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Asset allocation and asset location: household evidence from the survey of consumer finances

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Abstract

The rapid growth of assets in self-directed tax-deferred retirement accounts has generated a new set of financial decisions for many households. In addition to deciding which assets to hold, the traditional choice among bonds, stocks, and other investment classes, households with substantial assets in both taxable and tax-deferred accounts (TDA) must now decide where to hold them. This paper uses data from the Survey of Consumer Finances to assess how many households have enough assets in both taxable and tax-deferred accounts to face significant asset location choices. It also investigates the asset location decisions these households make. In 2001, 49% of households had at least some assets in a tax-deferred account, and more than 11 million households had at least US\$25,000 in both a taxable and a tax-deferred account. Asset allocation inside and outside tax-deferred accounts is quite similar, with about 70% of assets in each location invested in equity securities. Roughly two thirds of households with financial assets in both taxable and tax-deferred accounts hold portfolios that are tax efficient. Most of the other third could reduce their taxes by relocating heavily taxed fixed income assets to their tax-deferred account. For more than half of the households that hold apparently tax-inefficient portfolios, however, a shift of less than US\$10,000 in financial assets would eliminate tax inefficiency.

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Households have always faced the asset allocation problem, having to decide which assets to purchase and how much to invest in each of them. The recent growth of self-

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directed retirement plan assets has created a new problem for many households: asset location. This is the question of how much of a given asset to hold in a taxable account, and how much of it to hold in a tax-deferred account (TDA). In the United States, assets in participant-directed tax-deferred accounts totaled nearly 5 trillion dollars at the end of 2001, with US\$2.4 trillion in Individual Retirement Accounts (IRA) and US\$2.3 trillion in 401(k)-type retirement plans. At the end of 1990, by comparison, IRAs totaled US\$637 billion, and there were US\$735 billion in all defined contribution plans.

Asset location has attracted attention from researchers in public finance and financial economics, and is a frequent topic of discussion among financial planners, such as [Novack \(2003\)](#). [Shoven \(1999\)](#) outlined the structure of the asset location problem, and observed that tax minimization would usually dictate holding heavily taxed taxable bonds in the tax-deferred account, with less heavily taxed equities in the taxable account. Recent works by [Amromin \(2002\)](#), [Dammon et al. \(forthcoming\)](#), [Huang \(2001\)](#), [Poterba et al. \(2004\)](#), and [Shoven and Sialm \(2004\)](#) offer further insight on the optimal asset mix for households facing various tax and financial circumstances. The earliest studies of asset location derived very strong rules about optimal asset location in stylized environments. More recent work has emphasized that various institutional realities, such as limitations on the set of investment options available to the household or the structure of lending markets for large expenditure needs, may significantly affect optimal asset location decisions and may lead to deviations from predictions in a stylized setting. Taxes are only one of the factors affecting asset location decisions in such environments. Transaction costs or liquidity needs may make it optimal to hold some heavily taxed assets outside the tax-deferred account.

Most of the recent research on asset location has focused on the derivation of tax-minimizing portfolio strategies, rather than on the analysis of household portfolio choices. Several studies, however, have presented empirical evidence on asset location. Two studies have been based on surveys of TIAA-CREF participants. One by [Bodie and Crane \(1997\)](#) finds that investors choose similar asset allocations in their taxable and tax-deferred accounts. A related study by [Ameriks and Zeldes \(2001\)](#) investigates age and cohort effects in portfolio choices of TIAA-CREF participants, and shows that most participants make very few, if any, allocation changes with respect to their contribution flows. The extent to which the behavior of TIAA-CREF participants can be generalized to the population at large is an open issue.

A third study ([Barber and Odean, 2004](#)) is based on data drawn from client records at a discount brokerage firm. It shows that households hold equity mutual funds and taxable bonds in their tax-deferred accounts, while they hold individual equities in their taxable account. Because individual equity holdings tend to be less heavily taxed than bonds or equity mutual funds, this asset location pattern is broadly consistent with tax-minimizing behavior. However, households are also more likely to trade stocks in their taxable than in their tax-deferred account, even though trading in the tax-deferred account does not generate capital gains tax liability. A key concern with this study is whether data on assets held through a single brokerage firm adequately capture a household's broader balance sheet.

A fourth study ([Amromin, 2002](#)) uses data from the Survey of Consumer Finances to summarize tax-deferred account holdings and to investigate whether precautionary

demands for financial assets, coupled with penalties and restrictions on withdrawing assets from tax-deferred accounts, can explain deviations from tax-efficient asset location patterns. The findings suggest that the standard deviation of household labor income is related to asset location choices, with households in less risky occupations choosing more tax-efficient asset locations. This paper represents an important step toward modeling the factors that affect asset location choices.

Finally, [Poterba and Samwick \(2003\)](#) use the Survey of Consumer Finances to investigate the relationship between a household's marginal tax rate and its likelihood of saving through a tax-deferred account (TDA). Higher marginal tax rates are correlated with greater use of these accounts, and with the likelihood of holding bonds in a TDA. This paper does not analyze asset location choices, however.

In this paper, we also use data from several Surveys of Consumer Finances (SCFs) to analyze asset location decisions. The SCF data provide complete and disaggregate information on the portfolios held by a large sample of households. These data cover holdings across all financial intermediaries, which makes it possible to study the overall structure of the household portfolio, rather than just the structure of the components held at a single financial institution. We compute the number of households facing asset location decisions as well as the value of the assets held by households with such choices. We then explore asset location patterns and relate these patterns to household characteristics that affect the gains from tax-efficient asset location, particularly household marginal tax rates.

The paper is divided into five sections. The first presents information on the number of households that have significant balances in both taxable and tax-deferred accounts. Section 2 explores how households allocate their assets in taxable accounts and TDAs. In the aggregate, equity investments make up more than two-thirds of tax-deferred financial assets and a similar proportion of taxable financial assets. The third section develops several simple classification rules to indicate whether or not households are making asset location decisions that are tax efficient. It also reports on the portfolio reallocation that would be needed to bring households in tax-inefficient positions to tax-efficient points. Section 4 presents cross-sectional regression and discrete choice evidence on the correlation between various household characteristics and asset location patterns. We investigate age, income, and net worth patterns in tax efficiency, as well as the effect of marginal tax rates. A brief conclusion suggests directions for future research.

1. How many households face significant asset location choices?

The recent expansion of tax-deferred accounts in the United States has included Individual Retirement Accounts (IRAs), which are available to all taxpayers with earned income, 401(k) plans, which are employer-provided defined contribution plans available at some firms, 403(b) plans, which are similar to 401(k) plans but are available to employees at nonprofit institutions, and a number of other smaller programs. [Poterba et al. \(2001b\)](#) provide more information on the growth of tax-deferred accounts and the characteristics of those who participate in them. [Table 1](#) shows that assets held in tax-deferred accounts represented 16.8% of total household financial assets at the end of 2001, almost double the share in 1985. Tax-deferred assets are roughly equally divided

Table 1
Self-directed tax-deferred assets as a percent of total financial assets

Year	IRA (%)	DC pension (%)	Total (%)
1985	3.1	5.5	8.6
1990	5.3	6.1	11.4
1995	6.9	7.9	14.8
1998	7.9	8.4	16.3
2001	8.5	8.3	16.8

Source: Flow of Funds, Z.1 release, Tables L.10 and L.119.c. Total financial assets were US\$8.0 trillion in 1985, US\$12.3 trillion in 1990, US\$18.6 trillion in 1995, US\$27.2 trillion in 1998, and US\$28.3 trillion in 2001.

between IRAs and various types of defined contribution pension plan accounts. A growing fraction of the assets in IRAs were actually accumulated in pension accounts, and then “rolled over” to an IRA.

