Draft
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Household Portfolios in the United States

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1. Introduction

In deciding how to structure their assets and liabilities, American households face a broad array of options. Savings can be allocated to a wide range of assets, from simple bank accounts to sophisticated assets like real estate investment trusts. Credit is available from many types of institutions -- banks, credit unions, finance companies, credit cards -- with all kinds of borrowing terms: loans versus lines of credit, fixed or variable interest rate, and secured or unsecured loans. Deregulation, easy entry, and developments in information technology have been important in the proliferation of financial products.

Given the relatively liberal U.S. financial environment, it is perhaps surprising that the portfolios of American households tend to be very simple and safe. In 1998, the typical household had three types of financial assets, most frequently a checking, savings, and tax-deferred retirement account; less than one-half of all households had any type of investment in stock. There is also quite a lot of borrowing in costly forms like credit cards, and from costly sources like finance companies. Even in the top quintile of the income distribution, portfolios tend to be fairly undiversified, with some borrowing in the form of high cost debt. Understanding these puzzles may shed a lot of light on why households select the assets and liabilities that they do.

While there has been a considerable amount of research on household saving behavior, the portfolio decisions of households are less well understood. Some studies have examined the equity premium, borrowing constraints, and information and transactions costs (see King and Leape, 1994; Haliassos and Bertaut, 1995; Blume and Zeldes, 1994). But there has been little systematic investigation of household portfolio behavior to date. There are several reasons why this gap needs to be filled. First, because returns vary across assets and costs vary across debts, portfolio decisions have important implications for the pace of wealth accumulation -- and thus for such issues as the adequacy of precautionary saving and degree of retirement preparedness. Second, portfolio decisions play a key role in determining how changes in macro variables -- interest rates, stock prices, inflation, and unemployment -- affect household spending and saving. Third, portfolio decisions also underlie the effects of fiscal policies -- like the capital gains tax or

Social Security reform -- on personal and national saving. Fourth, the behavior of individual investors impinges directly on questions about the efficiency of financial markets (Shiller 1997). And finally, understanding households' portfolio decisions may also provide richer insights into theories of consumption and saving behavior.

This paper provides an in-depth review and analysis of household portfolios in the United States. The next section of the paper describes trends in the structure of household portfolios in the past 15 years, using both aggregate and survey data. We document the growth of tax-deferred retirement plans, the increased role of equity, and the shift toward home equity-based borrowing. We also update previous comparisons between the SCF and aggregate data from the Flow of Funds. The third section of the paper presents evidence on the structure of household portfolios from the SCF and discusses previous research in the field. The fourth part of the paper uses recent advances in simulation methods to estimate econometric models of portfolio choice. We estimate a multivariate probit model of decisions to hold various assets and liabilities, and for some items extend the model to levels of holdings as well. We use this model to investigate determinants of portfolio structure, including earnings risk, transactions and information costs, life cycle considerations, housing wealth, retirement wealth, and liquidity constraints. The final section draws implications of our findings, especially those for understanding how household portfolios respond to changes in fiscal policy, macroeconomic variables, and financial innovations.

2. Data on household portfolios

Aggregate data on households' assets and liabilities are available from the Federal Reserve Board's Flow of Funds accounts (FFA). The FFA are compiled from institutional sources and provide a comprehensive view of households' holdings; they include both assets and liabilities held directly by households, as well as by pension funds held on households' behalf. Table 1 shows some broad trends in household portfolios from 1983 to 1998.[1] (Note that, while published figures from the FFA on the 'household sector' include the assets and liabilities of nonprofit organizations, the figures presented here remove the holdings of nonprofits).[2] Throughout this

[1]All dollar figures in the tables and text are adjusted to 1998 terms using the "current methods" version of the consumer price index for all urban consumers (Stewart and Reed, 1999).

[2]At present, FFA estimates of nonprofit holdings are available through 1995 only, due to lags in the availability of the source data. For 1998, we estimated holdings of nonprofits in 1998 by

period, the single most important item in aggregate household assets was residential property; nonetheless, its share of total assets slid from 28% in 1983 to 22% in 1998. For households overall, the relative importance of financial assets increased substantially over this period, rising from about 45% to 61% of total assets. The composition of financial assets also shifted appreciably, with the relative importance of time and savings deposits declining while the importance of pension funds, corporate equity, and mutual funds rose.

Several factors underlie these trends. The first and major consideration is the sustained growth in stock prices over the period. As shown in Figure 1, the S&P 500 stock price index rose from 165 in 1983 to 600 in 1995 and 1,100 in 1998;[3] with inflation subdued for most of this period, this represents an average real increase of over 10% per year. Second, whereas mutual funds represented a narrowly-held specialty product before the 1980s, after that time the industry grew dramatically, with the number of funds rising from 564 in 1980 to 6,778 in 1998 (Investment Company Institute, 1998). The large array of institutions offering mutual funds, the proliferation of types of funds available, and the rise of no-load funds have made it easier and less costly for investors to acquire a diversified portfolio of stock.

A third major trend during this period was the introduction of tax-deferred retirement accounts. Most households could make tax-deductible contributions to Individual Retirement Accounts (IRAs) between 1983 and 1986; although broad deductibility was curtailed in 1986, IRA balances have continued to grow due to capital gains, rollovers from 401(k)-type accounts, and contributions from self-employed persons.[4] Additionally, following a Treasury ruling in the early 1980s, pension coverage started to shift away from traditional defined-benefit (DB) plans, in which employees receive a fixed payment based on salary and years of service, and toward 401(k)-type defined-contribution (DC) plans, in which employees and/or employers make contributions to retirement accounts. For employees, 401(k)-type plans have the advantages that both contributions and returns are tax-deferred, vested balances are portable, employees often have investment options, and they may be able to borrow or make withdrawals from the account.

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taking total (i.e. household plus nonprofit) holdings in 1998 and assuming that nonprofits held the same share of the total as in 1995. This assumption seems reasonable, given the small movements in the shares over the period for which separate estimates are available.

[3]Year-end figures.

Fourth, the combination of rising stock prices and the growth of stock investment through mutual funds and retirement accounts has been associated with a significant increase in the equity share of households' financial assets. As shown at the bottom of table 2, the share of household-sector financial assets invested in corporate equities -- either directly or through a mutual fund, retirement account, other managed asset, or DB pension fund -- rose from 15% in 1983 to 35% in 1998. In terms of total household assets, this rise put households' equity holdings almost on par with residential property at the end of 1998.

The final and related point concerns the role of equity in residential property. Equity in residential property dwindled in importance in the 1990s, with its share of total household wealth falling from 22% in the 1980s to about 15% in 1998. The decline partly reflects the relatively slow growth of housing prices: between 1983 and 1998, median home prices less than doubled, compared to the sixfold increase in stock prices (Figure 1). But factors on the liability side of the household balance sheet also contributed to this trend. Notably, whereas households used to be able to deduct all types of interest payments from their taxable income, the Tax Reform Act of 1986 limited deductibility to interest payments on debt backed by home equity.[5] This change increased the relative attractiveness of borrowing against the primary residence, contributing to a rise in the share of mortgage debt in total household borrowing and a rise in the ratio of mortgage debt to the value of residential property.[6]

While the aggregate data describe the portfolios of the household sector overall, they do not directly portray developments in the *typical* household portfolio. Ownership of some assets, notably stock and bonds, is quite concentrated at the top of the wealth distribution, so, for example, it is not necessarily clear whether the shift toward risky financial assets is broad-based. To examine trends at the household level, we look at data from the Federal Reserve Board's Survey of Consumer Finances (SCF). Conducted triennially since 1983, the survey collects detailed information on households' assets, liabilities, incomes, and other characteristics.[7] In

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[4]More recently, the 1997 tax bill introduced Roth IRAs, for which contributions are taxed but withdrawals are not.

[5]The limits were phased in over a three-year period. See Poterba, this volume, and Maki (1996) for further analysis of this subject.

[6]Increased leverage may also reflect incentives to channel funds into retirement accounts, rather than pay down tax-preferred debt (Engen and Gale, 1997).

[7]See Kennickell, Starr-McCluer, and Sunden (1997) for an overview of the SCF.

recent years, the SCF sample has consisted of a standard representative sample of about 3,000 households, supplemented by a special sample of about 1,500 wealthy households drawn from tax records. In descriptive analysis, sample weights can be used to make the data representative of the population as a whole. This "dual frame" sample design provides adequate representation of both broadly-held items, like homes and vehicles, and other items, like stocks and bonds, held disproportionately by the wealthy.

Table 2 presents some basic descriptive statistics from the SCF. [***Note***: Results from the 1998 survey will be available in January 2000,[8] and will be incorporated into the next version of this paper. The current draft mentions select findings that have already been publicly reported]. Because of concerns about nonreporting in survey data on wealth, it is of interest to know how the SCF compares to the Flow of Funds.[9] As the table shows, estimates of average household wealth from the SCF have been about 10% to 20% below estimates for the same period from the FFA. While it may be tempting to attribute the divergence to underreporting by households, there are a number of conceptual differences between the two data sources that at least contribute to the divergence. Notably, the FFA include some items not collected in the SCF (i.e. currency holdings, DB pension reserves, and durable goods other than vehicles), and these may well outweigh the items included in the SCF but not the FFA (nonresidential property, and miscellaneous valuable assets such as artwork and antiques). A careful study by Antoniewicz (1996) found that, after adjusting for conceptual differences between the FFA and SCF, the two data sources tend to square fairly well, although the SCF estimates of financial assets remained somewhat below comparable measures from the FFA.[10]

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[8]See Kennickell, Starr-McCluer, and Surette, forthcoming.

[9]Because respondents often have incomplete information on their holdings or may be unwilling or unable to report details, the SCF data are carefully cleaned and edited, and missing values are systematically imputed.

[10]Two other issues are worth mentioning. First, in the FFA, households' holdings are computed as a residual, that is, by taking total holdings of a given asset or liability and subtracting out holdings attributable to other sectors. While there is no a priori reason to believe that this imparts a systematic bias to the household numbers, uncertainties in allocating funds across sectors may leave some scope for measurement error. Second, for practical reasons, the SCF does not sample households at the very top of the wealth distribution, such as those whose net worth would place them in the Forbes 400 range. For example, in 1995 the cut-off to make it into the Forbes 400 was net worth of $415 million; the 1995 SCF had only one household with net worth above this level. This omission causes only modest understatement of total household wealth. For example,

Tables 2 and 3 show trends in ownership and holdings of assets and liabilities using the SCF data. Many of the trends seen in the aggregate data are also apparent in the micro data. The share of liquid accounts -- including checking, savings, money market, and call accounts -- in total assets has edged down since 1989, although the share of households owning such accounts has remained above 85 percent. The period also saw declining ownership of several types of traditional investments -- including certificates of deposit, U.S. savings bonds, other bonds, and cash-value life insurance – reflecting the relatively unattractive returns to these products and proliferation of higher-return alternatives like mutual funds. Mutual fund ownership rose from some 5% of households in 1983 to over xx% in 1998 [12.3% in 1995], and while direct ownership of stock actually drifted down between 1983 and 1995, it xxx in 1998. The share of households having a tax-deferred retirement account --either IRA or 401(k)-type-- rose from about 31% in 1983 to xx% in 1998 [43% in 1995], and the median value of holdings more than tripled in real terms.[11]

As a result of the combination of broader ownership of equity and rising prices, the share of households owning publicly-traded stock -- either directly or indirectly through a mutual fund, retirement account, or other managed asset -- rose substantially, from 31.6% in 1989 **to almost 49% in 1998**.[12] This expansion has been broad-based across income, age, and education groups, so that the composition of stockholders has changed somewhat: stockowners in 1998 were somewhat younger than stockowners in 1989, and their median income and wealth were lower (Appendix Table A).[13] Nonetheless, stockownership has traditionally been concentrated in the upper tail of the wealth distribution, and the recent expansion of ownership has not altered this picture: for example, the share of stock held by households in the top 5% of the wealth distribution essentially held steady between 1989 and 1998.

