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10 Survey Estimates of Wealth: An Assessment of Quality

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10.1 Introduction

This paper examines the three most recent surveys of household net worth and provides an assessment of their probable quality, their potential usefulness for analysis, and their different strengths and weaknesses. For the most part, we concentrate on the two surveys produced at the University of Michigan's Survey Research Center (SRC)—the

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This paper owes a substantial debt to the federal agency sponsors and staff who supported the collection of the household wealth surveys that are analyzed here. In particular, the authors appreciate the help, interest, and financial support of the Board of Governors of the Federal Reserve System, the Office of the Assistant Secretary for Planning and Evaluation in the Department of Health and Human Services (the two major sponsors of the 1983 Survey of Consumer Finances [SCF]), and the National Science Foundation (the major sponsor of the Panel Study of Income Dynamics [PSID]). The Department of Health and Human Services was the major supporter of the PSID from 1973 until 1977 and an important supplementer since then.

The authors are especially grateful for the work done by Robert Avery, Greg Elliehausen, and Arthur Kennickell of the Federal Reserve Board staff, who not only devoted a great deal of painstaking effort to cleaning the 1983 SCF data and estimating imputed values but also provided the data that underpin secs. 10.6 and 10.7 of the paper. Fritz Scheuren of the Internal Revenue Service staff was extensively involved in the design and implementation of the high-income supplement to the 1983 SCF. Jack McNeil of the U.S. Census Bureau gave us a good deal of help and guidance in interpreting the Survey of Income and Program Participation data. The authors also wish to express their appreciation to the staff—Richard Barfield, for much of the statistical analysis in the paper, and Esther Kerr, for preparation of the manuscript. Needless to say, the analysis and conclusions in the paper are the sole responsibility of the authors.

1983 Survey of Consumer Finances (SCF) and the 1984 Wealth Supplement to the Panel Study of Income Dynamics (PSID)—but do pay some attention to the 1984 Wealth Supplement to the Survey of Income and Program Participation (SIPP). This differential concentration results mainly from the fact that the SIPP wealth data are the subject of a separate paper at the conference as well as from the fact that we have a comparative advantage in examination and analysis of the SCF and PSID data.

The general plan of the paper is to provide an assessment of the wealth surveys in terms of five characteristics that relate to quality: the sample and questionnaire design; the derived distribution of wealth holdings, especially the upper tail; the size of measurement errors; the incidence of item nonresponse and imputed values; and the comparison of survey estimates with independent information on national wealth. First, section 10.2 provides a description of the basic designs of the surveys. We discuss the basic sample designs, which have a great many features in common but also have specialized features; response rates and their interpretation in terms of probable quality; and the designs of the questionnaires themselves in terms of level of detail, definitions of variables, and the use of single or multiple household respondents. The major differences turn out to be the special design features of the SCF, especially the high-income supplement to that survey; the oversampling of low-income households and the longitudinal characteristics of the PSID; and the enormous difference in level of detail (and cost) between PSID and either SCF or SIPP. The PSID was a very low-cost wealth survey compared to the other two and contained substantially less detailed information on the composition of household net worth.

Section 10.3 provides some descriptive statistics for all three household wealth surveys. We start with a basic description of the composition and amount of wealth holding as estimated by the three surveys and of the distribution of the three samples by amounts of net worth reported in the surveys. These data are not quite comparable since the SIPP data available on the public use tape are top coded (truncated) in several of the net worth categories. The striking feature of these comparisons is the substantial similarity in the amounts and distribution of wealth holding across the three surveys—provided one ignores households with extremely high wealth (in excess of $0.5 million). This is not true for all types of assets, but it is certainly the dominant feature of these comparisons. Because of differences in both the estimated distributions and the estimated average wealth of relatively wealthy households, the three surveys produce substantially different estimates of total net worth for the United States as a whole—SCF shows by far the largest total, with PSID next and SIPP lowest. It appears that much of the difference in estimates of total wealth among the three surveys

is due to differential estimates of wealth held in the form of common stock or business assets—types of wealth that are heavily concentrated in the population. The higher SCF wealth totals are also due in part to the oversampling of very wealthy households, resulting in a presumably more accurate representation of the wealth of such households in the total. It has been known for many years that survey estimates of wealth will typically underestimate the wealth of wealthy households unless special efforts are made to provide an adequate representation of such households in the sample design; SCF explicitly did so, while neither SIPP nor PSID was so designed.

Section 10.4 uses a model-based approach to analyze the probable measurement error in the three household surveys. Basically, we set up a version of a standard life-cycle/permanent income model of wealth holdings, in which net worth or the various components of net worth are related to income and age and to a variety of factors presumed to be associated with lifetime earnings (occupation, education, marital status, race, and sex). The basic idea is that residuals from such a model are a combination of misspecification, omitted variables, and measurement error and that differences in the explanatory power of the same model run across different surveys give some insight into the probable size of the measurement error component. We also experiment in this section with various truncations designed to reduce the weight of very high values in the analysis.

In addition to the overall assessment of the quality of net worth data measured in this way, this section also provides as many comparisons as possible between the net worth components measured in the three surveys. Complete comparability is not possible, simply because the level of aggregation differs quite a lot among the surveys. For the most part, we can compare all the net worth components for SIPP and SCF since both measure net worth with a fair level of disaggregation. We can make some global comparisons between PSID net worth categories and both SIPP and SCF, although the comparisons are not always precise because the asset definitions in PSID are not totally commensurate with those used in the other surveys.

By and large, the results of this set of analyses are quite favorable to SCF, and moderately favorable for PSID, relative to SIPP. We think there are well-defined reasons for these differences, and we relate them to differences in survey characteristics discussed in the previous sections.

Section 10.5 discusses quality as reflected by the incidence of imputed values. All survey data contain item nonresponse, and either such observations can be dropped from the analysis, or values for the missing item can be imputed. All three household wealth surveys have done extensive imputations, using somewhat different procedures. In

this section, we examine the incidence of imputations, in terms of both percentage of cases for which values had to be imputed and percentage of assets or liabilities that represent imputed values rather than respondent-provided values. What turns up here is that imputed values are very high for certain types of assets in all data sets (e.g., the cash value of life insurance reserves), are relatively low for other asset types (e.g., checking or savings accounts), and differ quite a lot among the three surveys—imputations are clearly lower for SCF than for SIPP, but it is difficult to compare PSID with the other two because of the difference in aggregation.

In this section, we also examine the "outlier" problem involved in measuring household wealth from sample surveys. The basic SCF data provide several good illustrations of outliers—observations whose inclusion in the survey total with the original weight provides conclusions that run counter to common sense or ordinary observation. This issue arises in several of the net worth components derived from the SCF data, and we discuss various types of adjustment that are suggested in the literature. We also provide an analysis of the sensitivity of both the aggregate estimates and the model-based estimates to various ways of handling outliers.

Section 10.6 of the paper uses data from the Federal Reserve Board's flow-of-funds accounts (FFAs) to make some aggregate comparisons with SCF estimates. This section, as well as much of the analysis on imputations, draws heavily on Avery, Elliehausen, and Kennickell (1987), in which FFA and SCF comparisons are provided. We do some adjustment of the results from the Avery, Elliehausen, and Kennickell paper and also provide a general view of what aggregate comparison between the SIPP and PSID surveys and the FFA data would look like, given that we have comparisons involving all three surveys and a comparison of one survey with aggregate FFA data from 1983.

A principal conclusion in this section is that many of the differences between the aggregate FFA data and the SCF data seem to reflect inadequacies of the FFAs rather than bias or measurement errors in the surveys. This is especially true for estimates of real estate, concerning which there is well-documented evidence that survey estimates of home equity and housing values represent unbiased population estimates of the mean, although with substantial measurement error in individual cases. Other FFA estimates that differ substantially from the survey estimates are also highly suspect, for example, FFA estimates of saving and checking accounts are quite likely to overestimate the holdings of such accounts by households and to underestimate holdings of such accounts by business. Overall, the surprising message is that the survey estimates of wealth are remarkably close to the aggregate

FFA data and that many of the larger differences are more likely to be attributable to errors in the FFA data than to errors in the survey data. That conclusion runs counter to much previous thinking about the reliability of survey-based estimates of household wealth.

Section 10.7 examines the data on pension rights obtained as part of the SCF survey. Estimates were obtained directly from households of the expected value of their entitlements to pension benefits from either their current or their previous employers; counterpart data were also obtained directly from the pension providers about the pension rights that would accrue to employees with certain characteristics. These two sources of data can be directly compared in the SCF data to assess the quality of respondent data—an important topic since the general view is that respondents possess little if any information about their pension rights. The SCF found mixed, but encouraging, results. While nearly all households knew whether or not they were covered by a pension plan, the majority of those covered did not know what benefit amount they would receive at retirement. Among those that did give estimates, however, the differences between the household and pension provider data were surprisingly small. The median values differed by less than 20 percent, and the correlation between the two was reasonably high. Moreover, imputations of missing benefit amounts, based solely on other household data, proved to be a close match to the pension provider data.

The final section of the paper, section 10.8, provides an overall assessment of data quality in the three household surveys and some recommendations. The recommendations are designed to illuminate decisions about resource allocation as it relates to the collection of data on household wealth. Here, we are concerned about the tradeoffs between data quality and data costs, and our conclusions probably run counter to what has been widely believed by students of survey measures of household wealth. Briefly, we conclude that, for analyses in which net worth is needed as an independent variable, relatively inexpensive measures of household net worth can be obtained with sufficient reliability to make them valuable as an analytic variable. The evidence here comes mainly from the surprisingly strong performance of the PSID data, which represents a very short module on a survey designed primarily for other purposes. The analysis indicates that these estimates are of surprisingly high quality, relative to the quality obtainable with much more intensive survey methods and much higher costs per case. On the other hand, if one wants to analyze the characteristic of wealth and wealth holdings, the types of measures obtained on PSID are simply not adequate, and here we focus on the comparison between SCF and SIPP estimates.

10.2 Alternative Sources of Survey Data

Between 1983 and 1985, three national surveys obtained information on household assets and debts: the 1983 SCF, the 1984 PSID, and the 1984 SIPP. Although the overall objectives of these research projects differed, as did some of the major elements of the sample design and measurement strategies, they nonetheless share a substantial number of common elements. Each study focuses on similar measures of economic well-being, each used nationally representative household sample surveys, and each relied on self-reported information on holdings of assets and debts.

The 1983 SCF, conducted by the SRC at the University of Michigan, continued a longstanding research program first begun in 1946.[1] Although this survey was usually conducted annually from the late 1940s through the 1960s, during the past dozen years it has been conducted only twice: in 1977 and 1983. The 1983 survey was unique. Like the others in the series, it focused on household wealth, collecting detailed information on the amount and types of financial and nonfinancial assets and liabilities. But it also collected data on entitlements to pension benefits, and the nationally representative base sample was supplemented by a sample of high-income households in order to improve representation of the upper tail of the wealth distribution. This design is comparable to only one prior household wealth survey—the 1962 Survey of Financial Characteristics of Consumers (SFCC), which also incorporated a high-income supplemental sample (Projector and Weiss 1966).

In addition to the supplemental high-income sample, the SCF included a second supplemental sample of pension providers. In view of the importance of pension entitlements for the analysis of wealth as well as saving behavior, the 1983 SCF was designed to incorporate interviews with all pension providers that included SCF family members as participants. Since respondent data on pension coverage were also collected, the independent pension provider data offer an opportunity to assess the accuracy of these self-reports. Interviews were conducted with the household sample from April to July 1983 and with the pension providers from September to December 1983.

The PSID, conducted by the SRC, was begun in 1968, and reinterviews have been conducted in each subsequent year.[2] The PSID was designed for the analysis of the dynamics of change in the economic well-being of individuals and families over time. Because of research and public policy interests in issues related to poverty, the base representative cross-section sample was supplemented by a sample of low-income households. Following all those who move out of sample families and weighting to account for people moving into sample families

provide representative (weighted) samples each year. The annual interviews include core questions on income, employment, and family composition as well as special supplements. The questions on holdings of assets and debts were included in the seventeenth annual interview wave, conducted from March to September 1984.

The SIPP was designed to obtain information over time on the level and change in the economic well-being of individuals and households (U.S. Bureau of the Census 1986). Although information on participation in federal transfer programs was of special interest, the data can be used to address a wide array of research interests. The SIPP was designed as a panel survey, consisting of nine interview waves at four-month intervals over a period of two and a half years. In addition to the core survey content on income and labor force participation included in each interview wave, various questionnaire supplements have been included. Questions on ownership of assets and debts were included in the fourth interview wave, conducted between September and December 1984, as well as in the seventh wave.[3]

10.2.1 Base Samples

Each of the three studies used comparable sampling methods. All three are multistage area probability samples, designed to be representative of the noninstitutionalized resident population. Both the SCF and the PSID base samples were drawn from the SRC's master sampling frame. The base sample design gave all households an equal and known probability of selection. The SIPP sample was drawn from an updated listing prepared for the 1970 decennial census. All three base samples were stratified by geographic area, with clusters of housing units selected at the final stage.

Small differences in population coverage among the three samples exist. The SIPP sample included residents of Alaska and Hawaii, while the SCF and the original PSID samples did not. Although the census samples include group living quarters while SRC samples do not, for the purposes of the wealth analysis the SIPP data base excluded all persons living in group quarters (dormitories, rooming houses, religious group dwellings). All three base samples excluded U.S. citizens residing abroad. Some additional coverage differences were related to the inclusion in the SIPP sample of housing units on military bases (not barracks). Although similar definitions of "housing unit" (SCF) and "living quarters" (SIPP) were used, data on primary and secondary family units are continued separately for the PSID when leavers return home but combined as household totals in SCF and SIPP. To correct for this difference, the PSID data presented in this paper have been

adjusted to reflect the combined total where a secondary family unit was present.

10.2.2 Supplemental Samples

The PSID low-income supplemental sample, as well as the SCF high-income supplemental sample, was originally drawn by federal agencies. In both cases, before the actual names and addresses were released to SRC, permission from the potential respondents was sought by the federal agency. Only information for respondents who agreed to participate was forwarded to SRC.

The PSID supplemental sample was initially drawn by the Census Bureau from the 1966–67 Survey of Economic Opportunity. From this base, selection for inclusion in the PSID was limited to households with incomes of less than twice the official poverty level whose head was under age sixty in 1967. When respondents were asked for their approval for the Census Bureau to forward their name and address to the PSID for interviewing, approximately 75 percent responded in the affirmative.

The SCF supplemental sample of high-income households was drawn by the Internal Revenue Service from the 1980 Statistics of Income data file. An income cutoff criterion of $100,000 in adjusted gross income was used to determine eligibility for inclusion in the sample. Respondents were chosen at random within income strata, with differential selection probabilities based on the proportion of estimated wealth holdings within each strata. Each person selected as a potential respondent was sent a letter seeking permission to release his or her name and address to SRC. For individuals who indicated their willingness to participate in the survey, the only information forwarded to SRC was the name and address. No financial information for specific individuals, or the sample as a whole, has been provided by the Internal Revenue Service, and no identifiable financial information collected by SRC has been released to anyone. Despite the safeguards devised to insure confidentiality, only 9 percent of the persons contacted agreed to participate in the study. It is important to note that, owing to concerns about privacy, no follow-up letter was sent after the initial mailing (the use of a follow-up letter usually results in higher response rates).[4] As we note later, it is hard to know how the 9 percent response rate for this supplemental sample should be interpreted: declining to volunteer is not the same as refusing to be interviewed.

The SCF also included an additional supplemental sample of pension plans and providers. The sample for the study of employer-sponsored pension benefit plans was derived in three interdependent stages. The overall research design was based on the use of the SCF to identify,

in turn, which households were covered by employer-sponsored pensions, which pension providers and plans covered these employees, and which benefit formulas and requirements governed these pension entitlements. The SCF questionnaire obtained detailed information on employment for the household head and spouse. All respondents or spouses with work experience were questioned about pension coverage on their current job as well as vested pension entitlements from prior employers. Households that reported pension coverage were asked to identify the provider of the pension—in most cases, their employers.

All the pension providers that were identified were pooled, and a sample listing was generated. A telephone interview was conducted with each of the pension providers. Each pension provider was asked to identify the pension plans that covered workers in a specific occupational classification and work location. Each pension provider was asked to mail copies of all official plan documents that covered SCF respondents to SRC. All necessary information on entitlement formulas and benefit requirements was coded from official plan documents by a trained staff of specialists. To estimate the dollar amount of pension entitlements, the provisions and benefit formulas obtained from the pension providers were combined with the household interview data on the respondent's income and employment history.

10.2.3 Panel Procedures

All three studies incorporate panel designs. For the SCF survey, however, the asset and debt questions were included in the first wave of interviews, and so for practical purposes it can be viewed as a single cross-section survey.[5] Although the PSID and SIPP panels differ greatly in terms of length, both share similar panel designs. The PSID follows all members of the original sample of families as well as any new family units that those original families spawned over time. As children leave home or adults separate to establish their own households, new families are "born" and remain part of the panel as long as they include a member or child of a member of the original base sample. Families drop out of the panel through death or combination with other panel families or are eliminated because no eligible sample member remains. This design produces an unbiased, weighted sample of families over time and thus remains representative with respect to its original sample design. The 1968 interview samples included 2,930 families in the base cross-section sample and 1,872 families in the low-income supplement. Overall, the size of the panel has increased from 4,802 families in 1968 to 6,918 in 1984.

The SIPP was designed to follow all members of the original sample of households that were age fifteen and older at the time of the first

interview. In each subsequent SIPP wave, all members of the original households were eligible for reinterviews. Original sample members who left the household were also contacted, and information was obtained on them and all other members of the "new" household. Members of the "new" households that were not part of the original sample were included as part of the data base only while they resided with original sample members. Since the SIPP panel calls for interviews over only a two-and-a-half-year period, the limitation to persons age fifteen or older has little practical effect.

10.2.4 Sample Size and Response Rates

The SCF was a personal interview survey. Most respondents were contacted at home for the interview, although many of the high-income respondents preferred to be contacted at an office location where records and, in some cases, accountants and other financial advisers could be consulted. The respondent selected within the household was either the head in a single-adult household, or the most knowledgeable spouse in married-couple households. The SCF data base included 4,262 completed household interviews—3,824 cross-section and 438 high-income interviews. The overall response rate was 73 percent, with a response rate of 71 percent for the cross-section portion. For high-income respondents who granted SRC permission to contact them, the response rate was 95 percent. About 4 percent of the cross-section cases were judged to be of uniformly poor quality in regard to financial data and were deleted from the analysis.

For the pension provider supplement, 1,886 households with 2,261 people reported being covered by one or more pension plans. Of these, 1,735 households covering 2,061 people gave permission and the necessary information to contact their pension provider. Consequently, 91 percent of all covered employees in the original SCF sample were included in the pension study sample base. Among all eligible pension providers, 86 percent were successfully contacted. These providers covered 91 percent of all eligible sample members, indicating a higher success rate among providers who covered multiple sample members. Once contacted, 85 percent of the providers provided sufficient information to ensure accurate coding. When each of these stages is taken into account, the overall coverage rate was 73 percent for all eligible sample members and 73 percent for all eligible pension providers. The overall coverage rate for households was somewhat higher (75 percent), as was the coverage rate for all eligible pension plans (75 percent).