The aggregate data illustrate the growing importance of IRAs and 401(k)s, but they do not indicate how many households have substantial balances both in TDAs and in taxable accounts. We investigate this using data from the 1989, 1992, 1995, 1998, and 2001 Surveys of Consumer Finances (SCFs). The SCF is the best available source of data on household wealth and its components. It asks a comprehensive set of questions, has a large sample size, and oversamples high net worth households. The 2001 SCF, which is described in [Aizcorbe et al. \(2003\)](#), sampled 4449 households, with 2917 in the random sample and 1532 in the stratified random sample that over-weighted those with high incomes or net worth. By combining an area probability sample with a high-income oversample, the SCF provides accurate information on broad population characteristics, while also offering in-depth information on households that hold a disproportionate share of financial assets. Seven households are excluded from the public use dataset due to disclosure concerns, leaving a sample with 4442 observations. Households (28%) in the survey have a net worth of over a million dollars. All of our tabulations weigh the various observations in the survey by their sampling weights so that our reported statistics should be representative of the US population.

We measure the total value of the assets held in tax-deferred accounts as the sum of assets held in 401(k)s, 403(b)s, IRAs, and supplemental retirement accounts (SRAs). We exclude the value of assets in some traditionally defined contribution plans that do not fall into these categories, since such plans may not allow participants much control over their asset allocation decisions. This exclusion probably leads to understatement in the value of tax-deferred assets that are directly controlled by individual investors. A similar control issue arises with respect to some assets in 401(k) plans, where employer-imposed constraints on asset allocation may limit individual discretion. We nevertheless include all 401(k) plan assets, because virtually all 401(k) participants control asset allocation decisions for at least some of their holdings.

Table 2 presents summary information on the percentage of households with tax-deferred accounts. The first column shows the percentage with Individual Retirement Accounts, 401(k) plans, 403(b) plans, or other self-directed retirement saving plans. It rises from 30.7% in 1989 to 49.1% in 2001. The next column shows the percentage of households with financial assets, excluding transaction accounts such as checking

Table 2

Percentage of households with tax-deferred accounts or financial assets outside tax-deferred accounts, 1989–2001

Year	Tax-deferred assets (%)	Taxable financial assets outside TDA (%)	Either taxable financial or tax-deferred assets (%)
<i>All households</i>			
1989	30.7	45.6	55.1
1992	33.8	44.5	55.4
1995	40.7	43.1	58.4
1998	45.7	46.8	63.0
2001	49.1	46.1	63.5
<i>Households with heads younger than 60 (2001 Count = 77.9 million)</i>			
1989	32.7	43.7	54.7
1992	35.9	41.9	54.1
1995	44.6	41.4	59.2
1998	49.6	44.2	63.4
2001	53.2	44.1	64.5
<i>Households with Heads Older than 60 (2001 Count = 28.6 million)</i>			
1989	25.7	50.5	56.1
1992	28.8	50.9	58.4
1995	30.9	47.7	56.3
1998	35.1	54.0	61.7
2001	37.9	51.3	60.7

Source: Tabulations from Surveys of Consumer Finances. Financial assets outside the tax-deferred account include stocks, equity mutual funds, certificates of deposit, savings bonds, and other taxable bonds. Tax-exempt bonds are not included in the set of financial assets outside the TDA. In 1989, 6.5% of households reported some holdings of tax-exempt bonds; this fraction was stable across surveys, rising to 6.6% in 1998. Virtually all households owning tax-exempt bonds also held taxable bonds. The numbers of households in the five Surveys of Consumer Finances are 93 million (1989), 95.9 million (1992), 99 million (1995), 102.6 million (1998), and 106.5 million (2001).

accounts, outside their TDA. Approximately 45% of the households in each of the five Surveys of Consumer Finances reports ownership of these assets. This percentage would be much greater if we included financial assets in transaction accounts. We exclude them on the grounds that they do not reflect long-term investment positions in the way that TDA balances do. The last column in Table 2 shows the percentage of households with either taxable financial assets, excluding transaction accounts, or tax-deferred assets. This group accounts for 55% of households in 1989 and 63% in 2001.

The upper panel of Table 2 presents findings for the entire population, while the two lower panels disaggregate households by whether the household head is above or below the age of 60. There are two reasons for distinguishing these subsets of households. First, the tax rules that affect withdrawals from tax-deferred accounts change when the account holder turns 59 1/2. Individuals above this age can withdraw assets from TDAs without penalty, so assets inside and outside TDAs are closer substitutes, aside from the tax treatment of accruing income, after this age than before. Second, there may be differences in risk aversion or other factors that are age-related and that lead to differences in asset allocation between younger and older households.

The lower panels of [Table 2](#) show that younger households are more likely to hold assets in TDAs (53% vs. 38% in 2001), while older households are more likely to have financial assets in taxable accounts (51% vs. 44%). For households headed by someone over the age of 60, the probability of having assets in a TDA increased from 26% to 38% between 1989 and 2001. The increase was sharper for younger households: 33–53%. These differences probably reflect the growing availability of employer-linked retirement accounts, such as 401(k)s, over the last two decades. Older workers who have been out of the labor force for much of this period are less likely to have participated in these programs.

[Table 3](#) presents more detailed information on the sets of households that face asset location decisions. It shows the number of households with TDA balances, and non-TDA balances, above various threshold levels in 1989 and 2001. Asset thresholds are measured in constant 1998 dollars, and the shaded entries along the diagonal show the results when we apply the same threshold to both taxable and tax-deferred accounts. The asset thresholds do not adjust for the deferred taxes associated with holdings inside TDAs, or the greater prospective after-tax returns associated with assets held in these accounts. [Poterba \(2003a\)](#) suggests that for time horizons of between 25 and 40 years, and for interest rates close to the levels that prevailed during our sample period, these two factors largely offset each other.

The upper panel of [Table 3](#) presents information from the 1989 SCF, while the lower panel presents data from 2001. In 2001, 33.7 million households had positive amounts of both taxable and tax-deferred assets. Of this group, 17.7 million households had more than

Table 3
Households with significant holdings of both taxable and tax-deferred financial assets

Value of Tax-Deferred Account	Financial Assets in Taxable Account				
	> 0	≥ 10K	≥ 25K	≥ 50K	≥ 100K
1989					
>0	19.8	11.2	8.0	5.9	3.6
≥ 10K	13.1	8.7	6.8	5.1	3.2
≥ 25K	8.0	5.9	4.8	3.8	2.4
≥ 50K	4.4	3.6	2.9	2.6	1.8
≥ 100K	2.0	1.6	1.4	1.3	1.0
2001					
>0	33.7	20.9	16.1	12.2	8.8
≥ 10K	25.7	17.7	14.1	11.0	8.2
≥ 25K	19.7	14.5	11.8	9.5	7.1
≥ 50K	14.9	11.4	9.7	8.0	6.2
≥ 100K	9.5	7.4	6.6	5.6	4.5

Each entry shows the total number of households (in millions) with the specified mix of assets in tax-deferred and taxable accounts. Asset cutoffs in both 1989 and 2001 are measured in 1998 dollars. Financial assets are defined as in [Table 2](#).