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the total net worth of the Forbes 400 was $503 billion in 1995, compared to an estimate for the non-Forbes population of $21,930 billion from the SCF – suggesting understatement in the SCF on the order of 2-1/4%.

[11]Note that the value of retirement-account holdings is overstated by the amount of future tax liabilities.

[12]Note that this share cannot be computed for 1983, since that survey lacks information on the composition of investments in mutual funds, retirement accounts, and trusts and other managed assets.

[13]Appendix Table A is not included in the current draft.

The survey data also document the declining relative importance of home equity in household wealth.[14] According to the survey data, for households overall, equity in the primary residence declined from 28% of net worth in 1983 to xx% in 1998 [23% in 1995]. For the *typical* homeowner, home equity represents a larger share of their total wealth than this overall share implies: for example, the median share among homeowners was xx% in 1998 [49% in 1995]. But the median share is also considerably lower now than it was in the 1980s, due to growth in retirement accounts and other stock-based assets in homeowners' portfolios, along with the trend toward greater leverage associated with the home.

Finally, the share of households having credit card debt rose appreciably over the 1983-98 period. This is a period when bank-type credit cards became widely available in the U.S., especially in the first half of the 1990s when credit card solicitations filled households' mailboxes.[15] The widespread use of credit card debt in the U.S. is somewhat puzzling, considering the relatively high interest rates on credit card debt; even with the competition and low introductory rates, the average interest rate on bank-type credit cards remained above 15% in 1998, versus about 8% for a home-equity loan.[16]

3. The structure of household portfolios: evidence and previous studies

In simple portfolio models, investors allocate funds across assets with different risks and returns; optimization results in diversified portfolios, with the relative importance of different assets reflecting investors' risk and time preferences. Of course, such simple models abstract from several important aspects of the household portfolio problem. In particular, (1) investors also face background risk associated with labor earnings and business income; (2) a key

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[14]The FFA series on residential property includes all 1-4 family homes, not just the primary residence; other types of property are attributed to other sectors. The SCF distinguishes between the primary residence and other property owned by households (residential and commercial). According to the 1995 SCF, primary residences represented about 86 percent of the total value of residential property owned by households.

[15]The share of households having at least one bank-type card (Mastercard, Visa, Optima, and Discover) rose from 43% in 1983 to xx% in 1998 [66% in 1995]. Among households having cards, the share with balances outstanding after the last month's payments moved up from 52% to xx% [56% in 1995].

investment option, housing, yields consumption flows as well as investment returns, and its price may covary with income; (3) there may be information and transactions costs that vary across investments; and (4) households make borrowing decisions, as well as asset allocation decisions, and may face liquidity constraints. This section first describes the structure of household portfolios in the U.S., using a format comparable to other studies in this volume, and then reviews what we know about portfolio decisions from previous research.

Evidence. Table 4 provides some basic stylized facts on the structure of U.S. households' financial assets, using data from the 1995 SCF. The vast majority of households have only a few types of financial assets: of the thirteen main categories of financial assets in the SCF, the average number per household was 3.[17] Some 9% of households had no financial assets whatsoever; another 17% had only one asset, most commonly a checking account. Another 54% of households had 2 to 4 types of assets, typically a checking account along with a savings account, retirement account, and/or cash-value life insurance. The remaining 20% of households had 5 or more types of assets; items like directly-held stock and mutual funds become common only among households having 7 or more types of assets.

As Table 5 shows, there is a clear correlation between wealth and the structure of household portfolios.[18] Ownership of almost all types of assets and liabilities rises with wealth; the only exceptions are vehicle loans, credit card balances, and consumer debt (left panel). As wealth rises, the shares of total assets held in homes and vehicles decline, while the shares in stocks, bonds, mutual funds, trusts and other managed assets, businesses, and real estate rise; the share of all forms of publicly-traded stock in total assets also rises (center panel). The variation in portfolio structure across the wealth distribution, combined with the concentration in wealth ownership, implies large differences in concentration across assets and liabilities. For example, households in the top 5% of the wealth distribution own 57% of total net worth, but their shares are considerably higher for stocks, bonds, trusts and other managed assets, business equity, and

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[16]The average credit card interest rate is from the Federal Reserve Board's G19 statistical release, and the home equity loan rate is from HSH Associates, Financial Publishers. For additional discussion, see Ausubel (1991) and Calem and Mester (1995).

[17]The median was also 3.

[18]For early evidence on wealth and portfolio composition, see Uhler and Cragg (1971).

investment real estate (right panel). The only items where the distribution of holdings is anything close to proportionate are credit card balances and vehicle loans.

Variations in asset composition imply differences in the riskiness of households' portfolios. To gain more insight into this question, we divide financial assets into three broad categories reflecting their degree of risk: (1) "safe" financial assets, including liquid accounts (checking, saving, money market, and call), certificates of deposit, and U.S. savings bonds; (2) "fairly safe" financial assets, including other government bonds, tax-free bonds, cash-value life insurance, and amounts in mutual funds, retirement accounts, and trusts and other managed assets that are not invested in stock; and (3) "fairly risky" assets, including stocks held directly or through mutual funds, retirement accounts, and trusts and other managed assets, and corporate, foreign and mortgage-backed bonds. While this categorization may have some arbitrary aspects, the main findings reported here are robust to minor changes in classification – as long as liquid accounts are classified as "safe" and stock-based assets are classified as "fairly risky."

In the four most recent SCFs, about one-quarter of all households had safe assets only (Table 6). About one-quarter of households had "safe and fairly safe" assets in 1989, with this category steadily losing ground over the 1990s. The categories into which households moved were "safe, fairly safe, and fairly risky" and "safe and fairly risky"; together these categories had almost half of all households in 1998, up from about one-third of households in 1989. Not surprisingly, these shifts boosted the share of households' financial assets held in risky forms. Retirement accounts played an important role in the trends toward greater diversification and higher risk: for example, the share of households reporting stock investments through a retirement account rose from 18% in 1989 to xx% in 1998 [29% in 1995].

With financial assets comprising only one part of the portfolio picture, it may also be important to consider other risky assets held by households. Thus, Table 6 also shows a more general measure of risk, including business equity and investment real estate, as well as risky financial assets. Here too the share of households having some type of risky asset rose between 1989 and 1998, so that by 1998 the share of total household assets held in risky forms reached almost xx%.

A classic issue in portfolio studies concerns the tendency for risk to vary with age. As shown in Table 7, the share of households having risky financial assets is generally highest in the

prime-age years and drops off in the older age ranges. The share of risky assets in total financial assets was highest in the 45-54 group in the 1989 and 1992 surveys, and in the 55-64 age group in 1995 and 1998. The measures of broader portfolio risk also show risk-taking to be highest in the 35-64 age ranges. Of course, the patterns in the data may reflect both age and cohort effects, and it is not straightforward to separate these two.[19] Nonetheless, the survey data show that, for virtually all age groups and for both risk measures, the percentages of households owning risky assets have risen substantially over time; only in the over-75 age group has ownership of risky assets held steady.

Previous research on household portfolios. Previous research has touched on particular issues in portfolio behavior, such as why households hold relatively few assets, why the equity share has traditionally been low, and why there are age profiles in ownership of risky assets. Several factors have been investigated, both within and outside of a standard optimizing framework. (Tax issues have also been studied in detail, but they are dealt with in Poterba's chapter, this volume).

A first and important issue concerns risky human capital. As discussed in Gollier (this volume), both theory and intuition suggest that households with relatively risky human capital should have a relatively safe financial portfolio, other things being equal. Careful calibration studies have demonstrated that, indeed, adding stochastic income to a standard portfolio model reduces the optimal risky share (Haliassos and Bertaut, 1995; Heaton and Lucas, 1997). Thus, one might expect to find safer financial portfolios among people whose incomes fluctuate more, such as salespeople, business owners, and those who run a risk of uninsured unemployment. However, this possibility is difficult to investigate empirically due to the self-selection problem: people with riskier income streams may have inherently different risk preferences, making it hard to isolate the specific effect of higher income risk.

Another aspect of risky income concerns the relationship between age and risk. In the classical literature, Merton (1969) and Samuelson (1969) investigated the view that older investors should shift their portfolios away from risky assets, as their time horizons shorten and they have less chance to recover any losses. While the classical models provided little justification

[19]Poterba and Samwick (1997) use a cohort approach to analyze data from the 1983, 1989, and 1992 SCFs.

for this view, more recent work points to other factors that may underlie the age profile. First, younger people face more background risk in their human capital, which could temper their demand for stocks. As they enter prime-age years and uncertainty about lifetime income declines, they may take on more financial risk (see Gollier, this volume). Second, young and prime-aged people have greater labor supply flexibility than older people, so if the returns to their investments turned out to be low, they could work more or retire later (Bodie, Merton, and Samuelson, 1992). In contrast, older people would have to reduce consumption in line with their income, and so may choose to limit their risk. Finally, other sources of uncertainty in old age may also temper willingness to take risk, such as uncertainty about the length of life and the risk of large health or nursing care expenses.

A second important factor in the structure of household portfolios concerns housing wealth. Investment in housing has a number of unique features. Housing yields consumption flows as well as investment returns. The initial investment is large and indivisible. Housing prices may covary with income. And housing wealth is relatively illiquid, although not completely since home equity can be borrowed against. Theoretically, including an asset like this in the portfolio could temper the risk taken in financial investments. Thus, for example, Flavin and Yamashita (1998) use a mean-variance approach to show that, because younger households have highly leveraged portfolios typically dominated by housing wealth, they should use their cash flow to pay down their mortgages or invest in safe assets, rather than buy stock. In contast, older households have built up their assets and reduced their ratios of housing to net worth, and so can allocate higher shares of their financial assets to investments in stock.

A third consideration is information and transactions costs. Whereas opening a checking account is fairly straightforward, it may take time to learn how to invest in other assets and to manage them over time (e.g. tax schedules, quarterly statements, etc). For example, King and Leape (1987) found that the probability of owning an asset rises with age, even after controlling for the lifecycle profile in wealth; they interpret this finding as consistent with a model in which information about investment opportunities arrives stochastically over time. Haliassos and Bertaut (1995) and Bertaut (1998) identify a role of information costs in deterring investment in stock; for example, education is positively correlated with stockholding, even after controlling for income and other factors, suggesting advantages in processing financial information. Vissing-

Jorgenson (1999) documents appreciable costs of entry and participation in the stock market. Nonetheless, it seems probable that such costs have tended to decline over time, as the growth of mutual funds and self-directed retirement accounts have made it much easier to invest in stock.

A fourth consideration concerns borrowing decisions and liquidity constraints. Most portfolio models focus on asset allocation decisions, without giving much attention to the liability side of the balance sheet. This is an important gap, since there are many interesting questions about the relationship between debt and assets (e.g. Engen and Gale 1997) and about the optimal composition of borrowing (e.g. Brito and Hartley 1995). Some work has investigated how liquidity constraints may affect household portfolios. Notably, Paxson (1990) distinguishes between assets that can be readily liquidated for consumption purposes (cash, checking accounts) and those that cannot be used for current consumption but may be used as collateral for loans. She shows that exogenous borrowing ceilings will lead households to hold a larger share of their assets in liquid form, to reduce the probability of being credit constrained in the future. However, if households can borrow using their illiquid assets as collateral, holding a less liquid portfolio may actually lower the probability of becoming credit constrained.[20]

Finally, behavioral approaches have also been used to study household portfolios, especially aspects that are hard to explain in standard models. For example, many individual stock investors appear to trade actively, rather than buying and holding (Schlarbaum, Lewellen, and Lease 1978; Barber and Odean 1998). They also seem to hold shares that have declined in value, and sell shares that have gained, despite tax benefits to the opposite strategy (Shefrin and Statman 1985, Odean 1998). More broadly, many households seem to favor illiquid assets like retirement accounts, possibly to overcome self-control problems (Thaler and Shefrin 1988; Laibson, Repetto, and Tobacman 1998). Finally, it seems possible that widespread use of credit card debt could reflect some myopia in borrowing decisions (Ausubel 1991). While studies taking behavioral approaches are often intriguing, empirically it is sometimes difficult to distinguish such approaches from carefully-specified standard views.