Almost all the 1984 PSID interviews were conducted by telephone (92 percent), and the respondent was most frequently the family head (81 percent)—defined as the husband for married couples. One dis-

tinctive aspect of the PSID is that small annual payments are made to the respondents to complete interviews ($10) and to provide updated address information ($5). The PSID data base included 6,918 completed interviews. This represented a 97 percent response rate from the prior year's base, as has been true for most years. Given that this was the seventeenth interview wave, and because panel attrition was much higher in the first few years, the cumulative response rate as a proportion of the original sample base was just 44 percent. Studies have shown that the cumulative loss has not meant an increase in bias. A detailed study of panel attrition over the first fourteen years found no systematic evidence of nonrepresentativeness of the PSID data (Becketti et al. 1983; Duncan, Hill, and Ponza 1984).

The SIPP survey conducted personal interviews with each individual age fifteen or older living in selected households. Data were then aggregated to the household level for analysis. The fourth wave of SIPP included 20,900 completed household interviews, with a cumulative response rate of 85 percent, averaged across the four rotation groups. In both the SCF and the PSID surveys, asset and debt information was obtained for the household as a unit, whereas the SIPP survey ascertained whether the assets and debts were held separately by individuals within the household or were jointly owned by household members. Jointly held assets and debts were reported by either spouse in SIPP, depending on who was the first to be interviewed. Most of the SIPP interviews appear to have been conducted with the wife in husband/wife households, in contrast to both PSID and SCF, in which the most knowledgeable adult (usually the husband in husband/wife households) was the respondent.

10.2.5 Weights

In order to provide for unbiased population estimates, each survey devised a set of weights. In general, the procedures used to construct the weights were similar and included adjustments for differential selection probabilities and nonresponse rates. Although the procedures for assigning relative weights were similar, the variation in the weights differs substantially among the surveys.

The SCF weights were devised to integrate the cross-section and high-income supplement. These weights are based on the separate selection probabilities for each subsample and the joint probability for respondents that were eligible for selection in both samples. Weights were also adjusted to reflect the overall household nonresponse rate as well as the differential nonresponse rates across the seventy-four primary sampling units in the national sample. In addition, poststratification adjustments were made to the final weights, to bring the

sample distribution in line with population demographics as measured in the 1980 census.

Weights for the PSID were devised to combine the two samples, taking into account the original probabilities of selection for each subsample and the joint selection probabilities and adjusting for those who refused to participate and other sources of nonresponse. The PSID weights have also been adjusted for movement of nonsample individuals into sample families and for presumed or actual mortality. The PSID weights do not include any poststratification adjustments to force the distribution of selected variables to correspond to an external estimate of the population—although comparisons indicate a close match without such adjustments.

Weights for the SIPP data represent three factors: the selection probability, nonresponse adjustments, and poststratification adjustments using independent information on the estimated population size, by age, race, and sex. In addition, the weights were adjusted so that husband and wife were given equal weights.

10.2.6 Questionnaire Format

A major methodological difference across the three projects involved the type and number of questionnaire items used to measure wealth. The measurement of household wealth requires the valuation of a wide array of assets and debts. Each study divided the various assets and debts into a manageable number of mutually exclusive and exhaustive categories. The SCF used much more narrowly defined categories and frequently obtained balances on an account-by-account basis within those categories. The PSID and SIPP surveys, in contrast, used many fewer and much more broadly defined categories. (This difference in the level of detail reflects the fact that the measurement of net worth was a major focus of the SCF and a supplementary objective for the other two projects.) Given that the amount of information that must be provided by respondents is extensive, more accurate reporting is believed to be obtained by using greater detail in the measures. In the case of assets and debts, much of the information is recorded and comes to the attention of respondents on an "account" basis. Thus, the SCF asked respondents about each checking or savings account separately and asked about each mortgage, installment, or credit card debt separately.

The difference between the SCF and the PSID in the number of questionnaire items is quite dramatic: what the PSID covers in ten questions the SCF used more than 100 questions to elicit. The SIPP survey was between these two extremes but much closer to the PSID. The PSID used three categories of financial assets (liquid assets, stocks,

and bonds), three categories of tangible assets (primary residence, other properties, and vehicles), and three categories for ownership of businesses (including farms), pension entitlements, and household debts.

Across the three surveys, the greatest difference in the number of questionnaire categories involved financial assets. The PSID used just three questionnaire categories of financial assets for which dollar amounts were determined: checking and savings accounts, money-market funds, certificates of deposit, government savings bonds, and Treasury bills (including funds in individual retirement accounts [IRA] and Keogh accounts); stocks, mutual funds, investment trusts (including funds in IRA and Keogh accounts); and bonds, rights in trusts or estates, life insurance cash value, and collectibles held for investment purposes. The SIPP survey used eight financial asset categories to obtain dollar holding of financial assets:[6] regular and passbook savings accounts, money-market deposit accounts, certificates of deposit and other savings certificates, and negotiable order of withdrawal (NOW), super NOW, and other interest-earning checking accounts; money-market funds, U.S. government securities, municipal and corporate bonds, and other interest-earning assets; checking accounts (non–interest earning); stocks and mutual fund shares; U.S. savings bonds; IRA accounts; Keogh accounts; and other financial assets. The SCF used more than twenty questionnaire categories to measure financial asset holdings, and, for some of the categories, separate balances were determined for each account in the category: checking, NOW, share draft, super NOW, super share draft, cash management, sweep accounts (five accounts); IRA accounts; Keogh accounts; all savers certificates; seven- to ninety-day savings certificates, six-month money-market certificates, repurchase agreements; small saver, four-year, or other savings certificates; money-market mutual funds, money-market deposit accounts (three accounts); passbook, statement savings, share, or Christmas club accounts (five accounts); U.S. savings bonds; federal government bonds and bills; state, county, and municipal bonds; corporate and foreign bonds; tax free mutual funds; other mutual funds; stocks in company for which family member works; stocks held in investment clubs or partnerships; other publicly traded common or preferred stocks; call money accounts; trusts or managed investment accounts; life insurance cash value; and other financial assets.

The three studies more often used similar categories to define tangible assets—primary residence, vehicles, and other properties. But even here the studies differed in the types of questions asked. For example, the SCF study asked respondents to identify each vehicle they owned by its make, model, and year of manufacture as well as the amount of any outstanding debt on each vehicle. Using the vehicle's make, model, and year of manufacture, the asset value of each vehicle was estimated

from "blue books," and then the amount of outstanding debt was deducted. The net value of each vehicle was then summed for household totals. In sharp contrast, using just one question, the PSID asked respondents not only for one dollar figure that covered all household vehicles ("everything on wheels") but also that this figure be given net of any debt owed on those vehicles. The same was true for the measurement of debt. In comparison to the many detailed questions on household debts included in the SCF questionnaire, the PSID used one question to determine the total amount of all outstanding debt, aside from mortgages and vehicle loans. The SIPP was similar to the SCF in the method of measuring vehicle equity and similar to the PSID in the method of measuring debt.

10.3 Descriptive Statistics and Patterns

10.3.1 Introduction

In this section, we provide a general overview of the SCF, PSID, and SIPP survey data. The descriptive statistics cover the incidence and mean holdings of various types of assets in the three surveys within various net worth categories, and the section concludes with an extensive analysis of the age and income patterns of asset holding in the SCF and PSID surveys.

10.3.2 Incidence of Asset Holding

Table 10.1 provides comparative statistics for the three surveys on the incidence of asset holdings of various types—housing equity, common stock and mutual fund shares, liquid assets, farm and business equity, equity in other real estate, and net worth. The most striking feature of these data is the commonality across the three surveys, even though there are some differences in definition with consequent minor effects on incidence. Some of the principal anomalies tend to be explained by minor differences in survey technique and definition. For example, SCF is much lower than the others in the estimated proportion of households reporting zero liquid assets and much higher in the estimated proportion reporting very small amounts of liquid assets (under $5,000). But that difference is almost certainly due to the relatively greater detail in the SCF survey on different types of checking and saving accounts within households. Similarly, PSID has fewer households reporting zero holdings of common stock than the other two surveys, but that is largely a consequence of the fact that PSID includes stock held in IRA and Keogh accounts in their common stock category while the others treat such holdings separately.

Table 10.1 **Comparison of Wealth Distributions in Three National Surveys (percentage of households in size category)**

Size Category	Net Worth			House Equity			Liquid Assets		
	PSID	SIPP	SCF	PSID	SIPP	SCF	PSID[a]	SIPP	SCF
Zero or negative	10.3	10.9	8.0	38.5	38.2	36.3	18.3	18.8	11.9
$1–$4,999	13.0	15.1	17.0	2.2	2.9	3.4	34.5	48.8	51.7
$5,000–$9,999	7.1	6.4	6.1	4.3	3.4	4.0	12.2	8.8	10.0
$10,000–$24,999	11.5	12.3	12.3	11.9	11.9	12.3	13.9	10.4	12.8
$25,000–$49,999	14.7	14.6	15.3	19.2	19.2	19.5	6.3	6.5	6.7
$50,000–$99,999	17.7	19.8	17.8	18.1	18.8	17.3	6.8	5.5	4.4
$100,000–$249,999	17.8	16.1	14.6	5.3	6.8	6.1	2.7	1.3	1.9
$250,000–$499,999	5.7	3.5	5.0	.4	.6	.9	.2	.1	.4
$500,000 or more	2.2	1.3	3.8	.0	.0	.2	.1	.0	.1
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	Common Stock and Mutual Fund Shares			Farm/Business Equity			Other Real Estate Equity		
	PSID[b]	SIPP	SCF	PSID	SIPP	SCF	PSID	SIPP	SCF
Zero	74.6	81.6	79.7	88.4	90.3	85.7	79.4	83.2	79.1
$1–$4,999	9.0	9.5	10.1	1.2	2.7	1.4	2.1	2.2	2.3
$5,000–$9,999	4.7	2.6	3.0	.5	1.0	1.1	1.7	2.0	2.8
$10,000–$24,999	3.3	2.9	2.7	1.7	1.6	2.6	5.2	3.6	4.3

(*continued*)

Table 10.1 (continued)

	Common Stock and Mutual Fund Shares			Farm/Business Equity			Other Real Estate Equity		
	PSID[b]	SIPP	SCF	PSID	SIPP	SCF	PSID	SIPP	SCF
$25,000–$49,999	3.5	1.4	1.6	1.3	1.3	2.3	3.5	3.4	4.6
$50,000–$99,999	3.1	1.0	1.3	2.0	1.1	2.1	4.6	2.9	3.6
$100,000–$249,999	1.4	.6	.8	3.8	1.1	2.5	2.8	2.0	2.0
$250,000–$499,999	.3	.2	.5	.5	.4	1.2	.5	.5	.8
$500,000 or more	.2	.2	.4	.5	.1	1.1	.3	.1	.5
All	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Net worth is defined equivalently in PSID and SCF; the SIPP definition excludes rights in investment trusts, life insurance cash surrender values, and "collectibles"—antiques, coin and stamp collections, etc. None of the surveys defines net worth to include household tangible asset holdings except for houses and cars (and collectibles in PSID and SCF). That is, household durables and furnishings are not included as part of net worth, although debt used to acquire such assets is included in liabilities in all three surveys. *House equity* is defined equivalently—market value of house less mortgages. *Liquid assets* is defined to include checking accounts, money-market funds and brokerage call accounts, savings accounts and credit union shares, certificates of deposit, and government savings bonds in all three surveys. In addition, PSID definitions include IRA and Keogh accounts held in liquid asset form as well as Treasury bills. *Common stock and mutual fund shares* is defined as publicly traded stock and mutual fund shares in all three surveys. PSID includes IRAs and Keoghs held in the form of stock. PSID and SIPP data are net of brokers' loans; SCF is not. *Farm business equity* is defined equivalently as the market value of the household's equity in owned businesses or farms less any debt owed on those assets. *Other real estate equity* is defined equivalently as the market value of real estate holdings other than the respondent's own home, including seasonal residences, less any debt on the real estate assets. Both SCF and PSID include land contracts held by the respondent as a rental real estate asset, while SIPP does not.

[a]Includes IRAs and Keoghs held in liquid asset form.

[b]Includes IRAs and Keoghs held in the form of stock.

There are two important differences among the surveys that show up in table 10.1. First, there is a substantial difference between SIPP and the other two surveys in the proportion of households reporting holdings of "entrepreneurial" types of assets—equity in farms or businesses and equity in real estate other than the respondent's own home. For both of these types of assets, as well as for holdings of common stock and mutual fund shares, the great bulk of households report nonownership. For farm and business equity, 90 percent of SIPP households do not report any equity, while, for SCF, almost 86 percent report zero equity; PSID is in the middle. But that means that fewer than 10 percent of SIPP households report some equity in farm or business holdings, while almost 15 percent of SCF households report such ownership—a difference of close to 50 percent in incidence. The same kind of difference shows up in reports of equity in real estate other than the respondent's own home; about 83 percent of SIPP households report zero equity, compared to about 79 percent of SCF and PSID households—a 25 percent difference in incidence. These relatively large percentage differences eventually show up in very substantial absolute differences among the three surveys in estimated aggregate holdings of such assets.

Second, there is a substantial and persistent difference in the incidence of very large asset holdings of all types reported in SCF compared to either PSID or SIPP. As noted in the discussion above on sample design, SCF does not leave the proportion of high-income households, and presumably high-wealth households, entirely to the chance occurrence of selection probabilities applied to the population generally but uses data from IRS files on income distribution to add a high-income and high-wealth supplement to the cross-section probability sample. The SCF is thus likely to have a less biased set of high-income and high-wealth households than either the PSID or the SIPP, unless response rates are independent of income and wealth—a proposition known to be false from a long history of surveys of household wealth. (There may, of course, be biases because of the low response rate in the high-income supplement.) We discuss that issue at greater length below. For the moment, the reader should simply note that, in almost every asset category, SCF has a much larger (weighted) proportion of households in the highest wealth category.

10.3.3 Mean Values of Wealth Holding

Tables 10.2, 10.3, and 10.4 summarize the wealth data from the three household surveys, showing mean values of various asset and liability categories for households distributed across what is roughly a logarithmic

scale of net worth size categories. There are some differences in the definition of net worth in the three surveys as well as some differences in the degree to which the data available to us represent original values reported by respondents instead of values truncated at some arbitrary level. The truncation problem applies only to SIPP: except for common stock, the SIPP tape that we used for the analysis is top coded at the level of $500,000. We note below an inadvertent omission from the top-coding rule applied by SIPP, which produces one very large value in business and farm equity that appears on our tape, but generally the SIPP data will show lower totals than either PSID or SCF because of the top coding.

Further, SIPP appears not to include rights in investment trusts, which both the other two surveys include as elements of household wealth; nor does SIPP include life insurance cash surrender values or "collectibles" as part of household wealth. Both the other two surveys include these assets, at least in principle. In addition, the PSID data may have a double-count of rights in investment trusts. In the global questions used in the PSID, one category was specified to include

Table 10.2 **Mean SCF Net Worth Components by Size Category, 1983 (N = 4,103, weighted estimates, mean value in dollars)**

Net Worth Size Category	Vehicle Equity	House Equity	Liquid Assets	IRAs, Keoghs	Common and Mutual Fund Shares	Other Real Estate Equity
Zero or negative	407	142	467	13	26	. . .
$1–$4,999	1,282	308	601	16	177	26
$5,000–$9,999	2,401	2,440	1,800	87	123	303
$10,000–$24,999	2,643	8,939	3,010	256	364	813
$25,000–$49,999	3,232	23,277	4,266	463	737	2,229
$50,000–$99,999	4,257	43,292	9,584	777	1,505	5,793
$100,000–$249,999	5,928	64,759	25,632	2,709	6,596	20,627
$250,000 $499,999	7,759	94,627	40,556	7,448	20,972	56,419
$500,000 or more	11,617	204,865	93,059	20,155	267,365	322,772
All	3,675	34,602	12,303	1,781	12,587	19,550
Memo:						
Percentage of total in open-end class	11.9	22.4	28.6	42.8	80.3	62.4
Total assets or liabilities (billions of dollars)[a]	308	2,904	1,032	149	1,056	1,640

Table 10.2 (continued)

Net Worth Size Category	Farm/ Business Equity	Bonds	Investment Trusts	Other Assets	Other Debts	Net Worth
Zero or negative	43	4	1	89	3,172	−1,979
$1–$4,999	26	244	16	244	1,027	1,915
$5,000–$9,999	109	. . .	40	1,094	1,199	7,180
$10,000–$24,999	401	44	123	1,849	1,675	16,768
$25,000–$49,999	1,072	101	304	2,743	1,508	36,917
$50,000–$99,999	3,136	113	416	4,235	2,045	71,062
$100,000–$249,999	15,324	1,161	1,036	9,086	2,500	150,367
$250,000–$499,999	83,970	16,709	4,400	12,693	2,475	343,078
$500,000 or more	562,578	70,458	150,711	38,762	24,233	1,718,109
All	28,488	3,748	6,208	4,956	2,711	125,188
Memo:						
Percentage of total in open-end class	74.6	71.0	91.7	29.6	33.8	51.9
Total assets or liabilities (billions of dollars)[a]	2,391	314	521	425	227	10,505

Note: Vehicle equity is defined as the blue book value of first, second, and third cars owned by respondents, less installment debt on these vehicles, plus the value of other wheeled vehicles (motorcycles, motor homes, recreational vehicles, campers, etc.). *House equity* is defined as the market value of the respondent's home less mortgages on the home. *Liquid assets* is defined as sum of checking accounts, money-market funds, broker call accounts, savings accounts, credit union shares, certificates of deposit, and government savings bonds. *IRAs, Keoghs* is defined as the value of IRA and Keogh retirement accounts. *Common stock and mutual fund shares* is defined as the value of common stock and mutual fund holdings in publicly traded corporations. *Other real estate equity* is defined as the respondent's equity in real estate holdings other than his or her own home—value of property less market value of mortgages, including land contracts as part of real estate holdings. *Farm/business equity* is defined as the market value of the respondent's equity in farms and businesses, including proprietorships, partnerships, and closely held corporations, less any debt outstanding on these assets. *Bonds* is defined as the market value of respondent's holdings of publicly traded bonds—corporate, federal government, state and local, and foreign. *Investment trusts* is defined as the respondent's share of investment trusts. *Other assets* includes personal loans owed to the respondent, gas and oil leases, and the value of "collectibles"—tangible assets such as antiques, stamp or coin collections, etc. *Other debts* includes open-end and closed-end credit, except for automobile debt, mortgages on principal residence, debt on other real estate holdings, and debt on farm or business asset holdings. *Net worth* is the sum of the ten asset categories shown here less other debts.

