

NBER WORKING PAPER SERIES

HOUSEHOLD OWNERSHIP OF VARIABLE ANNUITIES

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Working Paper 11964  
<http://www.nber.org/papers/w11964>

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
January 2006

We thank Hui Shan and Amir Sufi for outstanding research assistance, Andrew Samwick for providing us with computer code to impute marginal tax rates for households in the Survey of Consumer Finances, Cynthia Saccocia of Cerulli Associates for helpful discussions and data, Peter Davis, Moshe Milevsky, Austin Nichols, Kent Smetters and participants at the 2004 AEA meeting and the NBER Tax Policy and the Economy meeting for helpful comments, and the Social Security Administration and the Boston College Center for Retirement Research for research funding. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

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NBER Working Paper No. 11964  
January 2006  
JEL No. G22, J14, J32, H24

**ABSTRACT**

Variable annuities have been one of the most rapidly growing financial products of the last two decades. Between 1996 and 2004, nominal sales of variable annuities in the U.S. more than doubled, from \$51 billion to \$130 billion. Variable annuities now account for approximately nearly two thirds of annuity sales. The investment returns associated with variable annuities resemble those from mutual funds, and variable annuity buyers can select among a range of asset allocation options. Variable annuities are considered insurance products under the tax law, so buyers are not taxed on their investment returns until they make withdrawals from their variable annuity accounts. This paper describes the tax treatment of variable annuities, presents summary information on their ownership patterns, and explores the importance of several distinct motives for household purchase of variable annuities. The discussion of tax treatment examines the impact of the 2001 and 2003 tax bills on the relative tax treatment of variable annuities and other financial products. Household data from the 1998 and 2001 Survey of Consumer Finances shows that variable annuity ownership is highly concentrated among high income and high net wealth sub-groups of the population. Variable annuity ownership is less concentrated, however, than ownership of several other types of financial assets. Evidence on the role of tax incentives in encouraging ownership of variable annuities is mixed. The probability of owning a variable annuity rises with the marginal tax rate throughout most of the income distribution, but it is lower for households in the top tax bracket than for those with slightly lower tax rates.

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The shift from defined benefit pension plans to self-directed defined contribution plans, the possibility of reforming Social Security so that it includes personal accounts, and the growth in IRAs are examples of a broad shift toward greater self-reliance in the provision of retirement income in the United States. In policy and academic discussions of individual retirement security in this new environment, two issues are particularly prominent. One is the role of equity markets in providing for future retirement income. There has been a steady rise in the extent of equity market participation over the past two decades, largely as a result of the growth of mutual funds and the expansion of IRAs and 401(k) plans. The second issue is the decline in life annuitization in retirement, arising primarily from the shift away from automatically annuitized DB plans and towards DC plans. Many defined contribution plans do not offer life annuities as a payout option.

Despite the significance of both equity ownership and annuitization, very little research has focused on the rapid growth during the last two decades of a class of products known as variable annuities, which in principle combine equity ownership and an option to annuitize. Variable annuities were introduced in the mid-1950s to compete with mutual funds. The College Retirement Equity Fund (CREF) offered the first variable annuity product. The market for variable annuities remained quite small for several subsequent decades. In the early 1990s, however, the market began to grow rapidly. The American Council of Life Insurers (1999) reports that between 1990 and 1999, gross sales of individual (non-group) variable annuities rose from \$3.5 billion to \$63 billion. More recent data from the National Association for Variable Annuities (2005) suggest that variable annuity sales have declined since the late 1990s. The NAVA data show 1999 sales of variable annuities outside pension accounts, almost exclusively individual annuities, of \$60 billion, with a decline to \$51.3 billion in 2004. Total variable annuity sales in 2004, combining qualified account and non-qualified account sales, totaled \$129.7 billion. Sales to qualified accounts were

slightly less than forty percent of the market. Sales of fixed annuities, the annuity products that are most often the subject of economic analysis, totaled \$89 billion in 2004. Total assets invested in variable annuity products amounted to \$1.12 trillion at the end of 2004, compared with \$532 billion in fixed annuities.

Individuals may demand variable annuities for at least three, not necessarily exclusive, reasons. The first is a desire to accumulate wealth at favorable after-tax rates of return. Interest, dividends, and capital gains that accrue on assets held in variable annuity accounts are not taxed until the policyholder receives variable annuity payouts. This provides policyholders with the tax benefits of "inside build up," just as in IRAs and 401(k) plans. Gentry and Milano (1998) use both cross-state variation in income tax rates and time series variation in federal rates between 1984 and 1993 to study how taxes affect variable annuity demand. They find that aggregate sales of variable annuities are positively correlated with state marginal income tax rates, suggesting that variable annuities are purchased in part to avoid the tax burden on investments in traditional taxable accounts. At the time of their study, there was no publicly-available household survey data on variable annuity ownership.

A second potential attraction of variable annuities is their insurance component. Variable annuity contracts offer various forms of insurance. A common provision specifies that if the policyholder dies before retirement, heirs receive at least the nominal value of the policy contributions. Milevsky and Posner (2001) use risk-neutral option pricing to value the guaranteed minimum death benefit in variable annuities, and they conclude that in most cases the value of this insurance is quite small. However, many variable annuity contracts offer additional insurance features. We are not aware of any study that examines whether investor characteristics, such as self-reported risk aversion, can explain variable annuity demand.

The third motivation for holding variable annuities is the option to convert the contract at some future date to a life annuity that provides an annuitized income stream with the payouts indexed to the performance of a diversified investment portfolio. Brown, Mitchell and Poterba (2001) explore this aspect of annuity demand in a stylized life-cycle model. They conclude that most consumers would find it welfare-enhancing to hold at least a portion of their retirement portfolio in an equity-linked annuity product, but they do not examine actual patterns of annuity demand. Historically, very few variable annuity products have been converted into life annuities that pay benefits during retirement.

The limited body of research on household demand for variable annuities is explained largely by the lack of data. The 1998 Survey of Consumer Finances was the first nationally-representative household survey to ask detailed questions about the ownership of variable annuity products. We use both this survey and the following next wave, the 2001 Survey of Consumer Finances, to study the ownership of variable annuity products.

This paper is divided into four sections. The first describes how variable annuities work, focusing particularly on the tax incentives, the insurance features, and payout options at retirement. It also provides data on the size of the U.S. variable annuity market. Section two explains how the 1998 and 2001 SCF data can be used to analyze the cross-sectional determinants of variable annuity ownership. It presents summary statistics on variable annuity ownership in the SCF surveys. The third section compares variable annuity ownership patterns to those of other financial assets, and also reports on the inter-relationships between ownership of variable annuities and these other assets. The fourth section concludes by sketching several research issues about the demand for variable annuities that our analysis raises but cannot resolve due to data limitations.