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[20]See also Vila and Zariphopoulou (1997), Haliassos and Hassapis (1998), and Gollier, this volume. Note also that some households may find it advantageous to accumulate equity in the primary residence, since many states have exemptions for such equity in bankruptcy proceedings (Fay, Hurst, and White 1998).

4. Econometric analysis

As indicated by the SCF data in Table 4, for most U.S. households, the decision to hold some form of transactions account is frequently the initial step in determining the household portfolio. Of the 91 percent of households in the 1995 SCF that had any financial assets, 96 percent had a liquid transactions account, and for 22 percent of these households, this was the only type of financial asset held. To investigate the factors that lead households to hold a more sophisticated portfolio, we estimate a joint model of household portfolio allocation between some broad forms of assets and liabilities beyond transactions account ownership. Households choose to invest in equities, in safe investment assets, in home ownership, and in business assets. Stock ownership includes equities held directly, or through mutual funds, trusts and other managed accounts, and tax-deferred retirement accounts. Safe investment assets include certificates of deposit, saving bonds, cash value life insurance, and assets other than equities in mutual funds, trusts and other managed accounts, and retirement accounts. Because one of the intriguing puzzles related to U.S. household portfolio allocation concerns the incidence of relatively high-cost unsecured consumer debt, we also include a measure of unsecured consumer debt that covers outstanding balances on credit cards and consumer installment loans (excluding loans for motor vehicles).

Formally, we assume households are utility maximizers, and that each household i's indirect utility function is itself a function of the utility derived from holding or not holding assets 1 through N:

$$U_i = f(U_{1i},\ldots,U_{Ni}).$$

We further assume that the indirect utility associated with holding asset j is a linear function of observable household characteristics that may influence the decision to hold a given asset plus an error term u_{ji} which includes unobservable household-specific factors that may influence the portfolio decision. Let

$$U_{1ji} = X_{1ji}\mathrm{B}_{1j} + u_{1ji}$$

be the indirect utility function for household i when asset j is held and

$$U_{2ji} = X_{2ji}\mathrm{B}_{2j} + u_{2ji}$$

be the utility indirect utility function when asset j is not held. In practice, the indirect utility functions are not observable, and we observe instead dummy variables D_{ji} which take the value

$D_{ji} = 1$ if $U_{2ji} < U_{1ji}$,

That is, if the household's utility is higher when asset j is held, we observe that the asset is present in the household's portfolio, and

$D_{ji} = 0$ otherwise.

For each asset j, we then have the probability

$$D_{ji} = 1$$
$$= P(U_{2ji} < U_{1ji})$$
$$= P(u_{2ji} - u_{1ji} < X_{1ji}B_{1j} - X_{2ji}B_{2j})$$
$$= P(e_{ji} < X_{ji}B_j).$$

With the assumption that the error terms e_{ji} are normally distributed, the dichotomous choice model can be estimated by probit maximum likelihood. Because individual household heterogeneity may be important in determining the household portfolio selection, we allow for the possibility of correlation ρ between the disturbances for each household i, and estimate the household's decision to hold these assets jointly, as a 5-equation multivariate probit.[21]

As explanatory variables, we include a number of household demographic characteristics. To indicate household composition, we include a dummy equal to one if the household head is married or living with a partner, and another dummy equal to one if the head is a single female; the omitted category is single males. To capture the effects of the life-cycle on portfolio decisions, the age of the household head is included through a series of age-range dummies. The race or ethnicity of the household is included as a dummy variable which takes the value 1 if the household head is nonwhite or Hispanic.

Education may also be important for household portfolio allocation, as it can serve as an indicator of financial sophistication as well as a proxy for future labor income. Households are classified as having "less than high school education" if they have no high school diploma or equivalent, "high school education" (the omitted dummy), and "college degree or higher." Household labor income, including wage and salary income, income from unincorporated business

[21] Although the multivariate probit model is a straightforward extension of the bivariate probit, the computational requirements of probit models beyond the bivariate has hampered their practical application. Advances in estimation techniques and in computational power have only recently made such models readily accessible. To our knowledge, this is one of the first applications of the multivariate probit to the portfolio choice model.

interests, and unemployment compensation is included through a series of dummies for the income ranges, expressed in 1998 dollar amounts: less than $10,000, $10,000 to under $25,000, $25,000 to under $45,000 (the omitted dummy), $45,000 to under $75,000, $75,000 to under $100,000, and $100,000 or over.[22] Household financial wealth in 1998 dollars is included as the natural log of total financial assets.

To capture the effects of risk aversion on the portfolio allocation decision, we include two dummy variables using survey responses to a question on the willingness to undertake financial risk for financial return. Households are coded as ?willing to take above-average risk? if they said they were willing to take "substantial risk for substantial returns," or "above average risk for above average returns." Households are coded as ?no risk? if they responded that they are ?not willing to take financial risk,? with willingness to take average risk expecting average returns as the omitted dummy.

Multivariate Probit Results

Results from the five-equation probit model using the 1995 wave of the SCF are presented in Table 8. Using the multivariate probit technique, we find some significant differences across equations in the signs and significance of explanatory variables, pointing to some important differences in factors underlying the decisions to hold different assets and consumer debt. We also find significant correlations between the error terms, suggesting that decisions to hold these asset categories are not undertaken independently. Overall, we find considerable supporting evidence that U.S. household portfolios typically follow standard life-cycle behavior, subject to some differences across assets in entry barriers associated with information or transactions costs and possible influences of liquidity constraints on portfolio selections.

Age

For stock ownership, the estimated coefficients on age show that, after controlling for education, income, financial wealth, and other household factors, younger households are significantly more likely to hold equities than are older households. The estimated coefficients are significant and positive for age under 35, slightly smaller but still significant and positive for age 35-49, and significant and negative for households in the 65-74 and 75+ age ranges. In large part,

[22]In 1995, these income ranges corresponded to the following percentiles: less than 20th, 20th to less than 43rd, 43rd to less than 67th, 67th to less than 86th, 86th to less than 93rd, and 93rd and over.

the significant coefficients for age less than 50 reflects the growth in indirect stockholding through defined contribution pension plans among young households, which provides an opportunity for stock investment with relatively low information and transactions costs.[23] As discussed earlier, the willingness of young households to take on stock market risk given the opportunity may also reflect their longer investment horizon and the ability to offset potential financial losses through increased labor supply.

Age is less significant in explaining ownership of safe investment assets, with small positive coefficients for households under age 49, and a larger negative coefficient for households aged over 80. Younger households are significantly less likely to own a home, partly reflecting the need to accumulate assets for a down payment. Home ownership may also be less attractive to young households, due to job mobility, geographic mobility, and flux in household composition. Business assets are significantly less likely to be held by households under 50 or over 65. As would be predicted by life-cycle models with expected income growth, consumer debt is significantly more likely to be held by younger households and significantly less likely to be held by older households.

Income

Even after controlling for the level of financial assets, having labor income less than $10,000 (the 20th percentile) has significant negative coefficients for ownership of both stocks and safe investment assets; having income between $20,000 and $44,999 also has a significant negative coefficient for stocks. Lower income households may face liquidity constraints, leading to a more conservative portfolio or one more concentrated in more liquid assets. Lower income households are also less likely to be covered by defined contribution pension or thrift-type saving plans, reducing their access to equity investments at relatively low information or transactions

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[23]The relevance of the growth in indirect stock ownership for young households can be seen from estimating separate models for direct and indirect stock ownership. A single-equation probit model with identical right-hand side variables but using a dummy variable for directly-held equities only as the left-hand side variable yields insignificant coefficients for all age ranges, while one for indirectly-held equity ownership yields significant positive coefficients for age less than 50 and significant negative coefficients for age 65 and greater.

cost.[24] Having income over $100,000 also has a significant negative coefficient for safe investment assets; these households may have sufficient resources that they select only investments with higher returns than offered by these relatively low-risk assets. Higher income also contributes positively to the likelihood of home ownership. Having income over $100,000 has a very large, positive coefficient for business ownership. However, having income less than $10,000 also has a significant positive coefficient for business ownership. In many cases, having very low income results from losses reported on business enterprises: three-quarters of households reporting negative income (defined to include business income) had business assets.

Low realizations of income may also be indicative of more variable income, which could also help explain the negative coefficients on incomes under $25,000 for stock ownership. As noted earlier, adding background income risk should reduce the riskiness of the household financial portfolio, all other things equal. However, the 1995 SCF contains data only on income in the previous year, and information on the variability of a household's income is not available. Some supporting evidence that current low income realizations may reflect more variable income can be seen in survey responses to a question asking whether total income was unusually high, low, or normal compared with what would be expected in a "normal" year. Overall, 18 percent of households responded that their income was "unusually low"; this percentage was 29 for households with labor income under $10,000.[25]

Households with incomes below $25,000 are significantly less likely to have unsecured consumer debt. This may not be the optimal choice of such households, as some may be credit constrained. Indeed, the SCF contains a series of questions that asks whether households had ever been denied credit or received less credit than requested (and did not subsequently receive the full amount of credit upon reapplying) or did not ask for credit because they thought the request would be denied.[26] By this definition, 23 percent of households in 1995 would be

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[24]Only about four percent of households with labor income under $10,000 had or was eligible to have an employer-sponsored thrift-type saving account in 1995, compared with 32 percent of all households.

[25]However, adding this variable is insignificant in a probit regression for equity ownership. Under an alternative approach, Bertaut (1998) found insignificant coefficients for having a high-unemployment risk occupation in explaining equity ownership using data from the 1983-89 SCF panel.

[26]See, for example, Cox and Jappelli (1983).

classified as "credit constrained," and this proportion rises to nearly 29 percent for households with incomes under $25,000. Households with incomes over $100,000 are also significantly less likely to hold consumer debt.

Financial assets

Perhaps not surprisingly, households with higher financial wealth are significantly more likely to own all types of assets, but the same size increase in financial wealth, all other things constant, contributes more to the probability of stock ownership than ownership of other assets. To some extent this result is endogenous, as recent high market returns from stock ownership will have led to increased financial wealth. However, it is also consistent with the view that stocks tend to be added to a portfolio after safe investment assets have been accumulated. Households with higher financial wealth are also significantly less likely to hold consumer debt.

Education

Having a college education has a significant and positive effect on the probability of stock ownership, but not for other assets. The significant contribution of college education to the probability of stock ownership in 1995 suggests that despite the broadening of the ownership base since 1983, some informational advantage perhaps associated with financial sophistication remains important. Households with college education may also face less background income risk (Hubbard, Skinner, and Zeldes 1995), which could also lead to the selection of a portfolio with more financial risk. After controlling for age, income, financial assets, and other factors, college education is significant and negative for holding consumer debt. Financial sophistication may play a role here as well, as such debt is often at high interest rates and does not offer the tax advantages of alternatives such as mortgage and home-equity borrowing.

Willingness to take financial risk

Specifying willingness to take "above average risk for above average return" has a significant negative coefficient for safe investment asset ownership, while specifying "not willing to take financial risk" has a significant negative coefficient for stocks. The strongest results come from the equation for business ownership: willingness to take above average risk has a significant positive coefficient, and not willing to take risk has a significant negative coefficient.

