

## **Mutual Fund Portfolio Turnover and the Effective Tax Burden on Taxable Investors**

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The tax treatment of equity mutual funds is the result of a complex bargain originally struck in the Securities Act of 1940. Mutual funds are not subject to corporate income tax on their dividend income or realized capital gains. Instead, they must pass through their dividends and realized capital gains to investors, who then include these flows in their taxable income. Capital losses do not flow through to investors. If losses are realized within a fund, they can be used to offset other gains and to reduce the net gain distributed to investors, but net losses cannot be distributed. Losses that are not offset by gains must be carried forward.

The flow-through treatment of realized capital gains can create situations in which an investor purchases a mutual fund, sees the mutual fund shares decline in value, but still pays capital gains taxes prior to the sale of his shares. This would occur when the mutual fund manager liquidates positions that have accrued capital gains. When a fund distributes capital gains, the investor's tax basis is increased by the amount of the taxable distribution. This higher basis reduces the investor's capital gains tax liability when the fund shares are sold, so paying capital gains taxes when the fund distributes a gain represents a retiming of the capital gains tax liability, rather than a creation of a new liability. When the investor described above finally sells his mutual fund shares, his realized capital loss at sale will be larger than the simple difference between the sale price and the purchase price, because the intervening capital gain distribution will increase his tax basis.

The unusual tax treatment of mutual funds can make it difficult for investors to evaluate the prospective tax burden on fund investments, and there is even some debate about whether investors consider taxes in selecting mutual funds. For the substantial group of mutual fund investors who hold

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their shares through IRAs or other tax-deferred accounts, the tax issues associated with capital gains distributions are irrelevant. The central issue is therefore about the behavior of taxable investors. Two previous studies have explored the link between tax considerations and mutual fund inflows. Barclay, Pearson, and Weisbach (1998) focus on how unrealized capital gains within a fund affect fund inflows. They find that funds with a larger overhang of unrealized gains attract smaller inflows than otherwise similar funds with smaller unrealized gains. Bergstresser and Poterba (2002) investigate the impact of unrealized gains as well as recent capital gain distributions on inflows. They find that funds with substantial recent capital gain distributions, and with a high share of heavily-taxed dividends relative to lightly taxed unrealized capital gains, attract smaller inflows than funds with similar pretax return histories but lower investor tax burdens. They also find that large unrealized capital gains discourage inflows.

Neither of these studies provides a completely satisfactory analysis of the prospective tax burdens associated with holding a mutual fund. Barclay, Pearson, and Weisbach (1998) assume that the presence of an unrealized gain will lead to future capital gains tax burdens. They do not distinguish between funds that did not accrue capital gains, and therefore could not have substantial unrealized gains, and funds that accrued substantial gains but realized them and thereby raised investors' capital gains tax liability. Thus they combine differences in capital gain realization rates with differences in past return experience. Bergstresser and Poterba (2002) implicitly assume that a fund's historical tax burden will provide an accurate indication of its future tax burden. While some factors that affect the tax burden may be stable over time for a given fund or a fund-manager pair, such as the difference across managers in their propensity to realize gains or to hold dividend-paying stocks, there may also be substantial variation over time in a fund's tax burden. In particular, a fund that realizes most of its gains in one year, and thereby faces investors with a high tax burden, will be less likely to realize gains in the future, and thereby may face a lower tax burden.

In this paper, we consider an alternative approach to analyzing a fund's prospective tax burden. We use data on the fund's historical rate of capital gain realizations to forecast the fund's future

realizations and associated tax burdens. We implicitly assume that the fund's capital gain realization rate is a more stable attribute of the fund than other tax-related attributes, such as the realized tax burden and the stock of unrealized gains. We document the wide variation across funds in gain realization rates, and we develop an algorithm for computing future tax burdens based on these rates. We then estimate regression models for fund inflows to compare the explanatory power of this prospective capital gains tax burden with the alternative historical tax burden measure.