US\$10,000 in both settings, while 11.8 million households had more than US\$25,000 and 8.0 million had more than US\$50,000. A smaller group, 4.5 million households, had more than US\$100,000 in both types of accounts. This group, which accounts for just over 4% of all households, held almost 47% of financial assets outside transaction accounts. These households held 39% of all TDA assets, and 52% of taxable non-transaction account financial assets. Including both TDA and taxable balances, this group held US\$5.8 trillion in financial assets.

Comparing the 1989 and 2001 entries in Table 3 demonstrates the growing importance of the asset location issue. In 1989, 8.6 million households had more than US\$10,000, and 2.6 million had more than US\$50,000, in both taxable and tax-deferred accounts. Between 1989 and 2001, the number of households with tax-deferred assets above various thresholds grew much more rapidly than the number of households with taxable assets above various thresholds.

Table 4 places tax-deferred asset holdings in the broader context of household portfolios. It reports the distribution of TDA assets as a percentage of total financial assets for the 2001 SCF. Asset location issues are more important for households with large TDA balances than for those with small balances and for households with roughly similar holdings inside and outside their TDAs. For a household with a portfolio almost entirely in the taxable account, the asset mix within the 401(k) may be of little consequence, since the value of the 401(k) at retirement may represent a small fraction

Table 4
Share of financial assets held in tax-deferred accounts, 2001

Net worth or financial asset criterion	Millions of households with TDA and non-TDA assets	TDA assets as a percentage of total financial assets for households with both TDA and non-TDA assets					
		Percentile (%)					Mean (%)
		10th	25th	Median	75th	90th	
<i>All households</i>							
All	33.7	9.4	29.5	60.0	86.2	97.1	56.7
Financial assets ≥ US\$100 K	18.4	7.6	22.6	51.3	84.7	97.1	52.5
Financial assets ≥ US\$250 K	10.7	4.4	15.8	44.1	74.1	94.3	45.8
Financial assets ≥ US\$1 M	2.4	2.3	10.8	27.3	55.7	85.3	35.8
<i>Households Under Age 60</i>							
All	25.6	13.3	35.2	65.6	88.8	97.7	60.5
Financial assets ≥ US\$100 K	12.2	11.5	30.4	57.4	87.1	97.7	57.0
Financial assets ≥ US\$250 K	6.4	7.2	23.5	50.0	80.3	96.0	51.0
Financial assets ≥ US\$1 M	1.3	2.4	12.7	33.3	59.3	80.7	37.9
<i>Households Over Age 60</i>							
All	8.1	4.9	14.6	42.9	71.4	93.0	44.8
Financial assets ≥ US\$100 K	6.2	4.4	12.0	40.4	71.4	94.3	43.6
Financial assets ≥ US\$250 K	4.3	3.4	9.4	29.4	60.2	91.5	38.0
Financial assets ≥ US\$1 M	1.1	2.0	8.5	21.1	51.0	94.3	33.5

Source: Authors' tabulations using 2001 Survey of Consumer Finances. Total financial assets are defined as in Table 2. Income cutoffs are defined in 1998 dollars.

of total wealth. For a household with almost all of its assets in the TDA, the asset location decision is of little consequence—there are few assets outside the TDA to allocate. Asset allocation within the TDA affects such a household, while asset location does not.

Table 4 shows that in 2001, the median household with both tax-deferred and taxable financial assets had 60% of its financial assets in a tax-deferred account. At the 25th percentile, this value was 29.5%, while at the 75th percentile, it was 86.2%. Thus, there was substantial dispersion in the share of assets held in TDAs, and a substantial number of households had between one quarter and three-quarters of their financial assets in these accounts. For households with larger holdings of financial assets, the distribution of tax-deferred assets relative to all financial assets shifts toward the left. The median value of this ratio for households with at least US\$250,000 in total financial assets, for example, was 44.1%, compared with 60% for all households. These results nevertheless suggest that even in higher wealth strata, a substantial group of households have TDA and non-TDA holdings that are of similar magnitude.

2. Asset allocation patterns

Decisions households make about asset location can have a non-trivial impact on their long-run financial status. Consider a 45-year-old couple with US\$100,000 in a TDA, and the same amount in a taxable account. Assume that the couple faces a 28% marginal income tax rate on interest and dividends, and that they defer capital gain realizations until death and takes advantage of basis step-up at death so that the effective capital gains tax rate is zero. Further assume that both bonds and stocks yield returns of 7% per year, but all of the bond income is currently taxable while only 2% of the equity return, the dividend yield, is taxable. If the couple allocates their TDA to stocks and their taxable account to bonds, and makes no subsequent reallocation decisions, then at age 70, net of taxes paid to withdraw assets from the TDA, they will have US\$732,650. By comparison, if they invest the TDA in bonds and hold equity in their taxable account, the lower tax burden on the bond income that results from holding bonds in the TDA will result in an after-tax wealth at age 70 of US\$866,791. This represents an 18% difference in wealth at retirement. This calculation suggests the importance of considering the asset location decisions that households make.

2.1. Survey of consumer finances information on asset allocation

For most types of tax-deferred accounts, the Survey of Consumer Finances asks whether the account is invested ‘mostly or all in stock’, ‘split between stock and interest earning assets’, or “mostly or all in interest-bearing accounts,” or in “real estate,” “insurance”, or “other”. Hardly any TDA assets are held in real estate, insurance, or “other”. We use this information to construct estimates of the asset composition of tax-deferred accounts. We allocate all of the assets in accounts identified as ‘mostly or all in stock’ to equity, half of the value of ‘split’ accounts, and none of the value of other accounts to equity. We then sum these equity holdings, as well as the total value of all

accounts. The SCF does not distinguish taxable and tax-exempt bonds in the TDA, but based on evidence in Barber and Odean (2004), we assume that all bonds in TDAs are taxable bonds.

For holdings outside tax-deferred accounts, SCF respondents separately report the dollar values of direct stock holdings, equity mutual fund shares, and mixed equity-fixed income mutual fund shares. Aggregating these reported asset holdings provides a measure of equity held in taxable accounts. We do not include equity in privately held companies, since such assets may be illiquid and difficult to transfer from the taxable to the tax-deferred account. The SCF also provides considerable detail on fixed-income assets held outside tax-deferred accounts. Our measure of fixed-income assets includes certificates of deposit, savings bonds, and other taxable bonds held directly and through mutual funds. As in our foregoing analysis, we exclude the value of checking accounts and money market accounts on the grounds that holdings of these accounts are driven by liquidity concerns rather than asset allocation or tax issues.

Two asset types, tax-exempt bonds and US government saving bonds, raise difficult problems for our analysis of asset location. The holders of tax-exempt bonds pay implicit rather than explicit taxes, so the effective tax burden on tax-exempt bonds equals the yield spread between comparably risky taxable and tax-exempt bonds. This yield spread is usually smaller than the top marginal income tax rate times the taxable bond yield, so at least for households with relatively high marginal tax rates, tax-exempt bonds offer a higher after-tax return than taxable bonds. Because these bonds are tax-exempt, however, we classify them as “low tax assets” along with equities when we examine asset location decisions.