Other demographic characteristics

Even after controlling for income, financial assets, education, and other factors, the results indicate that nonwhite and Hispanic households are significantly less likely to own homes, businesses, or stocks. Conceivably, the negative coefficients for home and business ownership may at least partially reflect unequal access to mortgage and small business credit markets (Ladd, 1998; Blanchflower, Levine, and Zimmerman, 1999; Cavalluzzo, Cavalluzzo, and Wolken, 1999). The lower probability of stock ownership by nonwhite and Hispanic households, controlling for education, current income, and wealth, is somewhat more puzzling. One possibility is that such households may face greater lifetime income uncertainty, which could tilt the portfolio away from risky assets. Alternatively, family background may play some role in the lower probability of stock ownership, with family experience serving as a form of information about investments. For example, using data from the Panel Study of Income Dynamics, Chiteji and Stafford (1999) found that about 44 percent of young families whose parents owned stock held equities themselves, compared to 24 percent of those whose parents did not.

Results for married versus single female or single male show that married households and households headed by single females are significantly more likely to hold stocks than are single male households. The result for single females is somewhat unexpected, as previous studies have suggested that women tend to have less risky portfolios than men (Jianakoplos and Bernasek, 1998).[27] Households headed by single females are significantly less likely to have business assets. Married households are significantly more likely to hold safe investment assets, and, as expected, being married contributes significantly to the probability of being a homeowner. Married and single-female households are more likely to have consumer debt.

Correlation across equations

[27]Our result may in part reflect portfolios of widows who may have acquired stocks chosen by their spouses. To gain additional insight into this result, we also estimated single-equation probits (not reported) that decompose the single female dummy variable into one for widowed females and another for other single females, and look separately at directly and indirectly held stocks. In the equation for directly held stocks, the coefficient for widowed females is significant and positive, while that for other single females is not significant. While it is not possible to determine who was responsible for the decision to acquire stocks, it is nonetheless intriguing that, after controlling for age, income, wealth, and self-expressed risk aversion, being a widowed female contributes positively to the likelihood of holding stocks. In the equation for indirectly held stocks, other single females are significantly more likely to hold stocks than are single males, but

The estimates of the ρ's from the multivariate probit are significant for most pairs of equations, rejecting the null hypothesis that the disturbance terms are uncorrelated. The estimates are positive and significant for stock ownership and consumer debt, and positive and significant for safe asset ownership and consumer debt, but insignificant for stock ownership and safe asset ownership. These results suggest that unobserved household heterogeneity can help explain households that have both financial investment assets and consumer debt.

At first glance, a positive correlation between stocks and consumer debt is somewhat surprising, as it might be expected that households that have sufficient financial resources and are sophisticated enough to invest in equities would recognize the costs typically associated with holding consumer debt. However, the typical household that has both stocks and consumer debt is younger than the typical household with stocks and no consumer debt, and holds a larger share of its stocks indirectly. Among households with both stocks and debt, the median household holds all of its equities indirectly, rather than as shares of publicly traded stocks or shares of mutual funds; in contrast, among households with stocks and without consumer debt, typically only about half of stocks are held indirectly. For young households that have access to tax-deferred indirect ownership, gains earned in the stock market and through employer matching of employee contributions may exceed the interest paid on consumer debt, although as indicated in Figure 1, the more dramatic increase in U.S. equity prices has occurred since 1995.

It is harder to account for the positive correlation between safe investment assets and consumer debt, because households that have any of these assets and have consumer debt also have median home equity over $28,000, suggesting that they could have undertaken lower-cost, tax-advantaged borrowing. Similarly, it is hard to explain the positive correlation between home ownership and consumer debt, although it may be that homeowners, having established a credit history, may have better access to consumer credit. The negative correlation between business assets and stock ownership may reflect unwillingness to take on financial risk contingent on business ownership. It may also reflect more limited access to indirect ownership through employer-sponsored thrift plans. The correlation between business ownership and safe assets is

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the coefficient is not significantly different than for married households. In this equation, the coefficient for widowed females is significant only at the 10 percent level.

also negative, possibly suggesting that an additional factor for business owners may be a desire to keep financial assets in a more liquid form than provided by either equities or safe investments.

Portfolio shifts over time

Multivariate probit results for earlier survey years show that in general variables that are significant for ownership of any given asset type in 1995 are also significant and have the same sign in earlier surveys. Table 9 compares the significance of coefficients for each asset type from probit regressions from each survey; the sign of the coefficient is indicated if it is significant at least at the 5 percent level. In all the surveys, younger households are significantly less likely to own homes and are significantly more likely to have consumer debt, while households over 75 are significantly less likely to hold financial assets or businesses and also are consistently less likely to hold consumer debt. In all the surveys, having income under $10,000 (in 1998 dollars) is significant and negative for stocks and for debt, while income over $100,000 has a significant positive coefficient for business assets and a significant negative coefficient for debt. The log level of financial assets always has a significant positive coefficient for asset ownership and a significant negative coefficient for debt. Results for education are not as consistent, although there is always a significant difference between the coefficient for having less than high school education and the one for having a college degree for stock ownership. The most consistent results for the risk aversion variables are for business ownership, where willingness to take above-average risk always has a significant positive coefficient and not willing to take financial risk always has a significant negative coefficient.

The estimates of the δ's from the earlier surveys also show significant correlations in the error terms for the different portfolio choices. Household-specific factors that lead to holding business assets but not stocks or safe investment assets appear to be present in all waves of the SCF, as the estimates of δ between stocks and business assets and between safe and business assets are consistently significant and negative. Between other equations, for example between stocks and debt or between safe assets and debt, significant correlations are found in three of the four survey years. However, the positive estimate of the correlation between home ownership and consumer debt appears to be a recent development.

Figures 2(a)-2(e) explore how the effects of age, income, and financial assets interact to influence the probability of ownership of these broad asset and liability categories in each of the

four SCF waves used for this study. Under the probit model, the probability of ownership of household i is calculated by evaluating the cumulative normal of X_iB. Probabilities are estimated for the "typical" household at each age range, allowing labor income and financial wealth to take the median values for households in that age range. For all age ranges, households are assumed to be married, white non-Hispanic, to have high school education, and to be willing to take average financial risk.

Figure 2(a) shows the computed probability of equity ownership, by age, from each of the surveys. Although in the probit regressions the coefficients for age are significant and positive for younger households, the implied probabilities of stock ownership show a standard life-cycle humped shape. This profile reflects the lower income and lower financial wealth of a typical young household when compared with households in the middle years, so that the probability that a typical household under age 35 will hold equity is lower than the probability of ownership for households aged 50 to 64. Figure 2(a) also illustrates the broadening of the equity ownership base since 1983, as the implied probability of ownership of these representative households shifts up with each survey. In 1983, the typical household aged less than 35 had only about a 20 percent probability of equity ownership, while the probability of ownership of a typical household aged 50 to 64 was almost 40 percent. By 1995, however, the probability of equity ownership for the typical under-35 household had risen to almost 42 percent, and the probability of equity ownership had risen to 57 percent for the typical household aged 50 to 64.

Figure 2(b) shows how these same factors affect the probability of owning safe investment assets. The estimated probability of holding safe assets also shows a hump-shaped pattern, but it is far less pronounced than that for equities. At all age-ranges and for all surveys, the typical household has a probability greater than 50 percent of holding some form of safe investment asset. In contrast to the marked upward shift in the probability profiles for equities, there is little difference across surveys in the estimated probabilities of safe asset ownership. The generally high probabilities of ownership at all age ranges in all survey waves are consistent with the hypothesis that after acquiring a basic transactions account, households will invest first in these relatively safe investment assets with fairly low information barriers: assets that often can be found at the local bank or saving institution, frequently where the transaction account is held.

In contrast to the hump-shaped profiles for equity and safe asset ownership, the estimated probability of owning a home in all survey years rises sharply when the household moves from age less than 35 to between 35 and 49, but remains relatively flat afterwards (Figure 2(c)). The continued high probability of home ownership for older households, compared with the declining probability of holding stocks or safe investment assets, indicates that for many older households, a higher proportion of their wealth is held in their home. Among households who owned homes in 1995, median financial assets were about half as large as median home equity for households under 50, but were only about one-third as large for households over 75. The probability of business asset ownership peaks in the 50-64 age range, as illustrated in Chart 2(d), but even at this age-range ownership is uncommon; the estimated probability of ownership for the typical household aged 50-64 is only about 30 percent in all years.

The typical household under age 50 is considerably more likely to hold unsecured consumer debt than the typical older household, as illustrated in Figure 2(e). For all households, the probability of holding consumer debt has increased somewhat from 1983 to 1995. This relatively modest upward shift in the probability of holding any consumer debt masks a much more significant increase in the probability of holding credit card balances, somewhat offset by a decrease in the probability of holding consumer installment debt. The increased use of credit card balances at all ages is the result of both increased demand for such credit and increased supply, and it is difficult to distinguish between these effects in the survey data. The credit constraint questions from the SCF show little change in the percent of households responding that they had been turned down for credit (and could not get the full amount requested elsewhere) from 1983 to 1995; this percentage increased slightly from 11.7 percent to 12.1 percent for all households and was unchanged for households under age 35. However, data on credit limits for bank-type credit cards show a strong increase in the amount of credit available to young households: the median credit limit for households aged under 35 rose from $4,000 in 1989 to $7,000 in 1995 (both figures in 1998 dollars).

Estimation of Asset Levels

Estimating how household characteristics affect the levels of assets held from the SCF data is complicated by the fact that large subsets of the sample do not hold the asset or liability in question. Although a Tobit model allows estimation of a truncated sample with a large number of observations taking the value zero, this methodology will not be appropriate if the decision of

how much to hold in a given asset or liability is independent of the decision about which items to hold. If this is the case, an appropriate strategy will be to estimate a truncated regression model only on the households that actually hold a given asset or liability.

We estimate holdings of stocks, safe investment assets, and consumer debt, with the dependent variable expressed as the natural log of the relevant portfolio amount. In the regression for equity, we include the same independent variables as in the probit for stock ownership, with one exception: we do not include total financial assets, because of the clear endogeneity with the left-hand side variable. Instead, we use the log value of financial assets excluding stocks. Similarly, we use the log of financial wealth excluding safe investment assets for the safe asset regression.

Table 10 shows the coefficient estimates for the truncated regression model for log equity ownership using data from the 1995 survey; for comparability we also show the coefficient estimates from a single-equation probit model of equity ownership that also uses the log of financial assets excluding equities, instead of total financial assets.[28] By using the same variables, it is straightforward to compare the likelihood from a Tobit model and the alternative two-stage procedure of a probit for the decision to invest in equities, followed by the truncated regression of the amount of equities to hold on only the non-limit observations. The likelihood values from these three equations are listed at the bottom of the table. A likelihood ratio test rejects the null hypothesis that the Tobit restriction is appropriate (Greene, 1990).

Surprisingly few variables in the probit and truncated regressions for equities have the same significance and some in fact have the opposite sign; this supports the conclusion that the decisions to invest in equities and how much to invest, conditional on investing, are independent. For example, the coefficient estimate from the probit model indicates that households with labor incomes less than $10,000 are significantly less likely to hold equities than are households with incomes between $25,000 and $44,999. However, conditional upon equity ownership, having labor income less than $10,000 contributes *positively* to the amount of equities held. Although

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[28]The different specification of wealth changes some of the coefficient estimates in the probit slightly. In this specification, the dummy variables for age are insignificant, but the variables for education are significant. The log likelihood from this probit is –2010.0 compared with –1739.4

most households with low labor income also have low overall income, this tends not to be the case for the 10.5 percent of low labor income households that hold equities. Median total income for these households is about $16,000 and mean total income is about $52,000.[29] The only other income variable with a significant coefficient for the amount of equities held is the positive coefficient for income over $100,000.