The paper is divided into five sections. The first explains the problem of measuring the effective capital gains tax rate for a mutual fund investor, and concludes that there is no single approach to measuring this tax burden that solves all of the outstanding difficulties. Section two describes how we calculate the capital gain realization ratio (CGRR) and notes some of the conceptual problems with this measure. The third section describes how CGRR varies across large equity mutual funds, noting both cross-sectional differences in fund realization rates, and time series variation in the realization rates for individual funds. This section also reports the results of regression models that explain the differences across funds in their capital gain realization rates. We find that a number of factors, such as the length of a manager's tenure, help to predict a fund's gain realization rate. Section four reports regression models that compare the explanatory power of historical tax burdens, and effective tax rate measures based on the capital gain realization rate, for explaining fund inflows. The findings suggest that there have been changes in the relationship between past returns, tax burdens, and inflows during the last decade. Finally, there is a brief conclusion.

## **1. Defining the Tax Burden on Mutual Fund Investors**

The central problem in measuring the tax burden on equity mutual funds is deciding what tax rate to impute to the capital gains component of mutual fund returns. These capital gains have two components: realized gains that are distributed to investors, and unrealized gains that remain within the fund. For a fund investor, the tax liability associated with unrealized gains could be triggered in either of two ways. The fund manager might realize the gains while the investor is still holding his shares in the fund, in which case the realized capital gains will be passed through to the investor. Alternatively, the

investor might choose to sell his shares in the fund, in which case taxes will be due on the appreciated value of the fund shares.

Research on the tax burdens faced by mutual fund investors is designed to calculate a measure of the tax burden on returns earned by mutual funds, so that the after-tax returns earned by investors can be compared with the after-tax returns on bonds, directly-held stocks, or other investment classes. For this purpose, it is essential to collapse the future tax liabilities associated with capital gain or loss realization into a current measure of the investor's tax burden. Bergstresser and Poterba (2002) do this when they define the ex post tax burden on fund  $i$  in year  $t$  as

$$T_{it} = \tau_{DIV}d_{it} + \tau_{CG}(g_L + g_S)_{it} + \tau_{UCG}u_{it} \quad (1)$$

where  $\tau_{CG}$  is the tax rate on capital gains,  $\tau_{DIV}$  is the tax rate on dividend income,  $d$  denotes current dividend income,  $g_L$  and  $g_S$  are long and short-term realized capital gains, respectively,  $u$  is the fund's unrealized capital gains that accrue in period  $t$ , and  $\tau_{UCG}$  is the effective tax rate on unrealized capital gains. Measuring  $\tau_{UCG}$  requires strong assumptions about future patterns of investor behavior, in particular with respect to the sale of fund shares and the probability that the shares will be held until death. Bailey (1969) is an early example of a study that developed crude algorithms for estimating the value of  $\tau_{UCG}$  relative to  $\tau_{CG}$ . For common stocks, Bailey (1969) suggested that a value of .25 for this ratio might be appropriate. Bergstresser and Poterba (2002) assume that the high turnover rate on mutual fund shares leads to a somewhat higher value of this ratio, and when the statutory tax rate on realized long-term gains is 20 percent, they assume that  $\tau_{UCG} = .10$ .

There are two important limitations of this approach to measuring the ex post tax burden on a mutual fund, and to projecting this tax burden into the future. The first is that it applies the same tax burden on undistributed capital gains to all mutual funds, despite the fact that different funds realize gains at very different rates. Even if investors have the same propensities to sell shares in different mutual funds, fund managers differ. Because the realization-based capital gains tax system provides investors with an interest free loan between the time a gain accrues and the time it is realized, funds with lower

realization rates will impose lower effective tax burdens on the unrealized capital gains available to their investors. Our empirical work is designed to remedy this limitation in earlier work by developing an alternative, fund-specific measure of the capital gains tax burden on accruing capital gains. We model the gain realization rates for different funds, and then using these rates to construct new measures of the effective capital gains tax burden on accruing gains.