## **1. The U.S. Variable Annuity Market**

Variable annuities combine features of insurance products and mutual fund-style investment accounts. The funds invested in a variable annuity are held in designated “subaccounts” that are kept separate from the insurance company’s other assets. As a result, and unlike most life insurance or fixed annuity products, the assets are not subject to claims by the insurance company’s creditors should the insurance company become insolvent. Income earned on the annuity investments is tax-deferred until the individual begins making withdrawals. The preferential tax treatment of variable annuities derives from the inclusion of life insurance elements in the contract. Because individuals who hold whole life insurance policies are not taxed on their accruing income, excluding income on annuity policies from taxation preserves comparable treatment of these two asset categories.

Variable annuity sales in the U.S. exploded during the 1990s, and they have remained stable at a high level for the last half decade. Data from the American Council on Life Insurance (1999) suggest that individual (non-group) variable annuity considerations grew at a nominal annual rate of 38 percent between 1990 and 1999. One limitation of most data on sales of variable annuities is that the statistics refer to sales of new variable annuity policies, rather than the net purchases of variable annuities. Net purchases are smaller than sales of new policies because of surrenders, withdrawals and benefit payments from existing policies, and because of “Section 1035 exchanges.” This name refers to a provision in the tax code that allows a policyholder to make a direct transfer of accumulated funds in one annuity policy into another annuity policy without creating a taxable event. Within qualified plans, both mutual funds and variable annuities can be exchanged between vendors without triggering a tax liability. If an individual sells stocks in a taxable account in order to purchase shares of a different company, this exchange would trigger

capital gains taxation. With annuities, however, there is no tax consequence. An individual can exchange one company's product for another's and the earnings from the original investment will remain tax deferred until the annuity owner withdraws money from the variable annuity contract.

There is a substantial divergence between gross and net sales of variable annuities. Data for 2004 from NAVA (2005) suggest gross sales of \$129.7 billion, and net sales of \$40.2 billion. Cerulli (2001) reports that net purchases represented more than half of total variable annuity sales between 1995 and 1997, they declined to only twenty percent of total sales in 2001. Because 1035 exchanges represent a substantial part of the divergence between gross and net sales, to some extent insurance companies are competing for existing, rather than new, variable annuity business.

### **1.1 The Structure of Variable Annuity Products**

Variable annuities can be purchased in retirement accounts and outside these accounts. *Qualified* annuities are purchased using assets from qualified retirement plans, such as 401(k) plans. In many cases, such as university employees purchasing annuities through TIAA-CREF, qualified annuities may be purchased through an employer. Our analysis focuses on annuities purchased outside retirement plans; these are *non-qualified* annuities.

Most variable annuity providers offer a broad range of sub-accounts in which the assets may be invested. Equity and bond portfolios are the most common options. A buyer may purchase the variable annuity with a single initial premium payment, or with a sequence of premium payments over time. Most insurance companies selling variable annuities collect two fees: an investment management fee, and an insurance charge. The insurance charge covers insurance benefits associated with the variable annuity. Many variable annuities have front-end retail loads, and there are often surrender penalties that apply if funds are withdrawn before a pre-specified time period, often seven years. These penalties, known as Contingent Deferred

Surrender Charges, can be several percent of the annuity's value. Historically, with the notable exceptions of TIAA-CREF and Vanguard, there were very few no-load variable annuities. Cerulli Associates (2001) reports, however, that the no-load segment of this market has expanded in recent years. There has also been a shift toward “unbundled” variable annuities that offer buyers a minimal level of insurance, perhaps only a death benefit, along with the option to purchase additional insurance on an “*a la carte*” basis.

The combination of investment management expenses and insurance charges substantially reduces the returns available to variable annuity investors. In 2002, Morningstar reported that the average total expense for variable annuities investing in diversified portfolios of domestic equities with a “growth and income” focus was 115 basis points, while that for variable annuities investing in government bonds was 191 basis points. These expenses are substantially larger than those on open-end mutual funds holding similar assets.

Table 1 presents information on the average expenses and insurance costs for variable annuities by various categories. The data for this table are drawn from Morningstar databases for both variable annuities and mutual funds. The table shows that the asset-weighted average management expense for variable annuities in 2002 was 57 basis points, compared with 92 basis points for all mutual funds. The average variable annuity insurance charge was 109 basis points, however, making total expenses 165 basis points. Only 5 percent of variable annuity contracts have insurance expenses under 75 basis points, whereas 12 percent charge more than 140 basis points. The entries in Table 1 are asset-weighted so they are somewhat different than other tabulations, such as those in NAVA (2005), that weight all variable annuities equally.

Table 1 shows that the management expenses vary by the variable annuity’s investment objective, with the highest charges on international bond and international stock funds. For mutual



funds, the funds with these investment objectives also have two of the three highest average expense ratios. There is some variation across investment objectives in the variable annuities' insurance charge. The cost of the insurance should depend on the investment portfolio, since the value of an option to repay the annuity principal or the highest value of the annuity assets on any policy anniversary depends on portfolio parameters such as the volatility of the underlying assets. The high insurance charge of 130 basis points per year for variable annuities invested in government bonds is puzzling, given that government bonds are a low risk investment. However, variable annuity contracts are complex and they vary in the precise nature of their insurance component. It is possible that the insurance contracts typically associated with variable annuities that invest in government bonds are more generous than those associated with other asset allocations.

The management costs associated with investments in mutual funds or variable annuities can have an important effect on long-run wealth accumulation. To illustrate this, assume that an individual contributes \$1000 to a qualified account at age 30 and allows the account to grow for 30 years at an average annual nominal return of 10 percent before administrative costs. At age 60, the value of the account will have grown to \$13,563 if the expense charge is 92 basis points per year, but to \$11,400 if the charge is 165 basis points. Thus an increase in the expense ratio equal to the difference between the average expense ratio for mutual funds and that for variable annuities reduces wealth at age 60 by roughly 16 percent. This calculation assumes that the insurance component of the variable annuity does not affect the purchaser's wealth at age 60; there are some scenarios in which the insurance would affect the terminal value of the annuity contract.

## **1.2 The Tax Treatment of Variable Annuities: Accumulation and Payout Phases**

The opportunity for assets held in variable annuities to grow at the pre-tax rate of return

offers investors the potential to generate higher after-tax wealth from variable annuity investments than from traditional taxable investments. The complex tax treatment of withdrawals from variable annuities, however, makes the after-tax return advantage sensitive to the annuity buyer's payout decisions. If the payout takes place before the annuitant is 59 1/2, unless the distribution takes the form of a life annuity, the distribution is subject to income tax on the difference between the payout and the premium, plus a 10 percent penalty tax. Thus if an individual owned a single-premium variable annuity that was purchased at age 35 for \$10,000, and decided to withdraw the total value of the account at age 55, the tax on the proceeds would equal the individual's marginal federal income tax, plus ten percent, times the difference between the account value and \$10,000.

