RECONCILING FLOW-OF-FUNDS AND SURVEY-BASED MEASURES OF HOUSEHOLD WEALTH

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I. INTRODUCTION

Historically, household wealth estimates based on consumer survey data have been substantially lower than independent, institution-based, estimates. This relative understatement of wealth in consumer surveys has been attributed mainly to an undersampling of wealthy households, which are believed to hold highly disproportionate shares of many types of assets. As a consequence, population estimates of statistics such as means and Lorenz curves from ordinary cross-section data may be biased. Some would argue that such consumer survey data on wealth are appropriate only for estimation of statistics such as medians and size distributions which are less dependent on complete distributions of population characteristics.

The 1983 Survey of Consumer Finances provides the best opportunity since the 1963 Survey of Financial Characteristics of Consumers (Projector and Weiss (1966)) for studying the composition and distribution of household wealth. As part of the 1983 survey, a special sample of high-income households was obtained from federal income tax files. This sample oversamples the number of households in the top half percent of the income distribution at a rate fifteen times greater than a simple random cross-section of households. Preliminary evidence (Avery and Elliehausen (1986a) and Avery, Elliehausen, and Kennickell (1987)) indicates that inclusion of the high-income sample, appropriately weighted, significantly reduces differences between survey-based and flow-of-funds account estimates of some wealth aggregates. This suggests that unlike most other consumer surveys, data from the 1983 survey may generate adequately representative dollar distributions of household wealth.

This paper assesses the accuracy of household wealth estimates from the 1983 Survey of Consumer Finances and compares them with aggregate estimates from the flow-of-funds accounts and other sources. The paper is organized as follows: Section II briefly describes the design of the 1983 survey and discusses its comparability with other sources of data on household wealth. In Section III we present a detailed reconciliation of survey results with estimates from the household sector of the flow-of-funds accounts. Comparisons are also made with the 1963 Survey of Financial Characteristics of Consumers. Section IV provides a summary and conclusions.

II. THE 1983 SURVEY OF CONSUMER FINANCES

A. Survey Design

The 1983 Survey of Consumer Finances (SCF), which was conducted by the Survey Research Center (SRC) of the University of Michigan, collected detailed information on the assets and liabilities of a sample of U.S. households [2,3]. Within each household the "economically dominant" (primary) family (or individual) was interviewed [4]. Interviewing for the survey was done in person between the months of February and August of 1983. The survey sample consists of a nationally representative area probability cross-section sample and a supplementary representative high-income sample drawn from federal tax files.

Two different methods were used to draw the household samples of the 1983 SCF. Standard SRC area-probability methods were used to draw the cross-section sample. A total of 5,396 households were selected for this sample, of whom 3,824 (71 percent) participated in the survey [5].

The supplemental high-income sample was drawn from a large sample of 1980 Federal tax returns by the Statistics of Income Division (SOI) of the Internal Revenue Service. Using multifaceted sampling criteria, the SOI selected about 5,000 returns of high-income taxpayers residing in the sampling areas of the cross-section sample who were estimated to have large amounts of wealth [6]. The Comptroller of the Currency sent letters to the individuals in the high-income sample requesting participation in the survey. Names and addresses of individuals that agreed to participate were forwarded to the SRC. Of the 459 households of the group that agreed to participate, 438 households ultimately completed interviews [7].

The same questionnaire was used to interview respondents in both the cross-section and high-income samples, and field interviewers were not told which households were part of the high-income sample. The average length of an interview was 74 minutes in the cross-section and 87 minutes in the high-income sample.

Because observations for the 1983 were drawn from two different sampling frames, construction of appropriate sample weights is a particularly important issue. Relative weights for the cross-section sample were constructed to compensate for differential nonresponse rates across the survey's 75 primary sampling units. Those weights were further post-stratified by region and degree of urbanization to reflect population estimates from the March 1983 Current Population Survey (CPS).

Construction of weights for the full 1983 sample, including both the cross-section and high-income sub-samples, posed a more difficult problem. Full information on the high-income sampling procedure is not available. Moreover, the information collected from survey respondents is not sufficient to construct a fully accurate measure of the income concepts which the IRS likely used in drawing the sample. Additional complications stem from the fact that the high-income observations were drawn from a 1980 sampling frame (but reported data as of 1983) and the fact that the reporting basis for tax files (individuals or married couples) is not always the same as the survey (families).

Faced with these problems, it was decided to construct sampling weights for the high-income sample (and cross-section observations with income above a certain level) using a post-stratification scheme based on control totals for an "extended" income measure constructed from the 1982 Tax Model File (TMF) of the Internal Revenue Service. The TMF is a stratified sample of

88,218 individual tax returns with a significant over-sampling of high incomes (see Strudler (1983)). This income measure, which was constructed for all survey households using reported 1982 income data, is roughly comparable to the IRS measure of adjusted gross income plus excluded realized capital gains. Despite the fairly detailed income questions in the SCF it is clear that the survey measure of business income almost surely overstates the TMF measure. It appears likely that survey respondents often report something much closer to a cash-flow concept of income rather than income netted of expenses and depreciation. Unfortunately, there is not sufficient information in either the SCF or the TMF to make a precise compensating adjustment. A gross adjustment for the aggregate difference between the survey and TFM business income totals was made in constructing the survey measure of extended income. However, the potential for distortion at the individual level remains, with weights for households with business income particularly suspect [8].

Post-stratification cells were defined by the seven categories of extended income shown in table 1. For each of the top six income cells (above $80,000), equal weights were determined so that the weighted number of survey observations equaled the TMF totals. The original weights of the cross-section observations with income below $80,000 were adjusted so that the weighted number of SCF households equaled the population estimated from the CPS. High-income sample observations with income below $80,000 were arbitrarily assigned the same weight as observations in the $80,000 to $90,000 group [9].