[a]Estimated on the basis of 83.9 million households.

common stock, IRAs, Keoghs, and "investment trusts." The intent of the question was apparently to ask about REITs—real estate investment trusts or mutual stock funds. But some respondents may easily have interpreted the question to mean managed trust accounts generally. In the catchall asset question in PSID, "other assets," the question

Table 10.3 **Mean PSID Net Worth Components by Size Category, 1984 (N = 6,600, weighted estimates, mean value in dollars)**

Net Worth Size Category	Vehicle Equity	House Equity	Liquid Assets	Common Stock and Mutual Fund Shares	Other Real Estate Equity	Farm/ Business Equity	Other Assets	Other Debt	Net Worth
Zero or negative	763	32	353	62	48	290	69	5,682	−4,063
$1–$4,999	1,587	296	676	41	87	26	74	930	1,857
$5,000–$9,999	3,339	1,536	2,313	270	172	134	449	1,182	7,031
$10,000–$24,999	4,328	7,639	3,346	545	859	379	739	1,268	16,569
$25,000–$49,999	4,974	21,947	5,048	1,084	2,542	831	1,684	1,501	36,610
$50,000–$99,999	6,624	39,464	11,519	3,551	6,640	2,737	3,389	1,571	72,353
$100,000–$249,999	9,925	58,502	31,577	12,990	18,930	17,729	7,990	1,518	155,496
$250,000–$499,999	13,600	97,772	53,268	35,537	60,751	64,250	20,269	1,856	343,591
$500,000 or more	21,817	125,736	87,828	139,750	234,770	423,314	275,265	2,025	1,309,964
All	5,831	29,989	14,036	8,269	13,633	16,739	9,553	1,854	96,201

Memo:									
Percentage of total in open-end class	8.1	9.1	13.6	36.8	37.5	55.0	62.7	2.4	29.5
Total assets of liabilities (billions of dollars)[a]	503	2,573	1,204	709	1,170	1,436	820	159	8,254

Note: Vehicle equity is defined as the differences between the value of all the respondent's "wheeled vehicles" and any debt outstanding on such assets. *House equity* is defined as the market value of the respondent's home less any mortgages on that home. *Liquid assets* is defined as the value of holdings of checking acocunts, savings accounts, money-market funds, certificates of deposit, government savings bonds, Treasury bills, and IRAs and Keoghs held in liquid asset form. *Common stock and mutual fund shares* is defined as the value of the respondent's holdings of common stock, mutual fund shares, IRAs and Keoghs held in the form of common stock or mutual fund shares, and investment trusts, less any debt on these assets. *Other real estate equity* is defined as the market value of the respondent's holdings of real estate other than their own home less any debt owed on these properties. Includes land contract as a real estate asset. *Farm/business equity* is defined as the value of the respondent's equity in business or farm assets less any debt on those assets. *Other assets* includes the value of the respondent's holdings of bonds, rights in investment trusts, life insurance cash surrender values, and "collectibles," less any debt owed on these assets. *Other debt* includes any debt owed by the respondent except for debt on vehicles, housing, brokerage accounts, real estate other than own home, business or farm debt, or debt on other assets and would include such things as credit card debt, debt on open lines of credit, and installment and noninstallment debt except for vehicles. *Net worth* is the sum of the seven asset categories listed here less other debt.

[a]Estimated on the basis of 85.8 million households.

Table 10.4 **Mean SIPP Net Worth Components by Size Category, 1984 (N = 18,603, weighted estimates, mean value in dollars)**

Net Worth Size Category	Vehicle Equity	House Equity	Liquid Assets	IRAs, Keoghs	Common Stock and Mutual Fund Shares	Other Real Estate Equity	Farm/ Business Equity	Other Assets	Other Debt	Net Worth
Zero or negative	958	758	429	89	58	303	−38	180	6,604	−3,865
$1–$4,999	1,858	312	576	59	39	47	57	88	1,095	1,940
$5,000–$9,999	3,926	2,383	1,753	245	182	389	252	261	2,076	7,315
$10,000–$24,999	4,322	9,262	3,062	387	335	794	477	422	2,242	16,819
$25,000–$49,999	4,379	24,781	5,206	664	579	1,797	788	724	2,223	36,696
$50,000–$99,999	5,707	45,314	11,790	1,431	1,745	4,602	1,948	1,516	2,215	71,838
$100,000–$249,999	7,798	75,598	29,140	3,883	6,768	18,439	8,839	4,633	2,718	152,380
$250,000–$499,999	10,583	96,840	49,408	6,414	30,362	72,823	58,654	16,083	4,189	336,978
$500,000 or more	13,863	112,455	78,418	10,663	209,785	168,833	435,216	184,612	10,388	1,203,457
All	4,743	31,037	11,161	1,451	5,393	9,060	9,752	4,232	2,775	74,054

Memo:										
Percentage of total in open-end class	3.8	4.7	9.2	9.6	50.9	24.4	58.4	57.1	4.9	21.3
Total assets or liabilities (billions of dollars)[a]	410	2,683	965	125	466	783	843	365	240	6,401

Note: Vehicle equity is defined as the blue book value of respondent's holdings of vehicles less installment debt on such items. *Housing equity* is defined as the market value of the respondent's home less any mortgages. *Liquid assets* is defined as interest-earning assets held at banks and interest-earning assets held at other institutions plus checking accounts and government bonds (except for IRAs, Keoghs, and Treasury bills, liquid assets are defined equivalently here as they are in table 10.2 and 10.3). *IRAs, Keoghs* is defined as the value of the respondent's holdings of IRA and Keogh retirement accounts. *Common stock and mutual fund shares* is defined as the respondent's equity in holdings of publicly traded common stock or mutual fund shares. *Other real estate equity* is defined as the value of the respondent's holdings of real estate other than own home less any mortgages owed on these properties. This category does not include land contracts as a housing equity. *Farm/business equity* is defined as the value of the respondent's holdings of business and farm assets less any debt on these assets. *Other assets* includes bonds, loans owed to the respondent, and mortgages held by the respondent. *Other debt* includes open-end and closed-end consumer credit other than debt on vehicles and on common stock and mutual fund shares. *Net worth* is defined as the sum of the eight asset categories here less other debt.

[a]Estimated on the basis of 86.4 million households.

explicitly asks about "rights in investment trusts." Thus, respondents could have counted investment trust rights in both places, although the distribution of PSID assets suggests that most of the investment trust data show up in the "other assets" category and might not have been included in a major way in the "common stock, etc." category.

Finally, the three surveys do not refer to precisely the same time period. Interviewing for SCF was done in the spring of 1983, PSID data were obtained in the spring of 1984, and the SIPP data were obtained in the fall of 1984. These time-period differences should mean that, other things being equal, SIPP totals would be expected to be the highest of the three, PSID next, and SCF perceptibly lower. To some extent, the differences in timing tend to offset some of the differences in coverage—SIPP omits a couple of net worth categories and should therefore be lower than the others, but SIPP was conducted later than the other two and therefore would tend to show higher values. Our reading of the data is that the net differences between the surveys in coverage and timing are only a minor part of the observed differences.

What is most apparent from the data in tables 10.2, 10.3, and 10.4 is the general similarity in the distributions of various types of assets and liabilities and the striking differences among the three in the representation of very wealthy households. The data show a substantially higher level of mean net worth for the open-end wealth class for SCF compared to either PSID or SIPP in virtually every asset category and for PSID compared to SIPP in most categories. The combined effect of a higher mean value for asset holdings in the open-end class, coupled with the higher incidence of households in that category in SCF noted earlier, means that the overall population wealth estimates obtained from SCF are substantially larger than either SIPP or PSID; PSID is somewhat higher than SIPP. The importance of the open-end category for estimation of aggregate wealth is underlined by the memo item in the three tables, in which we show the proportion of total wealth holdings for particular types of asset that are attributable to asset holdings in the open-end category. For net worth as a whole in the SCF survey, more than 50 percent of the total is in the open-end class. For the other two surveys, the comparable proportions are 30 percent (PSID) and 21 percent (SIPP). That difference accounts in large part for the fact that mean net worth in the population as a whole is estimated at roughly $125,000 for SCF, a bit over $96,000 for PSID, and about $74,000 for SIPP.

In terms of specific types of assets and liabilities, the general tendency just discussed applies to all asset categories except vehicle equity. Here, SCF shows somewhat smaller numbers than either SIPP or PSID. The explanation seems to be in the method of data collection and evaluation used for vehicle equity. Both PSID and SIPP have very

broad definitions of vehicles: the category includes "everything on wheels"—boats, airplanes, trailers, recreational vehicles, campers, and so on. The SCF category is a bit more restrictive. In addition, PSID asked about the value of cars and other wheeled vehicles directly and in fact asked directly about equity in such items. In contrast, SCF and SIPP asked about make and model year, imputed values from blue book data, and then subtracted debt obtained from another set of questions about installment loans on these items. The overall thrust of these differences is to make the SCF estimate of vehicle equity a bit more conservative then either of the other two.

For other categories, the dominant difference is in the SCF open-end class mean values, which are substantially and consistently higher than either of the other two data sources. This is especially true for net worth categories where wealth is heavily concentrated—common stock, equity in real property other than own home, equity in noncorporate business, bonds, and investment trust accounts. The difference between SCF and the other surveys is not so large where assets are more evenly distributed, such as vehicles, houses, and liquid assets.

A summary of the differences between the three surveys in estimates of aggregate net worth and the composition of net worth is shown in table 10.5. For vehicle equity, house equity, liquid assets, and IRAs and Keoghs, the three surveys are quite close to each other. Aside from the last category (IRAs and Keoghs), these are assets that tend to be widely distributed among the population, and thus the estimated

Table 10.5 **Estimates of Aggregate Net Worth and Major Components (billions of dollars)**

	SCF	PSID	SIPP
Vehicle equity	308	503	410
House equity	2,904	2,573	2,683
Liquid assets	1,032	1,204	965[a]
IRAs, Keoghs	149	[b]	125
Common stock and mutual fund shares	1,056	709	466
Other real estate equity	1,640	1,170	783
Farm/business equity	2,391	1,436	843
Other assets	1,260	820	365
Other debt	227	159	240
Net worth	10,505	8,254	6,401[c]

[a]Includes corporate, municipal, and tradable federal government bonds, which are included in "other assets" in both SCF and PSID data. The SCF total for such bonds is $314 billion (see table 10.2).

[b]Included partly in liquid assets, partly in common stock.

[c]Total from SIPP file without top coding at the $500,000 level is approximately $6.8 trillion (data from U.S. Census Bureau).

size of the aggregates is not very sensitive to the representation of very wealthy households in the sample. In sharp contrast, for holdings of common stock the SCF estimate is more than double the SIPP estimate, with PSID about in the middle. The SCF estimate of equity in real estate other than own home shows similar characteristics—SCF more than twice SIPP, with PSID in between. For equity in farms and businesses, the SCF estimate is almost triple the SIPP estimate, while PSID is almost double the SIPP figure. And for "other assets," which includes bonds and investment trusts, the SCF estimate is more than three times as large as SIPP, while PSID is more than twice as large as SIPP.

As noted earlier, these large differences in total wealth are primarily accounted for by the large differences among the three surveys in the proportions of households owning very large amounts of wealth and the average amount of wealth held by such households. But what characteristics of the three surveys account for these differences in reported wealth holdings? In principle, all three surveys are based on probability samples of the U.S. population, and they should contain roughly equal distributions of population characteristics like income, age, race, marital status, education, and so on. However, response rates on a wealth survey are not independent of these population characteristics and in particular are not independent of income (and wealth) levels. The normal expectation is that very high-income households will tend to be underrepresented in population samples, simply because nonresponse is apt to be much higher in such households and a nonresponse correction cannot be made. In addition, over and above any underrepresentation of high-income households, population samples are apt to provide poor estimates of the mean values of wealth holding for those (underrepresented) sample elements with very high incomes; that is, not only will conventional probability samples underrepresent high-income households generally, but they are also likely to miss the true distribution within the high-income class. It was precisely that difficulty that underlies the importance of adding a high-income supplemental sample if a wealth survey is to have any prospect of capturing the true distribution of wealth in the society.

Note that two issues are involved. First, does the sample represent the size of the upper tail of the income distribution with reasonable accuracy? Second, do the parts of the sample in the upper tail of the income distribution adequately represent the true distribution of the population in that region? The three surveys differ dramatically in this regard, both in the degree to which they represent high-income households at all and in the sampling error (and probable bias) of wealth holdings among very high-income households. In addition, the public use SIPP data file will underestimate the size of the open-end income

class because income (as well as most wealth categories) is top coded (truncated). As noted below, the effect of top coding on the estimated distribution of income in the SIPP file is substantial.

Table 10.6 summarizes the information from the three surveys on the actual numbers of households, and the weighted proportions of the population, estimated to be in the various income classes. The weighted data take account of the sharply differential selection probabilities for high-income households in the three wealth surveys. Two estimates are shown for SCF. The first, SCF-CS, shows the income distribution for the cross-sectional part, which ought to be no different from PSID or SIPP. The second, SCF-F, shows the combined distribution for the cross-sectional and high-income parts of the SCF, which ought to be equivalent to SCF-CS when weighted but will have substantially more cases in the very high-income classes. It is these differences that appear to account for the large differences shown in tables 10.2, 10.3, and 10.4.

The data indicate substantial differences in the estimated distribution of income in the three surveys and even more substantial differences in the number of cases in the open-end income categories available to estimate mean wealth in those categories. The key income categories are the last two—households with incomes from $96,000 to $192,000 and those with incomes higher than $192,000. All three surveys have over 1 percent of households in the $96,000–$192,000 category, with SCF and SIPP having about 1.7 percent of the population there and PSID about 1.1 percent. Both SIPP and SCF-F have reasonable sample sizes in these categories—several hundred cases in both—while PSID has only fifty-five and SCF-CS only sixty-three. In the open-end income category—over $192,000—SIPP estimates the population as less than one-tenth of 1 percent, PSID about two-tenths of 1 percent, SCF-CS about five-tenths of 1 percent, and SCF-F about eight-tenths of 1 percent. In terms of the number of cases actually available to estimate

Table 10.6 **Comparison of Income Distribution in Three Wealth Surveys**

Income Class (hundreds of dollars)	Number of Cases				Weighted Proportion of Total			
	SIPP	PSID	SCF-CS	SCF-F	SIPP	PSID	SCF-CS	SCF-F
Under $10.8	4,433	1,724	996	996	23.5	23.0	26.5	26.4
$10.8–$23.9	5,695	2,051	1,223	1,223	31.0	29.3	33.3	33.2
$24–$47.9	5,956	2,054	1,069	1,072	32.4	33.0	29.3	29.3
$48–$95.9	2,168	703	298	328	11.3	13.4	8.6	8.6
$96–$191.9	335	55	63	191	1.7	1.1	1.8	1.6
$192 or more	16	11	13	294	.1	.2	.5	.8
Total	18,603	6,598	3,665	4,103	100.0	100.0	100.0	100.0

mean values of wealth in that income class, SIPP has only sixteen cases, PSID eleven, and SCF-CS thirteen; SCF-F has 294 because of the substantially higher selection probability in SCF-F for this income class. As already noted, top coding on the SIPP tape means that the open-end income category is underestimated.

While the difference between SCF and the other three surveys in the sample sizes in the high-income classes is clearly due to differential sampling weights, there appear to be large differences in the cross-sectional surveys that cannot be attributed to differential sampling fractions. Table 10.6 shows the weighted proportion of households in the open-end income class as 0.1 for SIPP, 0.2 for PSID, and 0.5 for SCF—all extremely small and based on tiny numbers of actual cases. However, the top coding on income reflected in the public use data tape makes a substantial difference here: the true proportion of SIPP households in the open-end income class (above $192,000) is actually about four-tenths of 1 percent rather than the one-tenth of 1 percent shown above. Since most of these cases must have come from the next highest income class, the true distribution of the SIPP sample in the two highest income classes is 2.0 percent, divided 1.6 percent in the $96,000–$192,000 class and 0.4 percent over $192,000 (pers. com. from census staff). The SCF estimates about 2.4 percent in these classes, divided 1.6 percent and 0.8 percent, while PSID is lower than either, with 1.3 percent in the two highest income classes, divided about 1.1 percent and 0.2 percent. Thus, SIPP and SCF are reasonably close to each other, and both are substantially larger than PSID.

This result is puzzling since the data in tables 10.2, 10.3, and 10.4 tell us that, first, the principal difference in the three surveys lies in the (weighted) proportions of households in the open-end wealth class and in the estimated mean value of wealth holdings in that class and, second, that SCF has both more households and higher average wealth in that class than PSID, which in turn has more than SIPP. But that difference apparently cannot be explained by counterpart differences among the three in the weighted proportions of households in the very high-income classes. The SCF/PSID difference can be explained in that way, but the difference between both and SIPP cannot—SIPP has an income distribution in the upper tail that is more like SCF than PSID and actually has more (weighted) households in that part of the income distribution than PSID. Thus, the differences between the three surveys must in large part represent differences in reported asset holdings for households with comparable income (and presumably other) characteristics.

A speculative interpretation that accords with survey folklore is that interviewer/respondent interactions are the cause. SCF interviewing was done by people who knew that there were a lot of wealthy households in the sample (because of the high-income supplement) and who

expected such households to be willing to be interviewed. PSID interviewing was done by many of the same people since the SRC field staff conducted both interviews. In addition, the rapport between PSID interviewers and respondents must be quite good since the same interviewers had been talking to many of the same households over a long period of time.

In contrast, SIPP interviews were conducted by people who had rarely conducted wealth surveys in the past and who may well have had the normal expectation of interviewers about the prospects of successfully interviewing wealthy people—that such interviews would be difficult and that most such respondents would either refuse or be uncooperative. Moreover, the SIPP respondent was often the wife in husband/wife households rather than the head of household (defined as the principal wage earner), designated on PSID, or the "most knowledgeable adult," specified on SCF. For wealthy households, that probably matters a good deal since knowledge of the household's assets—especially assets like net worth of a business, the value of a large common stock portfolio, and the value of investment real estate holdings—will often be sketchy unless the respondent is the person who controls that part of the household's saving and investment decisions. Expectancy theory (that people will behave as they are expected to behave) and cognition theory (that you cannot report accurately what you do not know) both predict that SIPP wealth data will be lower than either SCF or PSID, other things being equal.

This interpretation—that the differences between SCF and PSID are largely due to the differential representation of very wealthy households while the differences between SCF or PSID and SIPP are due largely to underreporting of the asset holdings of wealthy households—assumes that neither the coverage differences among the three surveys nor the effect of top coding in the SIPP survey can account for the observed differences. While there are some coverage differences that would explain why the SIPP estimates are lower, they are not large enough to account for much of the observed difference. As noted, SIPP does not include the cash surrender value of life insurance reserves or the value of "investment collectibles"—antiques, art, and so on—in net worth and may not have included rights in investment trusts. Both SCF and PSID included those types of assets, at least in principle. In addition, the PSID data may contain some double-counting of rights in investment trusts. But those differences could not under any circumstance account for more than about one-third of the overall difference between PSID and SIPP and about one-sixth of the difference between SCF and SIPP.

While the top coding on the SIPP public use tape clearly accounts for some of the difference between SIPP and the other two surveys, it

cannot account for much of it. The evidence is of two sorts. First, we know from informal communication with the Census Bureau that the net total worth of the SIPP data without top coding is less than 10 percent larger than the public use tape used for this paper. That is simply not enough to account for anything like the observed difference. Second, we do have two asset categories in which top coding was not applied to the public use tape—stock and mutual fund shares and (inadvertently) some of the estimates on the SIPP tape for equity in farm and business assets. For both these categories, the differences between SIPP and the two surveys are very large, and they cannot be accounted for by top coding. We are thus left with the interpretation that part of the difference in the net worth total for the three surveys is attributable to differences in the representation of high-income households in the three surveys, but a major part of the difference must be attributed to differential success in obtaining net worth estimates from wealthy households.

