPP and compares them to earlier studies (Colasanto et al. 1984; Danziger et al. 1984; Garner and De Vos 1995) using the intersection approach and U.S. Also presented are the scales implicit in the CE MIQ SIPP thresholds, official poverty thresholds, NAS-3 thresholds, and relative thresholds. Scales are presented for one person through six people except for those strictly based on the CE, where the top group includes six or more people. The top group for the CE MIQ SIPP scale is composed of only six people. For several of the scales, results are presented by age of the reference person, less than age 65 years or greater than or equal to 65 years, when the household is composed of one or two people.

Table 7. Average Equivalence Scales by Household Size Compared to Earlier U.S. Studies Using MIQ Thresholds

	This Study: Selected Sample			Earlier Studies Using MIQ				Additional This Study		
	SIPP MIQ	SIPP MSQ	CE MIQ SIPP[b]	1982 CE MIQ[c]	1982 CE MIQ with Expense[c]	1979 MIQ ISDP[d]	1981 MIQ BNS[e]	Official	NAS-3	Relative[f]
1 person	1.00	1.00	1.00	1.00	1.00	.	1.00	1.00	1.00	1.00
1 person, >= 65[a]	0.70	0.81	0.78	0.86	0.76	0.65		0.97	1.00	1.00
1 person, < 65[a]	1.17	1.10	1.12	1.06	1.10	1.00		1.02	1.00	1.00
2 people	1.32	1.26	1.43	1.44	1.31	.	1.35	1.29	1.42	1.68
2 people, >= 65[a]	1.01	1.14	1.32	1.37	1.25	0.80		1.21	1.41	1.70
2 people, < 65[a]	1.44	1.30	1.48	1.47	1.34	1.25		1.32	1.42	1.68
3 people	1.54	1.37	1.65	1.73	1.91	1.40	1.61	1.56	2.00	2.26
4 people	1.76	1.59	1.78	1.96	1.89	1.54	1.82	2.00	2.26	2.78
5 people	1.67	1.64	1.83	2.12	1.95	1.65	2.01	2.36	2.58	3.35
6 people	1.52	1.59	1.71	1.95	1.89	1.75	2.19	2.68	2.94	3.97
Approximate scale elasticity based on house-hold size 1 to 6	0.28	0.28	0.32	0.41	0.39	0.31	0.44	0.56	0.61	0.76

[a] Age of reference person in household

[b] Based on SIPP MIQ sample characteristics, 1982 coefficients from the De Vos and Garner 1991 study with correction in prediction equation, and All Items CPI-U for 1995 (Index value 152.4 with 1982-84=100).

[c] Garner and De Vos 1995 and unpublished results using sample selection correction; 'six persons' refer to households of six or more people.

[d] Scales based on one person being male, households with two people with husband and wife, and households with more than three people including a husband and wife with children. Danziger et al. 1984.

[e] Colansanto et al. 1984.

[f] Based on one-half the median income per adult equivalent (adult equivalents based on 1.0 for first adult, 0.7 for each additional adult, and 0.5 for each child) in MIQ sample.

Source: 1993 Survey of Income and Program Participation, authors' calculations.

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The approximate scale elasticity is calculated using the procedure described in Buhmann et al. (1988) and Atkinson et al. (1995) where the logarithm of the scale is a function of a constant and the logarithm of family size. Only household sizes of one to six people are included. Atkinson et al. (1995) have noted that this approximation summarizes well the relation between need and size, although alternative scales with the same elasticity may generate different results. Earlier researchers (e.g., Buhmann et al. 1988; Atkinson et al. 1995) have reported that equivalence scales based on subjective measures tend to reflect greater economies of scale than expert-based measures (e.g., OECD Social Indicators, U.S. Official Poverty Measure, NAS-3), and behavioral models. However, scales based on behavioral models are in the range of those based on subjective measures. Behavioral scales are derived from studies that aim to measure utility or welfare indirectly through revealed preferences of consumer spending constrained by some measure of income.

Looking at household sizes of one to six people, the scale elasticity for the SIPP MIQ and MSQ measures in Table 7 are both 0.28.[24] When the CE MIQ coefficients are applied to the SIPP MIQ sample, the elasticity is slightly higher (0.32) reflecting smaller economies of scale than the two SIPP measures. The CE measures produce even greater elasticities (0.41 and 0.39). The scale elasticity based on the 1979 ISDP data (Danziger et al 1984) is the same as for the SIPP MSQ threshold (0.31). In contrast, the 1981 Wisconsin BNS-based thresholds (Colasanto et al. 1984) result in scale economies (0.44) more similar to those based on behavioral studies using multivariate analysis of household expenditures with data from the U.S. CE Survey. Reported elasticities from these studies range from 0.40 to 0.48 (see Merz et al. 1993; Phipps and Garner 1994; Johnson and Garner 1994/95). However, scale elasticities as low as 0.23 have been

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[24] If the elasticity is based on households composed of one to five people, the elasticities differ and reflect fewer economics of scale: 0.35 and .31 for MIQ and MSQ respectively.

reported for the U.S. using econometric modeling (see Nelson 1993), as high as 0.66 for price-dependent scales (Johnson and Garner 1994/95), and even higher for other scales (e.g., Jorgensen and Slesnick 1987, Johnson 1998).

Expert-based scales tend to reflect smaller economies of scale and thus greater scale elasticities. For example, the experimental NAS-3 scale has an equivalence scale elasticity of approximately 0.61. The official poverty thresholds reflect similar economies of scale (elasticity=0.56). The OECD Social Indicator-based scale results in a relatively large elasticity indicating the least economies of scale among those examined in this study (0.76).