B. Non-response and Imputation of Missing Data

In any household survey, some responses to survey questions will be missing due to respondents' lack of knowledge or unwillingness to answer. In keeping with most comparable surveys, extensive steps were undertaken to impute missing data for the SCF. The size and complexity of the SCF made imputation difficult. The sample was too small to impute missing values with "hot deck" or matching techniques used by the Census Bureau. On the other hand, the comprehensiveness of the questionnaire offered opportunities for inference not found with shorter surveys. Consequently, a number of different methods for imputation were employed.

Three basic methods were used to impute missing data [10]. The first method computed missing values by formulas using information reported by respondents that was closely related to the missing items. For example, missing earned income could be imputed from reported wage rates, hours worked, and work history. Asset income could be inferred using average rates of return if asset values were given. Similarly asset values could be estimated from reported asset income. Length of unemployment coupled with the appropriate state benefit formula could be used to impute unemployment income; and work history and Social Security benefit formulas could be used to impute Social Security income. Where appropriate, random disturbances were added in making imputations.

The second method assigned missing values on the basis of random draws from conditional frequency distributions. This method was used primarily to impute missing values for variables with discrete values. It was also used to estimate dollar amounts in a few cases in which a very small number of missing values were present. A variant of this method involved using a conditional mean together with information reported by the respondent to estimate the value of a missing item. The amount of a first mortgage, for example, was sometimes estimated by multiplying the purchase price of the house by the average loan-to-price ratio in the year of purchase. The third method estimated missing values by regression. Missing values were assigned the value predicted by the regression plus a random disturbance term, which was generally assumed to be a truncated log-normal variable with the same variance as the residual term of the regression. This method was used to estimate most missing dollar amounts. Income and asset regression imputations were done simultaneously using an iterative technique in order to preserve second moments [11].

The cross-section and high-income samples were handled separately. Missing values for all observations in the high-income sample were imputed. In the cross-section sample, however, 159 of the original 3824 cross-section observations were discarded because virtually all dollar amounts for income and assets were missing [12]. All missing values for the remaining 3665 observations were imputed.

C. Comparability with other survey data

The 1983 SCF is the most recent survey in a series of wealth surveys conducted by the SRC. Surveys of Consumer Finances were conducted annually from 1946 to 1970 and again in 1977. The same basic methods were used in all these surveys. Nationally representative samples of households were selected, with the family being the unit of analysis. Minor changes in sampling and interviewing procedures, however, were introduced from time to time to improve survey results.

The Survey of Financial Characteristics of Consumers (SFCC) was a wealth survey conducted for the Federal Reserve Board in 1963 (Projector and Weiss (1966)). Methodological work for this survey was conducted by the SRC, and interviewing was performed by the Bureau of the Census. Like the 1983 SCF, the 1963 SFCC collected a more detailed inventory of assets and liabilities than is customary in other consumer surveys. The 1963 survey also used federal tax information to oversample high-income households. For the 1963 survey, a sample of housing units stratified by income reported in the 1960 Decennial Census was selected to represent households with incomes below $50,000. Households with incomes of $50,000 or more were selected from a sample of 1960 federal income tax returns. Although this sample selection procedure is not exactly the same as that used for the 1983 survey, it produced a heavy over-sampling of households in the upper end of the income distribution, making the 1963 sample the only household survey sample that is comparable to the full sample from the 1983 SCF. Direct comparisons between the 1983 SCF and the SFCC are presented in the next section.

The Survey of Income and Program Participation (SIPP) also provides information on the composition of household wealth (U.S. Bureau of the Census (1986)). The initial panel was a random cross-section of about 21,000 households selected by procedures similar to those used to select the cross-section sample for the 1983 SCF. Net worth information was collected between September and December 1984 [13]. Aggregate wealth estimates from the earlier Surveys of Consumer Finances and SIPP are generally comparable to those from the cross-section sample from the 1983 SCF in their understatement of aggregate wealth relative estimates from independent sources. Using comparably defined categories, we estimate an aggregate net worth for the SCF cross-section of $8,277 billion versus a $7,740 billion total for the SIPP sample [14]. The difference derives primarily from a smaller estimate of small business assets in the SIPP. The full sample SCF estimate of the same net wealth concept is $9,610 billion. Thus, it appears that the major difference between the two surveys arises from the inclusion of the high-income sample in the SCF.

The annual March Current Population Survey is perhaps the most comprehensive U.S. household economic survey, soliciting economic information from approximately 59,000 households (U.S. Bureau of the Census (1984)). The CPS does not collect wealth data comparable to the SCF. However, detailed household money income, by source, is available from both the CPS and SCF. A comparison of 1982 U.S. household totals for a number of income categories measured by both the SCF and the March 1983 CPS is displayed in table 2. The CPS totals are adjusted to exclude income for secondary families and unrelated individuals who would not have been included in the SCF. We also show a comparison of the SCF income data with aggregate 1982 household income compiled by the IRS from tax return data (Epstein (1984)). A selection of cases was made from the SCF to represent the population of households that would normally file tax returns. Non-taxable income was deleted for these calculations. 1962 IRS data (Paris and Hilgert (1984)) and aggregate 1962 household income compiled from the SFCC are also given in table 2.

The 1983 SCF overstates comparable CPS income by about 6 percent. Most of this overstatement stems from business income and income from dividends, trusts, and real estate. Interestingly, in a comparison of data with an "independent source" in 1983, the Census Bureau concluded that CPS data "underreported by about 10 percent" (U.S. Bureau of the Census (1985, p. 218)). The SCF also overstates IRS household income by about 7 percent. However, much of the discrepancy can be explained by the SCF's failure to find significant business, rental, and security losses. As noted earlier, this may stem from households earning real economic profits but accruing tax losses on investments. The 1963 SFCC household data matched up much more closely with IRS data.

III. A COMPARISON OF FLOW OF FUNDS AND SCF AGGREGATES

This section compares the aggregates of various components of wealth implied by the 1963 SFCC and the 1983 SCF with estimates of the Flow-of-Funds (FOF) Section of the Federal Reserve Board. The FOF figures are widely regarded among academic economists as being the most reliable aggregate indicators of the composition of the national wealth and its allocation across sectors of the economy. However, as is noted in more detail below, because FOF estimates combine data from numerous sources in a set of calculations, those estimates are best interpreted as point estimates of widely varying precision [15].