There is no reliable, publicly available data on withdrawals from variable annuities. Limited evidence suggests, however, that funds accumulated in variable annuity accounts are rarely converted to life contingent annuities at retirement. Brown and Warshawsky (2001) report that only about one percent of the individuals covered by variable annuity products are receiving payments from these accounts – the rest are still in the accumulation phase. It is not clear how many of the variable annuities currently in the accumulation phase will eventually be annuitized.

There are several different ways to receive distributions from a variable annuity, and they are subject to different tax rules. First, the policyholder could choose a lump-sum distribution. In this case the tax due at the time of the distribution is  $\tau*(V - P)$  where  $\tau$  denotes the policyholder's ordinary income tax rate,  $V$  denotes the value of the variable annuity at the time of the distribution, and  $P$  denotes the annuity premium. The premium,  $P$ , functions just like the purchase price for an asset that is subject to capital gains tax. Note that in this case there is no annuitization associated with the variable annuity. If the policyholder chooses to take several distributions from the policy, the distributions are fully taxable as ordinary income until the policy's remaining value falls below

P. The early payouts from the policy are assumed to be income, while the later payouts are returns of principal.

Second, the policyholder could choose to make periodic withdrawals from the variable annuity account. Such withdrawals are taxed according to an “earnings first, principal last” rule. If the value of the variable annuity account exceeds the annuity’s purchase price at the time of the withdrawal, the withdrawal is fully taxable as ordinary income until the withdrawal reduces the value of the variable annuity contract to less than the purchase price. Withdrawals from an annuity with a value below the purchase price are treated as returns of principal and are not included in taxable income.

A third payout structure the policyholder might choose is a stream of variable payouts for a pre-specified length of time, such as 10 years. In this case, the insurance company finds the value  $A_0$  that satisfies the equation:

$$V = \sum_{t=1}^T \frac{A_0}{(1+R)^t}$$

where  $V$  is the value of the accumulation,  $R$  is the variable annuity’s “Assumed Interest Rate,” as in Bodie and Pesando (1983), and  $T$  is the number of periods over which the annuitant chooses to receive payouts. Variable annuity payouts depend on the returns on the assets that underlie the annuity. A variable annuity is defined by an initial annuity payment  $A_0$ , and an updating rule that relates the annuity payout in future periods to the previous payout and the intervening portfolio returns. If the return in each period is denoted by  $z_t$ , then the updating rule for the annuity payout  $A_t$  is:

$$A_{t+1} = \frac{A_t(1+z_t)}{(1+R)}$$

With a fixed number (T) of variable payouts, the annuitant's tax in period t is  $TAX_t = \tau \left( A_t - \frac{P}{T} \right)$ .

This formula distributes the premium amount equally across all annuity payouts.

Finally, the policyholder could choose a life contingent annuity, which therefore has an unknown number of payments and uncertainty about the payout size. Brown, et al. (1999) describe the tax treatment of this case in some detail. For a life annuity,  $A_0$  is determined by solving

$$V = \sum_{t=1}^T \frac{A_0 \cdot S_t}{(1+R)^t}$$

where  $S_t$  is the probability that the individual will live to period t, and T is chosen to represent the maximum number of periods over which the annuitant might live.

The tax treatment of life-contingent payouts differs from that of certain payouts that are paid over a fixed time period. For life annuities, the IRS specifies an inclusion ratio ( $\lambda$ ), which determines the share of annuity payments in each period that must be included in the recipient's taxable income. The inclusion ratio is designed to measure the fraction of each annuity payout that reflects the capital income on the accumulating value of the annuity premium. The inclusion ratio is calculated by finding the expected number of years over which the annuitant can expect to receive benefits. This period,  $T'$ , is determined by the IRS using the Uniform Life Expectancy Table and the individual annuitant's age at

the time when payouts begin. The inclusion ratio is  $\lambda = 1 - \frac{P_0}{T' \cdot A_0}$ . Until  $T'$  years after the annuity

payout begins, the tax payment on each annuity payment is given by  $TAX_t = \tau \cdot \lambda \cdot A_t$ . After  $T'$  years, all payouts from the annuity policy are considered taxable income. This tax rule causes a discrete increase in the annuitant's tax burden, often at an advanced age.

Payouts from variable annuities are taxed as ordinary income. Investors who hold variable annuities that invest in corporate equities or other assets that may generate substantial

capital gains are therefore giving up the opportunity to receive capital gains tax treatment on the value of their appreciating assets. The difference between the capital gains tax rate and the ordinary income tax rate is therefore a critical determinant of the tax advantage of investing in variable annuities.

Consider a simple example of an equity index fund that earns an 8 percent return each year, net of expenses, with 2 percent from dividends and the remaining 6 percent from capital gains. Assume that the tax regime is similar to the one that applied during our sample period, and that assigned a notably higher tax rate to equity income than the current U.S. income tax does. In particular, assume that the investor is in a 33 percent marginal tax bracket for ordinary income, and that the statutory long-term capital gains tax rate is 20 percent. Further assume that capital gains are taxed as they accrue. The annual return on this fund is therefore 6.14 percent ( $6.14 = .67 \cdot 2 + .80 \cdot 6$  percent).

Now imagine that the investor held the same investments in a variable annuity so that all taxes are deferred until the assets are withdrawn. The investor benefits from tax deferral, but loses because the withdrawals are taxed at ordinary income tax rates, rather than capital gains rates. Assume that all of the assets in the variable annuity account are withdrawn at once; this is the lump sum distribution option described above. If the net-of-expense return on the variable annuity is the same as that on the mutual fund, then the value of a one dollar investment in the variable annuity, after  $K$  years, is:

$$V(K) = e^{0.08 \cdot K} - \tau \cdot (e^{0.08 \cdot K} - 1) = (1 - \tau) \cdot e^{0.08 \cdot K} + \tau$$

With  $\tau = .33$ , this reduces to  $(.67) \cdot e^{0.08 \cdot K} + .33$ . For the variable annuity to outperform the open-end mutual fund we need  $(.67) \cdot e^{0.08 \cdot K} + .33 > e^{0.0614 \cdot K}$ , which depends on  $K$ . When  $K$  is low, the mutual fund results in a larger terminal wealth than the variable annuity. When  $K = 5$ , for

example, the after-tax value of the taxable mutual fund is 1.36, while the value of the variable annuity is 1.33. At an investment horizon (K) of thirteen years, the advantage switches to the variable annuity. Indeed, if the horizon is 40 years, the value of the taxable equity index fund is 11.66, while the after-tax value of the variable annuity is 16.77. This simple analysis may overstate the advantage of a variable annuity because it ignores the ability to use realized capital losses on taxable mutual funds to offset taxable gains or up to \$3000 per year in ordinary income.