The age variables also show a pronounced pattern in the level regression different from that in the probit estimates. Although the probit shows no significant effects of age, holding non-equity financial assets and other variables constant, the amount of equity held increases with age for those households that do own stock: in the truncated regression, the coefficients for age under 50 are significant and negative, while those for age 65 and over are significant and positive. While older households may wish to reduce portfolio risk, and as a result may be less likely to hold equities, those older households who still hold equities are likely to have invested in the stock market over a long period, and consequently may have sizable stock portfolios. Although the probit equations find that single females are significantly more likely to hold equities than are single males, there is no significant difference in the amount of equities held by single females and single males, conditional on their labor income and other financial assets. However, nonwhite and Hispanic households are both significantly less likely to hold equities and, conditional on equity ownership, hold significantly fewer equities than do white non-Hispanic families with comparable income and non-equity wealth.[30] Households that responded they were "not willing to take any financial risk" but nonetheless are stockholders hold significantly fewer equities than do households willing to take average risk, while households willing to take above-average risk hold significantly more equities.

Results from a similar exercise estimating safe investment holdings are shown in Table 11, with the log of financial wealth excluding safe investment assets used in the relevant probit and

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for a single-equation probit using total financial assets; this difference is significant according to a likelihood ratio test.

[29]Similar regressions for the 1992 SCF also generate a significant negative coefficient on income less than $10,000 in the probit decision to invest equation and a significant positive coefficient in the truncated asset holding regression. This result is confirmed at the 10 percent level using the 1983 Survey. Using the 1989 SCF, the coefficient in the truncated regression model is positive, but significant only at the 15 percent level.

[30]This result was also found in the 1983 and 1989 surveys.

truncated regressions.[31] As with the results for equity holdings, the age-range dummies are generally insignificant for the ownership decision but show a pronounced relationship of increased age contributing positively to the level assets held, conditional on ownership. In contrast to the finding for equities, having labor income less than $10,000 does not contribute positively to the amount of safe investment assets held, conditional on ownership. Higher income contributes positively to the amount of safe investment assets held, conditional on ownership, as does greater financial wealth held in other assets. While the truncated regression model for the level of equity found that non-white and Hispanic stockholders held significantly fewer equities than did comparable white non-Hispanic households, the opposite is true for holders of safe investment assets: here the coefficient on non-white is significant and positive.[32]

Coefficient estimates from probit and truncated regressions for the log-level of consumer debt are shown in Table 12. This regression differs from the specification of the multi-variate probit model only from the inclusion of a home ownership dummy, included because of the positive, significant value of D for home ownership and consumer debt in the multivariate probit. The home ownership dummy is positive and significant in the probit regression, but apart from a change to the constant term, inclusion of this variable does not materially affect any of the other coefficients from their values in the multivariate probit.[33] As with the asset level equations, the coefficients from the truncated regression at times have opposite signs from the probit regression. Although households with a head aged under 50 are significantly more likely to hold consumer debt than a household aged 50-64, the amount of debt held by under-50 households is not significantly higher, once income and financial assets are controlled for. The dummy variable for having a household head aged over 75, however, is significant and negative in the truncated regression.[34]

Although households with labor income under $10,000 are significantly less likely to hold consumer debt, the amount of debt held, once other factors are controlled for, is not significantly different. In contrast, having household labor income over $100,000 significantly reduces the

[31]As in the equity holding estimation, a likelihood ratio test rejects the Tobit specification.
[32]However, this result is not consistent across surveys.
[33]A likelihood ratio test also rejects the Tobit restriction for the consumer debt regression.

probability of holding such debt, but increases the amount of debt held among such high-income households that are borrowers. In part, this may reflect higher credit limits for such high-income households: the median credit limit limit on credit cards for households with income over $100,000 was over $20,000, over six times the median credit limit for households with incomes of $40,000 or less. It is worth noting, however, that although the amount of consumer debt held by high-income households is significantly higher, their debt relative to their income is in fact quite modest: this ratio is only 2.6 percent for the median household with debt and income over $100,000, compared to 6.6 percent for the median household with debt and income under $45,000. While having either less than a high school degree or obtaining a college degree reduces the probability of having consumer debt, those households with a college degree that do borrow hold significantly more debt. Likewise, while higher financial wealth significantly reduces the probability of having consumer debt, it increases the level of debt for households that borrow. Homeowners are significantly more likely to hold consumer debt, but despite the possibility of obtaining lower-cost loans secured by the home, being a homeowner does not affect the level of unsecured consumer debt held. Although married households and single females are more likely to hold consumer debt, the amount of debt held is not significantly different from that held by single males. However, non-white and Hispanic households have significantly lower levels of debt.

The coexistence of safe asset ownership, home ownership, and consumer debt remains somewhat of a puzzle. Some credit card debt may be only transitory, reflecting temporary situations that result in credit card balances for households that normally pay off card balances in full. According to the 1995 SCF, 14.3 percent of households with credit cards had a card balance after making the last month's payment while also reporting that their normal payment practice is that they "always or almost always" pay off the total balance each month. The amount of debt held by these households is generally lower than for households saying they do not usually pay off balances; indeed, when a dummy variable for "usually pays off balances" is added to the truncated regression for the amount of debt held, it has a significant negative coefficient. Although homeowners may have access to secured lines of credit at preferential rates, especially considering

[34]Among households that hold consumer debt, the median level of debt relative to income also varies little across age-ranges at about 5 percent, except for households aged 75 or over, where it

the tax advantages to home-equity borrowing, some homeowners may not have sufficient home equity to take on additional loans. Additionally, some homeowners may be reluctant to refinance their mortgage or take out additional loans secured by their home if they anticipate moving in the near future, although the SCF offers little evidence to support the hypothesis that anticipated moves underlie homeowners' use of consumer credit.[35] However, nearly 19 percent of credit card holders are homeowners and also responded that they "hardly ever" pay off credit card balances in full. These households have median home equity over $35,000 and median financial assets of $11,200, but carry a median credit card balance of over $2,900 with a median interest rate on the most heavily used card of 14 percent.

Although it is tempting to conclude that homeowner households with consumer debt are "irrational," conceivably some high-debt households may be acting optimally if they have the option to default and declare bankruptcy. Although the majority of U.S. households in 1995 with consumer debt had financial assets sufficient to pay off their debt, a substantial minority—nearly 22 percent—had consumer debt greater than their financial assets, and more than 40 percent of this group were homeowners and had median home equity over $25,000. Using data from the 1992 SCF, White (1996) found that at least 15 percent of U.S. households could benefit financially from declaring bankruptcy. One factor in the decision to declare bankruptcy may be the presence and size of a "homestead" exemption in the state of residence. Where homestead exemptions are large, sizeable home equity and large amounts of consumer debt may be a rational combination if households have some possibility of contemplating bankruptcy.[36]

5. Summary of results and policy implications

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is 2 percent.

[35]A question in the 1995 SCF asks households about the percent chance that they would remain at their current address in two years. Responses ranged from 0 representing "no chance" to 100 representing "absolutely certain." A dummy variable for having home equity greater than $1,000 interacted with the probability of remaining at the same address is insignificant in explaining either the probability of holding consumer debt or the level of debt held.

[36]Other research suggests that U.S. households may be becoming less reluctant to default on consumer debt or declare bankruptcy. Notably, Gross and Souleles (1998) use a data set of individual credit card accounts and find that a decrease in stigma can explain much of the recent increase in the propensity to default on credit card debt.

[*To be elaborated in the next draft*]. Our econometric results suggest that U.S. household portfolios are typically influenced by standard life-cycle considerations, subject to some important differences across assets in entry barriers associated with information or transactions costs and influences of liquidity constraints on portfolio selections. The interaction of these life-cycle influences, entry barriers, and liquidity constraints helps explain why the typical U.S. household portfolio is fairly simple, despite the array of investment options available.

Our results suggest a number of policy implications. (1) With portfolios differing considerably across the distribution of income or wealth, changes in key asset prices, such as interest rates or stock prices, may have quite different effects on households of different types. For example, Romer and Romer (1998) on interest rates, Starr-McCluer (1998) on stock prices. (2) With age often a significant factor in portfolio choice, demographic shifts likely play some role in asset markets, albeit perhaps modest and possibly offset through general equilibrium effects.

Table 1. **The Level and Composition of Household Wealth: Aggregate Data**

	1983	*1989*	*1992*	*1995*	*1998*
Avg. net worth per household (th. of '98 $)	209.5	263.2	262.0	281.0	347.3
Assets and liabilities as % of total assets:					
Financial assets	44.6	48.8	53.0	56.0	61.1
Liquid assets[1]	3.4	3.6	3.6	3.5	3.3
Time and savings deposits	12.3	10.9	9.1	7.7	7.0
Savings bonds	0.6	0.5	0.6	0.6	0.5
Other bonds	2.7	3.7	4.2	3.9	2.7
Corporate equity[2]	6.9	8.1	10.5	11.9	13.8
Mutual funds	0.7	2.0	2.7	4.0	5.9
Pension reserves[3]	12.0	14.4	16.4	18.8	22.1
Life insurance	1.9	1.6	1.8	1.8	1.7
Bank personal trusts	2.5	2.4	2.6	2.6	3.1
Other financial	1.6	1.5	1.5	1.3	1.0
Nonfinancial assets	55.4	51.2	47.0	44.0	38.9
Residential property [4]	28.0	29.2	27.1	24.8	22.3
Noncorporate business[5]	19.1	14.1	12.1	11.7	10.3
Durable goods	8.4	7.9	7.8	7.5	6.4
Debts	13.0	14.1	14.5	15.0	14.0
Mortgage	8.5	10.0	10.8	10.6	9.8
Consumer debt	3.4	3.6	3.1	3.7	3.2
Other debt	1.1	0.6	0.6	0.8	1.0
Memo items:					
Equity share of financial assets[6]	14.9	19.1	23.2	27.6	34.6
Equity in residential property as % of net Worth	22.4	22.4	19.1	16.8	14.6
Mortgage debt as % of total debt	65.1	70.6	74.2	70.4	69.9
Mortgage debt as % of value of residential Property	30.3	34.2	39.8	42.6	43.8
Wealth-to-income ratio	4.2	4.7	4.5	4.8	5.6

Source: Authors' computations, Flow of Funds Accounts (updated 11/16/99).

Notes:
[1] Includes currency, checkable deposits, money market accounts, foreign accounts, and security credit.
[2] Includes equity in closely held businesses.
[3] Only employer sponsored plans –IRA and Keoghs are included in the items in which they are invested.
[4] 1-4 family residential property.
[5] Equity in noncorporate businesses only.
[6] Published figure for the FFA household sector (i.e. includes nonprofits).