Table 3 presents estimates of household wealth calculated from survey and FOF data for 1962 and 1982 [16]. The 1963 SFCC survey data used were weighted to be representative of the 1963 household population with dollar values given in nominal terms. The edited SFCC data set reported by Projector and Weiss was used with slight modifications [17]. Because the SFCC and SCF were conducted early in 1963 and 1983 respectively, we have chosen to compare the survey aggregates with the end-of-year FOF figures for the previous years. Because the FOF concepts sometimes differ from the taxonomy used elsewhere in this paper, the survey variables were combined to correspond as closely as possible to FOF measures. The specific content of each line item is discussed in detail below and in the notes to the table.

The survey estimates given are weighted sums of the various asset types using the appropriate statistical sampling weights. To illustrate the importance of the high-income supplement, 1983 SCF figures for both the full sample and the cross-section sample alone are presented. Note that the addition of the high-income sample substantially increases many of the survey totals and decreases the estimated sampling variance of asset types widely believed to be highly concentrated such as stocks and bonds. Somewhat surprisingly, however, inclusion of the high-income sample actually decreases the estimate of aggregate non-corporate business equity.

In principle, FOF figures are intended to describe the replacement value of tangible assets and the market values of financial assets held within the United States [18]. Two types of FOF estimates are given in table 3 for each year. The first is the official estimate of wealth of the household sector, which includes both real households as well as charitable and other nonprofit organizations, personal trusts, and estates. The second is an estimate of the holdings of "real" households based on calculations made by Frederick Yohn and others in the FOF Section of the Federal Reserve Board using special tabulations provided by the Internal Revenue Service [19]. The 1982 figures represent the benchmark year calculations. Unfortunately, there were not sufficient data to extend the real household series before 1975 directly. The assumption adopted to make the separation of sectoral holdings in 1962 is that the proportion of sectoral assets held by real households in 1962 is the same as it was in 1975. As is evident from the table, there is a substantial difference between the two estimates of some categories. Except where noted, all further comparisons made in this section refer to the real household figures for the FOF, and for the 1983 comparisons, to the full sample for the 1983 SCF.

Netting all the asset and debt types shown in table 3, the 1963 SFCC captures 75.0 percent, the 1983 SCF cross-section sample 99.6 percent, and the 1983 SCF full sample 109.6 percent of the FOF value for real households. However, there is great variation in correspondence over asset classes, some of which is the result of a degree of mismatch in definitions.

Although the survey and FOF totals for currency and checkable deposits appear to be quite close, particularly in 1983, differences in their construction and in the concepts they are intended to measure are sufficiently large that a meaningful comparison may not be possible. Because this asset is the very volatile both at the micro level and in the aggregate, timing differences may cause large distortions in comparisions of the two measures. In addition, there are at least four identifiable sources of discrepancy between the FOF and survey measures.

First, a particular problem arises with the treatment of currency in this calculation. None of the survey figures include currency. However, by construction, the FOF implicitly attributes to households the entire stock of outstanding U.S. currency except that held by firms. Thus, to make a comparison with the survey data, it is necessary to subtract all non-business currency from the FOF figures. While there was no data on household holdings of currency solicited by either of the surveys discussed here, there is independent survey evidence which suggests that only about 12 percent of the aggregate stock of currency can be accounted for by reported holdings of households (see Avery et al. (1986,1987)). There is no direct measure of business holdings of currency; however, if we assume that firms hold as much currency as households, this implies an adjusted FOF real household measure of checkable deposits excluding currency of $43.5 billion in 1962 and $190.5 billion in 1982. Given this adjustment, the survey figure for 1963 is still only half of the FOF figure while the 1983 survey figure actually overstates the FOF figure by 43 percent.

Second, particular problems for the 1983 comparison may have been generated because of the slight differences in the timing of the survey and FOF measurements. MMDAs had only been legally in existence for two weeks when the FOF figures were measured but had grown rapidly in use by the time the survey was conducted. Reflecting this growth, MMDA accounts totaling $153.6 billion are included in the full sample SCF estimates as checkable deposits while the FOF aggregate stock held by all sectors was only $43.2 billion at the end of 1982. Since much of this growth involved shifts from savings accounts, it is likely that the mismatch of checkable deposits is probably understated and the mismatch of savings accounts overstated [20].

Third, even the difference between the survey and FOF measurements of checking account balances may be distorted by check float. Aggregate checking account measurements are determined by the balance sheets of banks. This means that checks which have been deposited but which have not yet been debited from the check-writer's account are in effect counted twice. If survey respondents report the amount in their checkbook balance - subtracting checks written but not yet debited - it will differ from the amount shown by their bank for their account. The difference in these measures can be large. Measured float within the banking system (cash items in the process of collection) is typically about one-fourth of total checking account balances. Because this figure does not include "mail float" - checks written but not deposited in a bank - the true double counting is larger. Since the even the approximate size of household float is unknown it is not possible to determine how much of the difference in survey and FOF checking account measures should be attributed to it. However, any such adjustment we might make would increase the survey measure (or decrease the aggregate) and very likely by a sizable amount.

A final problem in comparison of the FOF and survey measures of checkable deposits stems from the way that the FOF household accounts are constructed. In the FOF, household holdings are computed as a residual from the aggregate stock of currency and checkable deposits given the combined holdings of currency and checkable deposits held by other sectors as determined from banking statistics and financial statements of firms. Because very little data exist on the cash holdings of closely-held corporations, there is a strong reason to suspect that the household residual is overstated and is likely to include some business accounts.

Because the FOF measure of savings accounts is also computed as a residual from the aggregate stock given the holdings of firms, comparison of survey and FOF measures of these accounts is similarly clouded. Note as well, the comparison of savings account measures for 1983 is further complicated by the timing problems induced by the introduction of MMDAs as discussed above.