Table 1 suggests that the expenses associated with a variable annuity will typically exceed those on the equity mutual fund. We can compute the greatest possible value  $g$ , the amount by which the expense ratio on the variable annuity can exceed that on the mutual fund, such that the after-tax terminal wealth from the variable annuity will exceed that from the mutual fund. These calculations are in the spirit of earlier studies, such as Milevsky and Panyagometh (2001), PriceWaterhouseCoopers (2000), Reichenstein (2000), and Toolson (1991), which have compared the after-tax investment returns available in variable annuities and in mutual funds.

Table 2 presents our calculations of the relative attractiveness of mutual funds and variable annuities. Under pre-2003 tax rates and assuming that the taxable mutual fund has a post-expense rate of return of 8 percent, at a horizon of 20 years, for example, expense differentials of less than 37 basis points will result in a higher terminal value with the variable annuity. Given an average expense differential between mutual funds and variable annuities of 73 basis points, one would have to hold the investment for 31 years in order for the tax advantage of variable annuities to offset the expense differential.

The 2003 Jobs and Growth Tax Relief Reconciliation Act reduced the maximum tax rates on both dividends and capital gains to 15 percent. In this case the value of  $g$  falls substantially,

and indeed becomes negative for holding periods as long as 29 years, meaning that for shorter holding periods a taxable account will yield higher account balances even with an identical cost structure. Even with a horizon of 40 years, under the new tax rates, variable annuities provide a higher net of tax return only if the expense differential is under 25 basis points.

### **1.3 Insurance Features of Variable Annuities**

Variable annuities offer a range of potential insurance features. In particular, if the variable annuity owner dies before converting to a life annuity, the insurance company typically provides a minimum guaranteed death benefit. Milevsky and Posner (2001) explain that a typical benefit stipulates that at least the original investment will be returned to the estate or the beneficiary of the policy, regardless of the performance of the underlying assets in the account. Thus a variable annuity buyer has a put option that has a nominal strike price equal to their cumulated nominal contributions.

Milevsky and Posner (2001) suggest that the put option is the least valuable option that variable annuities provide. Many providers offer a guaranteed death benefit that set benefits at various “high water marks,” meaning that they lock-in some portion of past investment returns. For example, a “Maximum Anniversary Value” feature guarantees the maximum value that the investment achieves on a specified date, usually the contract anniversary date. The insurer guarantees to pay out the higher of the value of i) the purchase price, ii) the highest value on any anniversary date, or iii) the value of the account at the date of death. Alternatively, insurers may offer minimum growth guarantees for the assets held in the variable annuity by promising a death benefit that is equal to the actual account balance or the value of the premiums compounded at a specified rate of interest. This particular death benefit is often offered as a rider at additional cost to the annuity buyer.

Milevsky and Posner (2001) use option pricing techniques to compute the actuarially fair value of the insurance component of these guarantees. They find that “a simple return of premium death benefit is worth between one to ten basis points, depending on purchase age. In contrast to this number, the insurance industry is charging a median Mortality and Expense Risk charge of 115 basis points, although the numbers do vary widely for different companies and policies.” In evaluating this claim, however, one should remember that the “one to ten basis point” valuation is only of the simplest death benefit. In recent years, the array of insurance benefits offered through variable annuity products has become more diverse and complex, with features that are often firm or contract specific. During the 2001 and 2002, after a sharp decline in equity markets, some of these insurance components proved very expensive for insurance companies. Policy provisions that guaranteed variable annuity buyers the value of their portfolio at past policy anniversaries committed insurance firms to substantial payouts in a declining equity market. For example, Treaster (2003) reports that the Hartford Financial Services Group, which in the year 2000 paid out only \$5.4 million as a result of variable annuity guarantees, faced payouts of \$258 million during the bear market of 2002.

## **2. Summary Patterns of Variable Annuity Ownership**

We explore the cross-sectional patterns of variable annuity ownership using the 1998 and 2001 Surveys of Consumer Finances. The 1998 SCF is the first to distinguish household ownership of variable annuity products from ownership of several other investment products. Beginning in 1998, the SCF asks “do you (or anyone in your family living here) receive income from or have assets in an annuity?” Respondents are specifically told to *exclude* employment-related pensions as well as any assets that have been recorded earlier in the survey. They are then asked to distinguish between annuities set up to provide only income and those that “have



an equity interest.” We identify variable annuity owners as those who report having an equity interest that is invested in financial assets, such as stocks, bonds, money market, and real estate. We exclude those who report that their annuity is invested in life insurance/fixed contracts, tangible assets other than real estate, intangible assets, and other assets, since these are unlikely to be standard variable annuities. We suspect that our definition is conservative and that we have excluded some households who hold variable annuities.

Using our definitions of variable annuity ownership, there are 4.8 million variable annuity owners in the 1998 SCF. The total value of the variable annuities reported in the 1998 survey is \$255 billion. For the same year, the American Council on Life Insurance (1999) reports that there were 14.6 million variable annuity policies in force, with total asset reserves of \$354 billion. NAVA (2005) reports \$343.0 billion of variable annuity assets in non-qualified accounts for 1999. There is no reason to think that the number of households should match the number of policies, as households may have multiple policies even with the same insurer. However, we would ideally want the value of assets in the SCF to match the asset reserves reported by life insurers. The SCF measure is roughly three quarters of the ACLI or NAVA number. We suspect that this is because some variable annuity owners reported the assets in these accounts elsewhere on the survey, perhaps as other financial assets. We are not aware of any evidence suggesting that mis-reporting rates vary by income, wealth, or age, or in any systematic fashion that might affect our analysis.

## **2.1 Demographic Patterns of Ownership**

Table 3 presents summary information on the characteristics of households that owned variable annuities in 1998 and 2001. The first two columns indicate the percentage of households with various characteristics that own variable annuities, while the third and fourth columns show

the percentage of all variable annuities that are owned by households in each category. Columns one and two show that just under 4 percent of households reported owning a variable annuity in 1998. By 2001, this figure had increased to 4.65 percent. The small fraction of households owning variable annuities, and the high correlation between variables such as household income and net worth, makes it difficult to obtain robust findings when we carry out multivariate statistical analysis. We therefore restrict our analysis in this paper to univariate analysis, which still provides valuable evidence on the large and growing variable annuity market.