Table 2. **The Level and Composition of Household Wealth: Survey Data**

	1983	*1989*	*1992*	*1995*	*1998*
Level of net worth					
Median (th '98 $)	56.9	59.0	55.8	59.4	
Average (th '98 $)	194.6	233.8	211.1	220.4	
SCF average as % of FFA	92.9	88.8	80.6	78.4	
Assets and liabilities as % of total assets					
Financial assets	29.4	28.9	30.6	35.2	
Liquid accounts	5.0	5.7	5.4	5.1	
Certificates of deposit	3.3	3.0	2.5	2.1	
Savings bonds	0.2	0.4	0.4	0.5	
Other bonds	3.1	3.0	2.6	2.3	
Stocks	7.9	4.5	5.1	5.7	
Mutual funds	0.9	1.6	2.4	4.7	
Retirement accounts	3.8	5.5	7.5	8.8	
Cash-value life insurance	2.4	1.8	1.9	2.7	
Trusts & other managed assets	2.6	1.9	1.7	2.2	
Other financial	0.2	1.4	1.2	1.2	
Memo: All equity	9.5	8.3	10.4	13.8	
Nonfinancial assets	70.6	71.1	69.4	64.8	
Primary residence	31.6	31.2	31.7	30.1	
Investment real estate	15.3	16.2	14.9	11.4	
Business equity	19.3	18.2	17.8	17.3	
Vehicles	3.4	3.8	3.8	4.5	
Other nonfinancial	0.9	1.7	1.1	1.5	
Debts	12.9	15.3	16.2	16.1	
Mortgage & home equity	7.4	8.4	10.4	10.8	
Loans for investment real estate	2.7	4.0	3.2	2.4	
Vehicle loans	0.8	1.2	0.9	1.1	
Credit card balances	0.2	0.3	0.5	0.6	
Other debt	1.8	1.4	1.2	1.2	
Memo items:					
Equity share of financial assets	n.a.	28.6	34.1	39.1	
Equity in primary residence as % of net worth	27.9	26.9	25.4	23.0	
Median share for homeowners	59.6	58.4	54.1	49.3	
Mort/HE debt as % of total debt	57.2	54.8	64.2	67.4	
Mort/HE debt as % of home value	23.3	26.9	32.8	35.9	
Wealth-to-income ratio	4.38	4.53	4.63	4.64	

Source: Surveys of Consumer Finances, weighted data (updated 11/16/99). See notes following the tables for detailed definitions.

Table 3. **Ownership and median holdings of assets and liabilities**

	Percent of HHs with holdings					Median amount , among HHs w/holdings (th of '98 $)				
	1983	*1989*	*1992*	*1995*	*1998.*	*1983*	*1989*	*1992*	*1995*	*1998*
Net worth	92.1	88.7	89.5	89.9		67.3	78.7	71.0	74.4	
Financial assets	89.7	88.6	90.1	90.6		11.2	13.9	12.9	14.4	
Liquid accounts	87.4	85.3	86.9	87.0		2.9	2.7	2.6	2.3	
Certificates of deposit	20.1	19.9	16.7	14.3		15.9	15.3	12.6	10.6	
Savings bonds	20.2	23.9	22.3	22.8		0.5	0.8	0.7	1.1	
Other bonds	4.2	5.7	4.3	3.1		34.9	35.7	34.3	31.1	
Stocks	19.1	16.8	17.0	15.2		6.4	9.5	9.1	9.6	
Mutual funds	4.5	7.2	10.4	12.3		11.1	15.3	18.3	21.2	
Retirement accounts	30.8	35.6	38.1	43.0		7.1	13.1	16.4	17.0	
Cash-value life insurance	34.1	35.5	34.9	32.0		5.4	3.8	3.5	5.3	
Trusts & other managed assets	4.0	3.6	4.0	3.9		15.9	31.8	22.8	31.9	
Other financial	1.6	13.8	10.8	11.1		5.9	2.5	2.9	3.2	
Memo: Any equity	n.a.	31.6	36.7	40.4		4.8	10.8	12.0	14.5	
Nonfinancial assets	90.3	89.2	90.8	90.9		76.2	86.0	79.0	88.2	
Primary residence	63.4	63.9	63.9	64.7		82.5	89.1	91.3	95.6	
Investment real estate	21.0	20.2	19.3	18.0		55.5	58.6	51.4	53.1	
Business equity	14.4	11.6	11.9	11.1		70.3	89.1	68.5	47.8	
Vehicles	84.4	83.8	86.1	84.1		6.5	8.8	7.8	10.5	
Other nonfinancial	7.4	12.4	8.3	9.0		7.9	9.5	8.0	9.3	
Debts	70.0	72.7	73.4	74.7		17.2	19.8	20.6	24.0	
Mortgage & home equity	36.9	39.5	39.1	41.0		34.4	42.7	50.2	54.9	
Loans for investment real estate	8.2	7.3	7.8	6.4		29.8	40.7	27.4	31.9	
Vehicle loans	28.1	35.2	30.4	32.5		4.9	7.3	6.0	7.1	
Credit card balances	37.0	39.7	43.7	47.3		0.8	1.1	1.1	1.6	
Other debt	44.6	43.7	42.5	42.2		1.7	1.7	1.6	1.5	

Source: Surveys of Consumer Finances, weighted data.

Table 4. **Diversification of financial assets: Percent of households owning different types of financial assets, by number of types held**

	% of HHs	*Check-ing accounts*	*Savings Accounts*	*Retire-ment accounts*	*Cash value life ins.*	*Savings bonds*	*Money market accounts*	*Call accounts*	*CDs*	*Mutual funds*	*Stocks*	*Bonds*	*Trusts & managed assets*	*Median financial assets (th '98 $)*
All HHs	100	80.4	35.9	43.0	32.0	22.8	18.0	1.6	14.3	12.3	15.2	3.1	3.9	10.8
# of asset types:														
None	9.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1	17.1	72.3	8.2	3.9	6.2	1.2	2.8	0.0	0.5	0.2	0.0	0.0	0.0	0.6
2	19.4	88.6	29.5	23.4	20.1	6.9	7.5	0.0	7.4	2.5	3.5	0.0	1.1	5.1
3	18.7	91.4	44.4	51.1	34.4	19.9	13.7	0.2	13.2	6.8	9.1	1.0	2.0	16.9
4	15.4	95.5	55.3	70.3	45.5	36.6	21.5	1.4	19.2	14.8	19.4	2.3	5.6	33.7
5	9.3	95.2	55.0	81.3	60.3	50.5	35.6	1.8	28.5	27.8	36.3	6.1	7.4	63.7
6	5.4	91.9	58.2	86.7	69.6	63.4	56.0	4.1	39.3	41.3	48.3	9.4	10.7	104.5
7	3.3	96.4	69.4	91.9	71.2	65.5	66.0	11.3	44.6	57.9	63.2	17.1	17.6	161.2
8	1.3	99.9	65.5	97.7	83.9	69.3	73.1	22.7	41.7	65.7	78.7	36.0	31.6	314.4
9	0.6	96.8	66.7	99.8	90.9	80.7	89.0	31.2	68.7	77.5	92.1	47.0	18.9	372.2
10+	0.2	75.5	81.0	99.5	98.4	85.6	100.0	51.5	81.9	88.4	100.0	72.3	27.1	579.5

Source: 1995 Survey of Consumer Finances, weighted data (updated 11/16/99).

Table 5. **Ownership and holdings of assets and liabilities, by wealth quartile and top 5%**

	% of HHs w/holdings					Item as % of group's assets					Group's holdings as % of total HH holdings				
	0-25	25-50	50-75	75-100	Top 5	0-25	25-50	50-75	75-100	Top 5	0-25	25-50	50-75	75-100	Top 5
Net worth >0	88.2	100.0	100.0	100.0	100.0	31.7	51.3	71.9	91.1	93.8	-0.2	3.1	11.3	85.7	57.2
Financial assets	74.9	95.0	98.3	100.0	100.0	15.9	17.6	23.8	39.5	40.9	0.5	2.6	9.4	87.5	58.1
Liquid accounts	66.4	91.1	97.1	99.2	99.4	5.8	4.2	4.6	5.3	5.2	1.6	5.3	15.0	78.1	42.5
CDs	2.8	9.0	19.1	30.2	32.6	0.5	1.1	2.0	2.2	1.7	0.3	4.2	19.3	76.2	29.5
Savings bonds	8.8	21.9	29.4	35.2	32.5	0.5	0.5	0.5	0.5	0.2	1.2	6.4	21.9	70.5	18.8
Other bonds	0.3	0.7	1.6	10.7	21.7	0.1	0.1	0.2	2.9	4.1	0.0	0.1	1.8	98.1	87.5
Stocks	3.0	9.3	15.2	36.9	51.0	0.4	0.8	1.0	7.2	9.7	0.0	0.5	2.5	96.9	81.6
Mutual funds	1.7	5.7	12.6	32.0	48.0	0.2	0.6	1.6	5.7	6.6	0.1	1.2	5.2	93.4	59.6
Retirement acc'ts	17.9	41.0	52.3	70.2	79.3	4.8	5.9	8.0	9.3	7.5	0.5	3.6	14.0	81.8	44.2
Cash life ins.	14.8	29.2	39.6	51.7	52.0	2.5	3.2	4.0	2.4	1.5	1.1	5.3	16.4	77.3	29.2
Trusts & managed	0.5	2.1	3.9	10.0	18.4	0.2	0.4	0.7	2.6	3.2	0.1	0.7	3.7	95.4	81.8
Other fin.	8.0	11.3	10.8	13.8	19.3	1.0	0.8	1.1	1.3	1.2	1.8	6.5	16.6	75.1	49.9
Memo: Any equity	15.5	38.1	46.3	69.7	86.1	2.9	4.5	6.2	16.3	18.6	0.2	1.6	6.5	91.8	66.9
Nonfinancial assets	74.5	97.8	99.2	99.8	99.8	84.1	82.4	76.2	60.5	59.1	1.6	7.4	15.7	75.3	46.7
Primary residence	21.4	72.5	88.9	93.2	94.7	52.1	63.8	58.5	21.3	11.7	2.1	12.2	26.2	59.6	23.1
Inv. real estate	2.6	11.2	18.5	45.0	66.6	2.3	3.4	5.0	13.5	14.4	0.4	2.0	5.9	91.7	62.0
Business equity	1.3	6.7	13.3	25.9	50.2	0.3	1.6	3.2	21.8	30.0	0.0	0.5	2.5	96.9	85.3
Vehicles	70.1	88.3	91.6	92.4	90.8	28.4	13.0	8.5	2.4	1.2	8.4	19.0	26.8	45.7	15.8
Other nonfin.	3.9	7.2	11.2	15.9	22.9	0.9	0.6	1.1	1.6	1.9	0.9	4.8	11.4	83.0	66.9
Debts	58.5	82.7	78.8	70.5	70.6	68.3	48.7	28.1	8.9	6.2	8.4	18.3	23.6	49.7	21.9
Mortgage & home eq.	14.7	54.1	55.0	50.4	56.8	42.8	39.2	22.7	5.2	2.8	5.1	20.7	27.7	46.5	16.9
Inv. real estate debt	1.1	3.3	5.4	17.6	29.2	1.3	1.0	1.2	2.7	2.7	2.4	4.6	6.5	86.5	54.4
Vehicle loans	25.8	41.8	36.0	25.2	15.8	10.5	4.2	2.0	0.3	0.1	17.9	26.1	28.9	27.0	7.1
Credit card balances	37.5	57.0	55.9	33.5	23.4	4.7	1.9	1.2	0.1	0.0	22.8	29.3	24.6	23.2	5.4
Other debt	34.2	50.3	42.1	30.6	29.3	8.8	2.4	1.0	0.6	0.6	28.5	11.8	15.4	44.4	27.1

Source: 1995 Survey of Consumer Finances, weighted data.

Table 6. **The riskiness of household portfolios**

	1989	*1992*	*1995*	*1998*
Financial assets				
Share of households with				
Safe assets only	25.9	26.5	24.4	
Safe and fairly safe	28.2	24.5	23.2	
Safe and fairly risky	2.9	4.4	-	
Safe, fairly safe, and fairly risky	28.9	32.1	40.1	
No safe, some other type	2.7	2.6	2.9	
No financial assets	11.4	9.9	9.4	
Percent of households' total financial assets in:				
Safe assets	37.4	32.5	25.6	
Fairly safe assets	31.5	31.7	34.1	
Fairly risky assets	31.1	35.8	40.3	
Total	100	100	100	
Total assets				
Percent of households' total assets in risky items (risky financial assets, business equity, and investment real estate)	43.5	43.6	42.8	

Notes:

"Safe assets" include liquid accounts (checking, saving, money market, and call), certificates of deposit and U.S. savings bonds.