There is a second limitation with the approach described in (1), and it is more difficult to address. This arises from the inability of mutual funds to pass through capital losses to their investors. Provided  $g_L$ ,  $g_S$ , and  $u$  are all positive, so that the fund generates capital gains and the manager realizes net gains, the approach described above offers an attractive conceptual framework for analyzing tax burdens. When funds generate losses, however, so that  $u$  is negative, or when the fund manager realizes net losses, the basic framework becomes inadequate. It then becomes essential to recognize the time lag between the generation of losses by the securities held in the fund, and the recognition of losses by fund investors. This can be accelerated if investors sell their shares, but for buy-and-hold fund investors, the time lag may be substantial.

In the 1990s, when tax considerations in mutual fund investing first began to attract attention, most funds generated capital gains. The approach to measuring after-tax investor returns suggested in equation (1) therefore seemed reasonable, and it motivated work such as Bergstresser and Poterba (2002), who analyzed fund tax burdens over the 1993-1999 period. The last three years, however, have witnessed negative returns on many equity mutual funds. Accruing capital gains have been negative, and the stock of unrealized gains held by many funds has been replaced by a stock of unrealized losses.

The present paper does not consider the problem of unrealized losses, but focuses instead on alternative approaches to treating the future tax burdens associated with mutual fund gains. In this way it provides new insight on the alternative ways to measure fund tax burdens during a period of rising share prices, such as the 1990s. In future work we hope to address the role of losses, and incomplete loss pass-through, on fund returns and fund investors.

## **2. Defining the Capital Gains Realization Rate and Implementing Effective Tax Rate Calculations**

The centerpiece of our analysis of fund tax burdens is replacing the constant assumed tax rate on undistributed capital gains in equation (1) with an alternative measure of the unrealized capital gains tax burden that varies across funds. We calculate this tax measure by assuming that the rate at which investors in different mutual funds realize gains is the same, but allowing for differences across fund managers in their gain realization rates. This leads us to focus on the capital gain realization rate as a key attribute of a mutual fund.

A fund's capital gains realization rate (CGRR) during any interval is the fraction of the fund's accrued net unrealized capital gains that the manager chose to realize. Two pieces of information are needed to calculate the CGRR – the amount of capital gains the fund realizes and distributes to its shareholders and the stock of unrealized net capital gains from which the fund distributes the gains. If CGDIST is total amount of capital gain distributions and GAINSTOCK is the stock of unrealized capital gains, then fund  $i$ 's capital gains realization rate in period  $t$  is

$$\text{CGRR}_{it} = \text{CGDIST}_{it} / \text{GAINSTOCK}_{it} \quad (2)$$

One challenge in generating fund-specific capital gains realization rates is measuring the fund's stock of unrealized net capital gains. We have annual data reported at the end of the calendar year, so we can only measure the stock of unrealized capital gains as of December 31<sup>st</sup>. Over the course of a year, however, a fund's stock of unrealized net gains may fluctuate due to changes in asset prices and realization decisions by the fund manager. Consider a fund that has \$1 million in capital gains in August. If the fund manager realizes \$100,000 in gains, but by the end of December, the prices of the fund's assets have fallen so that it now has only \$700,000 in unrealized gains, we would calculate the fund's capital gains realization rate as  $100,000 / (100,000 + 700,000)$  or 0.125. When gains were actually realized, however, the capital gains realization rate was 0.10.

It is possible for the measured CGRR to be greater than one, less than zero, or undefined. Our measure of the stock of unrealized capital gains aggregates unrealized gains, unrealized losses, and tax-loss carry-forwards. We calculate GAINSTOCK as the sum of the year-end stock of net unrealized

capital gains plus capital gains distributions during the year. Distributed gains cannot be negative, but the other component of GAINSTOCK can be, which leads to the measurement difficulty.