The sensitivity of the aggregate wealth data to adequate representation of the small number of very wealthy households in the population would be even more visible in these data if we were able to classify households by other variables that relate to large wealth holdings. While trying to represent the upper tail of the income distribution is clearly the single most important factor in determining the adequacy of a wealth survey, the age of the respondent must also be highly relevant: asset holdings, after all, are the cumulative consequences of initial wealth, saving rates, and rate of return on both. Older households have a much longer period of time over which to allow initial wealth holdings to grow and to allow annual savings to grow. Thus, holding income constant, older households will have much larger wealth holdings than younger households, at least until retirement. But it is clearly impossible to provide meaningful data on the joint distribution of very high income and age in either the SIPP or the PSID surveys—one has little confidence in estimates of mean wealth holdings obtained from samples of sixteen and eleven, and one simply cannot provide meaningful estimates of wealth holdings for SIPP or PSID respondents in the highest income category cross-classified by age. That can be done for SCF respondents since there are several hundred households in the open-end income category. Table 10.7 shows that distribution for SCF respondents, indicating mean income and mean wealth holdings by age for the 293 SCF respondents with incomes above $192,000; the importance of age is evident.

Although there are major differences between the three surveys in aggregate wealth estimates, in the estimated degree of wealth concentration, and in the distribution of wealth among types of assets, all of which relate to differences in the representation of very wealthy households, one should not lose sight of the commonality of results for the

Table 10.7 SCF Respondents with Incomes Greater than or Equal to $192,000

	Age Class						
	<35	35–44	45–54	55–64	65–69	70–74	75+
Weighted mean income (thousands of dollars)	363	345	355	387	437	438	562
Weighted mean wealth (thousands of dollars)	986	1,585	4,239	3,330	4,613	3,496	6,461
N	4	38	69	95	43	21	23

great bulk of the U.S. population in these three surveys. For households with less than $250,000 in net worth, a category comprising over 90 percent of all households, almost all net worth is in the form of housing equity, vehicle equity, and liquid assets. There is very little difference among the three wealth surveys in estimates for these three types of assets. Thus, the wealth data for all three are virtually interchangeable for analyses that focus on, for example, the saving, asset accumulation, labor supply, spending, and fertility behavior of all but the wealthiest 5–10 percent of the population.

10.3.4 Income and Age Distribution of Wealth Holdings

Tables 10.8 and 10.9 provide a more detailed view of the composition of asset and debt holdings obtained by SCF and PSID. Both tables show mean values for the two surveys by income class and age class. The patterns are basically similar for the two except where the highest income classes are concerned, where SCF mean values are consistently much higher. Thus, the message here is fundamentally the same as the message in the earlier tables—adequate representation of high-income and high-wealth classes is crucial to an understanding of wealth and the wealth distribution, and, the better the representation of such households, the better the survey. More precisely, without representation obtained from something other than a conventional probability sample design, accurate assessment of wealth holding in the United States is an impossible task using household survey techniques.

These data have a number of features that are worth noting. First, the exceptional level of detail available on SCF permits examination of the characteristics of wealth holdings in the U.S. population in a way not possible with either of the other two surveys. The PSID, as noted earlier, has only very global net worth components, while SIPP is between the two but closer to PSID than to SCF.

The striking feature of table 10.8, where the SCF data are displayed, is the pattern of relative concentration among the population of various types of assets and liabilities. That concentration is best shown by the last column in the table, which shows the fraction of total asset holding

Table 10.8 **SCF Net Worth Data by Income and Age Class, 1983: Mean Values in Thousands of Dollars**

Net Worth Category	A. Income Class (percentage of population)							
	<$10.8 (26.4)	$10.8–$23.9 (33.2)	$24.0–$47.9 (29.3)	$48.0–$95.9 (8.6)	$96.0–$191.9 (1.6)	≥$192 (0.8)	All (100)	Percentage of Total in Open-End Class
Real estate:								
Gross value of home	16.0	29.5	55.6	97.6	192.4	370.3	44.9	6.9
Gross value of other property	3.1	6.2	16.1	62.6	123.0	857.7	22.2	32.5
Gross value of land contracts	.1	1.1	1.5	2.6	10.2	18.5	1.4	11.2
Total property	19.2	36.8	73.2	162.8	325.6	1,245.5	68.5	15.3
Mortgages on home	1.7	5.3	15.3	28.2	37.9	64.0	10.3	5.2
Mortgages on other property	[a]	.8	3.1	14.6	26.7	110.4	3.8	24.5
Mortgages on land contracts	. . .	.1	.3	.7	1.1	2.2	.2	8.3
Total mortgages	1.7	6.2	18.7	43.5	65.7	176.6	14.3	10.3
Equity in home	14.2	24.2	40.2	69.4	154.5	306.3	34.6	7.4
Equity in other property	3.2	5.4	13.0	48.0	96.3	747.3	18.4	32.8
Equity in land contracts	.1	1.0	1.2	2.0	9.1	16.3	1.2	11.7
Total equity in property	17.5	30.6	54.4	119.4	259.9	1,069.9	54.2	16.6

Financial assets:								
Checking accounts	.5	1.0	1.3	3.1	7.3	26.1	1.4	15.1
Money-market funds and broker call accounts	.2	1.5	2.7	7.8	32.4	93.1	3.3	23.5
Saving accounts and credit union shares	.6	1.9	3.0	5.5	8.6	10.6	2.4	3.7
Certificates of deposit	1.2	4.0	5.3	10.4	19.7	46.1	4.8	8.0
Government savings bonds	.1	.2	.5	.6	.9	6.8	.4	15.8
Total Liquid Assets	2.6	8.6	12.9	27.4	69.0	182.6	12.3	12.4
Other bonds	[a]	.4	.9	9.6	42.1	219.1	3.7	48.6
Common stock and mutual fund shares	.3	1.6	4.2	21.8	151.4	769.9	12.6	51.3
IRAs or Keoghs	.1	.7	1.4	5.0	19.4	45.9	1.8	21.6
Trust accounts	.2	.4	1.8	3.4	24.6	573.6	6.2	77.5
Cash value of life insurance	1.0	1.8	4.4	6.8	13.5	33.4	3.2	8.6
Personal loans and gas, oil leases	[a]	.1	.1	.5	3.9	21.2	.4	49.7
Total other financial assets	1.7	5.0	12.8	47.1	255.0	1,661.2	27.9	49.9
Total financial assets	4.3	13.6	25.7	74.5	324.0	1,843.8	40.2	38.4
Business assets:								
Net equity in business or farm (no management interest)	1.4	.8	1.7	12.9	40.0	208.2	4.6	37.8
Net equity in business or farm (management interest)	5.0	5.9	15.2	53.8	210.1	970.9	23.9	34.1
Total business equity	6.4	6.7	16.9	66.7	250.1	1,179.1	28.5	34.7

(*continued*)

Table 10.8 (continued)

Net Worth Category	A. Income Class (percentage of population)							
	<$10.8 (26.4)	$10.8–$23.9 (33.2)	$24.0–$47.9 (29.3)	$48.0–$95.9 (8.6)	$96.0–$191.9 (1.6)	≥$192 (0.8)	All (100)	Percentage of Total in Open-End Class
Other tangible assets:								
Automobiles (gross)	1.6	3.7	6.2	8.9	11.2	14.3	4.5	2.7
Debt on automobiles	.3	.9	1.7	2.4	1.6	1.2	1.1	.9
Equity in automobiles	1.3	2.8	4.5	6.5	9.6	13.1	3.4	1.8
Other tangible assets	.6	.9	1.3	3.9	8.1	38.9	1.6	25.5
Total assets (gross)	32.1	61.7	123.2	316.8	918.9	4,322.7	143.3	25.3
Debt:								
Revolving charge debt	.3	.4	.9	1.5	2.1	31.5	.9	28.2
Credit cards	.1	.3	.5	.6	.4	.4	.3	1.0
Open lines of credit	.2	.2	.4	.9	1.7	31.1	.6	42.0
Closed-end consumer debt	.8	2.0	3.0	5.4	13.3	51.0	2.9	14.9
Installment debt	.4	1.4	2.6	4.4	4.5	10.5	1.9	4.6
Automobiles	.3	.9	1.7	2.4	1.6	1.2	1.1	.9
Other	.1	.5	.9	2.0	2.9	9.3	.8	. . .
Noninstallment debt	.3	.6	.4	.9	8.7	40.5	.9	35.7
Total consumer credit	1.1	2.5	4.0	6.9	15.4	82.5	3.8	18.2
Real estate debt	1.7	6.2	18.7	43.5	65.7	176.6	14.3	10.3
Total debt	2.9	8.7	22.7	50.4	81.1	259.0	18.1	12.0
Net worth	29.3	53.0	100.4	266.4	837.8	4,063.7	125.2	27.2

	B. Age Class (percentage of population)							
	<35 (30.4)	35–44 (19.5)	45–54 (15.7)	55–64 (15.0)	65–69 (6.7)	70–74 (5.4)	75+ (7.2)	All (100)
Real estate:								
Gross value of home	20.4	52.5	66.2	61.7	60.3	44.3	32.5	44.9
Gross value of other property	5.6	16.0	29.8	32.6	83.8	18.7	15.9	22.2
Gross value of land contracts	.3	.9	1.5	2.8	4.0	1.3	1.6	1.4
Total property	26.3	79.4	97.5	97.1	148.1	64.3	50.0	68.5
Mortgages on home	10.2	18.4	13.8	7.5	3.7	1.1	.4	10.3
Mortgages on other property	1.9	5.0	8.0	4.5	2.9	.2	1.0	3.8
Mortgages on land contracts	.2	.2	.2	.6	.2	. . .	.1	.2
Total mortgages	12.3	23.6	22.0	12.6	6.8	1.3	1.5	14.3
Equity in home	10.2	34.2	52.4	54.2	56.6	43.2	32.1	34.6
Equity in other property	3.8	11.0	21.8	28.1	80.9	18.5	14.9	18.4
Equity in land contracts	.2	.7	1.3	2.2	3.8	1.3	1.5	1.2
Total equity in property	4.2	45.9	75.5	84.5	141.3	62.0	48.5	54.2
Financial assets:								
Checking accounts	.5	1.1	1.4	2.6	2.9	2.5	2.0	1.4
Money-market funds and broker call accounts	.6	2.5	4.2	5.1	8.9	5.2	4.6	3.3
Savings accounts and credit union shares	1.0	2.3	2.6	2.6	4.2	2.9	5.2	2.4

(*continued*)

Table 10.8 (continued)

	B. Age Class (percentage of population)							
	<35 (30.4)	35–44 (19.5)	45–54 (15.7)	55–64 (15.0)	65–69 (6.7)	70–74 (5.4)	75+ (7.2)	All (100)
Certificates of deposit	.7	1.6	3.0	7.7	13.8	12.7	12.1	4.8
Government savings bonds	.1	.2	.3	.9	.6	.2	.7	.4
Total liquid assets	2.7	7.7	11.5	18.9	30.4	23.5	24.6	12.3
Other bonds	.2	1.6	3.2	6.8	13.9	8.7	5.9	3.7
Common stock and mutual fund shares	1.1	4.7	13.4	24.1	33.7	33.9	21.0	12.6
IRAs or Keoghs	.3	1.2	2.0	5.3	4.3	1.2	.2	1.8
Trust accounts	1.1	1.3	26.1	5.1	5.3	3.4	3.1	6.2
Cash value of life insurance	2.5	3.9	3.7	4.8	3.2	2.6	1.0	3.2
Personal loans and gas, oil leases	[a]	.1	.8	.7	1.0	.1	.1	.4
Total other financial assets	5.2	12.8	49.2	46.8	61.4	49.9	31.3	27.9
Total financial assets	8.1	20.5	60.7	65.7	91.8	73.4	55.9	40.2
Business assets:								
Net equity in business or farm (no management interest)	.7	3.8	6.0	6.0	10.8	4.6	11.7	4.6
Net equity in business or farm (management interest)	5.3	18.3	51.4	45.8	33.9	19.9	4.9	23.9
Total business equity	6.0	22.1	57.4	51.8	44.7	24.5	16.6	28.5
Other tangible assets								
Automobiles (gross)	3.7	5.4	6.1	5.3	4.2	2.9	1.8	4.5
Debt on automobiles	1.2	1.6	1.5	.9	.4	.1	[a]	1.1

Equity in automobiles	2.5	3.8	4.6	4.4	3.8	2.8	1.8	3.4
Other tangible assets	1.2	2.0	2.4	2.4	.8	1.0	.8	1.6
Total assets (gross)	45.3	129.4	214.1	222.3	289.6	176.1	125.1	143.3
Debt:								
Revolving charge debt	.5	1.3	1.3	1.9	.3	.1	[a]	.9
Credit cards	.3	.5	.4	.3	.1	.1	[a]	.3
Open lines of credit	.2	.8	.9	1.6	.2	[a]	[a]	.6
Closed-end consumer debt	2.7	4.7	3.1	3.0	.9	.4	1.4	2.9
Installment debt	2.0	3.0	2.4	1.7	.6	.2	.1	1.9
Automobiles	1.2	1.6	1.5	.9	.4	.1	[a]	1.1
Other	.8	1.4	.9	.8	.2	.1	.1	.8
Noninstallment debt	.6	1.7	.7	1.3	.3	.2	1.3	.9
Total consumer credit	3.2	6.0	4.4	4.9	1.2	.5	1.4	3.8
Real estate debt	12.3	23.5	22.0	12.6	6.8	1.2	1.5	14.3
Total debt	15.5	29.6	26.4	17.5	8.0	1.7	2.9	18.1
Net worth	29.8	99.8	187.7	204.8	281.6	174.4	122.2	125.2

Note: The "net worth" categories here are self-explanatory. A possible exception is "other tangible assets," which include "collectibles," such as stamp and coin collections, antiques, art, etc.

[a]Less than $50.

Table 10.9 **PSID Net Worth Data by Income and Age Class, 1983: Mean Values in Thousands of Dollars**

	A. Income Class (percentage of population)							
Net Worth Category	< $10.8 (23.0)	$10.8–23.9 (29.3)	$24–47.9 (33.0)	$48–95.9 (13.4)	$96–191.9 (1.1)	≥ $192 (0.2)	All (100)	Percentage of Total in Open-End Income Class
Home equity	11.0	20.0	33.2	65.7	136.7	122.6	30.0	1.0
Real estate equity	2.8	6.1	14.0	37.6	95.5	186.5	13.6	3.3
Business and farm equity	3.7	5.8	15.0	46.5	73.5	892.2	16.7	13.0
Stocks and mutual funds	.8	3.4	7.1	20.7	150.1	105.1	8.3	3.1
Liquid assets	5.1	11.2	15.4	24.8	66.5	174.6	14.0	3.0
Other assets	1.4	2.5	12.1	28.3	46.7	66.5	9.6	1.7
Vehicle equity	1.5	4.1	7.4	11.8	18.1	14.5	5.8	.6
Other debt	1.3	1.2	1.9	3.7	6.5	4.9	1.8	.7
Total net worth	25.0	52.0	102.4	231.9	580.6	1,556.0	96.2	4.0

	B. Age Class (percentage of population)							
	< 35 (31.9)	35–44 (18.7)	45–54 (13.5)	55–64 (15.0)	65–69 (5.4)	70–74 (5.7)	75+ (9.8)	All
Home equity	9.3	33.0	47.5	47.8	46.2	34.5	29.0	30.0
Real estate equity	2.9	15.2	23.1	20.5	31.3	11.7	13.3	13.6
Business and farm equity	5.2	32.4	28.0	24.5	12.0	8.7	4.0	16.7
Stocks and mutual funds	1.6	5.6	11.7	16.7	13.0	11.2	13.1	8.3
Liquid assets	3.5	10.2	14.6	20.2	31.9	23.1	30.1	14.0
Other assets	1.7	5.8	5.7	25.7	6.2	3.1	28.8	9.6
Vehicle equity	4.2	7.6	8.2	7.3	7.1	4.2	2.5	5.8
Other debt	2.3	2.3	3.1	1.0	1.0	.4	.3	1.8
Total net worth	26.1	107.7	135.8	161.8	146.6	96.1	120.4	96.2

Note: Definitions used here are the same as described in table 10.3.

of each type represented by holdings of those in the open-end income class—above $192,000. Among the most concentrated categories are trust accounts (77.5 percent owned by households with incomes over $192,000), common stock (51.3 percent), bonds (48.6 percent), equity in business and farms (34.7 percent), equity in real estate other than own home (32.8 percent), and "other tangible assets" (25.5 percent). Some of the debt categories are also highly concentrated in the open-end income class—over one-third of the noninstallment debt (items like personal loans) and more than 40 percent of the debt incurred on open lines of credit. Among the least concentrated wealth categories are savings accounts (3.7 percent of the total in the open-end income category), mortgages on principal residence (5.2 percent), gross value of principal residences (6.9 percent), certificates of deposit (8.0 percent), and cash value of life insurance (8.6 percent). Most of the debt categories are also widely distributed among the population: automobile debt and credit card debt have only about 1 percent of the total in the open-end income class. The comparable PSID data in table 10.9, which contains much less detail because the PSID categories are much more aggregated, show income and age patterns that are similar for income classes below $96,000 but quite different for income classes above that level—with much less concentration of holdings.

A summary of the distributional characteristics of the three wealth surveys is shown in table 10.10, where a comparison of the mean asset holding by income class is provided for roughly equivalent asset categories. These data show dramatically that the major difference between the surveys shows up in the mean value of heavily concentrated assets held by households in the two (occasionally three) highest income classes. The best comparison here is between PSID and SCF, where the mean values of asset holdings are often very close for the first four income classes—up through the $48,000–$95,900 class. But, for net worth held in the form of equity in real estate other than own home, the mean value in SCF for the highest income class is almost four times as large as for PSID. For common stock, mutual fund shares, IRAs, and Keoghs, the SCF open-end mean is about eight times as high. For other assets (which includes bonds and rights in investment trusts), the SCF mean value in the open-end income class is more than ten times higher than the PSID mean value. And, for net worth as a whole, SCF shows a mean value almost three times as high as PSID. Even for assets that are much more evenly distributed among the population—home equity, for example—SCF showed an average value almost three times as high in the open-end income class.