In the 2001 SCF, 4.6% of all households reported owning tax-exempt bonds, and another 1.8% held tax-exempt money market accounts. The percent of all households owning tax-exempt bonds has been very stable during our sample period. As the percentage of households with tax-deferred accounts has increased, however, the fraction of households that has both taxable and tax-deferred financial assets, who also holds tax-exempt bonds has declined. This fraction was 16.3% in 1989, compared with 10% in 2001. Most of the households that own tax-exempt bonds also hold taxable fixed-income securities. In 2001, of the 4.9 million households holding tax-exempt bonds, less than half million reported holding no other financial assets outside their TDA.

US government savings bonds also pose some difficulties. Interest on these bonds is not taxed until the bonds are redeemed, so the bonds receive TDA treatment even when they are held outside the tax-deferred account. In 2001, 9% of the households who held only fixed income assets outside their TDA held only savings bonds. Holding such bonds outside the TDA does not result in the same tax burden as holding other taxable bonds. We therefore treat savings bonds as “low-tax assets” in most of our analysis, and we refer to corporate and other government bonds as “highly taxed fixed income.”

2.2. Asset allocation patterns

Our analysis of asset location decisions focuses on whether households hold equities or other low-tax assets in their taxable accounts or in their tax-deferred accounts. Table 5 reports the first step in our analysis: summary information on the equity exposure of SCF

Table 5
Asset allocation in taxable and tax-deferred accounts, 1989–2001

	1989	1992	1995	1998	2001
<i>All financial assets</i>					
Equity as Percentage of Total Financial Assets	40.4%	47.8%	55.5%	69.7%	71.6%
Tax Exempt Bonds as Percentage of Total Financial Assets	13.5	12.0	9.6	6.1	7.3
Percent of Households with Equity or Fixed-Income Assets	54.0	54.5	56.7	62.6	63.5
Percent of Households with Any Equity	27.3	32.4	36.6	45.8	50.0
Percent of Households with Any Fixed-Income Assets	48.8	48.2	47.4	48.3	46.9
<i>Financial assets held in TDA</i>					
Equity as Percentage of TDA Financial Assets	33.6	46.8	54.4	67.7	70.1
Percent of Households with Equity or Fixed-Income Assets	29.1	32.4	38.2	45.0	49.1
Percent of Households with Any Equity	13.3	19.9	24.7	34.5	39.4
Percent of Households with Any Fixed-Income Assets	23.2	24.3	25.0	26.1	26.4
<i>Financial assets held in outside TDA</i>					
Equity as Percentage of Financial Assets in Taxable Account	42.5	48.2	56.0	70.8	72.4
Tax Exempt Bonds as Percentage of Total Financial Assets	17.7	17.6	14.1	9.4	11.4
Percent of Households with Equity or Fixed-Income Assets	45.7	44.5	43.2	46.8	46.1
Percent of Households with Any Equity	20.0	21.0	22.3	27.6	30.0
Percent of Households with Any Fixed-Income Assets	39.9	38.6	35.7	35.7	32.9

Source: Authors' tabulations based on Survey of Consumer Finances. Fixed income assets include holdings of tax-exempt debt and savings bonds.

households. The table also shows the percentage of households who hold fixed income assets and tax-exempt bonds. The first panel in Table 5 shows that equity rose from 40.4% of financial assets in 1989 to 71.6% of financial assets in 2001. This increase reflected both high returns and broadening participation in equity markets. The share of households holding equity in either taxable or tax-deferred accounts rose from 27.3% to 50%, while the share of investors holding fixed-income assets remained steady at just under 50%. The share of households with any equity or fixed-income assets rose from 54 to 63% over this time period.

The two lower panels of Table 5 present separate information on financial assets held inside, and outside, tax-deferred accounts. In 1989, the equity share of assets held in TDAs (34%) was below the equity share in taxable accounts (43%). By 2001, 70% of TDA assets and 72% of non-TDA assets were held in equities. Table 5 also shows that the percentage of households with equity in their TDA rose from 13.3 in 1989 to 39.4 in 2001. The similarity of the stock–bond mix inside and outside TDAs raises questions about the extent to which investors are considering tax factors in deciding whether to locate assets inside or outside the TDA, although a complete analysis of this issue requires comparison of the asset allocation choices made by individual households. We present such a comparison below.

Table 6 focuses exclusively on households that own equity, and documents variations in the mode of ownership. The first row in Table 6 shows that in 1989, 27.3% of households owned stock, with 7.3% holding equity only through their TDA, 6% holding equity both inside and outside the TDA, and 14% holding equity only outside their TDA. The table

Table 6
Percentage of households holding equity, 1989–2001

Year	Any equity holdings (%)	Equity held both inside and outside TDA				Equity held only in TDA (%)	Equity held only outside TDA			
		Total (%)	Direct and indirect (%)	Only indirect (%)	Only direct (%)		Total (%)	Direct and indirect (%)	Only indirect (%)	Only direct (%)
1989	27.3	6.0	1.1	1.1	3.8	7.3	14.0	1.8	2.0	10.2
1992	32.4	8.6	2.5	1.4	4.7	11.4	12.5	1.8	2.7	8.1
1995	36.6	10.3	2.6	3.3	4.5	14.4	12.0	1.7	3.8	6.5
1998	45.8	16.4	4.7	4.8	6.9	18.1	11.3	2.1	3.7	5.5
2001	50.0	19.3	6.2	5.1	8.1	20.1	10.7	1.9	3.6	5.2

Source: Tabulations from Surveys of Consumer Finances.

also shows that 14% of all households (10.2+3.8) had only direct equity holdings, while 6% (1.1+1.1+1.8+2.0) held at least some equity through a mutual fund.

These summary statistics changed during the 1990s. By 2001, 13.3% of households held taxable equity only through stock owned directly, while 16.8% held some taxable equity through a mutual fund (16.8=6.2+5.1+1.9+3.6). The percentage of the population holding at least some equity rose to 50.0%. This was the result of rising numbers who held equity only in a TDA (7.3% to 20.1%) as well as an increase in the number who held equity both inside and outside a TDA (6–19.3%). The data from the Survey of Consumer Finances document a pronounced trend toward a higher fraction of equity investment occurring through financial intermediaries.

Table 7 presents information similar to that in Table 6, but it does so for the case of bonds rather than stocks. For taxable bonds, the after-tax return differential between the TDA and taxable account is more substantial than for stocks. In addition to splitting fixed-income investments by TDA and non-TDA location, Table 7 also distinguishes taxable fixed-income investments in taxable accounts from holdings of tax-exempt bonds, and specifies the number of households holding savings bonds as their only fixed-income investment. The table shows that changes in bond ownership are not as pronounced as those for stock ownership, with almost no change between 1989 and 2001 in the percentage of households owning fixed income assets. Of the 46% of households who owned some fixed-income assets, roughly one quarter held fixed-income assets inside their TDA but not outside, while nearly half held fixed income assets outside the TDA but not inside. There has been some increase, from 8.8% to 13.4%, in the percentage of households with fixed-income investments held only through their TDA, and a decline, from 25.6 to 20.8%, in the set of households with fixed income held only outside the TDA. The overwhelming majority of SCF households hold no tax-exempt bonds, although those who do hold these bonds tend to be in the highest net worth strata, which makes the aggregate portfolio share held in these bonds significant.