For the remaining financial assets, only corporate stocks are within 10 percent of the FOF figures. However, there are important conceptual differences in the quantities measured and in how assets are allocated among categories. For example, the distinction between mutual funds and MMF shares may have been drawn differently by respondents and the FOF. Note that the sum of the two categories matches much more closely than the individual items. Similarly, it appears that the total value of bonds matches the FOF figures much more closely than the individual components do, suggesting that survey respondents may not know the precise type of bonds they own. Moreover, while bond values for both sources are intended to measure book or face values, it is likely that some of the survey data reflect market values. Note as well that bond holdings of households are computed as a residual of the known stock of bonds issued less retirements and amounts held by other sectors as determined from balance sheet data. This residual is likely to be even noisier than is the case for savings accounts and currency and checkable deposits since the aggregate holdings of all sectors are not as precisely measured. While the issuance of bonds is a clear matter of record, the retirements are substantially less well documented.

Measurement of life insurance is more seriously affected by conceptual mismatches in the survey and FOF data. While the surveys measure the cash value of life insurance and IRAs at insurance companies, the FOF measures in-

surance reserves.

In principle, the FOF measure of corporate equities includes all corporate equities. However, in practice, only publicly traded equities are captured in the data used to construct this figure. Almost all holdings of small, closely-held, corporations except those allocated to other categories such as real estate are missed. Thus, for comparability the survey figures constructed here also specifically exclude closely-held corporate stock (totaling $97.7 and $886.2 billion dollars in 1963 and 1983 respectively). The adjusted corporate equity figures reported in table 3 match very closely.

In the case of real estate, the survey and FOF measures have serious conceptual differences. The FOF accounts derive the value of residential land from assessed values in the Census of Governments and the value of structures cumulated as a perpetual inventory using valuation methods which attempt to measure reproduction costs. Because of limitations in these primary data, it is not possible to distinguish between principal residences, secondary residences, or other types of rental properties in the FOF accounts. The closest feasible survey measure is the reported market value of principal and secondary residences and, in the case of the 1983 SCF, some other relatively small amounts of properties. While the survey figure overstates the FOF amount by only about 17 percent in 1963, the overstatement is over 50 percent in 1983. Because the procedures used to determine the replacement value of structures appear to be plausible, our strong suspicion is that the major difference is made by the use of assessed values of land. The rise of such initiatives as Propositions 13 and 2-1/2 over the last decade very likely cause serious distortions in the computation of land values in the FOF accounts on the basis of assessed valuation.

Perhaps a more meaningful comparison to the survey figures on owner occupied housing might be the data on the market value of housing gathered by the Census Bureau in the 20 percent sample of the decennial census, though this figure, like those reported from the surveys examined here, also may suffer from problems of self-valuation by households. Unfortunately, only the median value of owner-occupied housing is available from the Census in published form. According to their figures, the median U.S. owner-occupied house rose in value 397 percent from 1960 to 1980. This compares to the 429 percent rise in the median value of household principal residences as measured by the 1963 and 1983 surveys.

As another check on the survey respondents' valuation of housing, we compared the appreciation rates implied by their current valuation and reported home purchase price with the changes in regional housing price indices. The mean survey and index appreciation rates were virtually identical (the mean ratio of appreciation rates was 1.01 which was not significantly different from unity) although older homeowners tended to underestimate appreciation and newer homeowners overestimate. The fact that the outstanding stock of household mortgages corresponding to the constructed survey measure of owner occupied real estate is within 10 percent of the aggregate FOF measure in both 1963 and 1983 gives us additional confidence in the survey figure.

The valuation of non-corporate farms, sole proprietorships, and partnerships is perhaps the most complicated measurement problem of all. Across any of the types of national accounts, this is the category that is least well understood. It is particularly important to note that in both surveys, an attempt was made to exclude assets owned by families for business purposes from other family assets. However, it is clear that the finances of many such organizations are co-mingled with those of their owners and respondents may have been inconsistent where they placed the line between them. Moreover, it is similarly unclear what is an appropriate valuation method for businesses in which a large element of the reported valuation may derive from something very close to the human capital of its owners [21]. In the FOF accounts, this item is estimated as a perpetual inventory of the residual necessary to create a balance of flows in the non-corporate sector. While this seems a reasonable approach given the paucity of other data, it is also subject to substantial potential errors of measurement. The corresponding survey measures are constructed from the reported market values of all non-corporate businesses, and in the case of 1963, all farm businesses as well. The survey figures for 1963 and 1983 are about 11 and 21 percent below the FOF calculations respectively [22]. Given the usual suspicion of overvaluation of small businesses in survey data, this is rather surprisingly close agreement [23]. However, this area needs intensive methodological work before we can hope to develop a sufficient framework for future scientific measurement.

Survey and FOF figures for trusts are not given in the table. Trusts, which are treated in the FOF accounts as a subsector of the household sector, were estimated by the FOF accounts to be $238.7 billion at the end of 1982. The 1983 SCF measure, which is contaminated by managed investment accounts, is $279.8 billion. In addition to the managed investment accounts, the survey figure very likely also includes informal trusts. Comparable figures for 1963 are $54.3 billion for the SFCC and $47.1 billion for the FOF accounts using an estimation procedure comparable to that used for the "true household" figures given in table 3. Because, in the case of the 1983 data, nothing is known about the composition of the holdings of these accounts, it is not possible to allocate "excess" holdings across other categories.

Comparison of survey and FOF figures for debts is more encouraging. Most debts for the household sector are directly measured by FOF from financial institution data and should, therefore, be relatively reliable. Only the relatively small part of the household debts not mediated through a financial or government institution is missed in the FOF accounting (survey debt owed to other individuals was therefore excluded in computing the figures in table 3). As noted above, the amount of mortgages outstanding measured by the surveys is 92 percent of the comparable FOF estimate. This is a number that it is very reasonable to suppose would be well measured in either framework. Institutions are able to separate mortgages owned by households from those owned by businesses, and most

households appeared to be able to report mortgage terms accurately.