These comparisons are striking testimony to the fact that because of nonresponse bias the characteristics of a probability sample in a very high-income class may be quite unlike the true characteristics of

Table 10.10 **Comparison of Selected SIPP,[a] PSID, and SCF Mean Net Worth Components by Income Class: Mean Values in Thousands of Dollars**

Net Worth Category	Income Class						All	Percentage of Total in Open-End Income Class
	< $10.8	$10.8–$23.9	$24–$47.9	$48–$95.9	$96–$191.9	≥ $192		
Home equity:								
SIPP	17.2	25.0	35.0	56.9	82.1	99.1	31.0	.3
PSID	11.0	20.0	33.2	65.7	136.7	122.6	30.0	1.0
SCF	14.2	24.2	40.2	69.4	154.5	306.3	34.6	7.4
Real estate equity:								
SIPP	3.3	5.2	9.1	23.5	59.8	71.8	9.1	.7
PSID	2.8	6.1	14.0	37.6	95.5	185.5	13.6	3.3
SCF	3.2	6.4	14.2	50.0	105.4	763.6	19.5	32.5
Business/farm equity:								
SIPP	3.6	3.8	5.0	13.4	264.3[b]	63.2	9.8	.5
PSID	3.7	5.8	15.0	46.5	73.5	892.2	16.7	13.0
SCF	6.4	6.7	16.9	66.7	250.1	1,179.1	28.5	34.7
Common stock and mutual fund shares, IRAs, Keoghs:								
SIPP	1.1	2.1	5.9	22.3	62.5	531.5	6.8	8.8
PSID	.8	3.4	7.1	20.7	150.1	105.1	8.3	3.1
SCF	.4	2.3	5.7	26.8	171.4	816.8	14.4	47.9

(*continued*)

Table 10.10 (continued)

Net Worth Category	Income Class						All	Percentage of Total in Open-End Income Class
	< $10.8	$10.8–$23.9	$24–$47.9	$48–$95.9	$96–$191.9	≥ $192		
Liquid assets:[c]								
SIPP	4.7	9.8	11.9	20.4	46.4	87.7	11.2	.7
PSID	5.1	11.2	15.4	24.8	66.5	174.6	14.0	3.0
SCF	2.6	8.6	12.8	27.4	68.9	182.7	12.3	12.4
Net worth:								
SIPP	31.2	49.3	72.0	151.2	600.2	865.6	74.0	1.0
PSID	25.0	52.0	102.4	231.9	580.6	1,556.0	96.2	4.0
SCF	29.3	53.0	100.4	266.4	837.8	4,063.6	125.2	27.2
Memo: SIPP data without top coding (plus other minor adjustments)	29.1	50.6	77.1	179.2	463.0	904.1	78.1	4.6

Note: Definitions for SCF and PSID are the same as those found in table 10.8 (SCF), table 10.3 (PSID), and table 10.4 (SIPP). Net worth does not equal the sum of the six asset categories listed since net worth includes both other assets and other debt, which are not shown here.

[a]The SIPP data are top coded (truncated) at $500,000, except common stock and business and farm equity. The effect on the data is to reduce SIPP net worth by about 10 percent; the effect on the mean values in high-income classes could be substantial.

[b]The SIPP outlier in our data tape is in this cell. One case accounts for roughly 80 percent of the total and mean value.

[c]PSID includes some components not in the SCF or SIPP definitions—IRAs and Keoghs in liquid asset form and Treasury bills.

that class. Thus, despite the exceptionally close match, or so it seems to us, between PSID and SCF in the income classes below $48,000 and often in the income classes between $48,000 and $192,000, PSID is not able to represent wealth holdings in the crucial income class in table 10.10—households with more than $192,000. The reader will recall that PSID has only eleven households in that category, in contrast to the almost 300 in the SCF group.

Table 10.10 also indicates the principal reason why SIPP is so much lower in net worth than either PSID or SCF. It is not, as discussed earlier, because the public use SIPP file is top coded. Rather, it seems to be due to the fact that SIPP was much less successful than either PSID or SCF in collecting wealth data from households with large holdings of entrepreneurial type assets—business or farm equity or equity in real estate other than own home.

The divergence between SIPP and the other two surveys in these asset categories is not limited to the very high-income classes. Rather, SIPP begins to diverge sharply from the others in the $24,000–$47,900 income class, and the divergence grows in the higher-income classes. In contrast, SIPP is much more like PSID and SCF in estimates of holdings of conventional financial assets—common stock and liquid assets—although both SIPP and PSID have substantially lower estimates of mean holdings in the two highest income classes than SCF. In short, table 10.10 suggests that SIPP does pretty well on housing equity, common stock, and liquid assets, although along with PSID it has high-income class means that are much too low. It does much worse on holdings of entrepreneurial assets than either, and PSID in turn does much worse than SCF on the entrepreneurial holdings of very wealthy households.

While it is clear enough that PSID and SIPP cannot possibly represent the asset holdings of very wealthy households, the SCF data are also a bit suspect in that regard, although for different reasons. The problem is not that there are insufficient households at the upper end of the income and wealth distribution in the SCF sample to get a good estimate of mean wealth holdings but rather that we have no way of knowing what kind of bias might be contained in the SCF high-income supplement because of the way the sample was drawn. Technically, the response rate for the high-income supplement was of the order of 9 percent. But this is clearly a poor estimate of the true but unobservable response rate since it does not indicate that 91 percent of eligible households refused to provide information or could not be located—as response rates ordinarily would be interpreted. Rather, households had to volunteer to be included in the wealth survey, and we have no way of knowing what fraction of households would have agreed to participate if names and

addresses of eligible households had simply been supplied to the SRC and attempts made to contact these households by SRC interviewers. No doubt the response rate would not have been as high as obtained in the SCF cross-section sample—roughly 73 percent—but it seems clear a priori that the response rate would not have been 9 percent. We simply do not know enough about the true characteristics of high-income and high-wealth households to be able to tell whether the 1983 SCF representation of these households provided a reasonable picture of them. Considerations of privacy prevented using IRS data on the incomes of respondents and nonrespondents.

The data in table 10.10, as well as the earlier data in tables 10.2 and 10.8, give some reason for uneasiness about the SCF data. Whether measured by the importance of the open-end net worth category in total wealth (table 10.2) or by the importance of the open-end income category in total wealth (tables 10.8 and 10.10), the SCF data give a totally different picture of wealth concentration than either PSID or SIPP. We are quite prepared to believe that the PSID and SIPP data are much too low in these categories, but we have no solid basis for concluding that SCF has "gotten it right," so to speak. That issue is crucially dependent on whether SCF has the right weights in the open-end income class and on whether the SCF mean wealth values in that class are unbiased. Given the unusual nature of the SCF high-income sample, one cannot feel very confident about either.[7]

An interesting feature of the SCF data is that they provide the first indication of a topic discussed later—the "outlier" problem in survey measures of wealth. The most visible place where an outlier can be found in the SCF data is in row 2 of panel B in table 10.8—other real estate, defined as real estate holdings other than the respondent's own home. The pattern of mean real estate holdings by age has a sharp bump in the sixty-five to sixty-nine age group, going from just under $30,000 to over $80,000 and then back to under $20,000. It turns out that the estimated mean value of $83,800 for the sixty-five to sixty-nine age group is due almost entirely to a single case—an observation with $50 million of estimated holdings in other real estate and a relatively high weight in the SCF sample. That single case accounts for about three-fifths of the total wealth holding reported in that age category, and without that case the average value would drop from $83,800 to roughly $35,000. What should be done with cases of this sort is technically unclear, although various devices have been proposed to moderate the influence of outliers on the statistical properties of distributions. In some of the analysis below, we do adopt strategies to moderate the influence of outliers in the SCF data and discuss the topic at greater length in section 10.7.

10.4 Wealth Models and Measurement Error

The data discussed so far permit only limited direct inferences about data quality. Somewhat stronger inferences can be obtained by asking whether there are differences in the degree to which these three estimates of wealth can be explained by wealth models; more precisely, we can examine the residuals from a wealth model to make inferences about the size of measurement error in the three surveys. Our strategy is to fit a conventional life-cycle model of wealth accumulation to each of the three data sets, to estimate explained variances and standard errors from that model, and to use these statistics as indicators of data quality on the assumption that the observed model statistics result from a combination of misspecification and measurement error and that whatever misspecification exists ought to be roughly constant across the three data sources.

The typical analysis of this sort is based on one data set and uses the amount of explained variance and the standard error to test the model. Our design is based on multiple data sources that appear to measure the same phenomenon and involves some unusual types of differences—especially differences that relate to the alternative sample designs.

Two different sources of measurement error are of concern:[8] measurement errors in the dependent variables (net worth and its components) and measurement errors in the independent variables (income, age, education, sex, race, and marital status). Measurement errors in the dependent variables reduce the amount of explained variance in regression models. Measurement errors in the independent variables bias coefficients toward zero and thus also lower explained variance. In contrast to the substantial differences in the type and number of variables that measure assets and debts, all three surveys used similar questions to determine the household's economic and demographic characteristics. We therefore assume that the overall differences in explained variance reflect differential measurement error in the wealth variables rather than in the independent variables.[9] This assumption appears most appropriate for comparisons of SCF with SIPP. For the PSID sample, most of the independent variables have been subject to repeated verification and updating in each of the seventeen interview waves. Thus, the PSID may have relatively less measurement error in the independent variables when compared to either SCF or SIPP, tending to raise the amount of explained variance for PSID relative to SCF and SIPP without necessarily indicating lower measurement errors in the wealth variables. The extent of the differential, if any, in measurement errors in the independent variables is not known.

These same concerns apply to the use of the error variance of the regression estimate as a measure of data quality. Although explained and error variance are simultaneously determined by regression models and thus do not represent independent information, the R^2 figures are independent of the measurement scales, whereas the estimated error variances are not. Thus, comparisons of the proportion of explained variance across the three surveys are implicitly corrected for differences in sample means and variances. In contrast, the use of the standard error of the estimate for comparison focuses directly on differences in the observed variances and can be influenced by scale effects.

The model that we fit to each of the three sources of data is a conventional life-cycle model of wealth accumulation. The independent variables are income, age, education, occupation, race, sex, and marital status. The dependent variable is either net worth or one of the components of net worth. All the independent variables are categorical, while the dependent variable is continuous. Essentially, the equation we fit is a form of dummy variable regression called multiple classification analysis (MCA), in which the regression coefficients are deviations in each category from the overall mean, adjusted for the effects of other variables in the regression.

To estimate regressions in this form with either net worth or net worth components as the dependent variable, some transformation of the dependent variable is essential because of the strong likelihood of heteroscedastic residuals. The obvious transformation is to convert the dependent variable to logarithmic form, which assumes that the residuals are proportional to the original variable—a not unreasonable assumption. An alternative transformation is to use natural numbers but to truncate the dependent variable—a procedure that assumes that heteroscedasticity is a problem only for observations above the truncation point.

We examined the effect of various truncation rules on the model statistics, with the results shown in table 10.11. The dependent variable is net worth, the independent variables are as indicated above (age, income, occupation, etc.), and the truncation rule ranges from \$0.5 million to infinity. Only the ends of that scale are displayed for PSID and SIPP, while a full range of values is shown for SCF (means, standard deviations, and the standard errors of estimates are in thousands of dollars).

These results demonstrate conclusively that the standard errors in natural numbers for these three surveys, even with quite severe truncation, will differ substantially because of scale factors—SCF simply has larger net worth numbers (weighted) than the other two surveys, and even the substantial difference in the explanatory power of the models in favor of the SCF does not produce a lower standard error

Table 10.11 Effects of Truncation from Statistical Estimates from Wealth Surveys

Survey	Net Worth Truncated at:	Model Statistics[a] Mean	S.D.	$\bar{R}^2$	SEE
SCF	500 thousand	78.1	117.8	.536	80.2
SCF	2 million	99.9	236.5	.563	156.3
SCF	5 million	109.4	336.9	.533	230.2
SCF	6 million	110.8	358.2	.519	248.5
SCF	10 million	114.5	430.8	.462	316.0
SCF	20 million	118.7	549.3	.367	436.9
SCF	∞	123.6	799.0	.226	702.8
PSID	500 thousand	78.6	110.0	.42	83.7
PSID	∞	96.2	308.3	.16	282.2
SIPP	500 thousand	64.6	92.3	.36	73.8
SIPP	∞	73.8	471.1	.04	461.6

[a]The samples used for these calculations differ slightly from those shown in sec. 10.3. None of the differences would affect the results.

of the regression estimate. The results also show once again that the differences in mean wealth, and implied aggregate wealth, for the three surveys are almost entirely accounted for by the differential importance of the high-wealth category: when net worth is truncated at $500,000, the three surveys are quite close on the estimates of mean net worth in the population. These results for net worth models apply quite generally to models of net worth components estimated in dollar values for the three surveys.

We interpret the model results where the dependent variable is a natural number as indicating that part of the criteria for quality ought to be whether the mean and standard error represent the population adequately to begin with. Since the evidence suggests that SCF is the only one of the three surveys with a reasonable representation of the upper end of the wealth and income distribution, its mean and standard deviation are both larger and more valid than the other two. The fact that a wealth accumulation model does not push the standard error below that of the other two surveys is simply a consequence of the fact that the SIPP and PSID standard errors are too small to begin with.

Given the results of estimating these models in truncated natural numbers, we focus on models with the dependent variable transformed into logs. Negative values and zero values are assigned a small positive integer. For most of the net worth components, the proportion of households who do not own the asset is extremely large; hence, we show estimates using TOBIT—a technique appropriate for estimating a truncated dependent variable—along with estimates using ordinary least

squares (OLS). All the regressions are weighted, which is essential given the sample designs in the three surveys. In addition, some of the coefficients turned out to be sensitive to a few extreme values, and we have trimmed the weights on several SCF cases, redistributing the weight to cases in the same income range.

In addition to the problem of differences in scale affecting the estimated residuals, we also need to be concerned with differences in the importance of imputations, which can also affect both model fit and estimates of model error. Although the imputation methods vary, they commonly take the form of using regression methods or the equivalent to impute an asset value in cases in which the respondent reports ownership of the asset (or debt) but is unable or unwilling to provide an estimate of its value. Since the regression model used for imputation is probably very similar to the life-cycle wealth accumulation model used in this section, survey data with large amounts of imputation will produce, other things being equal, a larger proportion of explained variance than survey data with less imputation—the imputation method will tend to increase both total variance and explained variance equivalently, and residual variance will therefore be lower. Since the imputation methods used in the three surveys were not identical, and since a variety of methods were actually used, it is unclear how much of a bias this imparts to the results: it probably biases the SIPP data relative to both PSID and SCF since more imputation was needed on SIPP. PSID has fewer imputations to make but uses subgroup means, which reduces error variance a little more than Census hot deck imputations.

Table 10.12 shows the results of applying the model technique to all the possible comparisons that can be made between the three surveys. Since PSID contains relatively global measures of the various net worth components, we have matched the appropriate set of SCF components to the PSID definition. For SIPP, the level of detail most readily available to us is also relatively global for a good many categories, and we have done an alternative matching job using the SIPP categories on our data tape with the appropriate SCF components. In some cases (equity in housing and equity in farm and business assets), all the surveys define the variables in the same way. For other asset categories, there are minor differences in definition, and some comparisons cannot be made at all (e.g., common stock is not measured in PSID except as part of a broader category.)

In table 10.8, we show data source, type of net worth variable, model statistics (adjusted R^2 and standard error for the OLS regressions, log likelihood and standard error for the Tobit estimates). Estimates are shown for the log form of the dependent variables for reasons discussed

above. Both to achieve greater comparability and to get around the problem that Tobit-type estimates will often not iterate to a solution when weighted data are used, we standardized on sample size with a Monte Carlo technique—simple random samples with a target N of 5,000 were selected with probabilities proportional to weights. Five such simple random samples were selected for SCF (denoted SCF-1 to SCF-5 in table 10.12); for PSID and SIPP, only one such sample was drawn. The basic information on data quality can be inferred from the model statistics: other things being equal, a higher $\bar{R}^2$ (or a smaller log

Table 10.12 **Fit and Standard Error Statistics, Measurement Error Models of Wealth Data**

Data Source	Pseudo N	OLS R^2	OLS SEE	Log Likelihood	TOBIT SEE
			Net Worth		
SCF-1	4,976	.508	1.71	−9,766	1.86
SCF-2	5,042	.493	1.69	−9,867	1.81
SCF-3	4,970	.503	1.67	−9,687	1.81
SCF-4	4,949	.513	1.69	−9,666	1.84
SCF-5	4,810	.506	1.64	−9,301	1.76
PSID	4,922	.494	1.74	−9,726	1.92
SIPP	5,097	.396	1.85	−10,397	2.04
			Housing Equity		
SCF	4,976	.368	2.36	−9,570	3.46
PSID	4,922	.372	2.30	−9,497	3.37
SIPP	5,097	.290	2.46	−10,211	3.60
			Real Estate Equity		
SCF-1	4,976	.149	2.21	−4,904	7.11
PSID-1	4,922	.150	2.18	−4,743	7.07
SCF-2	4,976	.130	2.15	−4,528	7.53
SIPP-2	5,097	.095	1.98	−4,090	7.84
			Business and Farm Equity		
SCF	4,976	.250	1.93	−3,430	7.90
PSID	4,922	.417	1.61	−2,752	6.81
SIPP	5,097	.419	1.20	−2,088	5.77
			Liquid Assets		
SCF	4,976	.500	1.52	−8,842	1.77
PSID	4,922	.417	1.70	−9,138	2.04
SIPP	5,097	.373	1.76	−9,390	2.21

(continued)

Table 10.12 (continued)

Data Source	Pseudo N	OLS R^2	OLS SEE	Log Likelihood	TOBIT SEE
	Net Worth				
	Common Stock				
SCF	4,976	.232	1.61	−4,081	4.84
PSID	4,922	.194	1.89	−4,852	5.19
SIPP	5,097	.138	1.53	−3,804	5.38
	IRAs				
SCF	4,976	.212	1.29	−3,277	4.50
SIPP	5,097	.181	1.41	−4,013	4.67

Note: The dependent variables in the regression are generally defined as above in the relevant tables (i.e., table 10.1–10.4 and 10.8–10.10). There are some differences: net worth is not defined precisely the same in the three surveys, as already indicated in the notes to tables 10.2–10.4; common stock in SIPP is defined as equity in common stock rather than gross holdings; and the SCF definition of common stock is gross holdings. The PSID definition of other real estate equity does include land contracts, and the SCF definition was accordingly matched—denoted by SCF-1 and PSID-1. For real estate, SIPP does not include equity in land contracts as part of other real estate holdings, and the SCF definition was modified to accord with SIPP—denoted by SCF-2 and SIPP-2. Liquid assets in SIPP are defined to include interest-earning assets held at banks and interest-earning assets held at other financial institutions. It thus excludes non-interest-earning checking accounts and government savings bonds. For PSID, liquid assets are defined to iclude IRAs and Keoghs. The SCF definition of liquid assets is between the two.

likelihood in absolute terms) indicates that the data are of higher quality, and a lower standard error indicates less measurement error and thus higher quality.

Some of the differences in both the model fit and the standard errors are illuminating. For example, there is very little difference among the three surveys in the apparent quality of the data on liquid assets. The SCF has a slightly higher explained variance and slightly lower standard error than either PSID or SIPP (for slightly different definitions of liquid asset holdings), and the same pattern holds for both OLS and Tobit estimates. For housing equity, a comparable story emerges: here, PSID has a slightly better fit and a lower standard error than SCF, and SIPP is a bit worse in both fit and error, but the differences are small. For net worth, SCF is a shade better than PSID on both fit and error statistics, while SIPP is not quite as good on either criteria.