Table 7 illustrates the importance of savings bond investments in taxable accounts. In 2001, 9.0% of households that held fixed income assets only outside the TDA held only savings bonds. Twelve years earlier, in 1989, this was 14.0%. In addition, of those who hold fixed income assets in both their taxable and tax-deferred accounts, 5.5% held only savings bonds in their taxable account.

Table 7
Percentage of households holding fixed-income (FI) assets, 1989–2001

Year	Any fixed-income holdings (%)	Fixed income held both inside and outside TDA					Fixed-income held only in TDA (%)	Fixed income held only outside TDA				
		Total (%)	Both taxable and tax-exempt bonds (%)	Only taxable bonds (%)	Only tax-exempt bonds (%)	Savings bonds only FI asset outside TDA (%)		Total (%)	Both taxable and tax-exempt bonds (%)	Only taxable bonds (%)	Only tax-exempt bonds (%)	Savings bonds only F. I. asset outside TDA (%)
1989	48.8	14.3	2.3	11.7	0.3	6.5	8.9	25.6	1.7	23.6	0.3	14.1
1992	48.2	14.4	1.7	12.4	0.3	6.9	9.9	23.9	1.8	21.5	0.6	12.2
1995	47.4	13.1	1.5	11.2	0.4	7.4	12.0	22.4	1.9	19.9	0.7	11.9
1998	48.3	12.8	1.4	10.9	0.5	6.8	13.3	22.2	2.0	19.3	0.8	9.9
2001	46.3	12.1	1.4	10.2	0.5	5.5	13.4	20.8	1.7	18.1	1.0	9.0
(mean FI assets)	(71 K)	(134 K)	(493 K)	(78 K)	(241 K)	(52 K)	(33 K)	(58 K)	(335 K)	(24 K)	(213 K)	(11 K)

Source: Tabulations from Surveys of Consumer Finances. Entries in parentheses in the last row are the average total fixed income assets for households in that category.

3. Asset location decisions

We now explore asset location choices. [Table 8](#) presents information on the number of households who report various asset location patterns in the 2001 SCF. The columns of this table indicate whether households have tax-deferred accounts, and if they do, what asset classes they hold in these accounts. The rows describe the assets that the households hold in their taxable accounts. We combine tax-exempt bonds and savings bonds with equities held in taxable accounts to define “low-tax assets.” We once again present three sets of results, one for all households, one for those headed by someone over the age of 60, and one for households below the age of 60.

The upper panel of [Table 8](#) shows that there are 52.3 million households ($24.2 + 17.7 + 10.4$) with assets in tax-deferred accounts; these are households in columns 2 through 4. Of this group, there are 33.6 million households with taxable assets outside the TDA. This is the group of households whose asset location decisions we study, and whose table entries are shaded.

We define an asset location pattern that allocates taxable fixed income assets to tax-deferred accounts before taxable accounts as “tax minimizing.” Households that follow such asset location patterns are labeled as tax efficient. The entries in [Table 8](#) that are lightly shaded correspond to asset location patterns that could be tax-minimizing. The darkly shaded entries correspond to investment patterns that do not appear to be consistent with tax-minimization. There are 10.3 million households (19.7% of all households with TDAs) holding only fixed-income assets in their TDAs. Among households who also have non-TDA assets, 6.0 million (or 17.9% of the total) have only taxable fixed-income assets in their TDAs. This is a group that might be allocating their highly taxed assets to their tax-deferred account. Of this group, 4.9 million households held lightly taxed assets outside the TDA. These households, who are following a strict “bonds in the TDA, stocks, and other lightly taxed assets in the taxable account” allocation rule, represent less than one tenth of the households with tax-deferred accounts, and 14.6% of those with both TDA and non-TDA financial assets.

The upper panel of [Table 8](#) also shows that there are 1.1 million households with only taxable fixed income assets in their TDA, and only the same asset category outside their TDA. This group may also be following a tax-minimizing asset location strategy, as may be the 11.0 million households with only equity in their TDA and only low-tax assets in their taxable account. One additional group, those with taxable fixed income assets and stocks in the TDA, and low tax assets in the taxable account, could also be tax minimizing. This group consists of 6.7 million households. Adding all of the lightly shaded boxes together yields 23.7 million households—45.4% of all households with TDA assets, and 70% of those with both TDA and non-TDA financial assets—who may be following tax-minimizing asset location rules. About 30% of the SCF households appears to be “tax inefficient” by our stylized criterion.

One might ask how the finding that less than one third of all households are “tax inefficient” can be reconciled with aggregate data showing similar overall bond-stock asset allocations in taxable and tax-deferred accounts. Remember that households that hold only equity in both the taxable account and the TDA, or only taxable bonds in both locations, are classified as tax efficient. Eleven million households, or nearly half of all

Table 8
SCF households (millions) with various asset combinations, 2001

	Households with no assets in TDA	Households with only equity in their TDA	Households with both equity and taxable fixed income in TDA	Households with only taxable fixed income in TDA	Total number of households
All Households					
Households With No Taxable Assets Outside the TDA	38.9	7.9	6.4	4.3	57.4
Only Low-Tax Assets Outside TDA	7.7	11.0	6.7	2.4	27.8
Low-Tax Assets and Taxable Fixed-Income Outside TDA	3.4	4.5	3.5	2.5	13.8
Only Taxable Fixed-Income Outside TDA	4.3	0.7	1.2	1.1	7.4
Total	54.2	24.2	17.7	10.4	106.5
Households With Household Head < 60					
Households With No Taxable Assets Outside the TDA	27.6	7.2	5.7	3.0	43.5
Only Low-Tax Assets Outside TDA	5.9	9.2	6.2	1.5	22.7
Low-Tax Assets and Taxable Fixed-Income Outside TDA	1.4	3.3	2.6	0.8	8.1
Only Taxable Fixed-Income Outside TDA	1.6	0.5	1.1	0.4	3.6
Total	36.4	20.2	15.6	5.7	77.9
Households with Household Head ≥ 60					
Households With No Taxable Assets Outside the TDA	11.2	0.7	0.7	1.3	13.9
Only Low-Tax Assets Outside TDA	1.8	1.9	0.5	1.0	5.1
Low-Tax Assets and Taxable Fixed-Income Outside TDA	2.0	1.2	0.9	1.7	5.8
Only Taxable Fixed-Income Outside TDA	2.7	0.2	0.1	0.7	3.8
Total	17.8	4.0	2.2	4.6	28.7

“Low-Tax Assets” include tax-exempt bonds, savings bonds, and equity. The results are virtually unchanged if tax-exempt bonds are aggregated with taxable fixed income securities. If savings bonds are re-allocated to taxable fixed income, the number of households in the tax-inefficient regions, particularly among those under age 60, rises substantially.

tax-efficient households, fall into the all-equity group. Their portfolios show similar asset allocations in both taxable and tax-deferred accounts, but they are still “tax efficient” by our criteria.

Table 8 also shows that there is a substantial group of households that hold both fixed-income and equity investments, but who hold all of their equities inside their tax-deferred account. These households are in dark-shaded entries of the table. There are 1.9 ($=0.7+1.2$) million households that hold only fixed-income securities outside their TDA, while holding either all equities or a mix of bonds and stocks in the TDA. These households appear to be following just the reverse of the “bonds in the TDA” strategy. Another 4.5 million households hold only equity in the TDA, while holding both taxable fixed income and low-tax assets outside. There are 5.2 million households that report only equity, or both equity and fixed-income securities in the TDA, and holdings of both low-tax assets and taxable fixed income assets outside the TDA. These households, like those who hold bonds outside the TDA and stocks inside, could probably increase their after-tax financial assets at retirement by holding more of their fixed-income investments in their tax-deferred account, while preserving their overall risk exposure. Such changes might, however, alter the household’s liquidity, which Huang (2001) argues can be an important consideration in asset location.