Table 3 indicates that variable annuity ownership is highly correlated with income and net worth. In the bottom half of the income distribution, for example, just over 2 percent of the population own variable annuities. In the top decile, the ownership rate is over 10 percent in 2001. Ownership is even more highly concentrated by net worth deciles, with 16 percent of the top net worth decile owning variable annuities. From 1998 to 2001, overall growth in ownership rates appears to be concentrated at the top of the net worth distribution, particularly in the top quintile.

Older households are more likely to own variable annuities. Less than two percent of households under the age of 45 own variable annuities. This rate rises to 5.7 percent in the “pre-retirement” ages of 45-64, and nearly nine percent for age 65+ households. Variable annuity ownership is also steeply rising with education level, with 12.45 percent of households with more than a college education reporting ownership of an annuity, compared with less than three percent of those with a high school education or less.

Variable annuity ownership is highly concentrated among high income and high net worth groups. In 2001, 38 percent of variable annuities were held by households in the top decile of the income distribution, and more than half were held by those in the two top deciles. Since many retired households may have current income that does not reflect their lifetime earnings position,

ranking by current income may provide an incomplete indicator of the concentration of variable annuity holdings. The statistics on the net worth of variable annuity holders may be more revealing. More than seventy percent of variable annuities are held by households in the top ten percent of the wealth distribution, and only fifteen percent are held by households who are not in the top fifth of the wealth distribution.

## **2.2 Marginal Tax Rates and Variable Annuity Ownership**

Table 3 also stratifies households by their marginal federal income tax rate and then tabulates the probability of owning a variable annuity. Our tax rate variable is the marginal income tax rate on ordinary investment income for each household in the 1998 and 2001 SCF. We use an updated version of the algorithm developed by Poterba and Samwick (2003), which estimates a “first dollar” marginal tax rate on investment income. The algorithm was developed for use with all of the available Surveys of Consumer Finances, including those from the 1980s. The set of variables that might be used to compute tax rates for SCF households varies over time, and has become more elaborate in recent surveys. In particular, beginning in 1995 SCF respondents were asked if they itemized deductions on their income taxes. Recent surveys also include information on Adjusted Gross Income (AGI) that was not recorded in early surveys. We are currently in the process of updating the tax rate algorithm to incorporate this information. The present analysis, however, is the same as that in Poterba and Samwick (2003); it does not utilize the reported information on itemization status or taxable income.

The tax rate is computed in two steps. First, we set interest and dividend income to zero and find the household’s federal income tax payment. Then, we assume that the household receives interest income equal to the maximum of \$100 or five percent of its total financial assets, and we recompute its tax liability. The marginal tax rate on investment income is then

defined as the difference in the tax liability divided by the amount of investment income imputed to the household.

Our tax rate algorithm uses SCF data to impute as many items on the 1040 as possible. Filing status is determined by the household's marital status, with all married households assumed to file a joint return. Personal exemptions are estimated based on marital status and the number of dependents in the household under age 18. The SCF reports information on many of the components of total income. Wages and salaries, tax-exempt interest, alimony received, rents and royalties, business income, and farm income are all defined similarly in the SCF and for tax purposes. Unfortunately, many other income and deduction items, such as IRA distributions and refunds of state and local taxes, are not reported in the SCF.

We make several calculations and imputations to estimate adjustments to total income, which in turn affect tax liability. Self-employment tax applies to all business and farm income. IRA and Keogh contributions can be imputed based on information in the survey, but we set these contributions to zero in computing our marginal tax rates. The SCF also includes data on alimony paid, and this is an adjustment to income. There is no data on other adjustments that are allowed on form 1040, such as moving expenses, so we set these items to zero. Subtracting the total adjustments from total income gives the household's AGI. We also estimate whether each household will itemize deductions on Schedule A. The SCF reliably reports information on interest payments and charitable contributions. Deductions for local taxes are based on the reported value of real estate and personal property subject to tax. Itemization is determined by comparing the sum of these deductions to the standard deduction appropriate for the household's age and filing status. The lack of reported information on other possible deductions, such as medical expenses, state and local income taxes, casualty losses, and job expenses is the biggest

handicap in using this algorithm to calculate marginal tax rates in the SCF.

The household's exemptions and deductions are then subjected to the applicable income-based limits, and they are subtracted from AGI to compute taxable income. Applying the appropriate tax rate schedule to taxable income gives the household's tax liability. Total taxes equal this liability measure, plus self-employment taxes and alternative minimum taxes. We did not compute tax credits, since the SCF does not contain the information needed to evaluate most of them.

The rows in the fifth panel of Table 3 present the results with households stratified by marginal tax rates. In both 1998 and 2001, the probability of owning a variable annuity is higher for households in high marginal tax brackets than for those in low tax brackets. In both years the lowest probabilities of ownership are for those with tax rates of less than 21.5 percent. These households do not have ownership rates exceeding 3.5 percent. Most of these households would either be in the 15 percent income tax bracket, or would be in a zero tax bracket group. In 2001, households facing the highest income tax rates, those above 35 percent, have a lower probability of owning variable annuities (8.3 percent) than households with tax rates just below the top range (11 percent). The pattern is different in 1998, when the highest probability of owning a variable annuity is observed among households with the highest marginal tax rates.

The last two columns and last four rows of Table 3 show the fraction of variable annuities held by households in different tax rate categories. The 1998 data show that more than a quarter of all variable annuities are held by households with marginal tax rates of 35 percent or greater. Only ten percent of these assets are held by households who are assigned very low marginal tax rates by our algorithm. The results for 2001 suggest a shift in the concentration of variable annuity ownership toward lower income tax brackets. Only fifteen percent of variable annuities

are held by those with marginal tax rates of 35 percent or above, while there is an increase in the share of variable annuities that are reported by households with tax rates between 7.5 and 21.5 percent. The share of variable annuities held by those with very low marginal tax rates was lower in 2001 than in 1998.

One difficulty in evaluating the results on marginal tax rates and variable annuity ownership patterns is that retired households may have low marginal tax rates, even if their lifetime income placed them in higher marginal tax brackets when they purchased their variable annuity contract. To explore this issue we stratified households by age of the household head, and then repeated our analysis of the ownership probabilities by marginal tax rates. For the 45-64 age group in 2001, the age group for which variable annuity ownership becomes substantial, there is a monotonic relationship between marginal tax rate and variable annuity ownership probability. For households with a marginal tax rate of 35 percent or greater, the ownership probability is 11.8 percent. For those in the 30-35 percent tax rate category, this probability is 10.8 percent, while for those between 21.5 and 30 percent marginal tax rates, it is 7.6 percent. For older households, those headed by someone aged 65 or older, the variable annuity ownership probability peaks in the 30-35 percent marginal tax rate category, where the ownership rate is 19.3 percent. For the elderly households in the highest marginal tax rate category, the ownership probability is 5.2 percent. Similar declines in the ownership probability at the highest marginal tax rate category for those in the 35-44, and under 35, age groups.