Two examples highlight the measurement difficulties. First, consider a mutual fund that has \$400,000 to invest at the beginning of the year. In one scenario it invests all of its money in a stock which costs \$100 per share on January 1<sup>st</sup> and \$120 per share on December 31<sup>st</sup>. Capital gains as a percent of net assets would then be  $((120-100)*4,000)/(120*4,000)$  or 16.7 percent. Multiplying this number by year-end net assets,  $120*4,000$ , would give us the correct measure of the stock of unrealized capital gains. Now consider the same mutual fund, but which now invests half of the \$400,000 in the asset worth \$120 per share on December 31<sup>st</sup> and half in a stock which costs \$100 per share on January 1<sup>st</sup> but only \$80 per share on December 31<sup>st</sup>. Now there are no net unrealized capital gains at year-end, even though the fund manager could sell some of the appreciated stock and thereby generated capital gain distributions for the fund shareholders.

As a second illustration of the measurement problems, consider a fund that fund invests \$100,000 in the stock which is worth \$120 per share on December 31<sup>st</sup> and \$300,000 in the stock which is worth \$80 per share on December 31<sup>st</sup>. The reported percentage of net assets that are capital gains would now be negative,  $(120*1,000+80*3,000-(100)*4,000)/(100*4,000)$  or -10 percent. We would calculate the stock of unrealized capital gains to be -\$40,000. In this case, if the fund manager sold some appreciated stock, the CGRR would be negative.

Aggregating unrealized gains and losses and tax-loss carry-forwards in the denominator of CGRR captures differences in capital gains realization behavior of mutual funds. If two funds have the same amount of capital gains distributions and stock of unrealized gains, but one has a larger stock of unrealized capital losses, the fund with the larger stock of unrealized capital losses will have a larger CGRR. This reflects the fact that it could have used some of its losses to offset its gains. However, a practical problem arises since when CGRR is outside the unit interval, it can no longer be used a the probability that the fund will realize a \$1 of accrued capital gains.

We can use a mutual fund's CGRR to generate a measure of an individual investor's expected future tax burden on the fund's unrealized capital gains. If we assume that the CGRR is a fund-specific constant, and that the nominal interest rate,  $r$ , the tax rate on capital gains,  $\tau_{CG}$ , and the tax rate on interest income,  $\tau_{INT}$ , are all constants, then the expected present discounted value of the future tax payments on \$1 of unrealized capital gain in fund  $i$  in period  $t$  is:

$$\begin{aligned}
 EPVCG_{it} &= \tau_{CG} CGRR_{it} + \frac{\tau_{CG} CGRR_{it} (1 - CGRR_{it})}{(1 + r(1 - \tau_{INT}))} + \frac{\tau_{CG} CGRR_{it} (1 - CGRR_{it})^2}{(1 + r(1 - \tau_{INT}))^2} + \dots \\
 &= \tau_{CG} CGRR_{it} \sum_0^{\infty} \frac{(1 - CGRR_{it})^k}{(1 + r(1 - \tau_{INT}))^k} \\
 &= \tau_{CG} \cdot \frac{CGRR_{it} (1 + r(1 - \tau_{INT}))}{CGRR_{it} + r(1 - \tau_{INT})}
 \end{aligned} \tag{3}$$

In our calculations, we assume that  $r = 0.05$ ,  $\tau_{CG} = 0.20$  and  $\tau_{INT} = 0.31$ , and we then calculate fund-specific expected tax rates on capital gains each period. In fact, however, the nominal interest rate as measured by the 30-year Treasury constant maturity rate has ranged from 5% to 8% over our sample period. We allow the capital gains realization rates to vary across fund-years in most of our analysis, but one could alternatively assume that the CGRR is constant and construct an estimate of this value by averaging the results from different years.