"Fairly safe assets" include other government bonds, tax-free bonds, cash-value life insurance, and amounts in mutual funds, retirement accounts, trusts and other managed assets that are not invested in stock.

"Fairly risky assets" include directly-held stock and stock held through mutual funds, retirement accounts, trusts and other managed assets.

Table 7. The riskiness of household portfolios, by age of the household head

	% of HHs w/risky financial assets				Share of group's financial assets held in risky forms				% of HHs w/risky fin. or nonfin. assets				Share of group's total assets in risky forms			
	1989	1992	1995	1998	1989	1992	1995	1998	1989	1992	1995	1998	1989	1992	1995	1998
All households	31.9	37.2	40.6		31.1	35.8	40.3		46.4	48.6	51.6		43.5	43.6	42.9	
By age of HH head:																
Under 35	22.6	28.5	36.6		20.4	26.2	30.1		33.3	36.5	44.3		28.1	29.0	24.0	
35-44	39.3	42.5	46.6		34.1	32.5	40.3		55.0	54.7	56.7		39.8	38.0	37.6	
45-54	42.3	47.0	49.0		38.3	42.6	42.9		57.6	57.6	61.0		49.0	49.4	45.6	
55-64	36.4	45.4	40.0		30.0	39.9	44.8		54.4	62.8	54.1		48.8	51.0	51.5	
65-74	27.1	31.8	34.5		28.3	33.8	35.8		44.3	45.7	50.3		44.9	46.3	45.1	
75+	26.0	26.7	29.7		29.4	27.8	39.7		37.8	35.2	39.0		38.5	31.5	36.8	

Source: Surveys of Consumer Finances, weighted data.

Table 8. Coefficient Estimates from Multivariate Probit Model of Ownership of Selected Assets and Liabilities of U.S. Households, 1995 Survey of Consumer Finances

	Stocks			Safe Assets			Homes			Businesses			Consumer Debt		
	$	Standard Error	Sig.	$	Standard Error	Sig.	$	Standard Error	Sig.	$	Standard Error	Sig.	$	Standard Error	Sig.
Constant	-3.644	0.1785	***	-2.017	0.1498	**	-0.256	0.1357	+	-1.810	0.1445	**	0.261	0.1158	*
Married	0.212	0.0700	**	0.307	0.0652	**	0.648	0.0648	**	-0.007	0.0677		0.203	0.0596	**
Singfeml	0.341	0.0831	**	0.112	0.0776		0.089	0.0721		-0.605	0.0931	**	0.227	0.0686	**
Nonwhite	-0.165	0.0676	*	0.002	0.0670	+	-0.261	0.0630	**	-0.231	0.0783	**	0.090	0.0564	
Agelt35	0.382	0.0821	**	0.155	0.0795	*	-1.062	0.0823	**	-0.394	0.0845	**	0.384	0.0654	**
Age3549	0.209	0.0691	**	0.151	0.0674		-0.538	0.0767	**	-0.146	0.0614	*	0.390	0.0548	**
Age6574	-0.146	0.0930		-0.042	0.0845		0.126	0.1057		-0.246	0.0809	**	-0.528	0.0769	**
Age75p	-0.363	0.1039	**	-0.317	0.0886	**	-0.141	0.1019		-0.454	0.1031	**	-0.772	0.0965	**
Lylt10	-0.615	0.0999	**	-0.261	0.0839	**	-0.185	0.0864	*	0.277	0.0951	**	-0.624	0.0766	**
Ly1025	-0.220	0.0823	**	-0.098	0.0816		-0.007	0.0795		0.032	0.0927		-0.202	0.0719	**
Ly4575	0.032	0.0748		0.074	0.0786		0.342	0.0770	**	-0.027	0.0818		0.107	0.0683	
Ly75100	0.089	0.1091		0.026	0.1098		0.616	0.1290	**	0.117	0.1022		0.088	0.0936	
Ly100p	-0.098	0.0909		-0.218	0.0879	*	0.531	0.1034	**	0.756	0.0861	**	-0.570	0.0774	**
Lths	-0.105	0.0850		-0.083	0.0814		0.002	0.0793		-0.077	0.0993		-0.150	0.0702	*
Coll	0.130	0.0559	*	-0.123	0.0540	*	-0.037	0.0605		-0.098	0.0546	+	-0.200	0.0486	**
Logfin	0.356	0.0143	**	0.248	0.0108	**	0.095	0.0088	**	0.125	0.0108	**	-0.034	0.0078	**
Abvrisk	0.082	0.0666		-0.236	0.0600	*	-0.028	0.0689		0.194	0.0571	**	-0.086	0.0536	
Norisk	-0.444	0.0580	**	-0.065	0.0588		-0.030	0.0625		-0.222	0.0635	**	-0.075	0.0523	
ρ with stocks	…	…	…	0.010	0.0370		0.050	0.0380		-0.154	0.0370	**	0.097	0.0336	**
ρ with safe				…	…	…	0.074	0.0360	*	-0.073	0.0353	*	0.081	0.0322	*
ρ with home							…	…	…	0.125	0.0399	**	0.081	0.0315	**
ρ with bus.										…	…	…	-0.086	0.0322	**

** Significant at 1 percent level
* Significant at 5 percent level
+ Significant at 10 percent level
log likelihood -9726.5

Table 9. Comparison of Signs and Significance of Coefficients from Multivariate Probit Regressions of U.S. Household Portfolios, Various Survey Years

	Stocks				Safe Assets				Homes				Businesses				Consumer Debt			
	1983	1989	1992	1995	1983	1989	1992	1995	1983	1989	1992	1995	1983	1989	1992	1995	1983	1989	1992	1995
Constant	-	-	-	-	-	-	-	-	-	-			-	-	-	-			+	+
Married			+	+	+	+	+	+	+	+	+	+					+	+	+	+
Singfeml	+	+		+	+	+	+		+		+		-	-	-	-	+	+	+	+
Nonwhite		-	-	-		-	-		-		-	-	-	-		-				
Agelt35	+			+			-		-	-	-	-	-	-	-	-	+	+	+	+
Age3549	+			+				+	-	-	-	-				-	+	+	+	+
Age6574	-	-	-		-	-	-		+		+			-		-	-	-		-
Age75p	-		-	-	-	-	-	-					-	-	-	-	-	-	-	-
Lylt10	-	-	-	-		-	-	-	-	-		-			-	+	-	-	-	-
Ly1025		-		-			-		-					-			-	-		-
Ly4575	+		+		+		+		+	+	+	+					+	+	+	
Ly75100						+						+							-	
Ly100p			-		-		-	-	+		+	+	+	+	+	+	-	-	-	-
Lths	-	-	-										-				-		-	-
Coll	+		+	+	-			-	-								+			-
Logfin	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-	-	-	-
Abvrisk						-	-	-					+	+	+	+				
Norisk		-	-	-									-	-	-	-				
ρ with stocks	…	…	…	…	+	+	+			+			-	-	-	-	+	+		+
ρ with safe	…	…	…	…	…	…	…	…		+	+	+	-	-	-	-	+		+	+
ρ with home	…	…	…	…	…	…	…	…	…	…	…	…	+		+	+				+
ρ with bus.	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…	…			+	-

+ positive coefficient, significant at least at 5 percent level
- negative coefficient, significant at least at 5 percent level

Table 10. Coefficient Estimates from Probit Model of Stock Ownership and from Truncated Regression of the Level of Stocks Held by U.S. Households, Conditional on Ownership, 1995 Survey of Consumer Finances

Probit Regression for Stocks				Truncated Regression for Log Stocks			
	$	Standard Error	Sign.		$	Standard Error	Sign.
Constant	-1.624	0.1387	**	Constant	4.939	0.2490	**
Married	0.240	0.0648	**	Married	0.110	0.1118	
Singfeml	0.268	0.0771	**	Singfeml	-0.111	0.1441	
Nonwhite	-0.239	0.0647	**	Nonwhite	-0.420	0.1207	**
Agelt35	-0.006	0.0744		Agelt35	-1.324	0.1287	**
Age3549	-0.005	0.0628		Age3549	-0.607	0.0943	**
Age6574	0.039	0.0831		Age6574	0.202	0.1187	+
Age75p	-0.085	0.0945		Age75p	0.527	0.1512	**
Lylt10	-0.542	0.0859	**	Lylt10	0.400	0.1700	*
Ly1025	-0.259	0.0768	**	Ly1025	-0.146	0.1522	
Ly4575	0.139	0.0701	*	Ly4575	0.116	0.1239	
Ly75100	.0276	0.1000	**	Ly75100	0.170	0.1554	
Ly100p	0.293	0.0838	**	Ly100p	0.793	0.1318	**
Lths	-0.261	0.0827	**	Lths	-0.640	0.1806	**
Coll	0.266	0.0508	**	Coll	0.308	0.0800	**
Logfin excl stocks	0.170	0.0107	**	Logfin excl stocks	0.512	0.0187	**
Abvrisk	0.155	0.0593	**	Abvrisk	0.516	0.0814	**
Norisk	-0.554	0.0546	**	Norisk	-0.438	0.1044	**
Log likelihood	-2010.0			Log likelihood	-4506.4		

** Significant at 1 percent level
* Significant at 5 percent level
+ Significant at 10 percent level
Memo: Log likelihood from Tobit model -8796.8

Table 11. Coefficient Estimates from Probit Model of Safe Asset Ownership and from Truncated Regression of the Level of Safe Assets Held by U.S. Households, Conditional on Ownership, 1995 Survey of Consumer Finances

Probit Regression for Safe Assets				Truncated Regression for Log Safe Assets			
	$	Standard Error	Sign.		$	Standard Error	Sign.
Constant	-0.406	0.1157	**	Constant	6.917	0.2067	**
Married	0.337	0.0625	**	Married	0.096	0.1051	
Singfeml	0.048	0.0695		Singfeml	-0.200	0.1310	
Nonwhite	-0.094	0.0592		Nonwhite	0.249	0.1062	*
Agelt35	-0.182	0.0694	**	Agelt35	-1.329	0.1189	**
Age3549	-0.044	0.0608		Age3549	-0.578	0.0910	**
Age6574	0.125	0.0802		Age6574	0.458	0.1144	**
Age75p	-0.013	0.0089		Age75p	0.349	0.1406	*
Lylt10	-0.350	0.0767	**	Lylt10	0.092	0.1424	
Ly1025	-0.171	0.0724	*	Ly1025	-0.034	0.1318	
Ly4575	0.182	0.0711	*	Ly4575	0.302	0.1140	**
Ly75100	0.203	0.1032	*	Ly75100	0.555	0.1500	**
Ly100p	0.109	0.0827		Ly100p	0.925	0.1238	**
Lths	-0.288	0.0713	**	Lths	-0.185	0.1395	
Coll	0.012	0.0516		Coll	0.123	0.0783	
Logfin excl safe assets	0.097	0.0080	**	Logfin excl safe assets	0.268	0.0147	**
Abvrisk	-0.188	0.0577	**	Abvrisk	-0.127	0.0853	
Norisk	-0.217	0.0539	**	Norisk	-0.067	0.0896	
Log likelihood	-2206.9			Log likelihood	-5811.9		

** Significant at 1 percent level
* Significant at 5 percent level
+ Significant at 10 percent level
Memo: Log likelihood from Tobit model -10290.3

Table 12. Coefficient Estimates from Probit Model of Ownership of Unsecured Consumer Debt and from Truncated Regression of the Level of Consumer Debt Held by U.S. Households, Conditional on Ownership, 1995 Survey of Consumer Finances