In the FOF accounts, installment credit covers most credit that is extended to individuals by financial institutions and retailers and is scheduled to be repaid in two or more installments. The survey variable was constructed to correspond as closely to this definition as possible. Nevertheless, several adjustments are required to make the survey variables consistent with the FOF figure (see table 4). First, the FOF figure contains an undetermined amount of precomputed finance charges (the interest portion of contracted future installment debt payments). Finance companies typically include precomputed finance charges, retailers are believed to include them, and commercial banks report some precomputed finance charges. Thrift institutions, on the other hand, report only principal amounts outstanding. We estimated precomputed finance charges using SCF data assuming that all finance companies and retailers included precomputed charges and that all banks and thrift institutions did not.

Second, FOF estimates of the revolving component of installment credit include current charges as well as balances financed. Based on statistics obtained from other consumer surveys and from industry sources, about 40 to 50 percent of outstanding balances represent transactions use of credit cards, which are repaid in full at the end of the statement period. Thus we assume that 45 percent of outstanding balances are current charges in table 4.

Finally, FOF figures contain personal borrowing for business purposes, but survey respondents were instructed to exclude such borrowing. Before 1978, personal borrowing for business purposes was subtracted from the FOF consumer credit statistics, but the basis for those adjustments was data collected during the 1950s. Lacking current data, we used the pre-1978 adjustments [24]. After adjustments, FOF consumer installment credit outstanding and the comparable SCF estimate agree more closely - the SCF estimate is 83 percent of the aggregate figure.

Other household debts also agree more closely when adjusted. SCF estimates of single payment loans are higher than FOF estimates. SCF estimates of life insurance policy loans, however, are substantially lower than the aggregate figure after adjustment for business borrowing (50 percent of single payment loans). Bank loans n.e.c. in the FOF specifically exclude consumer credit and thus are probably institutional or business debts. Federal Treasury debts are also primarily institutional debts.

IV. CONCLUSIONS

The purpose of this paper was to compare estimates of household wealth derived from the 1983 Survey of Consumer Finances with independent estimates of the flow-of-funds accounts. Because it is commonly argued that survey data are inadequate to estimate means or aggregates of distributions such as wealth that are highly skewed, we have presented a great deal of background information for the reader to use in order to judge the credibility of our efforts. The most important part of that information is the description of the special high-income sample and the merged sampling weights that were devised.

It is clear that the inclusion of the high-income sample dramatically alters the survey-based assessment of aggregate household wealth. The full sample estimate of household net worth is over fifteen percent higher than the estimate using the cross-section sample alone. Differences between the samples also vary considerably from asset to asset. Thus, inferences on the importance of various assets in the household portfolio depend critically on the sample used. Stocks, bonds, and trusts, for example, constitute 14.8 percent of household assets when measured in the full sample, but only 9.7 percent when only the cross-section is used. Moreover, it is not clear that the cross-sectional sample can be simply reweighted to compensate for these differences. Assuming the response rate of the combined samples, approximately 36 cross-sectional respondents should have reported a net worth of more than $1.5 million (the top 1 percent according to the full sample); in fact only 22 did. But even if these individuals are reweighted to represent their "true" proportion, the cross-section based wealth aggregates understate the full sample estimates by over $1 trillion dollars. This occurs because cross-sectional observations are even more sparsely represented in the top 1/2 percent of wealthholders (7 respondents instead of the expected 18). In principle, these observations could be given even higher weights. However this raises serious questions about precision and efficiency. One would feel very uncomfortable drawing inferences about the estimated one-fourth of U.S. household wealth held by the top 1/2 percent of households base on a sample of seven.

A more adequate area probability sample would be expensive. Assuming the same cross-sectional response rates, it would have required an area probability sample of almost 200,000 to achieve the same representation of the top 1/2 percent as in the full sample SCF. However, before concluding that tax-file-augmented samples are the best solution to these problems, a more careful examination of the sampling frame has to be made. Only ten percent of the original high-income sample solicited by mail agreed to participate in the survey. Further work needs to be done to determine if this group is indeed representative.

In general, evidence presented here comparing SCF aggregate estimates with those from flow of funds accounts is encouraging. Estimates of aggregate household holdings of most financial assets and debts computed from the full SCF sample compare very closely with estimates from the FOF. Publicly traded stock and bond estimates, for example, are within two percent of the FOF totals. Mutual fund shares, home mortgages, and installment debts also compare very closely. Areas of disagreement are checking and savings accounts, real estate, businesses, and other debt. It is not clear that the source of these differences can be automatically traced to flaws in the SCF. As argued earlier, FOF data on household deposit holdings may be seriously contaminated by assets that in fact are owned by businesses. FOF estimates of other household debts also appear to have significant problems. It may be the case that survey estimates of household holdings are more accurate for these

items.

We are less optimistic that there is an easy resolution of the differences between survey and FOF estimates of businesses and real estate. Both estimation methods appear to have significant problems. Unlike most other items in the household balance sheet, these assets generally will not have an easily obtained and universally agreed upon market value. Survey respondents, for example, may be inconsistent in how they treat their human capital in valuing a small business. Unfortunately, FOF estimates of these two assets also have significant problems. Real estate land values are based on assessed values - a method which may be particularly trouble-prone in an era of changing assessment procedures and legislative restrictions. Aggregate information on closely-held businesses is virtually non-existent. Much needs to be done in improving both sets of estimates before either can be used in confidence as estimates of aggregates.