Equivalence scales for selected household types are presented in Table 8. As found for the different household sizes, the MIQ and MSQ thresholds result in equivalence scales that are rather flat compared to the expert scales. For example, the additional income or spending needed for one more child or person is less for the subjective measures than for the other scales presented in Table 8.

Table 8. Average Equivalence Scales by Household Composition: 1995

Household Type	SIPP MIQ	CE MIQ SIPP MSQ	SIPP[b]	Official	NAS-3	Relative[c]
One adult, no children, head>=65[a]	0.60	0.74	0.70	0.95	1.00	1.00
One adult, no children, head <65[a]	1.00	1.00	1.00	1.00	1.00	1.00
Two adults, no children, head>=65[a]	0.86	1.03	1.17	1.19	1.41	1.70
Two adults, no children head<65[a]	1.22	1.19	1.33	1.29	1.41	1.70
Three adults, no children	1.18	1.14	1.59	1.52	2.16	2.40
One adult, one child	1.25	1.17	1.24	1.31	1.51	1.50
One adult, two children	1.27	1.22	1.34	1.48	1.79	2.00
Two adults, one child	1.46	1.37	1.39	1.55	1.90	2.20
Two adults, two children	1.60	1.52	1.53	1.95	2.16	2.70
Two adults, three children	1.55	1.56	1.61	2.29	2.40	3.20

[a]Age of reference person
[b]Based on SIPP MIQ sample characteristics, 1982 coefficients from the De Vos and Garner 1991 study with correction in prediction equation.
and All Items CPI-U for 1995 (Index value 152.4 with 1982-84=100).
[c]Based on one-half the median income per adult equivalent (adult equivalents based on 1.0 for first adult, 0.7 for each additional adult, and 0.5 for each child) in MIQ sample.
Source: 1993 Survey of Income and Program Participation, authors' calculations.

Expert scales are likely more appropriate for situations in which commodities with few economies of scale, for example, food, account for a relatively larger share of total spending. Such scales are also more appropriate in situations in which intra-household allocations do not reflect the preferences of policy makers.[25] Expert scales are less likely to assume that a household makes substitutions across commodities. For example, underlying the U.S. official poverty thresholds is the assumption that families spend about one-third of their incomes on food. In contrast, behavioral and subjective scales reflect households' substituting across commodities explicitly or in their responses to their personal assessments of how to best meet the needs of their families. For example, the respondent to the MSQ could determine that his or her household could get by spending less on food and clothing in order to spend more on housing. The respondent would accomplish this for his or her household by eating at home more or sharing clothing among children. Alternatively, less expensive alternatives for some commodities available to individual families free up resources that could be spent on other commodities.

The question, "Which type of scale is more appropriate?" remains to be answered.[26] It may depend on the overall level of well-being in a given society or the location of the threshold along the income distribution. When one's focus is on the least well-off in society, the expert scale might be more useful. When one's focus is the entire distribution, household survey based scales, behavioral and subjective, might be more appropriate.

Regardless of choice of equivalence scale, results from analyses of household survey data through the use of behavioral and subjective models suggest that perhaps it is time to re-examine

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[25] See Lind (2001) for a discussion of differences in the assumptions of social planners versus households in the derivation of equivalence scales.

[26] See Bradbury (1989) for a discussion of the use of subjective measures in the production of equivalence scales and potential biases for scales used for public policy.

the underlying assumptions of the OECD and similar expert scales.[27] Apart from providing for commodities with smaller economies of scale, expert scales can overcompensate for the cost of commodities such as shelter and utilities for households and families in highly developed countries.

4.5 Percentages of Households with Incomes Below Various Thresholds

Tables 9 and 10 include percentages of the household population with actual before-tax incomes below various thresholds. The rates for the three SIPP minimum thresholds are presented and compared to those based on the official poverty thresholds, the NAS 3-parameter thresholds, and relative threshold. Table 9 includes the rates by different household sizes while Table 10 presents rates for households with and without children. The percentages of households with incomes below a given threshold are highest, on average, when based on the MIQ, either the SIPP MIQ or CE MIQ SIPP-. Of all households, 27.9 percent have total household incomes below the CE MIQ SIPP thresholds followed by the SIPP MIQ, 27.8 percent. The next highest percentage is for the relative poverty threshold (17.6 percent), followed by the SIPP MSQ threshold (15.0 percent), and the NAS 3-parameter threshold (10.0 percent). The measure using official poverty thresholds results in rates that are the lowest (9.8% overall).[28]

For all household size groups but two, the rates based on the official poverty line and those based on the NAS 3-parameter thresholds are lower than for the other definitions of well-being. The exceptions are for households composed of five and six people. For five people, the lowest rates result when the SIPP MSQ thresholds are used with 9.2 percent of households having before-tax money income below the corresponding household-size threshold. For these

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[27] See Van den Bosch et al (1993) for more on this issue.
[28] The official poverty rate, based on the Current Population Survey, for 1995 was 13.8 percent.