Figure 1 shows the relationship between EPVCG and CGRR, under several assumptions about the nominal interest rate,  $r$ . The relationship between EPVCG and CGRR, when CGRR is between 0 and 100%, is concave. When CGRR rises slightly above 0, EPVCG rises at a rapid rate and then starts to asymptote towards 20%, the statutory tax rate on realized capital gains. When the nominal interest rate is 5%, EPVCG is already 18%, very close to the statutory capital gains tax rate, when CGRR is around 20%. For an EPVCG of 10%, given a nominal interest rate of 5%, CGRR must only be 3%.

The CGRR is the starting point for a 'forward-looking' measure of a fund's tax burden that can be applied to the fund's accruing capital gains. We construct this "expected present value tax" measure as

$$EPVT_{it} = \tau_{DIV} d_{it} + EPVCG_{it} (g_L + g_S + u)_{it} \tag{4}$$

This expression assumes that investors assess the prospective tax burden on all of a fund's accruing gains in a given period by using the forward-looking EPVCG measure. It assumes that investors do not distinguish between gains that the fund realizes in the current period, and all other accruing gains. A variant of this approach would replace  $\tau_{UCG}$  in equation (1) with EPVCG, while still applying the statutory tax rate to any realized gains. The logic behind equation (4) is that it treats all accruing gains in the same way, and assumes that investors forecast their prospective tax burden on the basis of the capital gain realization rate. We have also considered the alternative approach, and the empirical findings are similar to the ones we report below.

We begin to apply our approach to measuring tax rates by considering the largest U.S. equity mutual funds. Table 1 reports the capital gain realization rates for the twenty largest U.S. equity mutual funds at the end of calendar year 2001. These funds include both actively managed and index funds, and they represent a range of different mutual fund families. The two largest funds, Fidelity Magellan and Vanguard Index 500, have more than \$70 billion under management, while the smallest fund in the table has just over \$15 billion in assets.

The entries in Table 1 show wide dispersion in the capital gains realization rates across funds in a given year and for a given fund over time. Consider the entries for calendar year 2001, a year when the market generated losses for many funds. In this case the highest CGRR is for the American Funds Fundamental Investor fund, which recorded a value of 18.75. For eight of the twenty largest funds, the CGRR was zero for 2001, and for two funds it could not be computed, because the denominator, the stock of unrealized gains plus realizations, was negative. The dispersion is greater in many of the earlier years, when most funds had accruing gains. In 1999, for example, the highest realization rate was for the Vanguard Windsor fund – it realized 35.3 percent of its available gains. The lowest realization rates were also for Vanguard funds. The Index 500 realized 1.7 percent of its gains, and the Total Stock Market Index fund realized 2.8 percent of its gains. There was a clear contrast between the two largest funds, with the CGRR for the Fidelity Magellan fund nearly ten times that of the Vanguard Index 500.

The rows of Table 1 show significant variation in fund realization rates from year to year. The realization rate for the Fidelity Magellan fund, for example, ranges from 2.7 percent (2001) to 69.5 percent (1996). The variation is generally greater for actively managed funds than for index funds. The American Funds ICA fund, the third largest fund in 2001, reports CGRR values between 57.3 and 7.4. These two extreme years are adjacent, and show that after a year of high realizations, 2000, a fund may have a year of low realizations, reflecting the smaller pool of gains available for realization.

While the data for the largest funds is instructive, we also consider a much larger sample of equity mutual funds when we consider the determinants of mutual fund inflows. Our data come from Morningstar, Inc. We analyze a sample of broad domestic equity retail mutual funds and have annual data on these funds from 1993 to 2001. Table 2 shows how the data sample changes with the various restrictions we impose. We exclude funds that are younger than 3 years, following Chevalier and Ellison (1997), and fund-years with net inflows less greater than 1,000%, following Bergstresser and Poterba (2002). We also exclude funds that serve primarily institutional investors, as these investors are tax exempt, and funds that are not rated by Morningstar. These restrictions leave us with a sample of 12,335 fund-years, with the number of funds increasing over the period 1993 to 2001, as more funds are begun. We also exclude fund-years for which CGRR is greater than 100% or less than 0, because in our later analysis we treat the CGRR as though it was the probability of the fund realizing gains in each period. This eliminates 1,119 fund-years. Of these, 1,119 fund-years, 399 are in 2001 and 380 in 2000. This is due both to the larger overall sample in these years, and to the sharp coincident drop in equity prices.