Probit Regression for Consumer Debt				Truncated Regression for Log Consumer Debt			
	$	Standard Error	Sign.		$	Standard Error	Sign.
Constant	0.171	0.1182		Constant	7.361	0.2192	**
Married	0.161	0.0605	**	Married	-0.111	0.1107	
Singfeml	0.220	0.0687	**	Singfeml	-0.179	0.1248	
Nonwhite	0.106	0.0567	+	Nonwhite	-0.262	0.0945	**
Agelt35	0.450	0.0676	**	Agelt35	-0.134	0.1183	
Age3549	0.415	0.0552	**	Age3549	0.118	0.1023	
Age6574	-0.537	0.0771	**	Age6574	-0.110	0.1805	**
Age75p	-0.772	0.0965	**	Age75p	-1.324	0.2471	**
Lylt10	-0.610	0.0766	**	Lylt10	-0.401	0.1459	
Ly1025	-0.200	0.0719	**	Ly1025	-0.134	0.1259	
Ly4575	0.083	0.0687		Ly4575	-0.084	0.1127	
Ly75100	0.055	0.0940		Ly75100	-0.028	0.1560	
Ly100p	-0.592	0.0777	**	Ly100p	0.396	0.1524	**
Lths	-0.153	0.0727	*	Lths	-0.007	0.1319	
Coll	-0.199	0.0487	**	Coll	0.221	0.0862	*
Logfin	-0.040	0.0079	**	Logfin	0.025	0.0158	
Home Owner	0.225	0.0563	**	Home Owner	-0.041	0.0949	
Abvrisk	-0.085	0.0536		Abvrisk	0.241	0.0983	*
Norisk	-0.074	0.0524		Norisk	-0.032	0.0915	
Log likelihood	-2509.0			Log likelihood	-3545.5		

** Significant at 1 percent level
* Significant at 5 percent level
+ Significant at 10 percent level
Memo: Log likelihood from Tobit model -7698.2

Notes to Tables 2-5

Financial assets	
Liquid accounts	Checking accounts, savings accounts, money market deposit accounts, money market mutual funds, and call accounts at brokerages
CDs	Certificates of deposit (may be short- or long-term)
Savings bonds	U.S. savings bonds
Other bonds	Federal government bonds other than U.S. savings bonds, bonds issued by state and local governments, corporate bonds, mortgage-backed bonds, foreign bonds, and other types of bonds.
Stocks	Directly-held stock in publicly traded corporations.
Mutual funds	Directly-held shares in all types of mutual funds, excluding money market.
Retirement accounts	Includes both individual accounts (IRA and Keogh) and employer-sponsored thrift-type retirement accounts.
Cash-value life ins.	Surrender value of life insurance policies that build up a cash value.
Trusts and managed assets	Equity interests in trusts, annuities, and managed investment accounts.
Other fin.	Royalties; futures contracts; oil and gas leases; future proceeds from a lawsuit, estate, or lottery; deferred compensation, etc.
Memo: Equity	Includes directly-held stock, …
Nonfinancial assets	
Primary residence	May be single-family home or some other type of residence (mobile home, apartment, town house, coop, etc).
Investment real estate	Includes residential and nonresidential property not owned through a business.
Business equity	Net equity in all types of privately-owned businesses, farms or ranches, professional practices, and partnerships. The household may have an active management role in the business, or may just invest in the business.
Vehicles	Includes all standard passenger vehicles (cars, trucks, vans, minivans, jeeps, antique vehicles, etc) not owned by a business, and all other types of personal-use vehicles (motor homes, recreational vehicles, airplanes, boats, motorcycles, etc).
Other nonfin.	Artwork, antiques, jewelry, furniture, Oriental rugs, musical instruments, race horses, valuable collections (coin, stamp, books, guns, wine, baseball cards), etc.
Debts	
Mortgage & home equity	All borrowing secured by the primary residence, including first and second mortgages and home equity loans and lines of credit.
Inv. real estate	All outstanding loans or mortgages on property other than the primary residence.
Vehicle loans	All outstanding loans on vehicles previously reported.

Credit card balances	Balances outstanding after the last month's payment on general-purpose (Mastercard/Visa) and other types of cards (store, gas, travel and entertainment, airline, etc).
Other debt	Includes home improvement loans, installment loans, student loans, lines of credit other than home equity, and loans against pensions and life insurance policies.

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Figure 1. Asset returns and macro variables, 1983-98

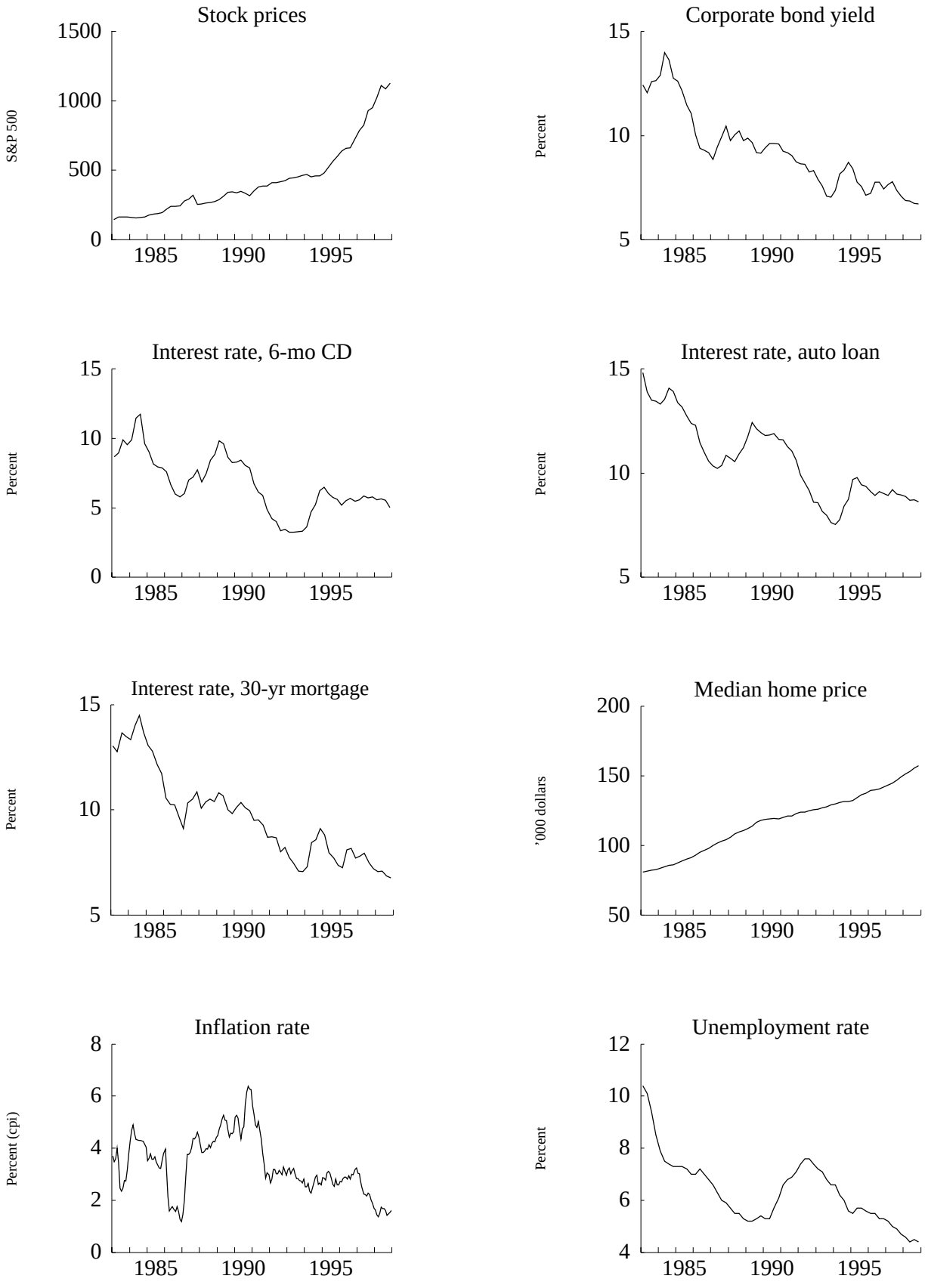
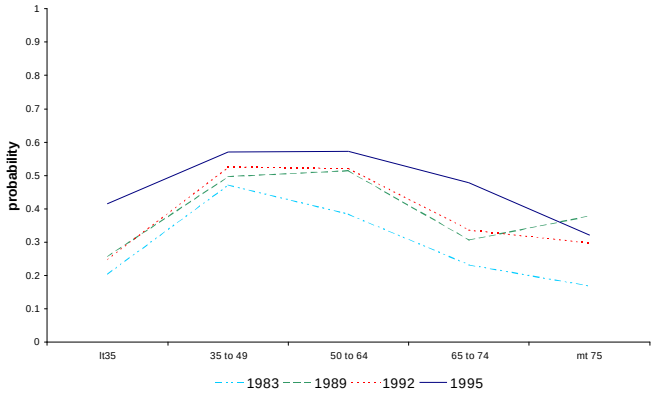
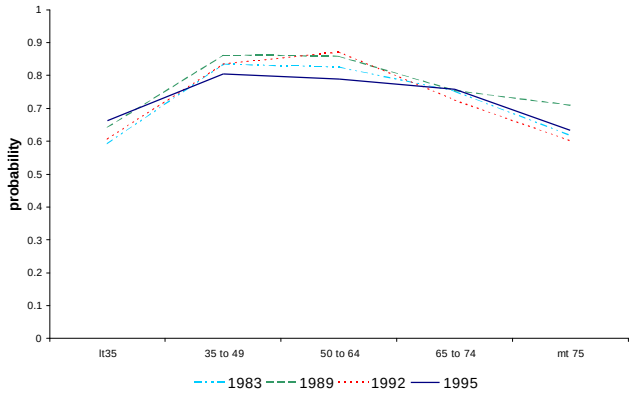


Figure 2. Estimated Probabilities of Holding various Assets and Liabilities for U.S. Households with Median Income and Median Financial Assets at Each Age Range; 1983, 1989, 1992, and 1995 Surveys of Consumer Finances

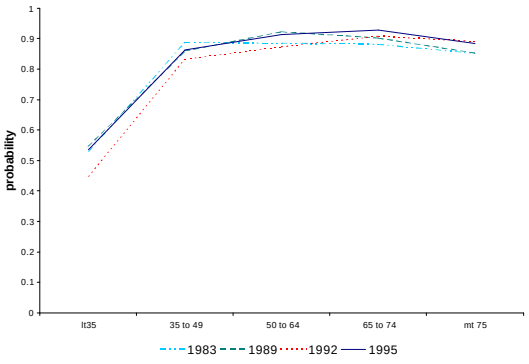
a. Estimated Probability of Holding Any Equity



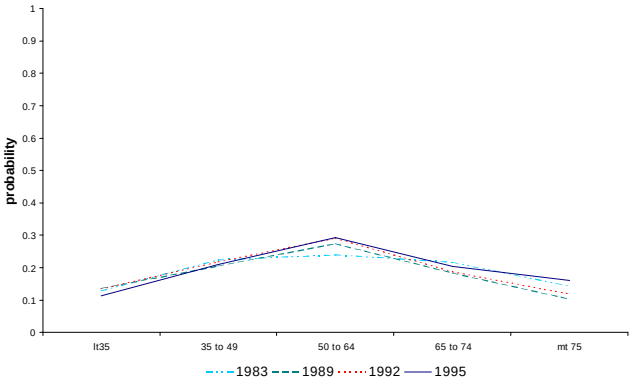
b. Estimated Probability of Holding Safe Investment Assets



c. Estimated Probability of Home Ownership



d. Estimated Probability of Holding Business Assets



e. Estimated Probability of Holding Consumer Debt