Table 9. Percentage of Households with Income Below Various Thresholds by Household Size: 1995 *(SIPP Sample Household Population Weighted)*

Household Size	SIPP MIQ	SIPP MSQ	CE MIQ SIPP[b]	Official	NAS-3	Relative[c]
1 person	40.0	25.1	38.9	14.6	13.4	18.4
1 person, >= 65[a]	38.3	30.3	44.3	16.1	14.7	23.5
1 person, < 65[a]	41.0	22.4	35.8	13.8	12.7	15.5
2 people	21.5	11.0	24.8	6.3	6.8	12.4
2 people, >= 65[a]	18.1	9.9	29.2	4.9	6.7	14.4
2 people, < 65[a]	22.8	11.5	23.0	6.8	6.8	11.6
3 people	26.2	13.4	24.2	6.2	8.7	15.9
4 people	23.8	11.6	21.0	8.4	9.0	18.8
5 people	23.4	9.2	25.1	12.4	11.4	26.6
6 people or more	24.5	14.6	27.1	22.2	20.7	41.0
Total	27.8	15.0	27.9	9.8	10.0	17.6

[a]Age of reference person
[b]Based on SIPP MIQ sample characteristics, 1982 coefficients from the De Vos and Garner 1991 study with correction in prediction equation, and All Items CPI-U for 1995 (Index value 152.4 with 1982-84=100).
[c]Based on one-half the median income per adult equivalent (adult equivalents based on 1.0 for first adult, 0.7 for each additional adult, and 0.5 for each child) in MIQ sample
Source: 1993 Survey of Income and Program Participation, authors' calculations.

same measures, rates are also the lowest for households composed of six people (14.6 of all households are in this group).

The rates in Table 10 distinguish between households with and without children specifically, and distinguish smaller households according to the age of the reference person. When elderly and non-elderly one- and two-person households are compared by age, the elderly are worse off than the non-elderly when rates are based on the official measure of poverty, the NAS-3 and relative thresholds. The pattern is not consistent when the three subjective measures are used. The SIPP MIQ and CE MIQ SIPP result in relatively higher poverty rates for non-elderly singles than for elderly singles. Rates for non-elderly singles range from 41 percent to

Table 10. Percentage of Households with Income Below Various Thresholds by Household Composition: 1995 (*SIPP Sample Household Population Weighted*)

Household Type	SIPP MIQ	SIPP MSQ	CE MIQ SIPP[b]	Official	NAS-3	Relative[c]
One adult, no children, head>=65	38.3	30.3	35.8	16.1	14.7	23.5
One adult, no children, head <65	41.0	22.4	44.3	13.8	12.7	15.5
Two adults, no children, head>=65	18.1	9.9	18.1	4.9	6.7	14.4
Two adults, no children head<65	17.3	8.0	29.2	4.5	4.2	8.4
Three adults, no children	12.9	5.5	16.3	3.1	5.3	10.9
One adult, one child	65.4	41.6	60.8	23.9	26.2	36.3
One adult, two children	75.3	48.5	70.4	25.0	31.3	47.0
Two adults, one child	25.3	9.4	18.9	3.8	5.7	12.0
Two adults, two children	24.7	10.5	18.3	6.1	6.8	16.1
Two adults, three children	24.1	7.6	22.4	9.0	5.8	22.9

[a]Age of reference person
[b]Based on SIPP MIQ sample characteristics, 1982 coefficients from the De Vos and Garner 1991 study with correction in prediction equation,. and All Items CPI-U for 1995 (Index value 152.4 with 1982-84=100).
[c]Based on one-half the median income per adult equivalent (adult equivalents based on 1.0 for first adult, 0.7 for each additional adult, and 0.5 for each child) in MIQ sample
Source: 1993 Survey of Income and Program Participation, authors' calculations.

44.3 percent. Twenty-nine percent of non-elderly couples without children are below the CE MIQ SIPP threshold.

When considering the relative economic position of households with children, Table 10 shows that MIQ thresholds yield the highest rates of those produced. The highest rates are for single-parent households. Single parents with one or two children are the least well-off, regardless of the measure. The greatest need results when the SIPP MIQ and CE MIQ SIPP measures are used. Up to 75 percent of all single-parent families with two children did not have enough income to meet minimum needs as measures by the MIQ-income intersection approach. When the SIPP MSQ is used, 48.5 percent did not have enough income to meet the minimum spending needs estimated by the MSQ-income intersection for the population. The household is also the worse off when the expert-based thresholds are compared to household income. For

example, about 25 percent of these households are below the official poverty line. A striking result from this table is that households with children are substantially worse off when the MIQ measures are used compared to other measures. Households most well-off, as distinguished by low rates, include those composed of three adults and no children. This result applies to all measures except the NAS-3.

In reviewing the percentages of households below the thresholds produced for this study, several issues with regard to the MIQ and MSQ arise. The MIQ is designed to relate the current income needs of a household to its current income. The question asked is about income to make ends meet. It could be that making ends meet is assuming one's current level of living and income. Although originally designed to allow household respondents to adjust their minimum incomes over time, most often the question is not answered again and the resulting threshold is based on a single point in time when the respondent answered. Consequently, the minimum income-based thresholds have been referred to as 'income sufficiency' thresholds (e.g., Garner and De Vos 1995). In contrast, the MSQ requests that household respondents think of a minimum spending amount for basic necessities and then defines those. Thus, it could be that respondents have some *basic level or standard of need* in mind when answering the MSQ rather than the MIQ.

With regard to the MIQ in the CE and SIPP, results presented in this study reveal that the MIQ thresholds are not only consistent but also similar for the SIPP population. This suggests that respondents using different survey instruments (i.e., an expenditure survey or an income survey) during different time periods interpret the question similarly. We conclude that the MIQ is less sensitive to context than we expected *a priori*.

5.0 Discussion and Conclusions

This research supports previous research in finding that asking respondents about their minimum income and spending needs results in significantly higher thresholds than those based on expert-based approaches. The minimum income- and spending- based thresholds produced in this study are higher than the U.S. official poverty thresholds and an NAS-based measure except in one instance. Further, equivalence scales calculated from personal assessment-based measures like the MIQ and MSQ result in greater economies of scale than the NAS-based scales, OECD scales, and those implicit in the official poverty measure. However, they are similar to scales derived from behavioral models of household expenditure survey data. This finding suggests that respondents may be better able to make tradeoffs to meet their needs, as reflected in their perceptions as well as actual expenditure behavior, than is expected or desired by experts or social policy makers. Another reason for the flatter equivalence scales derived from personal assessment and behavioral models is that respondents consider children to be consumption goods. Thus, the addition of a child or children does not add that much more to the needs of the household. The household instead spends more on the children and less on other previously purchased commodities.[29] No attempt is made to suggest which approach or measure is better. Each has a place in policy and economic analysis.