Table 3 shows the annual sums of dividend and capital gain distributions and net assets of our sample of mutual funds. In 2000, our sample accounted for \$13.5 billion in dividend distributions, \$183 billion in capital gains distributions, and nearly \$2 trillion in net assets. Total capital gains distribution and net assets grew with both asset prices and the number of funds during the period 1993-2000, but then fell sharply in 2001. The total amount of capital gains distributions in 2001 was only \$18.5 billion, only one tenth of the value of the previous year. This reflects the general decline in equity values between 2000 and 2001.

Tables 4 and 5 provide summary statistics for the pre-tax returns, CGRRs, and two tax burden measures for our sample of mutual funds. Table 4 provides summary statistics for the entire sample period and Table 5 provides annual summary statistics. We report both weighted and unweighted summary statistics, but we focus on the results weighted by beginning-of-year net assets, since we use these weightings in our regression analysis. We weight our observations by net asset size because most of our variables are expressed as percentages of net assets and, therefore, funds with smaller asset bases will have larger variances in these variables.

The average pretax return over the whole sample period is around 9%, but this average varies substantially year-by-year. This movement reflects general movements in the U.S. stock market over the sample period. With the exception of 1994 and 1993, the average annual pretax return is well above 15% during the 1990s. The pretax return then falls in starting in 2000, which has a -5% average pretax return, and then the average pretax return falls to around -13% in 2001. The average CGRR during the 1990s, when returns were strong, is fairly large, about 20%. The average CGRR in the sample actually rises in 2000, as the stock prices were declining, and then falls dramatically to an average of 5% in 2001. The temporary rise in CGRR occurs because funds were realizing capital gains from the stock price run-up in the late 1990s before the market correction. These capital gains distributions are reported at the end of 2000 when the stock of unrealized capital gains was much smaller than it was when the gains were being realized. The average tax burdens are larger in the 1990s when returns were higher, reflecting the greater number of dividend and capital gains distributions.

### **3. Explaining Inter-fund Differences in Capital Gain Realization Rates**

The statistics in Table 1 suggest that funds differ in their CGRRs, and that even within the universe of actively managed funds, there is significant variation. We now consider the variation in the CGRR across individual funds, and seek to explain the differences as a function of fund characteristics. We estimate reduced form regression models with CGRR as the dependent variable. Table 6 reports these models. In the first specification, we relate the CGRR to two indicator variables, one for whether the fund is an index fund and the other for whether it is a tax-managed fund, as well as the fund's turnover

rate. The regression model also includes time effects, indicator variables for each year. The coefficients on the two indicator variables are negative and suggest that both index funds and tax-managed funds have statistically significantly lower capital gain realization rates. The differences between these funds and the broad sample of other funds are substantively important. The average capital gains realization rate in our sample of 8674 fund-years is 22.3 percent, while for index funds it is only 7.8 percent, and for tax-managed funds it is 10.4 percent.

A fund's turnover rate is also a statistically significant determinant of the CGRR. A ten percentage point increase in turnover, from 0.50 to 0.60, for example, is associated with an increase of roughly 0.9 percent in the capital gain realization rate. This suggests that the difference between the CGRR of index funds and tax managed funds, and all other funds, is not due just to differences in turnover rates between these funds and actively-managed funds.