The generalizations that emerge from table 10.12 are fairly straightforward. Simply in terms of criteria relating to the direction of differ-

ences and the number of categories in which one survey has better or worse fit or error statistics than the others, both SCF and PSID appear to be a bit better than SIPP on quality criteria, while SCF and PSID are roughly equivalent. For example, of twenty-eight possible comparisons involving SCF and SIPP (two fit statistics, two error statistics, and seven categories), SCF is better than SIPP in twenty of the twenty-eight. On similar criteria, PSID is better than SIPP in fourteen of twenty possible comparisons, while SCF is better than PSID in twelve of the possible comparisons and worse on twelve. That this comparison is not entirely satisfactory is best shown by the results for the business and farm equity category, for which all three surveys define the variable in the same way. Here, SCF is distinctly worse than either PSID or SIPP, on both OLS and Tobit estimates and for both fit and standard error. But the descriptive data discussed earlier, as well as the aggregate comparison to be discussed below, clearly indicate that neither PSID nor SIPP has any reasonable representation of household wealth in the form of business and farm equity, while SCF clearly does. But the variables used in this analysis are unable to explain the pattern of SCF holdings, while they are more effective in explaining the (much poorer) measurements in PSID and SIPP. In effect, the results for this category suggest that there continues to be a scale effect, which will sometimes operate to the detriment of a survey that captures the appropriate dimension of household holdings in a particular wealth category, and that neither conversion to logs nor Tobit estimates represent a solution to that problem.

The pattern of age and income effect (not shown in table 10.12) are of some interest in themselves. In the basic data shown earlier, the age profile of asset holding was one that could be viewed as largely consistent with many versions of the life-cycle model. Net worth as a function of age tended to peak in the age bracket around fifty-five to sixty-four and declined steadily thereafter. The decline was especially marked in the SIPP data base but was substantial in SCF and moderate in PSID. However, correcting for factors that reflect important cohort differences as well as for factors that influence permanent income over and above current income (education, occupation, race, sex, and marital status), none of the three surveys shows much tendency for net worth to decline at all, even up to age seventy-five and above. The SIPP survey, which showed a marked decline with age in the descriptive data, now shows a monotonic rise with age throughout the entire range, and PSID, which earlier showed a very mild decline, now shows consistent increases. There is a slight tendency in the SCF data for log net worth to decline in the oldest age group, but not before then.

The income coefficients also tell what is by now a familiar story. In the income classes below $48,000, and sometimes in the classes below $192,000, the parameters for the three surveys are not systematically different for most of the net worth categories. In the income category above $192,000, and sometimes in all the categories above $48,000, the SCF income coefficient is considerably larger. The differences are especially marked for net worth categories in which wealth is highly concentrated—stock, business and farm equity, and real estate equity—and are much less marked in net worth categories (like housing equity and liquid assets) in which wealth is more dispersed.

The appropriate generalization about data quality from table 10.12 seems quite straightforward and is surprising in only one respect. The evidence suggests that the quality of the data in SCF, as reflected by the explained variance of the models as well as by the standard errors, is a bit better than the apparent quality of the PSID data and that both are consistently better than the SIPP data. Given the presence of the high-income supplement in the SCF survey, and despite the uncertain nature of the response rate from high-income households in SCF, one would have expected the quality of the SCF data to be higher than either of the other two surveys. The PSID, after all, used an experimental and very short module in which a few questions about net worth were included as part of an ongoing survey, while SIPP also had a net worth module imbedded in a survey whose major purposes and functions were otherwise. Neither PSID nor SIPP had any real prospect of being able to measure the wealth holdings of quite wealthy households, and neither should have been expected to do very well on that count. What is surprising to us is the remarkably strong performance of PSID relative to SIPP. Most of what we know about survey design would have suggested the reverse—that the greater attention to the details of household assets and liabilities found in the SIPP survey would have resulted in better estimates of assets and liabilities and of net worth. But that does not appear to have been the case.

10.5 Imputations and Outliers

Another measure of data quality has to do with the incidence of imputed value in the various surveys. The analysis here is quite straightforward, although the imputation method differed somewhat among the three surveys. In SIPP, imputations were done according to traditional Census Bureau techniques. A "host" observation was identified by matching along a number of characteristics, and the host's values imputed along with a disturbance term—the hot deck technique. For SCF, imputations were done in a variety of ways and using a great many types of methods. The process is described in Avery, Elliehausen, and

Kennickell (1987). In this paper, we basically reproduce the conclusions and data from that study, along with a few additional calculations. Generally speaking, the most common method appears to have been regression with a variance-preserving feature, although direct imputation using other variables on the survey was commonly used in many cases, and other more individualistic procedures appear to have been used as well. For PSID, much simpler imputation methods were used. Either mean values of similar subgroups or the midpoints of range estimate provided by respondent were the only methods employed, the former for relatively few cases.

Two types of imputation questions can be asked. First, what was the incidence of nonresponse with respect to the presence or absence of a particular type of asset or liability? Second, given that an asset or liability was reported to be owned, what was the incidence of imputation for amount where the respondent reported ownership but could not or would not provide an estimate of size?

The data from all three surveys are quite consistent with respect to imputations for the presence or absence of an asset or a liability. As table 10.13 indicates, such imputations were rare across the three wealth surveys. However, the situation differs quite a lot with respect to the relative importance of imputation for amounts, given that ownership was reported. Here imputations were about as frequent in PSID as in SCF and were more frequent in SIPP. For both SCF and PSID, the proportion of assets or liabilities represented by imputed value compared to the total amount of assets and liabilities ranged from relatively small amounts (e.g., 7.4 percent for checking accounts in SCF) to relatively large amounts (e.g., 75.9 percent for life insurance reserves in SCF). Imputed values were relatively large proportions of total values for equity in real estate other than own home, for equity in farm and business assets, and for equity in common stock. Imputations were of lesser importance for such categories as liquid assets, savings accounts, and IRA and Keogh accounts. Interestingly enough, as Avery, Elliehausen, and Kennickell (1987) document, the imputation percentages were substantially *lower* for the high-income part of the SCF sample than for the cross-section part, doubtless owing to the fact that the high-income part of the SCF sample consisted of volunteers.

A better comparison of the three surveys, therefore, would be to contrast the cross-section imputation for SCF with the PSID and SIPP imputation. Here, the SCF-CS imputation percentages are somewhat closer to those shown in SIPP, although SIPP is still appreciably higher. Incidentally, it is worth noting that the SIPP imputation percentages are substantially better than they had been in SIPP's predecessor—the Income Survey Development Program (ISDP), begun in the late 1970s. The ISDP had much higher imputation percentages than SIPP, and one

Table 10.13 **Item Nonresponse Rates for Three Wealth Surveys (percentage of households or amounts)**

	Nonresponse on Ownership				Nonresponse on Amount of Asset/Debt, Given That the Asset/Debt Is Owned						
Asset/Debt Category	SIPP	PSID	SCF-CS	SCF-HY	SIPP	PSID*	PSID	SCF-CS*	SCF-CS	SCF-HY*	SCF-HY
Principal residence	N.A.	N.A.	.1	.0	N.A.	N.A.	N.A.	4.4	7.8	.8	1.4
Other real estate	.9	.2	.1	.0	33.5	16.0	14.4	9.9	9.2	1.2	3.0
Publicly traded stock	1.2	.2	1.3	1.7	41.5	23.6	20.2	11.6	25.4	4.4	6.7
Bonds and trusts	N.A.	N.A.	.7	2.4	25.9[a]	N.A.	N.A.	25.1	24.7	6.3	6.2
Checking acocunts	1.9	↑	.1	.5	13.3	↑	↑	7.4	9.6	3.5	4.7
Savings accounts	1.7	↑	.2	.7	16.8	↑	↑	13.7	14.1	3.3	4.8
Money market accounts	2.1	↑	.2	.3	N.A.	↑	↑	15.7	18.3	4.3	9.3
Liquid assets	. . .	.2	. . .	. . .	. . .	22.1	11.4	. . .	. . .	. . .	. . .
Certificates of deposit	2.2	↓	1.3	.0	N.A.	↓	↓	23.6	25.6	8.2	9.0
IRAs, Keoghs	1.2	↓	.3	.3	N.A.	↓	↓	8.7	11.9	1.5	2.1
Savings bonds	N.A.	↓	.1	.2	24.9	↓	↓	10.1	17.4	1.0	4.6
Life insurance cash value	N.A.	N.A.	2.4	.5	N.A.	N.A.	N.A.	75.9	71.7	41.2	33.5
Business/farm equity	N.A.	.2	.1	.5	37.9	20.9	23.8	17.6	37.2	19.9	17.6
Automobiles	N.A.	N.A.	.0	.0	N.A.	8.5[b]	6.3[b]	N.A.	N.A.	N.A.	N.A.
Auto debt	N.A.	N.A.	.7	.0	N.A.	N.A.	N.A.	N.A.	4.6	N.A.	1.7
Consumer debt	N.A.	N.A.	.2	.4	N.A.	N.A.	N.A.	N.A.	5.6	N.A.	3.7
Mortgage debt on home	N.A.	N.A.	.3	.5	N.A.	N.A.	N.A.	N.A.	9.6	N.A.	3.6
Other mortgage debt	N.A.	N.A.	1.0	.0	N.A.	N.A.	N.A.	N.A.	8.2	N.A.	3.9

Note: Asset/debt categories are self-explanatory. The SIPP nonresponse data are taken from U.S. Bureau of the Census (1986, app. D). The PSID data are calculated directly from the data tape by the authors. Nonresponse on amount of assets or debts, given that the assets or debts are owned, included all respondents who did not give an estimate of market value when asked about the amount. Most of these respondents subsequently provided range responses—indicating the amounts were higher than X and lower than Y—from which imputations were made. For the SCF data, the asterisked columns are taken from Avery, Elliehausen, and Kennickell (1987) and are weighted by amounts. The SCF columns without asterisks were calculated by the authors. Arrows indicate assets included in liquid assets category.

[a]Bonds only.

[b]Equity in vehicles.

can expect that the SIPP imputation rates will drop as a fraction of total asset and liability values as the program proceeds.

Finally, we should note that the PSID imputations shown in table 10.13, and the text discussion above, overstate the incidence of imputations in PSID. When a PSID respondent reported that he or she did not know the value of an asset held by the household, he or she was asked a series of questions designed to bound the amount. The questions were of the form, "Is [net worth component] higher or lower than X?" If lower, "Is it lower than Y?" ($Y < X$). If higher, "Is it higher than Z?" ($Z > X$). Midpoints of the resulting ranges were then used to impute values. Only a few gave not even a range and had to be assigned the mean of a congruent subgroup (1 percent for most assets).

10.5.1 The "Outlier" Problem in Wealth Surveys

With rare exceptions, household survey estimates of means, variances, and aggregates are untroubled by what is called in the literature the "outlier" problem. For example, if one is trying to estimate the average value of houses in the United States, the standard deviation of housing values, and the aggregate value of the housing stock, the fact that there are a few houses worth several million or even tens of millions of dollars is not especially troublesome. In a sample selected at random with selection probabilities that depend on the relation between the sample size and some known external universe, neither the mean, the variance, nor the estimate of aggregate stock would be much influenced by whether or not a few very expensive houses were caught in the sample. The reason is that even very expensive houses are only higher than the mean by a factor of ten or so—there are no really extreme cases.

In contrast, suppose we try to estimate the mean, variance, and total weight of the universe consisting of several million gnats and one elephant. If we know nothing about where the elephant is located and thus must sample randomly, it will matter quite a lot whether our sample contains all gnats or happens to catch the elephant. If the elephant weighs as much as all the gnats combined and we are trying to estimate the mean, variance, and aggregate weight in the population, we will estimate a value that is roughly half the size of the true value if we do not catch the elephant, and we will estimate an average weight that is roughly too high by the inverse of the selection probability if we do catch the elephant. Concretely, if there are 80 million gnats in the universe and one elephant and we are picking a sample of 4,000, we have a selection probability of (approximately) one in 20,000. If we catch only gnats, we estimate the total poundage of this strange universe to be half as large as it should be; if we catch the elephant, we

estimate the poundage to be roughly 20,000 times too high. Evidently, if we draw a very large number of samples—say, 40,000 or 50,000 samples of 4,000 units each—the mean value of all the samples has at least some prospect of representing the true value in the universe, although it obviously does not have to. We may easily have too few or too many samples that include the elephant and thus still be pretty far off.

Of course, if we can produce a stratified random sample, in which the probability of selection is proportional to the importance of the relevant dimension (weight) in the universe, then, provided we know where the elephant can be found, we can sample with selection probability equal to unity where the elephant is known to be located and come up with a precisely accurate estimate of total weight, mean weight, and variance.

It is often the case that we are trying to use a sample to estimate some characteristic of the universe while knowing only certain very general properties of the universe—such as how many people there are in total. If the characteristic we are trying to sample is wealth, the possibilities of catching an elephant obviously exist. Consider a probability sample designed to measure wealth, with an N of 4,000 and a selection probability of roughly one in 20,000, and observe what would happen if one or more of the famous Hunt family were to fall into the sample. Assuming that the typical Hunt has assets of $1 billion, with a selection probability of one in 20,000, a Hunt in the sample would produce an estimated aggregate wealth for that single case of 1 billion times 20,000, or 20 trillion. Since the FFA data tell us that household net worth is on the order of 10 trillion in the aggregate, give or take a few trillion, that would tend to create a problem.

Although the distribution of net worth is not so highly skewed as in the universe of all gnats and one elephant, and we are not likely to find one or more of the Hunts to be a respondent in any probability sample of the population, net worth is distributed in a sufficiently skewed fashion that an outlier problem is quite likely to arise. The solution suggested in the statistical literature is to trim the weights when an outlier is identified.[10] The argument basically is that we ought to be doing a stratified selection probability if we are sampling a highly skewed distribution like net worth, and, if we cannot do so for technical reasons, we can certainly impose the restriction that the universe cannot contain 20,000 billionaires if we happen to catch one in a sample of 4,000 households. The reason we know that the universe cannot contain 20,000 billionaires is because of external data; the Forbes 500 does not have 20,000 members, for example. Thus, the recommended solution is (1) examine the case carefully to make sure that it does not represent a keypunching or coding error or a misreading by the interviewer and,

(2) if the data values are legitimate, recognize that the case cannot represent the selection probability that it was given originally and trim the weight substantially—down to one in an extreme case.

Are there outliers in the three wealth surveys discussed in this paper? The answer is unambiguous: yes, there clearly are. Four such cases are discussed briefly.

10.5.2 Case 1

In the original SCF data tape, there was a case deriving from the high-income sample with reported net worth of approximately $200,000,000 and a weight of roughly 5,000. Virtually all the assets in this case were in the form of equity in "owned farm or business." The total value of such assets, given the wealth value and the weight, amounted to approximately $1 trillion ($200,000,000 multiplied by roughly 5,000). That single case accounted for about one-third of the total value of farm and business equity in the SCF sample and approximately 10 percent of total household net worth in the United States. Examination of the details of the questionnaire did not suggest (at least not to us) that the data were obviously wrong—they were certainly a bit suspect, but they could well have been right. Subsequent data, obtained as part of the regular 1986 reinterview, suggested that the $200,000,000 was a misreport by either the interviewer or the respondent: it was certainly not a keypunching error since the questionnaire had $200,000,000 written unambiguously on it, not $2,000,000. But the 1986 data, coupled with some questions routinely asked about changes between 1983 and 1986, suggested that the $200,000,000 was in fact $2,000,000. The data value in the 1983 survey was correspondingly changed, and the outlier problem disappeared.

10.5.3 Case 2

In working with the SIPP data tape, we became suspicious of the possible existence of an outlier because the relation between the overall mean and the overall standard deviation of the sample suggested that the standard deviation was much too large, given the mean, compared to the other wealth data sets we were looking at. We ran a search for outliers in the data tape and discovered a $50,000,000 net worth case, again dominantly in the form of business equity, associated with a weight that was somewhat above average for SIPP—about 6,600, whereas the average weight was about 4,000. That case alone accounted for roughly $335 billion of net worth (roughly $50,000,000 multiplied by roughly 6,600) and represented more than one-third of the total SIPP value of farm and business equity and about 5 percent of total household net worth. Discussions with the Census Bureau people in charge of SIPP indicated that they were aware of the case, that their reinterview

data suggested that the value on our tape was almost certainly in error, and that the newest tape had a correction. (We also discovered, in the course of the conversation, that the SIPP tape was supposed to be truncated at $0.5 million in that category, that for technical reasons the truncation rule did not work on the particular variable that the $50,000,000 appeared in, and that the Census Bureau was in the process of recalling the offending tapes and replacing them with ones with the truncation rule firmly in place).

10.5.4 Case 3

This may be the most interesting of the lot. As we indicated earlier in the paper, a number of observations were dropped from the SCF sample because of large amounts of missing data, especially on financial variables such as assets, liabilities, and income. One of the cases that was dropped from the sample for such reasons was a cross-section case with a reported net worth of close to $1 billion. The reason the case was dropped was that the questionnaire contained virtually no income information, although there were lots of net worth data. Examination of the details of the questionnaire suggests, at least to one of us, that the case is probably genuine: when you have that much in assets, the whole notion of income becomes a bit unreal. When you need money, you wire one of your accounts to send you some. That case, which was in the SCF cross-sectional sample with an average weight, would have added $20 trillion, more or less, to measured household net worth—roughly double the total amount of net worth currently measured on the SCF. We differ somewhat about how to handle that case. At least one of us is inclined to put the case back in as legitimate and trim the weight substantially to the lowest-weight figure presently in the SCF file.

10.5.5 Case 4

Besides the outliers we have already noted in SCF, the data clearly suggest the existence of another outlier. As discussed above, in the line under property assets in table 10.8, one can observe a sharp bump in the age distribution of average property values—roughly from $30,000 to $80,000 and back to $20,000. Fully three-fifths of the total value of property holdings in that age class is due to a single case—a $50,000,000 holding of property for a respondent with a weight of approximately 5,000. There is nothing in the observation to suggest that the data are invalid. But one would not like to see statistical analyses conducted on an age distribution that include that kind of value plus that kind of weight. What we have done for the analysis in most of section 10.4 above is to trim the weight on that case down to the smallest weight given to any high-income household and then reallocate the difference

in weight to all the remaining high-income households. We did that with one other case in which the combination of net worth times weight seemed excessive, and the analysis in section 10.4 reflects those weight adjustments. The overall effect, incidentally, on average survey values is not small—instead of a mean net worth of about $125,000, as reported in table 10.4, the trimmed sample has a mean net worth of about $120,000, roughly a 4 percent reduction.

10.6 Aggregate Comparisons

A dimension of wealth survey quality that is often of great interest to economists is the degree to which a household wealth survey can reproduce what is thought to be the total national wealth and thus enable analysts to examine the distribution of a net worth figure known to be a reliable estimate of the aggregate. Traditionally, the standard view among virtually all analysts of both aggregate and survey data is that household wealth surveys cannot be used to capture the wealth in the upper tail of the wealth distribution and hence that survey estimates of wealth will always be a substantial underestimate of the wealth actually held by households. That judgment is based on experience with attempts to compare survey wealth estimates with external aggregates—conventionally, estimates derived from the FFA statistics. In this section, we reexamine that question, again drawing heavily on data from Avery, Elliehausen, and Kennickell (1987), who examine the issue in some detail.

It is useful to understand the reasons why survey estimates of wealth have always been suspect as to their aggregate characteristics. It is known (from casual rather than systematic observations as well as from IRS data) that the distribution of wealth is extremely skewed, with a large fraction of wealth being held by a very small proportion of total households. In the United States as well as most other countries, there is no universe of wealth holding that could be sampled efficiently to produce a survey-based estimate of total wealth—that is, it is not known precisely how wealth is distributed and how one can access households in a sample survey so as to ensure adequate representation of the very small proportion of households who are likely to account for a great deal of total wealth. In the absence of such a sample frame, surveys have typically relied on conventional area probability sampling techniques, which ought in principle to represent the entire population, including the very wealthy.