Another conclusion of this study is that question wording matters for personal assessment questions. The minimum income question results in higher thresholds than the minimum spending question. This is consistent with the findings of others (e.g., Morisette and Poulin 1991) that have asked differently worded questions of similar samples of households. The minimum income questions asked in the SIPP and CE allow respondents to define what the phrase '*to make ends meet*' means. It is likely that a larger bundle of commodities is the reference for

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[29] This explanation has been suggested by various researchers (e.g., Vaughan 2002).

respondents, as opposed to the specific list provided in the minimum spending question. Thus, higher thresholds would be expected with the MIQ.

Context (i.e., the type of survey in which the questions are asked) appears to play less of a role than we thought originally. It was hypothesized that a minimum income-based threshold using data collected in the U.S. Consumer Expenditure Survey (CE) would result in thresholds that were closer in value to the MSQ-based thresholds. Since respondents to the CE had been asked detailed expenditure questions up to four times over 12 months, they would be more focused on spending, both actual spent and adjustments that would be possible to reach a minimum. However, the resulting estimated CE-based thresholds, equivalence scales, and "poverty" rates are closer to the SIPP MIQ thresholds than they are to the MSQ thresholds. The conclusion is that consistent and similar minimum income questions result in consistent results over time.[30]

An examination of the CE MIQ thresholds (from Garner and De Vos 1995) yields an alternative interpretation of the effect of survey context and prior questions in the survey instrument. CE respondents were asked detailed expenditure questions several times, as noted previously, prior to being asked the MIQ. SIPP respondents were asked detailed income questions up to eight times in the survey and details about certain expenditures in prior modules. Also, in the SIPP, prior to being asked the MIQ and MSQ, respondents were asked about their ability to meet specific expenses. We suggest that the greater the detail asked concerning actual expenditures and the less specific the MIQ question wording, the higher the amount reported. This explanation is consistent with the work of researchers examining the relationship between

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[30] Citro and Michael (1995) stated the following in their review and evaluation of subjective-based poverty thresholds and questions upon which these thresholds are based. "If such responses were available over time on a consistent basis, however, they could provide useful information with which to evaluate the official methodology for updating the thresholds" (p. 136-137.

asking about total expenditures using one question versus asking about detailed expenditures with multiple questions (e.g., Winter 2002). The greater the detail asked, the higher the expenditure reported. The same relationship has been observed for income. More detailed data collected in the SIPP has consistently resulted in higher values than less detail using the Current Population Survey (e.g., Coder and Scoon-Rogers 1996).

Cognitive work suggests that improvements in question wording are possible. In concluding the cognitive work for the SIPP minimum income and spending questions, Stinson (1997a) suggests that perhaps the questions as worded place too great a cognitive burden on the respondent. She recommended questions asking the respondent what he or she considers a basic need and then asking further questions about each of these. One person's necessity could be another's luxury. For example, do the aged who lived through the Great Depression and World War II have a need for fewer necessities and are they better able to meet their basic needs than younger generations? Cognitively, with regard to the spending question, each commodity group could be asked about in turn, for example, one would ask, *"In your opinion, how much would you have to SPEND each year in order to provide barely adequate food for your family?"* This would be followed by questions for shelter, clothing, and other necessities. In the end, the analyst would add the parts together.

While the results presented in this study shed light on the issues raised above, additional modeling work would be fruitful. The model used in this paper was selected to maintain consistency with the earlier work of De Vos and Garner (1991), but possible improvements are clear. Some could only be made with additional questions being asked, while others can be made with the data that are currently available in the SIPP. For example, if data were available on total expenditures in the SIPP, a different MSQ model than the one used for this study could better

explain the variation in responses. Rather than intersecting actual income with income for minimum spending, intersecting actual total spending might be more appropriate. The resulting new MSQ thresholds would reflect spending on some basic bundle of commodities rather than on income needs per se.

Other model improvements would take account of the rich detail of information available in the SIPP that was not available to earlier researchers. For example, data were collected in the SIPP Basic Needs Module in 1995 to reflect a household's ability to meet expenses for specific commodities. These data could be used as explanatory variables in both the MIQ and MSQ equations. Other questions refer to a household's ability to meet expenses and whether the household has been evicted from the home or apartment for not paying rent or mortgage. Questions that are most related to basic needs, as defined in the minimum spending question, would be most useful for the MSQ model. Fixed expenditures have been reported to be important in models of minimum income (e.g., De Vos and Garner 1991), as well as particular expenditures (Garner and De Vos 1995). In addition, Dutch analysis reveals that households who have recently suffered a considerable decrease in their incomes report significantly higher minimum incomes than do household with stable incomes (De Vos and Garner 1991). Panel data from the SIPP would be ideal in modeling this situation.

Although marital status of female-headed households is included in the model, information about the length of time since widowhood or divorce/separation began might help explain the negative coefficient on these variables. The longer the time period, the more likely the household is able to adjust spending to meet their needs.

To better understand the life circumstances of the aged (those age 65 years or older), additional information would be useful. For example, a health status variable that reflects more

than work disability could add explanatory power to the model. The SIPP includes general health status questions as well as those specifically focusing on activities of daily living. Such variables could inform the discussion concerning the additional demands of poorer health on minimum economic needs.