### **2.3 Risk Aversion and Variable Annuity Ownership**

A household's risk aversion may affect its demand for the insurance component of variable annuity products. We test for a positive association between self-reported risk aversion and variable annuity holdings using the responses to the following question in the SCF:

“Which of the following statements on this page comes closest to the amount of financial risk that you and your (spouse/partner) are willing to take when you save or make investments?”

1. Take substantial financial risks expecting to earn substantial returns
2. Take above average financial risks expecting to earn above average returns
3. Take average financial risks expecting to earn average returns
4. Not willing to take any financial risk.

These measures have been used in Weisbenner’s (2002) study of stock ownership. We define four indicator variables corresponding to each of the four responses above.

The results suggest that the probability of owning a variable annuity is much lower for households that are not willing to take any financial risk than for households that are willing to take average, above average, or substantial financial risk. The ownership probability is roughly four percentage points higher for those in these three categories than for those in the “not willing to take risk” category. Most households are in the average or the above-average risk tolerance categories. Those in the “average risk” group own sixty percent of variable annuities. Those in the “above average risk” category own 21 percent of variable annuities in 1998, and 29 percent in 2001.

### **3. Ownership Patterns for Variable Annuities Compared with Other Assets**

While variable annuity ownership is a strongly increasing function of income, net worth, age and education, this is true for most financial instruments. Table 4 presents information on the probabilities of holding several financial assets classes other than variable annuities. These asset classes include taxable bonds, corporate stock, mutual funds, and tax-free assets such as tax-exempt bonds and mutual funds. The sharply rising probability of asset ownership by income and net worth categories is evident for taxable bonds and tax-exempt bonds as well as for variable

annuities. For example, in 2001, the ratio of the top to the bottom income decile's ownership rate was approximately 20 for variable annuities, while it was 26 for bonds, 25 for stocks, 18 for mutual funds and 22 for tax-exempt assets. The wealth-ownership profile is also steeply rising for variable annuities and other asset classes.

The age-ownership profile for variable annuities is much steeper than that for stocks or mutual funds. There is a four-fold increase in the ownership probability for variable annuities between ages 35-44 and age 65+, compared with an increase of less than twenty percent for mutual funds. Table 4 shows clearly that the variable annuity ownership probability is substantially lower than the analogous probabilities for stocks or mutual funds, but that it is comparable to the ownership probability for both taxable and tax-exempt bonds.

Table 5 presents information from the 2001 SCF on the percentage of various asset classes that is held by households at different points in the age, wealth, income, education, and marginal tax rate distribution. The table shows that variable annuity ownership is less concentrated than the ownership of the other asset types. For example, 73 percent of variable annuities are held by households in the top decile of the wealth distribution, compared with more than 96 percent of taxable bonds, 90 percent of corporate stock, and 90 percent of tax-exempt bonds. For mutual funds, the most broadly-held of the financial asset categories, the top tenth of the wealth distribution holds 79 percent.

Table 5 shows that older households hold a higher fraction of variable annuities than of other financial assets. Households headed by someone over the age of 65 hold nearly half of all variable annuities, compared with roughly one third the other financial asset categories we consider. The concentration of stock, bond, and tax-exempt bond ownership among the highest marginal income tax rate households is also greater than the analogous concentration for variable



annuities.

Tables 6 and 7 explore the cross-ownership patterns between variable annuities, other tax deferred savings vehicles, stocks, mutual funds, and tax-free assets. If variable annuities are viewed primarily as vehicles for tax-favored asset accumulation, but with higher expense ratios than the investment vehicles that can be held in IRAs, Keogh plans, and other tax-deferred accounts, then a high fraction of variable annuity owners should also hold these accounts.

The results in Table 6, which reports the probability that investors who hold one asset also hold another, offer only limited support for this prediction. Sixty-three percent of the households with variable annuities also hold IRAs or Keoghs. While this is consistent with substantial use of tax-deferred saving vehicles by variable annuity investors, the share of variable annuity holders with IRAs or Keoghs is no higher than the share of mutual fund or corporate stock investors. Moreover, only 42 percent of variable annuity investors hold corporate stock, and 22 percent hold tax-free bonds, even though these are the other tax-favored asset classes that one would expect to find in the portfolios of investors who are trying to maximize tax-free asset accumulation.

Table 7 presents information similar to that in Table 6, but instead of reporting the probability that investors in a given asset class hold another asset, it reports the fraction of assets in a given asset class that are held by investors who also hold another asset. Thus, in the first row, 73 percent of all variable annuities are held by investors who also hold assets in an IRA or a Keogh. Fifty-seven percent of variable annuity assets are held by households with some holding of corporate stock. The results are broadly similar to those in Table 6, in that they do not suggest large differences in the share of variable annuity investors and investors in other asset categories who hold assets in tax-deferred accounts.

The critical question that such cross-asset ownership probabilities raise is whether households turn to variable annuities after they have exhausted other opportunities for tax-deferred saving. The SCF does not provide data on contributions to tax-deferred saving accounts, so we cannot identify households who are constrained by the contribution limits for these accounts. Without more detailed information on the other options available to each household, it is difficult to test for a hierarchy of investment choices.

#### **4. Conclusions and Future Directions**

This paper documents the rapid growth during the 1990s of the market for variable annuities. The gross volume of annuity sales rose faster than the net volume of sales because many variable annuity contracts were terminated and the assets were transferred to new annuities. We identify two factors, the opportunity for tax deferral and the insurance features of variable annuities, which might contribute to the growth of variable annuities. We then evaluate the importance of these factors using data from the first two waves of the Survey of Consumer Finances that included questions that identify variable annuity holders in the U.S.

We find that variable annuity ownership is strongly increasing with income, wealth, age, and education. Importantly, however, we find that ownership of variable annuities across the education, income and net worth distribution is less concentrated than ownership of most other financial assets. Compared to other financial assets, variable annuities are more heavily concentrated at older ages. With regard to marginal tax rates, we find that higher marginal tax rates are associated with a greater probability of variable annuity ownership at low and moderate tax rates, but that this monotone progression breaks down for the taxpayers in the highest tax brackets.

Our proxy variables for risk aversion suggest that households that report a low tolerance for risk are much less likely to hold variable annuities than are households with greater risk tolerance. This may reflect greater willingness of such households to invest in the assets that are held in variable annuities, rather than demand for the insurance component of variable annuities.