The result that most households locate assets efficiently depends crucially on our decision to include savings bonds held outside of the TDA with equity to form a ‘lightly taxed’ asset category. Savings bonds are broadly held, and in particular, households with few other financial assets often hold savings bonds. Including savings bonds with other bonds would require reclassification of 8 million households as tax inefficient. Results based on this assumption are presented in Bergstresser and Poterba (2002). In contrast, since tax-exempt bonds are narrowly held and few households hold tax-exempt bonds and no other taxable bonds outside of the TDA, adding tax-exempt bonds to the ‘lightly taxed’ asset category has a minor effect on the results.

The two lower panels in Table 8 present results for age-based subsets of the population. Because tax-deferred accounts become more liquid at the age of 59 1/2, the liquidity concerns that might motivate bond holdings outside of the TDA would be less pronounced for these older households. In our sample, when savings bonds are included with the ‘lightly taxed’ assets, there is little difference in tax efficiency between younger and older households. For the households headed by someone under the age of 60, there is a 29.3% chance that they will be classified as “tax inefficient.” This matches precisely the probability that a household over the age of 60 will be classified as inefficient. One cautionary note about this result, however, is that it is sensitive to our decision to include savings bonds into the ‘lightly taxed’ category. If savings bonds were classified with taxable fixed income, then 58.8% of younger households and 37% of older households appear tax-inefficient.

Table 8 uses a stark criterion for inclusion in categories such as “only equity in the TDA”. To capture households that have mostly equity in the TDA, we repeated the calculations using greater than 80% of the TDA invested in equity in place of the 100% cutoff. We made similar changes in our other categorization criteria, replacing any 100% cutoff with 80%, and 0% with 20%. The results are broadly similar to the findings in Table 8, although fewer households are classified as following strategies that are not tax

minimizing when we take this approach. Of the 46.2 million households with TDA assets, 1.2 million have more than 80% of their TDA in equity, and less than 20% of their taxable account in equity. This compares with 0.7 million households in Table 8 with all of their TDA in equity, and all of their non-TDA assets in fixed income. The number of households following asset allocation patterns that are not tax minimizing, and are dark-shaded in the table, drops from 9.9 to 6.3 million when we use the looser categorization criterion.

We also explored the sensitivity of our findings to limiting our analysis to assets in Individual Retirement Accounts and Keogh plans. Households have complete control over asset allocation in all such accounts. Poterba (2003b) notes that for some defined contribution accounts, households may not be able to set their asset allocation. Households with only IRAs and Keoghs are slightly more likely to be following a tax-efficient investment strategy than other households. IRA and Keogh households (27%) appear to be tax inefficient, compared with just over 29% of the broader sample of tax-deferred accounts.

Table 8 provides some insight on the extent to which households are pursuing tax-minimizing asset location strategies, but it does not offer a quantitative measure of how far household portfolios are from tax-efficient points. To address this issue, we compute the amount of wealth that each household with TDA and non-TDA financial assets would need to reallocate in order to reach a tax-efficient portfolio. Table 9 summarizes the findings. The first row, following Table 8, reports that there are 9.9 million households that appear to be following tax-inefficient strategies. The second row shows how many of these households hold portfolios that would require asset movements of more than US\$2500 to reach a tax-efficient point. For example, a household with a US\$2000 TDA balance invested in equity, and large bond holdings outside the TDA, could be brought to a tax-efficient point by swapping US\$2000 of TDA equity for bonds. Such a household would

Table 9
Millions of households with tax-inefficient allocations after asset reallocation, 2001

Maximum possible reallocation	Current household allocation position				Total number of households
	Only equity in TDA, low-tax assets and taxable fixed income outside	Only equity in the TDA, only taxable fixed income outside	Both equity and bonds inside TDA, low-tax assets and taxable fixed income outside	Both equity and bonds in TDA, only taxable fixed income outside	
0	4.5	0.7	3.5	1.2	9.9
<i>Amount, in 1998 dollars</i>					
US\$2500	3.8	0.5	2.9	0.7	7.9
US\$5000	3.4	0.4	2.4	0.4	6.7
US\$10,000	2.6	0.3	1.8	0.2	4.9
<i>As a percent of TDA assets</i>					
10%	3.5	0.6	2.2	0.7	7.0
25%	2.5	0.4	1.5	0.5	5.0
50%	1.9	0.3	0.8	0.2	3.3

Each entry indicates the number of households with a tax-inefficient asset location pattern that cannot be moved to a tax-efficient allocation with a given percentage reallocation of assets.

be counted as tax-inefficient in the first row of Table 9, but not in the second. Households (20%) with tax-inefficient holdings are within US\$2500 of a tax-efficient point. If we allow for asset transfers of US\$10,000 per household, all but 4.9 million households can be brought to a tax-efficient point. Thus, for many of the households that are following what appear to be tax-inefficient strategies, the difference between the amount of retirement wealth they would accumulate under a tax efficient strategy, and the amount they would accumulate with their current strategy, is small.

Table 10 reports the total amount of wealth that must be reallocated to achieve a tax-efficient allocation for all households with TDAs. The first row focuses on the universe of households with TDAs and positive holdings of financial assets outside the TDA. In 2001, the total balance in TDAs among these households was US\$3.87 trillion. To move all households with TDAs to a tax-minimizing asset location would require asset transfers of US\$381.0 billion, one tenth of TDA assets.

Table 10 also shows the percentage of assets that needs to be reallocated to achieve tax efficiency for households whose assets meet various thresholds for TDA and non-TDA holdings. For those with at least US\$250,000 in both taxable and tax-deferred holdings, the required reallocation is US\$95.3 billion, or 8.1% of TDA assets. The required reallocation as a percentage of TDA assets is smallest for those with small holdings—those who do not have at least US\$25,000 in both their taxable and tax-deferred accounts. For this group, the reallocation needed to achieve tax efficiency (30.2 billion) is only 2.7%

Table 10
Proximity of actual portfolios to tax-minimizing asset location, 2001 SCF (US\$1998 B)

Holdings of both TDA and non-TDA financial assets in excess of:	Reallocation needed to achieve tax efficiency	Reallocation need to achieve tax minimizing allocation (omitting US\$25 K non-TDA fixed income outside TDA)	Reallocation to achieve equal allocation in TDA and taxable account	Amount of TDA assets	Total financial assets
<i>All Households</i>					
0	US\$281.0	US\$288.0	US\$365.9	US\$3868.4	US\$10,272.6
US\$25 K	250.8	238.0	326.8	2737.4	8313.3
US\$50 K	231.1	210.0	301.2	2316.9	7307.8
US\$250 K	95.3	90.7	164.9	1171.5	3715.4
<i>All Households Under Age 60</i>					
0	US\$179.9	US\$189.0	US\$200.3	US\$2543.0	US\$6014.5
US\$25 K	155.6	150.8	173.3	1690.8	4689.7
US\$50 K	142.8	131.6	157.4	1423.5	4145.3
US\$250 K	57.7	55.2	90.1	694.9	1955.3
<i>All Households Over Age 60</i>					
0	US\$101.1	US\$99.0	US\$165.6	US\$1325.4	US\$4258.2
US\$25 K	95.2	87.2	153.5	1046.6	3623.6
US\$50 K	88.3	78.4	143.8	893.4	3162.6
US\$250 K	37.6	35.5	74.8	476.6	1667.1

Author's tabulations from the Survey of Consumer Finances. Detailed calculation methodology is described in the text.

of total TDA assets. This reflects the smaller size of TDA relative to non-TDA assets for this group, as well as a greater tendency to hold taxable fixed income assets in the TDA among small account holders. The second column of [Table 10](#) shows the reallocation that would be needed to move tax-inefficient households to an allocation in which after a US\$25,000 buffer of liquid taxable assets, fixed income assets were held first in the TDA. The required reallocation when we allow for a buffer stock of non-TDA fixed income saving is almost the same as the required reallocations when we do not consider such a buffer.