Differences between the aged and non-aged might also be better explained by including variables that indicate whether household own their homes and their monthly out-of-pocket expenses, for example, for mortgages, property taxes, house insurance, and basic maintenance and repairs.

Other refinements to this work involve taking account of sample attrition and selectivity issues in the SIPP. Preliminary attempts to correct for sample selection, not reported here, were not sufficient to explain observed patterns. It is important to deal with these issues as differential sample attrition from the SIPP has been documented. People leaving the sample have been shown to be more likely to rent rather than own their homes, live in large metropolitan areas, have very low income and few assets, be Black or Hispanic, be between the ages of 15 and 24, and never married (U.S. Census Bureau 1998; McArthur and Short 1985; Jabine, King, and Petroni 1990 as reported in Citro and Michael 1995). Further, some welfare participants are more likely to remain in the sample over the panels (Tin 1996).

Another recommendation would be to use the term "family" and "household" more carefully in administering the MIQ and MSQ in the SIPP or similar surveys. The SIPP questions are embedded in a module about "household" well-being but they specifically refer to "family" situations. It is difficult to predict how the respondents interpreted these questions when there were multiple families in a household. More attention needs to be paid to this particular issue.

While much work remains, nevertheless, the findings presented here support those of Morisette and Poulin (1991) that reports of minimum incomes can be "remarkably stable" over time, and more specific wording of questions result in important differences in results. We suggest that this is true if questions and the surveys in which the questions are contained are themselves stable over time. Given this, the task of measuring well-being could benefit greatly from this information. As recognized by others, for example Citro and Michael (1995), these measures could provide useful information with which to evaluate other measures of well-being.

Appendix

The anchor income concept can be explained as follows. First, the relationship in equation (1) is assumed to exist between actual Y_{min} and actual Y. Second, there exists an anchor income, Y_{anc}, that underestimates actual income, Y, by a certain percentage. And third, reported minimally necessary income, Y_{minr}, underestimates Y_{min} by the same percentage that Y_{anc} underestimates actual income, Y. Thus

$$Y_{min} = Y_{minr} * \left(\frac{Y}{Y_{anc}} \right). \tag{1A}$$

Substituting equation (1A) into (1) results in equation (2A) which is used for the MIQ intersection model:

$$\ln(Y_{minr}) = a_0 + (a_1 - 1)\ln(Y) + \ln(Y_{anc}) + a_2 z_2 + a_3 z_3 + ... + a_n z_n + \varepsilon \tag{2A}$$

Anchor income, Y_{anc}, is an estimate of the income the respondent has in mind when answering the MIQ. Anchor income is estimated as a weighted sum of income components, in this case, of household members' and household non-member specific income. An assumption is made that only the income of the person accounting for the greatest share of total household income is fully taken into account. The weights of all other sources of income can be between zero and one, inclusive. The estimate of anchor income enters equation (2A) with a coefficient of one. See Homan 1988 and De Vos and Garner 1991 for the explicit model specification.

In the SIPP, detailed income data are collected for each member of the household and for the household as a whole when income cannot be assigned to an individual such as for food stamps. When an individual does not provide the data, a proxy respondent is asked to provide the household member's income. Member and household data are used to create member and

household component incomes that are included in a regression model to estimate anchor income for each household.

The estimated weights are produced from the regression for each of the following sub-components of household income according to who receives the income: spouse, children, other household members, and food stamps received at the household level. The results of this estimation produce an anchor income in which the income of the spouse is fully taken into account; the incomes of children, other household members, and food stamps are not fully counted (see Appendix Table A1). When estimating equation (2A), the weights from the anchor income equation are fixed when the other variables (e.g., household composition, age, education) are added to the model. De Vos and Garner (1991) note that this procedure may not seem satisfactory from a methodological perspective, yet this approach is followed in this study since one of the study objectives is to compare to earlier work in which similar methods were used (i.e., De Vos and Garner 1991; Garner and De Vos 1995).

Appendix Table A1. The Estimated Coefficients of Anchor Income

	SIPP MIQ	
	weight	**a symptotic standard error (a..s.e.)**
Income of main breadwinner	1.000	
Income of spouse	1.000	0.038
Income of children	0.513	0.047
Income of other household members	0.581	0.042
Food stamps	0.308	0.098

[a]Fixed at 1.
*Significantly different from 1 (p = 0.05) based on t-test=(1-weight)/a.s.e.
Source: 1993 Survey of Income and Program Participation, authors' calculations.

Empirically, when anchor income is included in the regression equation of minimum income, the impact of actual income on minimum income is obtained by adding one, the coefficient of anchor income, to the reporting income coefficient based on the estimation.

The predicted threshold with anchor income accounted for in the MIQ equation would be estimated as in equation (3A).

$$Y*(z_2...z_n) = \exp\left[\frac{a_0 + a_2 z_2 + ... + a_n z_n}{-a_1}\right]$$ (3A).