REFERENCES

1. Avery, Robert B. and Gregory E. Elliehausen. "Financial Characteristics of High-Income Families," Federal Reserve Bulletin (March 1986), pp. 163-177.
2. Avery, Robert B. and Gregory E. Elliehausen. 1983 Survey of Consumer Finances: Technical Manual and Code Book, Board of Governors of the Federal Reserve System, 1986.
3. Avery, Robert B., Gregory E. Elliehausen, Glen B. Canner, and Thomas A. Gustafson. "Survey of Consumer Finances, 1983," Federal Reserve Bulletin (September 1984), pp. 679-692.
4. Avery, Robert B., Gregory E. Elliehausen, Glen B. Canner, and Thomas A. Gustafson. "Survey of Consumer Finances, 1983: A Second Report," Federal Reserve Bulletin (December 1984), pp. 857-868.
5. Avery, Robert B., Gregory E. Elliehausen, Arthur B. Kennickell. "Measuring Wealth With Survey Data: An Evaluation of the 1983 Survey of Consumer Finances," Working Paper, Board of Governors of the Federal Reserve System, May 1987.
6. Avery, Robert B., Gregory E. Elliehausen, Arthur B. Kennickell, and Paul A. Spindt. "Changes in the Use of Transaction Accounts and Cash from 1984 to 1986," Federal Reserve Bulletin (March 1987), pp. 179-196.
7. Avery, Robert B., Gregory E. Elliehausen, Arthur B. Kennickell, and Paul A. Spindt. "The Use of Cash and Transaction Accounts by American Families," Federal Reserve Bulletin (February 1986), pp. 87-108.
8. Board of Governors of the Federal Reserve System, Flow of Funds Section. "Flow of Funds Accounts: Data Sources and Derivations," October 1971.
9. Curtin, Richard T. "Survey of Consumer Finances: Employer Sponsored Pension Benefit Plans," mimeo, Survey Research Center, University of Michigan, 1986.
10. Curtin, Richard T., F. Thomas Juster, and James N. Morgan. "Survey Estimates of Wealth: An Assessment of Quality," NBER Conference on Research in Income and Wealth, March 1987.
11. Epstein, Marshall S. "Preliminary Income and Tax Statistics for 1982 Individual Income Tax Returns," IRS Statistics of Income Bulletin, Winter 1984-1985, Washington, D.C., 1985, pp. 11-22.
12. Hess, Irene. Sampling for Social Research Surveys: 1947-1980, Ann Arbor:Institute for Social Research, 1985.
13. Internal Revenue Service. Statistics of Income-1982, Individual Income Tax Returns, U.S. Government Printing Office, Washington, D.C., 1984.
14. Kish, Leslie. Survey Sampling, New York: John Wiley and Sons Inc., 1965.
15. Lansing, John B. and James N. Morgan. Economic Survey Methods, Ann Arbor:Institute for Social Research, 1980.
16. McNeil, John M. and Enrique J. Lamas. "Year-Apart Estimates of Household Net Worth from the Survey of Income and Program Participation," NBER Conference on Research in Income and Wealth, Baltimore, March 1987.
17. Paris, David and Cecelia Hilgert, "Tenth Year of Individual Income and Tax Statistics, 1913-1982," IRS Statistics of Income Bulletin, Winter 1983-84, Washington, D.C., 1984, pp. 1-9.
18. Projector, Dorothy S. and Gertrude S. Weiss. Survey of Financial Characteristics of Consumers, Board of Governors of the Federal Reserve System, 1966.
19. Ruggles, Richard and Nancy Ruggles. "Integrated Economic Accounts for the United States, 1947-1980," Survey of Current Business, May 1982, pp. 1-53.
20. Strudler, Michael. General Descriptive Booklet for the 1982 Individual Tax Model File, Statistics of Income Division, Internal Revenue Service, 1983.
21. U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 142, Money Income of Households, Families, and Persons in the United States: 1982, U.S. Government Printing Office, Washington, D.C., 1984.
22. U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 143, Money Income of Households, Families, and Persons in the United States: 1983, U.S. Government Printing Office, Washington, D.C., 1985.
23. U.S. Bureau of the Census, Current Population Reports, Series P-70, No. 7, Household Wealth and Asset Ownership: 1984, U.S. Government Printing Office, Washington, D.C., 1986.
24. Wilson, John F., James L. Freund, Frederick O. Yohn and Walter Lederer, "Household Saving Measurement: Recent Experience from the Flow of Funds Perspective," NBER Conference on Research on Income and Wealth, Baltimore, March 1987.
25. Wolfe, Raymond. "Sole Proprietorship Returns, 1982," IRS Statistics of Income Bulletin, Summer 1984, Washington, D.C., 1984, pp. 17-41.
26. Wolff, Edward N. and Marcia Marley. "Long-term Trends in U.S. Wealth Inequality: Methodological Issues and Results," NBER Conference on Research on Income and Wealth, Baltimore, March 1987.

FOOTNOTES

1. Views expressed in this paper are solely those of the authors and in no way reflect opinions of the Federal Reserve Board or the Federal Reserve System. Aliki Antonatos, Richard Curtin, Martin David, Thomas Juster, Charles Luckett, Phoebe Roaf, Fritz Scheuren, Marvin Schwartz, James Smith, Mark Warshawsky and Edward Wolff provided helpful comments and assistance. The authors particularly want to thank Frederick Yohn for guidance in our work with the flow of funds accounts.

2. A more detailed description of the survey can be found in Avery et al. (1984a,1984b), Avery and Elliehausen (1986a,1986b), and Avery, Elliehausen and Kennickell (1987)

3. In order to have a broad picture of household assets, extensive data were obtained on pension and Social Security entitlements. In addition, a separate survey was also conducted with the employers of approximately 75% of those households reporting pension benefits to assess the value of private pensions (see Curtin (1986)). A follow-up survey of most respondents was also conducted in the summer of 1986 and is currently being processed.

4. This definition of family differs from that of the Census Bureau which exludes single individuals. Because some persons within a household -- those not related to the primary family -- were not interviewed by the SRC, wealth figures will understate the U.S. household total. We estimate, however, that the understatement is only about .4%. Because the number of primary families and households is the same, we use the terms interchangeably in this paper.

5. Observations selected for the 1983 SCF were drawn from 75 primary sampling units in 37 states and the District of Columbia. For a further discussion of the SRC sampling procedures, see Kish (1956), Lansing and Morgan (1971), and Hess (1980).

6. For a general description of the sample from which the survey sample was drawn, see Internal Revenue Service (1984). Unfortunately, because of legal restrictions, knowledge of the exact sampling procedure is restricted to employees of the SOI. The drawn sample appears to roughly coincide to individuals with an "extended" income of $100,000 or more in 1980.