The lower two panels of [Table 10](#) present analogous calculations for households with heads over, and under, age 60. The percentage of assets that needs to be reallocated to achieve tax efficiency is very similar for the two groups. This suggests that the change in tax rules affecting withdrawals after age 59 1/2 may not have a large impact on asset location decisions.

4. Explaining the divergence between actual asset location and tax-minimizing behavior

Households differ widely in asset allocations in taxable and TDA accounts. We conclude our analysis by exploring which types of households make tax-efficient asset location decisions. We do this in three ways. First, we estimate probit models for the discrete choice of whether or not a household is in the tax-efficient region in [Table 8](#). Second, we estimate regression models to explain the difference between the share of the tax-deferred account that is held in taxable fixed income assets, and the share of the financial asset portfolio outside the TDA that is held in fixed income assets. Finally, we estimate regression models in which the dependent variable is the share of TDA assets that would need to be reallocated to bring the household to a tax-efficient allocation.

We consider the household's marginal tax rate, its reported risk tolerance, its age, net worth, and income as explanatory variables in our analysis. All of these variables, with the exception of the marginal tax rate, are readily available from the Survey of Consumer Finances. Our marginal tax rate variable is an estimate of the household's marginal federal income tax rate on ordinary income, constructed using the algorithm described by [Poterba and Samwick \(2003\)](#). It describes the marginal tax rate on the household's first dollar of interest income. This "first dollar" approach avoids potential endogeneity of the marginal tax rate, in particular a link between the household's investment holdings and the tax rate. This variable is only available for the 1998 SCF, so we conduct our analysis using the 1998 data. Since the gains from tax-efficient asset location are increasing in a household's marginal tax rate, we test for an association between the marginal tax rate and asset location patterns.

In our estimation, we report results both for the entire sample of households with TDAs and non-TDA financial assets (1709 observations), and for a subsample of those households with IRAs (1410 observations). Some households in the subsample have TDA holdings only in an IRA, while others have both IRA and non-IRA holdings. When we analyze the subsample with IRA holdings, we define our measure of tax efficiency using only the assets held in the IRA. Thus, a household with an IRA fully invested in bonds, but

a 401(k) with substantial equity holdings, and equity holdings in a taxable account as well would be classified as tax efficient in the subsample analysis.

Our rationale for focusing on the second group is that some households with 401(k) accounts may hold equity in their TDAs because of employer restrictions on asset allocation. Many employers make 401(k) matching contributions in employer stock, and they require employees to hold this stock for some period of time. Such households might hold equity in their TDA, even though they would prefer to choose a more tax-efficient asset allocation. We have no way to identify households with constrained holdings in their 401(k)s, so we focus only on IRA holdings because households completely control these assets.

Table 11 presents the results of our empirical analysis of the cross-sectional determinants of asset allocation. The first two columns present estimates of probit models for a discrete dependent variable set equal to unity if the household exhibits a tax-efficient asset location pattern, and zero otherwise. The basic specification is

$$\begin{aligned} \text{Prob}(\text{TAXEFF}_i = 1) = & \Phi(\beta + \delta \times \text{MTR}_i + \alpha_1 \times \text{AGE60}_{ij} + \alpha_2 \times \text{AGE60}_{ij} \\ & \times \text{MTR}_i + \sum \gamma_k \times \text{NETWORTH}_{ik} + \sum \eta_c \times \text{RISK}_{ic} \\ & + \sum \rho_s \times \text{INCOME}_{is}) \end{aligned} \quad (1)$$

where TAXEFF_i is an indicator variable for tax efficiency, $\Phi(\cdot)$ denotes the standard normal distribution function, and we include categorical indicator variables for net worth and household income. The RISK variables are responses to three SCF questions that try to elicit a household's preferences with respect to the risk-reward tradeoff. The three ask if the household would "take substantial (above average/average) financial risks expecting to earn substantial (above average/average) returns".

The coefficient estimates suggest a positive, although statistically insignificant, relationship between household marginal tax rates and the tax efficiency of a household's asset location choices. For the full sample, the coefficient on the tax variable is positive. It is larger in absolute value, but still not statistically significantly different from zero, for the IRA subsample. We interact the indicator variable for a household head over the age of 60, and the marginal tax rate variable. A higher marginal tax rate has a smaller positive effect on the probability of a tax-efficient asset location for older than for younger households.

Columns 3 and 4 of Table 11 report regression equations in which the dependent variable is DIFF, the difference between the share of TDA assets in taxable fixed-income securities and the share of non-TDA assets in taxable fixed income securities. Because the simplest models of tax-efficient asset location suggest that taxable fixed income assets should be held in the tax-deferred account before they are held in the taxable account, the difference in the taxable fixed income shares in these two locations may offer a measure of the household's asset location choices one difficulty with this variable is that when households differ both in their desired portfolio shares for debt and equity, and when they also are constrained to hold different shares of their portfolios in taxable and tax-deferred accounts, DIFF may vary widely even across tax-efficient households. Such households might have DIFFs of zero, which would correspond to holding only fixed income in taxable and tax deferred accounts, or -1 , which would imply only bonds in the TDA and