The second column of Table 6 presents an expanded regression model with several additional explanatory variables. These include the age of the fund, the fund's lagged inflow and pre-tax return, and the tenure of the fund manager. The coefficients on turnover and the indicator variables for index funds and tax-managed funds are not substantially changed by including these new covariates, or by including indicator variables for funds with different investment styles. The age of the fund does not appear to be an important determinant of the capital gain realization rate. A fund's pretax return is negatively associated with the CGRR, suggesting that when a fund experiences large accruing gains, it does not increase the flow of capital gain realizations commensurately. The regression also shows that funds with managers who have been in the job for less than a year have higher CGRRs. This is a substantively important effect: a recent manager change raises the CGRR by 14 percentage points, relative to a sample mean of 22 percent.

#### **4. Comparing the Performance of Alternative Measures of Mutual Fund Tax Burdens**

The foregoing discussion explained how a fund's capital gains realization rate could be used to estimate the expected present discounted value of capital gains taxes per dollar of accruing capital gains. Table 7a presents these results for the largest equity mutual funds in 2001. The estimated tax burden is a

function of the estimated capital gain realization rate (CGRR) and the assumed after tax return available to the investor on accruing gains which are kept in the fund. Given our assumptions that  $r = 0.05$  and  $\tau_{INT} = 0.31$ , differences in the capital gain realization rates across funds map into differences in the capital gains tax burdens in Table 7a. For the Fidelity Magellan fund, the expected PDV of future taxes to be paid on a dollar of capital gains averaged 16.6 cents over the 1993-2001 period. This was lower than the statutory capital gains tax rate of 20 percent, and it reflects the value of deferral on accruing capital gains. Fidelity Magellan's average capital gain realization rate over this period was 25 percent, so the expected holding period for assets with capital gains was about four years. The difference between 20 percent and 16.6 percent reflects the value of deferring accruing capital gains, on average, by four years.

Because we construct the CGRR measure using data from only the current year, the measure of expected tax rates can vary substantially from year to year for a given fund as a function of year-to-year variation in realization activity. For Fidelity Magellan, for example, in 1996, when the CGRR was 69.5 percent, the expected PDV tax rate was 19.7 percent. With such a high CGRR, there is a minimal amount of deferral to create a distinction between the statutory and the expected present value tax rate. The estimated capital gain realization rate for 2001, on the other hand, was only 2.7 percent, which corresponds to a 9.0 percent expected PDV tax rate on capital gains.

Nonlinearity in the relationship between expected tax rates and capital gain realization rates mean that we must take care in aggregating numbers, for a given fund, across years. Consider a fund which realizes all of its available gains in even years and no gains in odd years. We would assign a 20% tax rate to such a fund in its realization years, and a zero tax rate in the non-realization years. The average expected tax rate of 10% would not be as informative as the expected tax rate based on the average realization propensity of 50%. The key nonlinearity is that the expected present discounted value tax rate is very low when the realization rate is very low, but that even modest increases from very low realization rates can result in substantial increases in the tax burden. The effect of small changes in the realization rate at high levels is very modest.

Table 7b repeats the same exercise as Table 7a, but calculates the backward-looking tax burden measure described in equation (1). This is based on each fund's realization behavior in each year, and an effective tax rate of 20 percent is assigned to realized gains. An effective tax rate of 10% is assigned to the portion of capital gains that accrue but remain unrealized by the end of the year. This approach does not use information on the fund's realization rate to attempt to calibrate the future tax burden on accruing gains. Table 7b highlights the broad differences in tax burdens between high-realization and low-realization funds. The average backward-looking tax burden measure of the Fidelity Magellan fund over the period is 2.61%, while the Vanguard Index 500 Fund has the lowest average, at 1.92%.

Table 7c describes the variation in the 'forward-looking' tax burden measure, defined in equation (4), for the largest funds. This 'forward-looking' measure uses the historical realization rates to project future capital gains tax burdens. When the CGRR is undefined, as it is when the stock of net accrued gains becomes negative, this tax burden measure is also undefined. Like the other versions of Table 7, Table 7c shows the average forward-looking tax burden measure over the entire period, as well as the measure computed separately for each year. The average forward-looking measure for the Fidelity Magellan fund is 2.73 percent over this period, remarkably close to the average backward-looking measure of 2.61 percent. The pattern of forward looking tax burdens for this fund is also quite similar to the pattern for backward-looking burdens, with troughs in 1994 and 2001 and a peak in between.