The SCF and other household surveys do not collect detailed information on the payout phase of variable annuities, in particular the use of lump sum payouts and annuitized streams. We hope that this data deficiency will be addressed in future surveys, and that we can then determine how many households are choosing lump-sum payouts rather than various annuity options.

Our analysis offers a useful starting point for the analysis of variable annuity demand, but many issues are left unresolved. For example, as our numerical examples illustrate, the 2003 federal income tax reform substantially reduced the incentive for households to invest in variable annuities relative to alternative investment products. A careful examination of how this tax change affects incentives and behavior may shed additional light on this issue. A second issue involves the separate analysis of the group and the individual markets for variable annuities. Group variable annuities are often purchased as part of employer-based retirement planning, and they may consequently not reflect the particular portfolio demands of the taxable households that own them. Individual purchases of variable annuities, however, are more likely to be driven by the specific after-tax portfolio needs of the purchaser. One useful enhancement of the household level data on annuity ownership would be distinguishing group and individual annuity purchases. Another issue that requires future analysis is the computation of effective load factors on variable annuities, and the comparison between these loads and those on other insurance products. For example, Mitchell, et al (1999) find loads on fixed life annuity products of around 15 percent,

while Brown and Finkelstein (2004) find loads on long-term care insurance as high as 50 percent for men. Computing the loads on variable annuities is more difficult than computing the loads on some other insurance products, because the return to a variable annuity investor depends on the investor's behavior. If the variable annuity is held for many years, and if the payouts are withdrawn as annuity payments, the net after-tax and after-expense return may be substantially greater than if the variable annuity is transferred to another insurance carrier after just a few years.

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Table 1: Expenses and Insurance Costs, Variable Annuities and Mutual Funds, Weighted by Assets Under Management, 2002

Investment Objective	Variable Annuities			Mutual Funds
	Management Expense	Insurance Charge	Total Expenses	
All	0.57	1.09	1.65	0.92
Balanced	0.61	1.20	1.80	0.79
Corporate Bond	0.55	1.13	1.68	0.72
Government Bond	0.61	1.30	1.91	0.90
Growth	0.70	1.23	1.93	1.04
Growth & Income	0.34	0.81	1.15	0.66
High Yield Bond	0.70	1.29	1.99	1.09
International Bond	1.01	1.33	2.34	1.05
International Stock	0.84	1.17	2.01	1.11

Source: Authors' tabulations from 2002 Morningstar Variable Annuities and Mutual Funds databases. Costs and expenses are measured in hundreds of basis points per year.

Table 2: Expense Differential (Variable Annuity Expenses – Mutual Fund Expenses) such that Investor would Accumulate Equal Wealth, by Holding Period (in basis points per year, assuming 8 percent rate of return)

Holding Period (years)	Pre-2003 Tax Rates	Post-2003 Tax Rates
5	-59	-145
10	-18	-98
15	13	-63
20	37	-36
25	55	-15
30	70	1
35	83	14
40	93	25

Source: Authors' calculations assuming 8 percent return (2 percent from dividends, 6 percent from capital gains). Assumed tax rates for pre-2003 period are 20% for capital gains, 33% for dividends and ordinary income. For post-2003, rates are 15% for capital gain and dividends, and 33% for ordinary income.

Table 3: Summary Statistics on Variable Annuity Ownership, 1998 and 2001

	Percentage of Households Owning Variable Annuities		Percentage of Variable Annuities Held by Households in Each Category	
	1998	2001	1998	2001
All Households	3.98%	4.65%	100.0%	100.0%
Households Grouped by Age				
< 35	1.02	1.74	3.5	4.5
35 – 44	2.38	2.06	15.2	6.5
45 – 64	4.50	5.68	51.5	39.3
65+	8.13	8.88	29.9	49.7
Households Grouped by Education				
< High School	1.16	3.41	3.9	3.5
High School	3.07	2.13	9.8	14.9
Some College	3.22	4.11	17.2	22.9
College	3.96	5.48	21.8	27.8
> College	12.28	12.45	47.4	30.9
Households Grouped by Income Decile				
Lowest Decile	1.76	0.53	1.3	1.5
Decile 2	1.86	2.22	2.2	3.5
Decile 3	0.97	1.06	1.7	2.5
Decile 4	3.48	3.67	5.8	1.6
Decile 5	3.45	3.28	5.8	3.7
Decile 6	2.82	6.01	4.7	14.4
Decile 7	3.43	5.77	3.7	12.7
Decile 8	7.03	6.71	18.0	8.4
Decile 9	5.61	7.52	8.1	14.9
Highest Decile	9.50	10.43	48.7	38.1
Households Grouped by Wealth Decile				
Lowest Decile	0.45	0.00	0.0	0
Decile 2	0.00	0.00	0.0	0
Decile 3	0.43	0.36	0.0	0
Decile 4	0.00	1.06	0.0	0
Decile 5	2.23	1.75	0.5	0.2
Decile 6	2.18	3.11	0.9	1.3
Decile 7	5.92	3.14	4.9	0.7
Decile 8	6.91	9.01	9.6	9.0
Decile 9	7.61	12.23	12.9	16.1
Decile 10	13.81	15.93	71.1	72.7
Households Grouped by Marginal Federal Income Tax Rate (MTR)				
MTR < .075	2.82	2.50	10.5	6.3
.075 < MTR < .215	2.05	3.50	8.9	23.7
.215 < MTR < .299	6.43	6.24	37.9	42.2
.299 < MTR < .350	9.33	11.00	14.3	12.7
.350 < MTR	9.71	8.27	28.4	15.1
Households Grouped by Level of Risk Tolerance				
“Substantial” Risk	6.40	5.36	4.77	3.42
Above Average	5.02	6.31	20.46	29.05
Average Risk	5.76	6.66	60.14	58.31
No Risk	1.41	1.89	14.64	9.22

Source: Authors’ tabulations using 1998 and 2001 Survey of Consumer Finances.