Appendix Table A2. Weighted Sample Means of Variables Included in Regressions of Ln (Y_{min})

	SIPP MIQ (n=6338)	SIPP MSQ (M=6295)
	Mean	Mean
Total Income (Y)	$42,530	$43,968
Reported minimum (Y_{min})	$28,813	$21,034
Ln (Y_{min})	10.036	9.732
Ln (Y)	10.317	10.328
Ln (Y_{anc})	10.286	.
Single, working	0.148	0.142
Single, not working	0.114	0.104
1 parent, working	0.265	0.270
1 parent, not working	0.041	0.047
2 people, 2 earners	0.132	0.131
2 people, 0 earner	0.078	0.081
>2 people, >2 earners	0.050	0.051
>2 people, 2 earners	0.047	0.048
>2 people, 1 earner	0.033	0.032
>2 people, 0 earner	0.012	0.011
2 others[a]	0.181	0.186
3 others[a]	0.081	0.084
4 or more others[a]	0.051	0.049
Age of reference person	48.114	47.811
Age^2 of reference person	2600.350	2565.330
Single >= 65[b]	0.096	0.085
2 people >= 65[b]	0.106	0.107
Oldest <6[c]	0.074	0.072
Oldest 6<12[c]	0.088	0.097
Oldest >=18[c]	0.268	0.260
Low education	0.078	0.072
High education	0.497	0.496
Black	0.121	0.120
Work disability of reference person	0.049	0.049
Female, married	0.081	0.083
Female, widowed	0.095	0.088
Female, divorced/separated	0.123	0.118

	SIPP MIQ (n=6338)	SIPP MSQ (M=6295)
	Mean	**Mean**
Female, never married	0.084	0.083
Northeast	0.200	0.201
Midwest	0.242	0.249
West	0.226	0.206
City	0.393	0.387
Rural	0.235	0.239

[a]Number of others in the household other than the head and spouse.
[b]Age of reference person in household
[c]Maximum age of others in the household other than the head and spouse.
Source: 1993 Survey of Income and Program Participation, authors' calculations.

References

Andrews, M., Nord, M., Kabbani, N., 2001. Food Expenditure, Food Security, and Minimum Food Spending Needs: Findings from the 2000 CPS Food Security Supplement. Paper presented at the Annual Meeting of the Association for Public Policy Analysis and Management, November 3, 2001, Washington, D.C.

Atkinson, A.B., Rainwater, L., Smeeding, T.M., 1995. Income Distribution in OECD Countries: Evidence from the Luxembourg Income Study, Social Policy Studies No. 18. Organization for Economic Co-operation and Development (OECD), Paris.

Battistin, E., Miniaci, R., Weber, G., 2000. What Do We Learn from Recall Consumption Data?, The Institute for Fiscal Studies Working Paper 00/10.

Bauman, K., 1998. Extended Measures of Well-being: Meeting Basic Needs, Current Population Reports: P70-67. Government Printing Office, Washington, D.C.

Bellido, N.P., Jano, M.D., Lopez Ortega, F.J., Martin-Guzman, M.P., Toledo, M.I., 1999. The Measurement and Analysis of Poverty and Inequality: An Application to Spanish Counurbations, in: Pyatt, F.G., Ward, M. (Eds.), Identifying the Poor, IOS Press/ International Statistics Institute.

Bickel, G., Nord, M., Price, C., Hamilton, W., Cook, J., 2000. Measuring Food Security in the United States: Guide to Measuring Household Food Security. U.S. Department of Agriculture, Food and Nutrition Services, Office of Analysis, Nutrition, and Evaluation, Alexandria, VA.

Bradbury, B., 1989. Family Size Equivalence Scales and Survey Evaluations of Income and Well-Being. Journal of Social Policy 18, 383--408.

Bradshaw, J., Sainsbury, R. (Eds.), 2000. Researching Poverty. Ashgate Publishing Ltd., Aldershot, England.

Browning, M., Corssley, T.F., Weber, G., 2002. Asking Consumption Questions in General Purpose Surveys. mimeo, University of Copenhagen.

Buhmann, B., Rainwater, L., Schmaus, G., Smeeding, T.M., 1988. Equivalence Scales, Well-Being, Inequality, and Poverty: Sensitivity Estimates Across Ten Countries Using the Luxembourg Income Study (LIS) Database. Review of Income and Wealth 34, 115--142.

Callan, T., Nolan, B., 1991. Concepts of Poverty and the Poverty Line. Journal of Economic Surveys 5, 243--261.

Citro, C.F., Michael, R.T. (Eds.), 1995. Measuring Poverty: A New Approach. National Academy Press, Washington, D.C.

Coder, J., Scoon-Rogers L., 1996. Evaluating the Quality of Income Data Collected in the Annual Supplement to the March Current Population Survey and the Survey of Income and Program Participation, SIPP Working Paper 215. U.S. Bureau of the Census, Washington, D.C.

Colasanto, D., Kapteyn, A., van der Gaag, J., 1984. Two Subjective Definitions of Poverty: Results from the Wisconsin Basic Needs Study. Journal of Human Resources 19, 127--137.

Danziger, S., van der Gaag, J., Taussig, M.K., Smolensky, E., 1984. The Direct Measurement of Welfare Levels: How Much Does it Cost to Make Ends Meet? Review of Economics and Statistics 66, 500--505.

Deleeck, H., Van den Bosch, K., De Lathouwer, L., 1992. Poverty and Adequacy of Social Security in the EC: A Comparative Analysis. Avebury, Aldershot, England.

De Vos, K., Garner, T.I., 1991. An Evaluation of Subjective Poverty Definitions. Comparing Results from the U.S. and the Netherlands. The Review of Income and Wealth 37, 267--285.

Fisher, G.M., 2001. 'Enough for a Family to Live On?'—Questions from Members of the American Public and New Perspectives from British Social Scientists. paper presented at the Twenty-Third Annual Research Conference of the Association for Public Policy Analysis and Management, Washington, D. C.

Garner, T.I., de Vos, K., 1995. Income Sufficiency v. Poverty: Results from the United States and the Netherlands. Journal of Population Economics 8, 117--134.

Garner, T.I., Stinson, L., Shipp, S.S., 1997. Measuring Subjective Economic Well-Being: An Economist's Viewpoint. paper prepared for the American Association for Public Opinion Research Conference, Norfolk, Virginia, May 13.