Table 11
 Explaining tax efficiency and asset allocation share differences

Explanatory variable	Tax efficiency indicator		Asset allocation difference		Required reallocation share	
	All TDAs	IRA sample	All TDAs	IRA sample	All TDAs	IRA sample
Constant			-0.282*	-0.157	0.020	0.123
			(0.103)	(0.130)	(0.055)	(0.076)
Marginal tax rate	0.117	0.288	-0.036	-0.294	0.003	-0.095
	(0.182)	(0.203)	(0.192)	(0.230)	(0.102)	(0.135)
Age > 60	0.001	0.047	-0.040	-0.144	0.043	-0.007
	(0.070)	(0.068)	(0.073)	(0.080)	(0.039)	(0.047)
Marginal tax rate* (age > 60)	-0.087	-0.138	-0.115	0.159	-0.043	0.002
	(0.246)	(0.246)	(0.265)	(0.285)	(0.140)	(0.168)
Will take substantial financial risk	0.038	0.016	0.142*	0.102	-0.019	-0.046
	(0.050)	(0.058)	(0.057)	(0.068)	(0.030)	(0.040)
Above-average financial risk	0.025	0.037	0.082*	0.011	-0.012	-0.032
	(0.037)	(0.041)	(0.040)	(0.048)	(0.021)	(0.028)
Average financial risk	-0.011	-0.036	0.013	-0.090	0.021	0.016
	(0.034)	(0.038)	(0.037)	(0.043)	(0.019)	(0.025)
Net worth 0–25 K	-0.217	-0.176	0.071	0.191	0.117*	0.091
	(0.131)	(0.160)	(0.097)	(0.146)	(0.051)	(0.085)
Net worth 25–100 K	-0.130	0.085	0.054	0.044	0.018	-0.089
	(0.114)	(0.094)	(0.087)	(0.119)	(0.046)	(0.070)
Net worth 100–250 K	-0.196	-0.042	0.061	0.090	0.037	-0.011
	(0.112)	(0.112)	(0.087)	(0.118)	(0.046)	(0.069)
Net worth 250 K–1 M	-0.325*	-0.160	0.068	0.089	0.063	0.002
	(0.106)	(0.111)	(0.087)	(0.118)	(0.046)	(0.069)
Net worth 1–2.5 M	-0.449*	-0.315*	0.097	0.128	0.121*	0.052
	(0.117)	(0.141)	(0.100)	(0.128)	(0.053)	(0.075)
Net worth >2.5 M	-0.475*	-0.334*	0.087	0.098	0.164*	0.096
	(0.122)	(0.151)	(0.114)	(0.139)	(0.060)	(0.082)
Income 25–50 K	-0.125*	-0.124*	0.074	0.035	0.039	0.053
	(0.049)	(0.051)	(0.045)	(0.050)	(0.024)	(0.029)
Income 50–100 K	-0.065	-0.100*	0.078	0.065	0.026	0.067*
	(0.047)	(0.050)	(0.046)	(0.051)	(0.025)	(0.030)
Income 100–250 K	-0.032	-0.054	0.062	0.092	-0.008	0.022
	(0.059)	(0.063)	(0.058)	(0.065)	(0.031)	(0.038)
Income 250–500 K	-0.049	-0.099	0.069	0.063	-0.042	0.047
	(0.089)	(0.096)	(0.091)	(0.098)	(0.048)	(0.058)
Income 500 K–1 M	-0.200	-0.231	0.145	0.141	0.189*	0.222*
	(0.157)	(0.154)	(0.145)	(0.147)	(0.077)	(0.086)
Income > 1 M	-0.049	-0.014	0.055	0.060	-0.010	0.002
	(0.153)	(0.138)	(0.159)	(0.160)	(0.084)	(0.094)
R2	0.0613	0.0757	0.0429	0.0403	0.0524	0.0522

Entries in columns 1 and 2 report coefficients from a probit model for an indicator variable that equals unity unless the household holds fixed income assets outside a TDA and some equity in a TDA. The later columns report regressions with the difference between the fixed income share in the TDA and the taxable account, and the reallocation required to reach tax efficiency as a share of TDA assets, as dependent variables. The sample size for columns 1, 3, and 5 is 1709, while for columns 2, 4, and 6 it is 1410. All equations include six indicator variables for the occupation of the household head, and seven indicator variables for the associated industry of the current or last job. Standard errors are shown in parentheses.

* Significant at 5% level.

only stocks outside. The theory of tax-efficient asset allocation does predict that DIFF should not be positive. The specification includes the same explanatory variables as the probit models reported in the first two columns:

$$\begin{aligned} \text{DIFF}_i = & \beta + \delta \times \text{MTR}_i + \alpha_1 \times \text{AGE60}_{ij} + \alpha_2 \times \text{AGE60}_{ij} \times \text{MTR}_i + \Sigma \gamma_k \\ & \times \text{NETWORTH}_{ik} + \Sigma \eta_c \times \text{RISK}_{ic} + \Sigma \rho_s \times \text{INCOME}_{is} + \varepsilon_i. \end{aligned} \quad (2)$$

Once again, the estimated coefficient on the marginal tax rate variable is sensitive to our choice of estimation sample. The coefficient on the marginal tax rate is negative in the models for both the full sample and the IRA subsample, although it is only statistically significantly different from zero for the first case. The point estimate for this specification, -0.294 , implies that a one percentage point increase in a household's marginal tax rate leads to a 0.3% decline in the difference between the share of fixed-income assets in the taxable and the tax-deferred account.

There is some evidence of a link between net worth and the difference in asset allocations between taxable and tax-deferred accounts. Higher net worth households appear to hold a higher share of their non-TDA assets in fixed income than lower net worth households. This finding is true for the IRA-only sample as well as for the broader sample. It is largely driven by a smaller amount of taxable fixed-income holding in the tax-deferred accounts of high net worth households. There are no pronounced patterns in the asset allocation patterns across income groups, and the coefficients on some of the adjacent indicator variables for income categories differ substantially.

The last two columns of Table 11 present regressions in which the dependent variable is the percentage of TDA assets that needs to be reallocated in order to reach a tax-efficient allocation. The coefficient estimates are positive in both cases, although in neither case is the coefficient statistically significantly different from zero. Taken together, the results in Table 11 provide only weak support for the role of marginal tax rates in affecting asset location decisions. This may simply reflect the presence of many other factors that also impinge on household decisions with regard to asset location, or it may result from limitations in our measure of marginal tax rates. Since our tax variable is computed from the income measures provided in the Survey of Consumer Finances, it does not reflect any of the household-specific variation in marginal tax rates that could arise from differences in deduction patterns or other specialized features of the household tax return.

5. Conclusions

This paper shows that asset location is an important financial issue for a substantial group of US households. More than 11 million households in 2001 had at least US\$25,000 in both taxable and tax-deferred accounts, and at least 4.5 million had more than US\$100,000 invested in each type of account. A broad range of studies both in academic journals and in outlets that are read by financial services professionals, such as Charron (1999), suggests that households can raise their after-tax retirement wealth by holding

highly taxed assets in their tax-deferred account, and lightly taxed assets outside. Data from the Survey of Consumer Finances nevertheless suggest that roughly one third of households with both taxable and tax-deferred accounts are following asset location strategies that are tax inefficient. The cost of tax-inefficient behavior may be modest, however, for many households. For roughly three quarters of the households that appear to deviate from tax-efficient asset location strategies, moving less than US\$10,000 in bonds or stocks would bring them to a tax-efficient allocation. The limited size of this reallocation places an upper bound on the foregone retirement wealth associated with current asset location decisions. It is also possible that the apparent tax inefficiency associated with the asset location decision is the outcome of a broader household optimization problem, in which liquidity needs or other factors may dictate asset holdings that deviate from tax-efficient configuration.

The asset location choice that we consider is just one part of a broader web of financial choices that confront households. These choices include whether or not to contribute to a tax-deferred saving program, such as an IRA or a 401(k) plan, how much to contribute, how to allocate assets in this account conditional on contributing, whether to borrow and if so how to use home mortgage debt and other loan vehicles. While we have only considered one of these decisions, the choices may in fact be inter-related. The decision to hold equities in a tax-deferred retirement account, for example, may affect the decision about how much to borrow and what form such borrowing might take. Our findings suggest that non-tax considerations may play an important part in some of these household decisions, although it is difficult to measure and analyze these factors. Further work should explore the household-level determinants of financial decisions on each of the margins described above. Moving beyond reduced form models of the type we consider, and developing structural models as by [Amromin \(2002\)](#), is likely to be a particularly promising direction for investigation.

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