7. Under these procedures, the Internal Revenue Service never knew the names of the final respondents. The SRC did not know the names of high-income individuals who were not willing to participate in the survey, nor did they have access to tax data for survey participants.

8. Because the reporting units in the survey and the TMF differ, we adjusted the TMF data in order to estimate income on a family basis. Married couples filing separately were "aggregated" into households by assuming that separate filers were all married to people with the same income (weights for such observations were halved). The final weight is only slightly affected by variations in this adjustment.

9. The SRC also constructed weights using a mesh based on unadjusted income and a relative weight constructed by the IRS. This weight has been used for most work on the SCF reported to date. Aggregate wealth estimates constructed using the SRC weight are about 5.0% higher than those estimated in this paper. Aggregate Income estimates are 3.6% higher.

10. For a complete description of imputation methods see Avery and Elliehausen (1986b).

11. A more detailed discussion of the robustness of the imputation procedures is given in Avery, Elliehausen, and Kennickell (1987). Wolff and Marley (1987) used different imputation procedures in conducting an evaluation of the SCF similar to this one. Their wealth and income estimates were somewhat lower than ours, suggesting that some conclusions are not robust to the imputation process used.

12. The determination of which observations were discarded was made strictly from rules based on the percentage of information that was missing. One household which did not meet these criteria was also discarded because it reported more than a billion dollars in assets and appeared to be an insincere interview. The area probability and full sample weights were also adjusted using a probit function to predict sample inclusion on the basis of demographic and ownership information (which was given for virtually all observations).

13. McNeil and Lamas (1987) provide a brief comparison of SIPP estimates of aggregate wealth totals with the FOF figures. Wealth data were also gathered for SIPP respondents in 1985.

14. See Curtin, Juster, and Morgan (1987) for a comprehensive comparison of SIPP and SCF wealth estimates. They also compare both surveys with estimates constructed from a supplemental wealth survey conducted with respondents to the Panel Study of Income Dynamics in 1984.

15. For more detailed discussion of the construction of the FOF accounts, see Board of Governors of the Federal Reserve System (1971) and Wilson et al. (1987).

16. An estimate of the standard error due to sampling of the estimated aggregate of each asset and liability category is given in columns 2, 6 and 8 of the table. These figures were computed by calculating the sample variance of each item within each sampling unit (the 75 cross-section PSUs and the nine high-income categories). Assuming independence of sample draws across each of these cells, the variance of an asset or debt category total was then calculated as the sum of the variances of each item included in that category weighted by the cell populations. Because these estimates take the sampling weights as fixed they are likely to understate the true sampling variance of the weighted sums.

17. Additional imputations were made in valuing business assets and the cash value of life insurance.

18. In practice, many of these calculations for the U.S. household sector are contaminated by data for Puerto Rico and U.S. territories. This is particularly true of stocks, bonds, and banking data. Indirectly, items derived from Balance of Payments and unified Federal budget data flows are also affected.

19. Ruggles and Ruggles (1982) construct measures of most of the same household wealth categories using adjustments to the FOF data and data from other sources. Unfortunately their published data ends in 1980. Their estimates are very similar to the estimates of "real"

households reported here for 1962.

20. A direct comparison can be made of estimates of checking accounts alone. Using data from a periodic Federal Reserve Board survey of account ownership, we estimate that banks and savings and loans had approximately $166.6 billion in consumer checking accounts as of March 1983. The SCF estimate for consumer checking accounts is $119.4 billion.

21. We estimate that almost 74 percent of the non-corporate farms, sole proprietorships, and partnerships reported in the 1983 SCF were the principal place of employment for at least one household member.

22. However, if closely-held corporate businesses are included in the survey measures they overstate the 1983 FOF figures by 16.7 percent and understate the 1963 FOF figures by only 5.7 percent.

23. The 1983 SCF totals for small business income overstate IRS estimates. The total 1982 non-farm sole proprietorship income given by SCF respondents was $71.7 billion compared to $53.1 billion reported by the IRS (Wolfe (1984)). However, survey estimates of gross receipts for the same firms understates the IRS total of $433.7 billion by $63.0 billion.

24. Five percent of automobile debts and 10 percent of other debts were estimated to be borrowed for business purposes.

TABLE 1: POST-STRATIFICATION WEIGHTS

Household Extended Income (dollars)	Number Cross-Section Cases	Number High-Income Cases	Weighted Number of Households
< $80,000	3,582	49	82,388,405
80-89,999	21	11	355,204
90-99,999	12	21	249,844
100-124,99	22	46	354,789
125-199,999	16	93	348,820
200-499,999	11	133	176,969
500,000 <	1	73	44,073
All cases	3,665	438	83,918,020

TABLE 2

SURVEY INCOME COMPARISONS

(CURRENT $S)

	1982 INCOME 1983 SCF ($ B)	1982 INCOME C.P.S. ($ B)	1982 INCOME 1983 SCF TAXABLE INCOME ($ B)	1982 INCOME I.R.S. DATA ($ B)	1962 INCOME 1963 SFCC ($ B)	1962 INCOME I.R.S. DATA ($ B)
SALARIES AND WAGES	1393.7	1443.5	1385.7	1564.6	277.3	283.4
BUSINESS OR FARM INCOME	291.3	110.5	290.4	53.7	41.9	33.3
TAXABLE INTEREST INCOME	98.5	95.1	95.9	157.2	6.4	7.2
DIVIDEND INCOME	--	--	46.7	54.2	6.7	10.6
NET GAINS FROM STOCKS	--	--	50.4	24.3	5.4	5.8
RENTAL OR TRUST INCOME	--	--	54.8	-2.1	8.8	--
DIVIDENDS/TRUST/RENTAL TOTAL	102.9	47.3	--	--	--	--
WELFARE OR PUBLIC ASSISTANCE	23.2	17.4	--	--	--	--
UNEMPLOYMENT OR WORKMANS COMP	20.6	32.8	--	--	--	--
ALIMONY OR CHILD SUPPORT	35.6	21.4	--	--	--	--
RETIREMENT INCOME	194.6	204.3	94.0	59.9	19.7	--
CATEGORY TOTALS	2160.4	1972.3	2017.9	1911.8	366.2	340.3