The problem is that nonresponse is known to be much higher among the very wealthy than among other households, but sampling statisticians have no precise way to estimate nonresponse rates as a function of income or wealth level by observing nonresponse rates in a

conventional area probability sample. Thus unless special provisions are taken to ensure the appropriate proportion of high-income/high-wealth households in a survey sample, it is bound to be true that wealth estimates derived from surveys will be much too low.

The way that problem has been overcome in the past, at least in part, has been to try to augment an area probability sample with a sample of high-income households derived from an external universe—the IRS universe of tax returns. While wealth is not an observable variable in such a universe, it is reasonable to presume that large amounts of wealth are associated with large amounts of income and to use the IRS income statistics to produce a sample of households that are known to have high incomes and can be presumed to have high wealth. That strategy was used in the 1962 SFCC and was also followed (with some unfortunate modifications) in the 1983 SCF. Broadly speaking, the strategy is to select a sample of very high-income households with a known probability of selection, using the IRS files on income, and to include those addresses along with a conventional cross-sectional sample. Interviewers do not know whether the households they are visiting have come from an area probability sample or from an IRS tax-filing sample, but the survey designers know the appropriate weight to be given to the IRS high-income sample since they know the total distribution from which the high-income sample was drawn. Since the cross section will yield some high-income households, the procedure is meant to ensure that the combined weight of the high-income supplement, plus the households from the cross section who fall into the high-income category by chance, yields a total weight sufficient to include high-income households with the proper proportions.

Note that this procedure does not ensure that the household survey will measure household wealth with a high degree of accuracy. Nonresponse is apt to be quite high among households in the high-income supplement, however derived (Projector and Weiss 1966). While one can correct for nonresponse, one cannot correct for nonresponse bias, and, if the asset holdings of the very wealthiest households in an IRS income group are larger for nonrespondents than for respondents, the survey estimates will still contain a substantial downward bias. Thus, there are serious problems, which some judge to be insurmountable, in using household surveys to estimate aggregate household wealth.

10.6.1 FFA Data

While it is certainly true that wealth surveys have their difficulties in estimating the aggregate properly, it is also true that the external aggregate data often used as a benchmark for "truth"—the FFA data—have problems of their own. While FFA aggregate statistics across all sectors can be judged to be reliable with a high degree of accuracy,

how those flows are partitioned among various sectors is a much chancier proposition. For example, the total amount of savings accounts is known with a high degree of accuracy for the economy as a whole. But some of those savings accounts are held by nonfinancial corporate business, some by financial institutions, some by state and local governments, some by federal governments, some by noncorporate business, some by closely held corporate business, some by foreigners, and some by households. Unfortunately, the estimates for the total amount of household savings accounts are derived from the FFAs largely as residuals—the total minus estimates for all the other sectors. The same is true for most of the other household assets and liabilities in the FFAs. For some of these, the match between the asset category and the household sector is quite close—home mortgages are well defined in the FFA statistics, and virtually all home mortgage debt is owed by households. But, for most assets and liabilities, the match is not nearly as close, and one has to rely on accurate sectoring in the FFA data.

The analysis below concentrates entirely on the SCF data. The aggregate match between PSID and SIPP data can easily be inferred, given the discussion earlier about the differences in the three surveys in mean levels of wealth and the mean values of various wealth components.

Substantial adjustments must be made in the data for any household survey before they can be compared with appropriate FFA estimates. For example, the SCF data include estimates of wealth held in the form of investment trusts, and these are not treated as household assets in FFA data. Thus, trusts were eliminated from the household survey numbers. Next, although the household survey estimates of farm and business equity include the value of assets in closely held corporations as well as assets held in farm, business, and professional proprietorships and partnerships, the comparable FFA category includes only the latter—assets held in the form of noncorporate proprietorships and partnerships. Thus, assets in the form of closely held corporate stock must be eliminated from the estimates of business and farm equity in the household wealth survey. It is unclear just where closely held corporations are counted in the FFA data. They are clearly part of household assets, just as publicly traded corporate stocks and bonds are household assets. But such assets are not counted in FFA estimates of the value of common stock, which appear to be based entirely on holdings of publicly traded stock. It is possible that part of these assets shows up in liquid asset holdings in the FFA accounts. Third, assets reported as "other real estate equity" in the household survey must be redistributed among various FFA categories—some go to owner-occupied housing (seasonal residences), others go to noncorporate

business, and still others appear to be assets owned by closely held corporations. Other adjustments need to be made in both the household survey data and in the FFA numbers to make the two conceptually comparable. All these adjustments are detailed in Avery, Elliehausen, and Kennickell (1987).

Table 10.14 presents the data provided by Avery, Elliehausen, and Kennickell in somewhat reorganized form, combining some asset categories for which the survey estimate appeared to misclassify assets relative to their (probably more appropriate) classification as reflected in the FFA data. Comparisons are shown for the 1983 SCF survey data.

The results are interesting and, in several respects, surprising. Overall, the 1983 SCF appears to provide a remarkably close match to the

Table 10.14 1983 SCF Implied Aggregate Data Compared to FFA Aggregate Data

	1983 SCF Full Sample	1983 SCF Cross Section	1982 FFA	Ratios SCF-F/ FFA	Ratios SCF-CS/ FFA
Assets	9,202	8,416	8,658	1.06	.97
Liquid assets	1,062	1,002	1,899	.56	.53
Currency and checking accounts	273	250	305		
Savings accounts	639	649	1,321		
Money market fund shares	122	78	207		
Savings bonds	27	26	67		
Fixed income assets	370	225	326	1.13	.69
Federal bonds	115	84	238		
State and local bonds	208	97	89		
Corporate and foreign bonds	47	44	. . .		
Variable price assets	1,052	655	1,044	1.01	.63
Publicly traded stock	924	548	968		
Mutual funds	128	107	76		
Other assets	582	495	336	1.73	1.47
Life insurance reserves	371	323	233		
Mortgage assets	211	172	103		
Tangible assets	6,136	6,037	5,050	1.21	1.20
Owner-occupied real estate	4,284	4,110	2,703	1.58	1.52
Noncorporate business equity	1,853	1,928	2,347	.79	.82
Debts	1,354	1,279	1,406	.96	–.91
Home mortgages	996	975	1,065		
Installment credit	252	240	270		
Other debt	106	64	71		
Net worth	7,848	7,137	7,252	1.08	.98

Note: Data taken from Avery, Elliehausen, and Kennickell (1987). We have reorganized their categories somewhat, but the basic data are exactly the same, except for a few minor inconsistencies in their table 6. We have assumed that their component numbers were correct and have modified the totals to accord with the sum of the components where there were discrepancies. The discrepancies were minor and do not affect any of the results.

overall total of net worth shown in the FFA data. That close aggregate match is a consequence of two major offsetting errors—the survey estimates of the housing stock are substantially higher than the FFA estimates, and the survey estimate of liquid assets held in the form of checking accounts, savings accounts, money-market fund shares, and government savings bonds are substantially lower than the FFA estimate. The two are quite close together for estimated holdings of common stock and mutual funds shares, of bonds (provided one combined corporate, federal, state and local, and foreign bonds into a single category), and of debt; the match is especially close for mortgage and installment debt. For noncorporate equity in farms and businesses, the match is reasonably close. Relative to comparisons of the same sort based on the 1962 SFCC, the 1983 SCF provides a much closer match to the FFA data: the 1962 data show FFA estimates higher for almost all categories than the survey data, with the exception of the stock of housing, for which the SFCC numbers were a bit higher.

We find these results curious. First, the evidence strongly suggests that the survey estimate of the value of the residential housing is a better estimate of the value of housing stock than the FFA estimate. Two types of evidence can be advanced. First, a record check study comparing household estimates of house value with actual sale prices for the same housing property was conducted in 1974 by the U.S. Bureau of the Census (Wolters and Woltman 1974). The study showed that the median price difference between household estimates of property value and sale prices was a little over $800 for property selling at about $27,000—an estimated difference of about 3 percent. In this study, the household estimates were lower than the actual property values as reflected by selling prices. Other studies suggest the same conclusion and indicate that, if anything, household estimates are likely to be a bit low because older households typically tend to underestimate the value of their housing properties relative to younger households—presumably because many of their houses were purchased many years ago and appropriate adjustments for housing price indexes are difficult to make if the time span between date of purchase and survey date is very long (Rodgers and Herzog 1987).

Second, estimates of housing value contained in surveys done in the 1960s (the 1963 SFCC), with housing value estimated from the 1983 SCF, show rates of increase in housing value that are very close to the rates of increase shown by housing valuations reported on the relevant decennial censuses, and the rates of price appreciation shown in the 1983 SCF are quite close to the price appreciation rate in housing price indexes (Avery, Elliehausen, and Kennickell 1987).

It is also reasonably clear why FFA estimates of the stock of residential housing might be low relative to market value estimates. The

FFA estimates are derived from a replacement cost model of the stock of residential housing plus an adjustment for land prices. The replacement cost model presumably uses the same data (house price construction indices) as have been shown to be consistent with the survey estimates of housing value, but the land price adjustment is particularly difficult to make and may well be seriously biased downward.

On balance, we read the evidence as suggesting that the survey numbers for residential housing stock are right (and, if anything, underestimates) but that the FFA numbers are much too low. It is also true that all three surveys examined in this paper show quite similar estimates of the value of residential housing stock. Since the methodologies are all about the same, that is hardly surprising.

The other major discrepancy between the survey estimates and the FFA estimates is in the liquid asset category, where the survey numbers on liquid asset holdings—checking and savings accounts, money-market fund shares, government saving bonds, and so on—are much lower than the FFA numbers. There are some technical reasons why the survey numbers would be expected to be lower—they do not, for example, include holdings of currency, while the FFA numbers do. But that cannot account for anything like the difference between the two. In particular, conceptual differences cannot begin to account for the differences between SCF and FFA in estimates of savings accounts, where the largest discrepancy appears.

In considering likely explanations of the difference between the SCF and the FFA estimates of liquid assets, it is worth noting that SCF and FFA are remarkably close in their estimates of the value of common stock and bonds and in estimates of both mortgage and installment debt. Moreover, it is worth noting that all three surveys examined here—SCF, PSID, and SIPP—have roughly the same liquid asset totals, although the three are very different for estimates of common stocks and bonds, where SCF numbers are much higher than the other two.

Our tentative conclusion is that the SCF numbers on liquid asset holdings are more likely to be correct than are the FFA numbers, although there are some technical differences between household survey estimates and such aggregate estimates as FFAs, which tend to narrow the observed discrepancy. That conclusion runs counter to the conventional wisdom, which has always regarded survey estimates of wealth as much less reliable than aggregate estimates derived from the records of financial institutions.

Our conclusion, which we recognize as largely informed conjecture, is based on three considerations. First, we would have thought that if households could estimate any of their financial asset holdings with reasonable accuracy, assuming that they were willing to be candid about their holdings, they could certainly estimate liquid asset holdings a lot more easily and accurately than common stock or bonds. In particular,

they could estimate holdings of savings accounts more easily than almost any other asset. Both stocks and bonds involve difficult valuation problems from the point of view of a respondent, although those problems are less onerous these days, when investors are apt to get monthly statements from their brokerage houses or investment advisers. But we can think of no reason why households would have difficulty in estimating their holdings of savings accounts.

Second, there are plausible reasons for supposing that the FFA numbers on liquid asset holdings are overestimated because of the difficulty of distinguishing households from business holdings.[11] We noted above that the FFA data did not appear to have any place to represent the substantial value of business assets in the form of closely held corporations since the corporate stock estimates in FFA are derived almost entirely from estimates of the value of traded stock. But many closely held corporations, as well as noncorporate businesses, must have part of their asset values in the form of liquid assets, and these are quite likely to be hard to disentangle from household assets.

Finally, there is a substantial conceptual difference between FFA estimates of some liquid assets—particularly checking accounts—and household estimates based on surveys. It is likely that households provide an estimate of their current checkbook balance when asked about checking account holdings. But FFA estimates include the "float"—checks that have been debited in the check writer's own account but not yet debited by the bank. Aggregate financial data derived from the balance sheets of banks will thus show larger asset holdings than survey respondents who report their checkbook balances by subtracting checks that have been written but not yet debited. The magnitude of the float can be substantial—Avery, Elliehausen, and Kennickell (1987) estimate it at a quarter of total checking account balances. Since this estimate does not include "mail float" (checks written but not yet deposited), the true discrepancy attributable to float is even larger. Unfortunately, this explanation is of virtually no help in explaining the very large discrepancy in savings account holdings, unless households systematically misclassified their checking and savings account balances to overestimate the first and underestimate the second.

In sum, we have some reason to believe that FFA estimates are conceptually constructed so as to be larger than survey estimates, some reason to believe that FFA estimates of household liquid assets are contaminated by some unknown proportion of business assets, and no plausible story as to why consumers should be able to estimate holdings of common stock but unable to estimate holdings of liquid assets.

Overall, we read the evidence in table 10.14 as casting at least as much doubt on the credibility of the FFA data as on the credibility of the aggregate survey data on household wealth. For the category for

which we know that the household measurements are most likely to be unbiased—the stock of housing—the survey numbers differ substantially from the FFA numbers. For asset categories for which we think that households probably have a difficult time making reliable estimates and for which the FFA numbers should be pretty good—publicly held stocks and bonds—the match is quite close. And for assets for which we judge that the household data should be more reliable than they are for common stocks and bonds—for example, liquid assets—the FFA numbers are substantially discrepant from the survey, and we have some reason to believe that conceptually comparable FFA numbers would be lower than the ones in table 10.14. Finally, for the data on consumer credit, the two match closely, especially for mortgages and consumer installment credit.

It is also interesting to note that the 1983 SCF appears to have done much better than the 1962 SFCC in matching FFA data in almost every asset category. That in itself is surprising since we have always thought that the 1962 SFCC was by far the most detailed and comprehensive consumer wealth survey ever done—including the 1983 SCF. For example, in the 1962 survey, estimates were obtained from the accountants of wealthy individuals about every asset and liability held by that household, including lists of shares of common stocks and their market value as of the survey date. In the 1983 SCF, respondents were asked a global question about how much publicly traded stock they owned—a procedure that sounds to us much less likely to yield accurate estimates than the 1962 SFCC procedure (although for some households that question was apparently answered by their accountants).

Perhaps the answer is that in 1983 households generally were much more knowledgeable about their assets and liabilities, if for no other reason than that they now continually receive information returns in conjunction with tax legislation that keeps them much better informed than consumers used to be about the value of various assets and liabilities. In addition, it may be that households are a good deal more sophisticated about the possible misuse of information by survey organizations and are more prepared to be candid about their holdings, provided they are willing to be interviewed at all. And, of course, survey organizations are a lot more sophisticated now than they used to be—all one has to do is compare any of the 1950s or 1960s versions of the SCF with the 1983 version to see the difference. We now expect respondents to give us precise dollar magnitudes, and interviewers are trained not to take "don't know" for an answer without trying pretty hard to extract a number from a hesitant or reluctant respondent. Those conjectures, of course, go under the heading of sheer speculation.

Given the data in table 10.14, it follows that the aggregate match between the PSID and the SIPP data is substantially less good than

the aggregate match for the SCF data, although the three surveys are in substantial agreement on housing stock and liquid assets. But, for financial assets, not only are the aggregate values in PSID and SIPP a good deal lower than they are in SCF, but the difference in dates suggests that the reverse should be true if all three surveys provided equally accurate measurements of aggregate wealth—SCF is the earliest of the three surveys, PSID was conducted about one year later, and SIPP was conducted about eighteen months later. A rough adjustment based on differences in FFA estimates of household net worth would add about 10 percent to the wealth holdings in SCF to make it roughly comparable in time to either PSID or SIPP.

10.7 Pension Assets

Entitlements to private and public pensions are the most important assets that have been omitted from the analysis presented so far in this paper. These entitlements are an increasingly important asset for individual families. They are also an important component of aggregate household wealth—private pension reserves accounted for 12 percent of outstanding household net worth in the Federal Reserve Board's 1982 FFAs. Rights to social security as well as other public entitlement programs are also excluded. As a consequence, the estimated wealth holdings included in this paper underestimate household wealth to a significant extent.

Pension reserves have been excluded from wealth estimates not because of the lack of recognition of their importance but rather because of the difficulty of obtaining reliable estimates from household surveys. In fact, the PSID, SIPP, and SCF surveys each contained questions on pension entitlements. Data quality concerns are based on both the ability of respondents to provide accurate information and the wide array of assumptions necessary to estimate pension wealth. Even with a reliable household measurement model, difficult issues remain on how to estimate a reliable current dollar value for entitlements to future income streams.

Wealth surveys use a "balance sheet" approach to assess the various types of assets and liabilities held by households, with each component monetized at its current market value. Unlike most assets held by households, pension benefits usually represent not ownership of an asset "stock" but rather an entitlement to a "flow" of future benefits. The valuation problem is not limited to plans whose benefits are defined as future income flows since even defined contribution plans (where the household usually has assets with a known value) often make benefits payable only after a certain age and may exclude the option of "lump sum" withdrawals at any time.

Three sets of assumptions are required to convert entitlements to benefit flows into stocks of wealth by discounting the expected stream of future benefit amounts to their present value. The first involves the appropriate discount rate to use in present value calculations. The second involves the personal and employment characteristics required to calculate vested entitlements for individual respondents. These assumptions are required because pension entitlements are defined with reference to two dates—the date the individual retires or terminates active participation in the pension plan, and the date at which benefit payments begin. The third involves the current and future financial viability of the pension plan itself as well as the effect of public policy and government regulation on plan benefits. Vested participants face a risk that the pension plan will be unable to meet its financial commitments when their entitlements are due. Government policies, such as funding standards and benefit guarantees, also influence the type and extent of risk faced by participants. Moreover, since benefits from employer-sponsored pensions are often integrated with social security payments, future changes in social security benefit provisions may change net benefit amounts.

10.7.1 Methods Experiment

The SCF pension study combined information from both household members and pension providers to estimate pension benefits. Respondent data played two crucial roles in the research design. First and foremost, the sample of pension providers was based on respondent reports of pension coverage. Systematic errors in self-reported pension coverage would undermine the representativeness of the derived pension provider sample. Second, even if the correct pension provider and plan formulas were identified, respondent data such as length of service, salary level, and other employment characteristics are required to calculate benefit amounts. Systematic errors in the employment information given by respondents would bias the resulting estimates of pension entitlements.

Given the importance of several crucial pieces of respondent information in this design, a separate methodological study was conducted (Duncan and Mathiowetz 1984). A small industrial firm in the Midwest provided access to official records, which included the name, address, and telephone number of all current employees as well as information on the employment and earnings history used to calculate pension entitlements. Differences between respondent reports and offical records were used to estimate the degree of measurement error. The respondent information for which accuracy was most important for the success of this research design involves pension coverage, job tenure, and wages. Inaccuracies in respondent reports of pension coverage

would bias the derived pension provider sample, by being either incorrectly included or incorrectly excluded. Tenure and wages are the two most frequently used variables in pension plan formulas. Inaccuracies in the respondent information on these variables would bias the estimated benefit amounts calculated from the plan formulas. The questionnaire items on pension entitlements included in the validation study were based on those used in the SCF and PSID studies.