Goedhart, T., Halberstadt, V., Kapteyn, A., van Praag, B.M.S., 1977. The Poverty Line: Concept and Measurement. Journal of Human Resources 12, 503--520.

Gordon, D., Adelman, L., Ashworth, K., Bradshaw, J., Levitas, R., Middleton, S., Pantazis, C., Patsios, D., Payne, S., Townsend, P., Williams, J., 2000. Poverty and Social Exclusion in Britain. Joseph Rowntree Foundation, York, England.

Gordon, D., Pantazis, C. (Eds.), 1997. Breadline Britain in the 1990s. Ashgate Publishing Ltd., Aldershot, England.

Greene, W.H., 1997. Econometric Analysis, Third Edition. Prentice-Hall, Upper Saddle River, NJ. pp. 67, 119.

Gundersen, C., Oliveira, V., 2001. The Food Stamp Program and Food Insufficiency. American Journal of Agricultural Economics 83, 875--887.

Hagenaars, A.J.M., van Praag, B.M.S., 1985. A Synthesis of Poverty Line Definitions. Review of Income and Wealth 31, 139--53.

Hagenaars, A.J.M., de Vos, K., 1988. The Definition and Measurement of Poverty The Journal of Human Resources 23, 211--221.

Hagenaars, A.J.M., 1986. The Perception of Poverty. North Holland, Amsterdam.

Homan, M.E., 1988. The Allocation of Time and Money in One-Earner and Two-Earner Families: An Economic Analysis. unpublished dissertation, Rotterdam.

Huggins, V.J., Winters, F., 1995. Income and Poverty Time Series Data from the Survey of Income and Program Participation. paper presented at the annual meeting of the American Statistical Association.

Jabine, T.B., King, K.E., Petroni, R.J., 1990. Survey of Income and Program Participation: Quality Profile. Bureau of the Census, U.S. Department of Commerce, Washington, D.C., pp.35--37, Table 5.4.

Jenkins, S.P., O'Higgins, M., 1987. Measuring Poverty in the European Community. mimeo, University of Bath.

Johnson, D.S., 1998. Equivalence Scales and the Distribution of Well-Being Across and Within Households, in: Jenkins, S.P., Kapteyn, A., Van Praag, B.M.S. (Eds), The Distribution of Welfare and Household Production. Cambridge University Press, Cambridge, UK.

Johnson, D.S., Garner, T.I., 1994/95. Unique Equivalence Scales Estimation and Implications for Distributional Analysis. Journal of Income Distribution 4, 215--234.

Johnson, D.S., Shipp, S.S., Garner, T.I., 1997. Developing Poverty Thresholds Using Experimental Data, in: *The Proceedings of the Government and Social Statistics Section. American Statistical Association*, Alexandria, VA. pp. 28--37.

Jorgenson, D.W., Slesnick, D.T., 1987. Aggregate Consumer Behavior and Household Equivalence Scales. Journal of Business and Economic Statistics 5, 219--232.

Kapteyn, A., 2002. email communication with Thesia I. Garner about median and mean predictions of the subjective poverty line, April 1.

Kapteyn, A., Kooreman, P., Willemse, R., 1988. Some Methodological Issues in the Implementation of Subjective Poverty Definitions. Journal of Human Resources 23, 222--242.

Kapteyn, A., van de Geer, S., van de Stadt, H., 1985. The Impact of Changes in Income and Family Composition on Subjective Measures of Well-Being, in: M. David, and T.M. Smeeding, Horizontal Equity, Uncertainty, and Economic Well-Being. University of Chicago Press, Chicago, pp. 35--64.

Kokoski, M.F., Cardiff, P., Moulton, B., 1994. Interarea Price Indices for consumer Goods and Services: An hedonic Approach Using CPI Data, U.S. Bureau of Labor Statistics Working Paper 256. Office of Prices and Living Conditions, U.S. Department of Labor, Washington, D.C.

Kominski, R., Short, K., 1996. Developing Extended Measures of Well-Being: Minimum Income and Subjective Income Assessments, SIPP Working Paper 228. U.S. Bureau of the Census, Washington, D.C.

Kot, S.M., 2000. The Distribution of Welfare and Its Relation to Poverty and Inequality. paper prepared for the 26th General Conference of the International Association for Research on Income and Wealth, Cracow, Poland.

Lind, J.T., 2001. Tout est au mieux dans ce meilleur des menages possibles: The Pangloss critique of equivalence scales. mimeo, Department of Economics, University of Oslo, Norway.

McArthur, E., Short, K., 1985. Characteristics of Sample Attrition in the Survey of Income and Program Participation, in: T*he Proceedings of the Joint Statistical Meetings Section on Survey Research Methods*. American Statistical Association, Alexandria, VA, pp. 366--371.

Merz, J., Garner, T.I., Smeeding, T.M., Faik, J., Johnson, D.S., 1993. Two Scales, One Methodology – Expenditure Based Equivalence Scales for the United States and Germany, Cross-National Studies in Aging Program Project Paper No. 8. All-University Gerontology Center, Syracuse University, Syracuse, New York.

Middleton, S., 2000. Agreeing Poverty Lines: The Development of Consensual Budget Standards Methodology, in: Bradshaw, J., Sainsbury, R. (Eds), Researching Poverty. Ashgate Publishing Ltd., Aldershot, England.

Morissette, R., Poulin, S., 1991. Income Satisfaction Supplement: Summary of Four Survey Years, English language version. Statistics Canada: Canada.

Nelson, J., 1993. Individual of a Base Equivalence Scales Estimation Using United States Micro-level Data. Annales d'Economie et de Statistiques Jan-March, 43--63.