TABLE 3

COMPARISON OF IMPLIED 1963 SFCC AND 1983 SCF AGGREGATES WITH FLOW OF FUNDS ESTIMATES OF COMPONENTS OF HOUSEHOLD WEALTH, BILLIONS OF CURRENT DOLLARS

(CURRENT DOLLARS)

	1963 SFCC		1962 FLOW OF FUNDS		1983 SCF FULL SAMPLE		1983 SCF CROSS-SECTION SAMPLE		1982 FLOW OF FUNDS	
	SUM ($ B)	STD. ERR. ($ B)	HH SECTOR ($ B)	REAL HH ($ B)	SUM ($ B)	STD. ERR. ($ B)	SUM ($ B)	STD. ERR. ($ B)	HH SECTOR ($ B)	REAL HH ($ B)
ASSET TOTALS	1249.5	41.7	1686.5	1671.5	9201.9	363.5	8415.8	644.8	9223.1	8567.5
CURRENCY AND CHECKABLE DEPOSITS	23.7	1.6	71.4	68.6	273.0	18.2	249.7	16.3	322.6	304.6
SAVINGS ACCOUNTS	104.8	5.9	208.3	207.3	639.2	32.1	649.2	34.9	1461.0	1321.3
MMF SHARES	--	--	--	--	122.1	12.2	77.5	9.0	206.6	206.6
SAVINGS BONDS	26.6	2.6	47.0	47.0	27.3	3.1	26.3	2.8	68.3	66.8
OTHER FEDERAL OBLIGATIONS	6.7	2.6	28.6	19.1	114.7	25.3	84.1	17.7	292.1	238.3
STATE AND LOCAL OBLIGATIONS	12.7	2.6	31.5	22.4	208.4	41.6	96.8	34.1	123.9	89.0
CORPORATE AND FOREIGN BONDS	5.9	1.4	9.5	5.2	47.2	10.8	44.0	11.9	54.8	--
MORTGAGE ASSETS	23.5	4.5	38.8	29.6	210.8	21.9	172.1	19.8	144.8	103.4
CORPORATE STOCK	197.1	21.9	416.2	349.9	923.9	176.2	548.3	119.9	1175.7	968.2
MUTUAL FUNDS	24.9	5.7	21.3	16.1	128.3	19.3	107.1	22.4	90.0	76.0
INSURANCE RESERVES	60.6	2.5	92.4	92.4	371.1	20.6	323.3	17.7	232.8	232.8
OWNER-OCCUPIED REAL ESTATE	474.0	11.7	403.8	403.8	4283.6	109.4	4109.7	118.7	2703.4	2703.4
NON-CORPORATE BUSINESSES	289.1	21.3	410.1	410.1	1852.6	221.6	1927.5	547.4	2347.1	2347.1
DEBT TOTALS	190.3	6.5	268.5	259.8	1354.1	48.2	1279.2	41.4	1561.1	1344.4*
HOME MORTGAGES	146.5	5.8	163.7	163.7	996.3	34.3	975.2	35.5	1064.6	1064.6
INSTALMENT CREDIT	27.7	1.2	51.0	51.0	251.9	18.0	239.7	11.3	335.0	224.5*
OTHER DEBT	16.1	2.0	53.8	45.1	105.8	18.4	64.3	8.0	161.5	55.3*
IRA'S/KEOGHS AT BANKS/S&L	--	--	--	--	57.5	7.1	38.3	4.4	51.0	51.0

* (see table 4)

TABLE 3: Definitions are given for entries in table 3 for 1963 SFCC and 1983 SCF together. For further definition of the FOF variables, see Board of Governors, 1980.

Currency and Checkable Deposits: All accounts with banks, thrifts or credit unions with check-writing privileges. The 1983 SCF figure includes all MMDAs.
Savings Accounts: All non-checkable deposits at banks, thrifts and credit unions, including small and large time deposits, CDs, and IRA and Keoghs at depository institutions (except MMDA accounts).
MMF Shares: All money market accounts held outside of banks, thrifts and credit unions. In 1983 this includes broker call accounts and IRAs and Keoghs at brokerages.
Savings Bonds: Face value of all U.S. Government Savings Bonds.
Other Federal Obligations: All other U.S. Government notes, bills and bonds valued at face.
State and Local Obligations: All bills, notes and bonds of state and local governments valued at face.
Corporate and Foreign Bonds: All other bonds valued at face.
Mortgage Assets: Outstanding principal on all mortgage assets, including land contracts, notes, and business notes owed to households.
Corporate Stock: Market value of all publicly traded stocks and amount in investment clubs.
Mutual Funds: Market value of all holdings of mutual funds.
Insurance Reserves: Cash value of whole life insurance policies and IRA's held with insurance companies.
Owner Occupied Real Estate: Market value of principal and secondary residences and other small residential properties.
Non-Corporate Businesses: Market value of equity share of all non-farm sole proprietorships and partnerships. For the 1963 SFCC this variable also includes the net equity in investment real estate and the value of all farm businesses. For the 1983 SCF this variable includes net equity in apartment buildings, raw land, farms and non-corporate farm businesses.
Home Mortgages: Principal outstanding on all properties reported above as "Owner Occupied Real Estate."
Installment Credit: The outstanding principal on all consumer debts on which regular payments are due.
Other Debt: The outstanding principal on all other household debts not include in the previous category.
IRA's and Keoghs: The value of all IRA and Keogh type accounts. Note that this value is also included in various other asset categories above.

TABLE 4: RECONCILIATION OF NONMORTGAGE DEBT

(Billions of Dollars)

Type of Debt	Published flow of funds**	Subtractions	Adjusted flow of funds	1983 SCF
Installment				
Automobile	126.2	13.1	113.1	108.1
Mobile home	22.4	2.7	19.7	18.5
Revolving	69.6	31.2	38.2	34.3
Other	116.7	18.2	98.5	63.6
Noninstallment	181.5	110.1	71.4	55.3

*less than 0.5
**Total household sector