Table 4: Probability of Owning Variable Annuities and Other Assets, 2001 SCF

	Variable Annuities	Taxable Bonds	Corporate Stock	Mutual Funds	Tax-Exempt Bonds
All Households	4.65%	3.00%	21.75%	17.9%	6.75%
Households Grouped by Age					
< 35	1.74	0.40	17.57	11.50	2.66
35 – 44	2.06	2.04	21.76	17.64	5.17
45 – 64	5.68	4.12	24.50	20.90	8.96
65+	8.88	5.00	21.84	20.26	9.30
Households Grouped by Education					
< High School	3.41	0.28	6.37	3.41	1.40
High School	2.13	0.89	13.15	12.44	3.72
Some College	4.11	3.06	21.28	14.97	6.34
College	5.48	5.45	38.54	29.43	10.31
> College	12.45	8.44	41.84	41.31	17.61
Households Grouped by Income Deciles					
Lowest Decile	0.53	0.49	2.50	2.78	1.08
Decile 2	2.22	0.22	6.01	4.90	2.28
Decile 3	1.06	1.44	9.20	6.87	2.50
Decile 4	3.67	1.45	16.20	13.81	5.40
Decile 5	3.28	1.35	14.76	12.92	4.28
Decile 6	6.01	0.81	18.28	17.98	3.98
Decile 7	5.77	2.86	23.01	17.44	4.63
Decile 8	6.71	5.73	30.32	25.10	10.11
Decile 9	7.52	3.27	38.65	28.88	10.59
Highest Decile	10.43	12.62	61.26	50.25	23.61
Households Grouped by Wealth Deciles					
Lowest Decile	0.0	0.0	6.88	2.08	1.74
Decile 2	0.0	0.0	0.48	0.0	0.0
Decile 3	0.36	0.0	4.00	0.34	0.20
Decile 4	1.06	0.24	4.86	4.48	2.48
Decile 5	1.75	0.76	11.86	11.42	2.23
Decile 6	3.11	0.74	21.89	12.91	3.71
Decile 7	3.14	1.54	21.68	17.73	5.81
Decile 8	9.01	2.22	31.47	28.74	6.11
Decile 9	12.23	5.83	47.87	44.24	15.82
Decile 10	15.93	18.72	66.79	57.27	29.53
Households Grouped by Federal Marginal Income Tax Rate					
MTR < .075	2.50	1.38	7.20	6.44	2.61
.075 < MTR < .215	3.50	1.82	15.20	12.83	4.36
.215 < MTR < .299	6.24	3.60	31.51	24.41	9.26
.299 < MTR < .350	11.00	6.76	46.73	47.24	14.38
.350 < MTR	8.27	13.14	60.59	45.14	23.48
Households Grouped by Self-Reported Risk Tolerance					
“Substantial” Risk	5.36	2.89	32.77	25.50	5.08
Above Average	6.31	4.22	39.53	32.14	9.79
Average Risk	6.66	4.28	28.00	23.21	9.22
No Risk	1.89	1.22	6.27	5.35	3.19

Source: Authors' tabulations using 2001 Survey of Consumer Finances.



Table 5: Share of Various Assets Held by Different Population Sub-Groups, 2001 SCF

	Variable Annuities	Taxable Bonds	Corporate Stock	Mutual Funds	Tax-Exempt Bonds
All Households	100%	100%	100%	100%	100%
Households Grouped by Age					
< 35	4.5	3.6	6.3	3.6	4.3
35 – 44	6.5	4.8	9.3	13.0	5.7
45 – 64	39.3	55.5	47.7	49.8	55.1
65+	49.7	36.2	36.7	33.6	34.9
Households Grouped by Education					
< High School	3.5	0.2	1.2	1.3	1.8
High School	14.9	3.2	5.4	12.9	6.7
Some College	22.9	10.9	13.4	12.3	11.7
College	27.8	35.6	37.7	34.2	32.5
> College	30.9	50.1	42.3	39.3	47.4
Households Grouped by Income Deciles					
Lowest Decile	0.1	0	1.3	0.2	0.4
Decile 2	3.5	0.3	0.1	1.2	0.3
Decile 3	2.5	0.7	1.1	1.4	0.3
Decile 4	1.6	0.3	1.7	2.8	1.4
Decile 5	3.7	0.2	1.4	3.0	2.6
Decile 6	14.4	2.0	3.2	6.1	1.6
Decile 7	12.7	3.1	5.4	5.0	4.8
Decile 8	8.4	5.4	5.1	7.7	6.1
Decile 9	14.9	3.6	8.4	12.5	6.3
Highest Decile	38.1	84.4	73.5	58.9	76.2
Households Grouped by Wealth Deciles					
Lowest Decile	0	0	0	0	0
Decile 2	0	0	0	0	0
Decile 3	0	0	0	0	0
Decile 4	0	0	0	0	0.1
Decile 5	0.2	0.1	0.1	0.3	0.1
Decile 6	1.3	0.1	0.4	0.5	0.3
Decile 7	0.7	0.3	0.7	2.0	1.3
Decile 8	9.0	0.6	2.1	4.1	1.4
Decile 9	16.1	2.2	6.4	13.7	6.9
Decile 10	72.7	96.7	90.2	79.4	90.0
Households Grouped by Federal Marginal Income Tax Rate					
MTR < .075	6.3	1.0	1.6	4.9	2.3
.075 < MTR < .215	23.7	12.4	11.2	16.7	17.2
.215 < MTR < .299	42.2	16.4	23.8	29.7	18.8
.299 < MTR < .350	12.7	15.0	16.2	16.6	13.5
.350 < MTR	15.1	55.3	47.3	32.0	48.1
Households Grouped by Self-Reported Risk Tolerance					
“Substantial” Risk	3.4	4.3	8.9	4.7	3.6
Above Average	29.1	35.0	37.9	36.7	28.3
Average Risk	58.3	56.0	45.3	50.3	60.0
No Risk	9.2	4.8	7.9	8.2	8.0

Source: Authors' tabulations using 2001 Survey of Consumer Finances.

Table 6: Cross-Asset Ownership Patterns, 2001

	Variable Annuity	IRA / Keogh	Corporate Stock	Mutual Fund	Tax Free Assets
Population	0.05	0.32	0.22	0.18	0.07
Variable Annuity	1.0	0.63	0.42	0.50	0.22
IRA / Keogh	0.09	1.0	0.42	0.37	0.13
Corporate Stock	0.09	0.62	1.0	0.40	0.18
Mutual Fund	0.13	0.65	0.48	1.0	0.25
Tax Free Assets	0.15	0.63	0.57	0.66	1.0

Notes: Tax Free Assets include tax-exempt bond and money market funds as well as municipal bond funds. All entries are based on population-weighted tabulations from the 2001 Survey of Consumer Finances.

Table 7: Asset-Weighted Cross-Asset Ownership Patterns, 2001

	Variable Annuity	IRA / Keogh	Corporate Stock	Mutual Fund	Tax Free Assets
Variable Annuity	1.0	0.73	0.57	0.55	0.26
IRA / Keogh	0.15	1.0	0.61	0.41	0.25
Corporate Stock	0.12	0.76	1.0	0.54	0.42
Mutual Fund	0.18	0.77	0.67	1.0	0.51
Tax Free Assets	0.10	0.84	0.74	0.63	1.0

Notes: Each entry shows the fraction of the asset indicated in the row that is held by households that also hold the asset in the column. Tax Free Assets include tax-exempt bond and money market funds as well as municipal bond funds. All entries are based on population-weighted tabulations from the 2001 Survey of Consumer Finances.