Among the 371 respondents in the experimental study, 97 percent correctly reported the status of their pension coverage. When asked about vesting status, 90 percent reported the correct number of years counted toward pension benefits, plus or minus one year. Respondents were more likely to underreport work tenure by more than one year (9 percent) than overreport by more than one year (1 percent). The validation study also found very little evidence of response bias in the questions on the respondents' prior years' wages. Respondent reports of annual earnings differed by less than 1 percent on the average from employer records, but this reflected the net effect of larger, offsetting errors—the mean absolute difference was 7 percent. These results indicate that the crucial information necessary for this research design can be reliably estimated using household surveys. The study also indicated that whether the respondent was vested was correctly reported by 89 percent. Questions asking for more detailed information on pension plans were much more frequently answered incorrectly—whether respondents were covered by more than one plan, whether it was a multiemployer plan, and so forth.

10.7.2 SCF Pension Data

In addition to the survey data on financial and tangible assets and liabilities, SCF also included survey questions about pensions on both the respondent's present job and past jobs and about the probable amount of future pensions that such rights entailed. In addition, SCF also obtained independent estimates from the pension providers (usually the employer) from whom household members were expecting to draw pensions in the future. Thus, we can compare estimates of pension rights obtained directly from households with estimates of pension rights obtained from pension providers. The latter were obtained by ascertaining the characteristics of the pension plan in which respondents had pension rights and producing an estimate of future pension benefits predicated on assumptions that were consistent with those used in the household part of the survey.

The decision to distinguish between respondent information that could be reported reliably (coverage, tenure, and income) from that which could not (benefit amounts) was clearly reflected in item nonresponse rates. The SCF question on pension coverage had a 1.1 percent missing

data rate, but the question on the amount of pension expected at retirement had a missing data rate of 61 percent. Thus, while nearly all respondents could report coverage, most respondents did not know the retirement benefit amount.[12] Still, 39 percent of the respondents did give an estimate of their expected retirement benefit. To assess the accuracy of these expectations, the benefit amounts that respondents reported in the household survey were compared with the amounts calculated using the actual plan provisions given in the pension provider data base. For these comparisons, calculations for both the household and the pension provider data bases were based on the same set of economic and behavioral assumptions. It is important to note that the questionnaire items focused on the expected pension benefit amount at retirement. As a consequence, the comparison was based on the assumption that the respondent remained working until the date he or she expected to retire or quit.

Given the very high level of missing data on the questions concerning benefit amounts, a second set of comparisons was also made. As with all other survey variables, pension amounts were imputed for respondents with incomplete or missing data. These imputations were done before the information from the pension provider survey was available. Consequently, the amount calculated from the pension provider survey can also be compared with the imputed amounts to assess the adequacy of those imputation procedures. The imputation procedure was limited to respondents age forty or older and used a regression technique with the predicted benefit amount expressed as a proportion of final wages.

When the pension provider data were used to estimate pension benefits, the initial pension benefit amount was 32 percent of final wages. In comparison, the respondent data without imputations amounted to 27 percent of final wages, and with imputations the proportion rose to 34 percent. This same pattern—the raw respondent data yielding the lowest estimates and the pension provider estimate being just below the imputed respondent estimate—was found among subgroups defined by sex, education, and occupation. Using the pension provider data, the estimated initial annual pension benefit was $12,096, compared with respondents' own estimates of $10,057 and with $12,696 when imputation was used with the respondent data. Thus, respondent data, without imputation, were about 17 percent lower than the benefit amounts determined from pension provider data; the imputations to the respondent data resulted in a 5 percent overestimate of pension benefits. These same general results held across sex and education groups and, as shown in table 10.15, indicate that respondent reports of pension entitlements are likely to be underestimates but that imputation procedures appear to remedy this shortfall.[13]

Table 10.15 **Comparison of Respondent and Pension Provider Reports of Pension Entitlements**

		Reported by Respondent		Imputed from Respondent	
	Pension Provider ($)	Amount ($)	Ratio to Provider Data	Amount ($)	Ratio to Provider Data
All	12,096	10,057	.83	12,696	1.05
Sex:					
Male	14,039	11,667	.83	15,061	1.07
Female	8,574	6,706	.78	8,747	1.02
Education:					
College	23,292	19,912	.85	24,853	1.07
No college	8,744	7,305	.84	9,113	1.04

Note: All pension amounts are the median initial annual benefits.

For the analysis of wealth, asset ownership is usually taken to be the equivalent to the legal entitlement to future pension benefits, and legal entitlements are restricted to those benefits that have accrued as of a given date, as if the participant would "quit tomorrow." For most types of behavioral analyses, however, discretionary saving decisions would be expected to be more sensitive to the level of expected retirement benefits, not the level of the current entitlement. Whether expected benefits or current entitlements are used makes a big difference. When the pension provider data were used to estimate the benefits respondents would receive if they retire when planned, the average pension benefit would represent about one-third of final wage, which would begin at age sixty-two, on the average. If, on the other hand, all respondents were assumed to "quit tomorrow," the annual pension benefit would average 22 percent of their current 1983 wage. Thus, even though the average number of work years was only one-third less under the "quit tomorrow" assumption, the estimated yearly pension benefit in current dollars was reduced by two-thirds. Moreover, under the "quit tomorrow" assumption, 38 percent of those that would have been eligible for full pensions at their planned retirement date would not be vested and would thus have no entitlement to future pension benefits.

10.8 Conclusions and Recommendations

The basic question posed by this paper is, What is a reasonable estimate of the probable quality of data on household wealth collected

by means of surveys, using as evidence the three wealth surveys conducted during the 1980s?

An assessment of quality must take into account sample and questionnaire design, response rates and nonresponse bias, ability to represent the important upper tail of the income and wealth distribution, the size of measurement error, the importance of item nonresponse and imputations, and the degree to which the household survey adequately represents national wealth. We read the evidence as consistent with a number of generalizations.

1. Measured against the standards set by previous household wealth surveys, all three of these data sets stand up quite well. They do not differ substantially among themselves when it comes to measuring total wealth and the distribution of wealth in the great bulk of the U.S. population.

2. The unique design characteristics of the SCF give it the highest overall potential for wealth analysis of the three data sets examined. The SCF has the right kind of sample design to measure both the overall distribution of wealth and the total national wealth. Its level of detail makes it more useful than the other two for examination of the detailed characteristics of wealth holdings and wealth distribution. Its response rates and potential nonresponse bias are generally worse than the other two, although that may be offset by the fact that it may have less nonresponse bias among very wealthy households. Its overall distributional characteristics seem clearly better than the other two. Its measurement error characteristics are at least as good as the other two, and probably better. It has less item nonresponse and thus less need for constructing imputed values. And it is clearly the best match to external control totals on national wealth.

3. Comparing PSID to SIPP, one gets a mixed picture, but, in general, PSID had the advantage. Although its basic sample design is less well suited to measuring wealth than SIPP (because it oversamples low-income families, for whom wealth holdings are relatively unimportant), its general descriptive characteristics, taking SCF as the benchmark, look to be closer to actual population characteristics than are those of SIPP. Although PSID is not able to describe the details of wealth holding nearly as well as SIPP because of its highly aggregated nature, its measurement error characteristics look to be consistently better than are those of SIPP. The PSID has a lower item nonresponse rate than SIPP and thus less need to construct imputed values, and it appears to be a somewhat closer match to external control totals.

Overall, we judge that the quality of these three wealth surveys is remarkably high, given past experience with attempts to measure household wealth by way of survey techniques. Partly because of differences in sample design—in particular, in the representation of high-

income and therefore high-wealth households—and partly because of what appears to be more successful implementation, it appears to us that the SCF and PSID data have better quality characteristics than do the SIPP data.

The most efficient sample design for a wealth survey depends on whether one has in mind using wealth as an independent variable in a model or as the dependent variable and the subject of major interest. If one is interested in wealth as an independent variable to model some other aspect of household behavior, the PSID design seems about right—a small number of relatively highly aggregated questions, involving little response burden and quite moderate cost.

For studies in which saving or net worth itself is the major object of interest, the SCF design has more of the right characteristics than either PSID or SIPP, but even the SCF design is clearly suboptimal. An efficient net worth survey should sample dollars of net worth with equal probability of selection. The SCF uses about one-quarter of the sample to estimate the upper half of the wealth distribution and the remaining three-quarters to estimate the lower half. An optimally efficient design would roughly double the sample size in the upper half of the wealth distribution and reduce it correspondingly in the lower half.

The SIPP design falls between these two and is not optimal for either. There are insufficient high-wealth households in SIPP to provide an efficient estimate of national wealth or to enable a detailed analysis of the distribution of net worth or its composition in the population at large. And SIPP appears to have substantially more detail than is needed to produce estimates of net worth useful as an independent variable in analysis.

The conclusion that a small number of highly aggregated net worth questions can produce wealth data of about the same quality as a substantially more intensive survey effort needs to be tested on a sample that does not have the strongly longitudinal character of PSID. It is possible that the exceptionally good results from the PSID wealth module are due to the fact that these households have been continually interviewed over a long span of time, often by the same interviewers. Testing the PSID design of a wealth survey on a small probability sample is clearly worthwhile, and one would not have confidence in our conclusions unless that were done.

The increasing importance of pension assets makes their continued exclusion from wealth analysis less acceptable on data quality criteria. The potential for bias that is due to this "omitted" variable is likely to rise along with upcoming changes in the age distribution of the population. The analysis indicates that some aspects of pension entitlements can be reliably measured in household surveys and that others

cannot. It is important to note that sufficient information on pension characteristics (whether covered, years covered, and wage information) can be reliably obtained and, when combined with data on wage replacement rates (by industry and occupation) can be used to impute benefit amounts. Such a procedure would be most suitable when the pension entitlements are used as independent variables in analysis models.

An important area in which a household wealth survey can significantly improve our knowledge about the economy is in the relative importance of noncorporate enterprises (partnerships and proprietorships), closely held corporations, and corporate enterprises. The household wealth survey data indicates that the first two of these categories are surprisingly large in the economy as a whole, but the survey estimates are based on small and possibly atypical samples of households with such assets. The aggregate data available from FFA on this issue are clearly unsatisfactory, and it may be that the best way to improve measures of economic activity, as well as wealth, is to start with the household survey and obtain detailed follow-up information from households with equity in proprietorships, partnerships, and closely held corporations.

Notes

1. Findings from the 1983 SCF are summarized in the *Federal Reserve Bulletin* (September and December 1984 and March 1986), as were the findings from the surveys conducted in the late 1940s and 1950s—then as now, the Federal Reserve Board has been the primary sponsor of these surveys. See also the annual volumes entitled *Surveys of Consumer Finances*, published by the SRC, from 1960 to 1970.

2. For information on the PSID, see the volumes entitled *Five Thousand American Families—Patterns of Economic Progress, PSID Procedures and Tape Codes*, and *User Guide to the Panel Study of Income Dynamics*, all published by the SRC. Basic data from all SRC surveys and many government surveys are available from Michigan's Inter-university Consortium for Political and Social Research.

3. For one-quarter of the sample (one of the four rotation groups), no interviews were taken in the second interview wave, making it the third rather than the fourth interview in which the asset and debt questions were first included.

4. No information was made available to SRC that indicated the adequacy of the name and address information used in the mailing, making it impossible to determine whether the lack of a response indicated a refusal or simply a letter that did not reach its proper destination.

5. The second SCF interview was conducted in 1986. All family heads were recontacted, as were any spouses that left to establish separate households.

6. The SIPP survey obtained more detailed information on account ownership than on dollar holdings. SIPP obtained ownership information on each asset type included in the category for the first two financial asset categories listed in the text, but obtained information on dollar holding only for the entire category.

7. An investigation of the potential bias in the high-income sample is being jointly conducted by SRC and IRS. The study is designed to yield sufficient information to assess the survey findings, yet ensure that the confidentiality of both data sources are maintained.

8. The discussion here is limited to the consequences of random measurement error. There is in addition correlated measurement error, which considerably complicates the analysis. Basically, we ignore that issue.

9. That assumption is most plausible for the demographic variables—age, sex, race, occupation, education and marital status. It is less plausible for income, where we can be reasonably certain that PSID has less measurement error than SCF. It is also plausible that SIPP has less measurement error than SCF for income in low to moderate-income households, but SIPP may well have more measurement error than SCF for high-income households.

10. The other major option is to delete the case from analysis. Opinions differ on whether outliers contain useful information. The trimming of the weights preserves any such information, while the deletion of the case does not.

11. A similar interpretation of the differences between survey and FFA estimates of household deposit accounts is given in Wilson et al. (chap. 2, in this volume).

12. The other SCF questions needed to calculate benefits from the pension formulas have relatively low missing data rates—5.9 percent for job tenure and 12.7 percent for wages. For these cases, the imputed tenure and wage variables were used in the pension formulas.

13. The success of the imputation procedures was related to the similarities in pension formulas. The average pension plan provided about 1.2 percent of the worker's final wage for each year covered, with a standard deviation of 0.7 percent. There were only relatively small variations in the mean per year replacement rate across major demographic subgroups, ranging from 1.0 to 1.3 percent. Consequently, regression imputations based on job tenure and income levels performed adequately.

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Comment Eugene Smolensky

This session is not about wealth and its distribution but about gathering some kinds of wealth data—those on household wealth. The emphasis is on the 1983 Survey of Consumer Finances (SCF) and the 1984 special wealth supplement to the Panel Study of Income Dynamics (PSID), with an occasional snipe at the Survey of Income and Program Participation (SIPP). The three data sets are compared on four characteristics and with a set of national aggregates. The basic message is, My God, but the Institute for Social Research does do a hell of a job, despite what you armchair data consumers might think—and on the cheap too.

Eugene Smolensky is dean of the Graduate School of Public Policy at the University of California, Berkeley.

The worst part of it is that there is a strong chance that the authors are right.

Most of the effort in the paper is devoted to tracing differences among the data sets to technical issues in survey design and implementation—topics that have been at the center of concerns of the Conference on Income and Wealth since at least volume 13 but that are not in the mainstream of economists' concerns today. It is a kind of nostalgic trip. These issues include sample design, particularly the role of oversampling; response rates; questionnaire design; top coding; the outlier problem; the most knowledgeable respondent problem; imputations; measurement error; and trade-offs between cost and quality. Imputations, top coding, and measurement error get quite extensive treatment.

In addition to the technical issues, the paper contains an extended comparison of the data reported in the three surveys and a comparison of the SCF with the data in the flow-of-funds accounts (FFA), which rests heavily on the work of Avery, Elliehausen, and Kennickell (1987). Obviously, Curtin, Juster, and Morgan have done a great deal of conscientious work, and the paper is very long. Most of my comments, unfortunately, suggest that it will have to be quite a bit longer.

There are at least two important omissions.

1. There are no comparisons with the usual sources of household wealth data—particularly sources concerning the distribution of wealth. There are no comparisons with the Consumer Expenditures Surveys (CEX), our only source of continuing data on household wealth. There are no comparisons with wealth estimates derived by capitalizing income from property, and there are no comparisons with estimates derived from estate data. (The last is addressed by Avery, Elliehausen, and Kennickell, but they are puzzled by what they find.) These comparisons would tell us more about the other data and methods than they would about the three surveys under review here, but it would be a great service to the profession to know something more about the data and methods that are the workaday stuff of workaday economists. I will return to this theme, particularly to the CEX, in a moment.

2. An omission of another sort relates to the lack of formal tests. We are asked to accept that things are similar or different by eyeballing some columns. What would be more important than formal tests of statistically significant difference would be to think of these alternative data sets as inputs in studies and to ask if the differences matter when making a policy decision or an analytic one.

Section 10.4 is an important exception. There the authors have the ingenious notion of fitting the same statistical model of lifetime accumulation of wealth to each of the three data sets as a way to analyze measurement error. The idea is that misspecification will be the same across the three data sets and that substantial differences in the correlation coefficient or in the standard errors of estimate therefore ought

to be telling us something about differential measurement error. But the authors in fact have trouble interpreting what they find, and it is abundantly clear that the precise errors in variables model that is being relied on and the way that model would be affected by measurement error in these surveys need to be precisely known. The model and its error structure are simply going to have to be written down and its sensitivity to selectivity explored analytically since measurement error is correlated with income and with age, since, consequently, measurement error is larger for some assets than others, and since those assets are best measured in the SCF.

I would like to draw an inference from the comparison of the SCF and the FFAs. The authors find that the two are remarkably close in their aggregates but that this results from two large and offsetting differences in the subcomponents. The SCF is very high on house values and very low on liquid assets. The authors argue that self-reported house values are more appropriate than FFA estimates of replacement value, made via a depreciation and land rent adjustment to ancient benchmarks. Surely, the authors must be right about this, certainly in this era in which there has been extraordinary inflation since the benchmarks were established. The low liquid assets reported by households are a puzzle since presumably that is the sort of asset households know most about. So FFA must be wrong again, and the error is probably in assigning too little to small businesses and closely held corporations. Again, FFA probably relies on old benchmarks. If these arguments are right, they relate to a more general concern about our statistical collection effort. If, whenever we look at an FFA number, it is wrong, can we also presume that the FFA numbers we have not looked at carefully are also wrong? If so, does that mean that, when SCF agrees with the FFA, the SCF number is also wrong? Do two rights make a wrong? It may be. Many of our time series are in danger now of being badly out of step with our evolving economy. The data collectors are always loathe to change an ongoing series, and for good reason, but now they lack the time, the trained manpower, and the money as well as the inclination to do anything different. Household surveys, however, are nearly always state of the art. It is becoming easier and easier for me to believe, therefore, what is truly the central message of this paper—if you want to know anything about this economy, you had better resurvey, and, when you resurvey, you had better oversample.

This line of argument takes me back, as promised, to the CEX. Here we have an ongoing survey, but one in which there are natural times at which to change the questionnaires or even the sampling frame. Ranging over income and expenditures as well as net worth, these data now offer what is becoming increasingly unavailable—data that link across the range of independent variables that analysts not directly

involved in the survey design will need to understand the variables in uses not of prime concern to the survey designers.

Nowadays you might want to answer such questions as, What does it mean to talk about changes in the distribution of wealth across families when about one child in five has a parent—the wealth-holding natural father, in all probability—residing in a different household? To what extent is the rapid convergence in income for young blacks and young whites and the divergence of income between old whites and their grandchildren going to affect wealth accumulation and its distribution? How tight in any case is the connection between income and wealth accumulation? Where are those random capital gains going? How much of domestic wealth is still held by domestic households? How frequently are the growing number of "involuntary entrepreneurs," to use Bronfenbrenner's felicitous phrase for describing people who go into business because they cannot find jobs, financing their businesses with personal debt? I am sure that each reader could immediately add three questions that he or she would want a graduate student to use the CEX to answer, if only we knew what to make of the asset and liability data of that survey.

The hope, probably forlorn, that the CEX net worth data are usable springs from the same evolving weakness in our statistical superstructure that I mentioned a minute ago. With the recipient unit, tax incentives across income sources, inflation and capital gains, and international capital flows all changing very quickly now, data routinely collected and tied to pre-1973 benchmarks are increasingly incredible. So we go out and survey—and the surveyors are now awash with projects and money. But these surveys are tightly targeted, so we get good data on one series and little or no related data on the variables that will inform our understanding of the target data set. Just as an example, how good is the income data in the SCF?

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