Phipps, S., Garner, T.I., 1994. Are Equivalence Scales the Same for the United States and Canada? The Review of Income and Wealth 40, 1--18.

Pradhan, M., Ravallion, M., 2000. Measuring Poverty Using Qualitative Perceptions of Consumption Adequacy. The Review of Economics and Statistics 82, 462--471.

Saunders, P., Matheson, G., 1992. Perceptions of Poverty, Income Adequacy and Living Standards in Australia, Reports and Proceedings No. 99. University of New South Wales Social Policy Research Center, Sydney.

Short, K., 2001. Experimental Poverty Measures: 1999, U.S. Census Bureau, Current Population Reports, Consumer Income, P60-216. U.S. Government Printing Office, Washington, D.C.

Short, K., Garner, T.I., Johnson, D.S., Doyle, P., 1999. E*xperimental Poverty Measures: 1990 to 1997*, U.S. Census Bureau, Current Population Reports, Consumer Income, P60-205. U.S. Government Printing Office, Washington, D.C.

Steiger, D.M., Mainieri, T., Stinson, L., 1997. Subjective Assessments of Economic Well-Being: Understanding the Minimum Income Question, in: the Proceedings of the Joint Statistical Meetings Section on Survey Research Methods. American Statistical Association, Alexandria, VA, pp. 899--903.

Stinson, L., 1997a. The Subjective Assessment of Income and Expenses: Cognitive Test Results, Final Report. U.S. Department of Labor, Bureau of Labor Statistics, Office of Research and Evaluation, Washington, D.C.

Stinson, L. 1997b. Using the 'Delighted/Terrible' Scale to Measure Feelings about Income and Expenses, in: the Proceedings of the Joint Statistical Meetings Section on Survey Research Methods. American Statistical Association, Alexandria, VA, pp. 904--909.

Stinson, L., 1998. Subjective Assessments of Economic Well-Being: Wave II, Cognitive Interviews, Final Report. U.S. Department of Labor, Bureau of Labor Statistics, Office of Research and Evaluation, Washington, D.C.

Tin, J., 1996. Program Participation and Attrition: The Empirical Evidence, SIPP Working Paper 222. U.S. Bureau of the Census, Washington, D.C.

Townsend, P. Gordon, D., 1991. What Is Enough? New Evidence on Poverty Allowing the Definition of a Minimum Benefit, in: Alder, M., Bell, C., Clasen, J., Sinfield, A. (Eds), The Sociology of Social Security. Edinburgh University, Edinburgh, pp. 35--69.

Townsend, P. Gordon, D., 1996. The Poverty Line in Britain Today: What the Population Themselves Say, Statistical Monitoring Unit Report No. 7. University of Bristol.

Townsend, P. Gordon, D., Bradshaw, J., Gosschalk, B., 1997. Absolute and Overall Poverty in Britain in 1997: What the Population Themselves Say, Bristol Poverty Line Survey, Report of the Second MORI Survey, University of Bristol.

U.S. Census Bureau, 1998. SIPP Quality Profile 1998, SIPP Working Paper 230. U.S. Bureau of the Census, Washington, D.C., Tables 2.1 and 5.1, pp. 47-51.

U.S. Bureau of Labor Statistics, 1997. *Consumer Expenditure Survey, 1994-95*, Bulletin 2492. U.S. Government Printing Office, Washington, D.C.

Van den Bosch, K., 1993. Poverty Measures in Comparative Research, in: Berghman, J., Cantillon, B. (Eds), The European Face of Social Security: Essays in Honour of Herman Deleeck, Avebury, Aldershot, England.

Van den Bosch, K., 2000. Using Subjective Information to Correct Biases in Deprivation Indices. paper prepared for the 26th General Conference of the International Association for Research on Income and Wealth, Cracow, Poland.

Van den Bosch, K., Callan, T., Estivill, J., Hausman, P., Jeandidier, B., Muffels, R., Yfantopoulos, J., 1993. A Comparison of Poverty in Seven European Countries and Regions Using Subjective and Relative Measures. Journal of Population Economics 6, 235--259.

Van Praag, B.M.S. 1968. Individual Welfare Functions and Consumer Behavior. North Holland, Amsterdam.

Vaughan, D.R., 1996. Self-Assessments of Income Needs and Financial Circumstances: Two Decades of Seeking a Place in Federal Household Surveys, in: The Proceedings of the Government and Social Statistics Section. American Statistical Association, Alexandria, VA., pp. 100-105.

Vaughan, D.R. 1993. Exploring the Use of the Public's Views to Set Income Poverty Thresholds and Adjust Them Over Time. Social Security Bulletin 56, 22--46.

Vaughan, D.R. 2002. email communication with Thesia I. Garner about flat equivalence scales from subjective measures, April 19.

Veit-Wilson, J., 1998. Setting Adequacy Standards: How Governments Define Minimum Incomes. The Policy Press, Bristol, UK.

Waldegrave, C., Frater, P., 1996. New Zealand: A Search for a National Poverty Line, in: Oyen, E., Miller, S.M., Samad, S.A. (Eds), Poverty: A Global Review, Handbook on International Poverty Research. Scandinavian University Press, Oslo, pp.160--186.

Watts, H.W. 1980. Special Panel Suggests Changes in BLS Family Budget Program. Monthly Labor Review 103, 3--10.

Winter, J., 2002. Design Effects in Survey-Based Measures of Household Consumption. SonderForschungsBereich 504, Rationalitatskonzepte, Entscheidungsverhalten und okonomische Mondellierung Working Paper 02-34, Universitat Mannheim.