The similarity of the measures reflects the fact that the two measures are just different ways of collapsing the information contained in the most recent year of the fund's experience. The difference is that the expected forward looking measure uses additional information, notably the fund's capital gain overhang, and it combines the information in a highly nonlinear way designed to capture more accurately the effective tax rate on accruing unrealized gains.

We now consider the explanatory power of the two measures of tax burdens in forecasting mutual fund inflows. We follow Bergstresser and Poterba (2002), and rely on data from Morningstar. We compute net inflows during each year,  $I_t^u$ , as a fraction of fund assets at the end of the previous year, as

$$I_t^u = \text{Assets}_t / \text{Assets}_{t-1} - (\text{NAV}_t + \text{DIV}_t + \text{GAINS}_t) / \text{NAV}_{t-1}. \quad (5)$$

In this equation,  $DIV_t$  and  $GAINS_t$  correspond to dividend and capital gain distributions, respectively. We adjust this measure, which is common in the empirical literature on fund inflows, to allow for the return on fund shares within the year. Our modified measure is  $I_t$ , defined as  $I_t = I_t^u / (1 + R_t/2)$  where  $R_t$  denotes the fund's return over the calendar year.

We investigate whether inter-fund differences in tax burdens, either backward-looking or forecast, explain fund inflows. We model mutual fund inflows as a function of past returns and other fund characteristics:

$$I_{i,t} = R_{i,t-1} * \theta + X_{i,t} * \phi + v_t + \varepsilon_{i,t}. \quad (6)$$

$I_{i,t}$  is the fund's inflow,  $R_{i,t-1}$  denotes a fund's past returns, possibly risk-adjusted, and the  $X_{i,t}$  vector includes other factors that may explain fund inflows, including either the lagged tax burden measure or the forward looking tax burden. The variables included in  $X_{i,t}$  are control variables that may influence inflows for reasons unrelated to returns. These include fund age, the initial size of the fund, fund turnover, the fund's stock of unrealized capital gains, and the fund's objective. We also include year-specific indicator variables in the estimating equations.

Table 8 uses the various measures of tax burden in inflow regressions. The first two columns use data for the 1993-1999 period, the same years as Bergstresser and Poterba (2002). The regressions in these columns confirm the results of that study; there is strong evidence that inflows are lower to funds that lower tax burdens, however measured. The third and fourth columns of Table 8 add data from 2000 and 2001 to the sample. Starting with the fourth column, adding the two new years of data does not change the basic findings. The coefficient on the pretax return declines, however, from 1.42 over the 1993-1999 sample to 0.922 for the 1993-2001 sample. This decline is statistically significant at the 1% level. More importantly, the forward tax burden measure has a statistically insignificant effect on inflows once data from 2000 and 2001 are added to the analysis.

An example may help to explain the loss of explanatory power for the forward-looking tax burden measure around the onset of the broad stock market decline in 2000. Consider a fund which starts the year with a stock of (net) unrealized gains equal to 20% of the value of the fund, and holds no

dividend-paying stocks. Suppose this fund passed through 10% capital gains, and has an unrealized loss of 15% (for a net of -5%). If we were to compare this fund to a fund which is the same in every dimension except for passing through 15% in capital gains and having an unrealized loss of 20% (again for a net of -5%), an interesting problem emerges. These two funds have the same pre-tax return, and the second fund arguably has worse tax management because it is passing through more capital gains. But, because total capital gains (realized and unrealized together) are negative, applying the higher estimated realization rates to the negative capital gain amount gives a measure of the tax burden that is lower, strangely suggesting MORE able tax management.

Table 9 shows that the finding that the ‘forward-looking’ capital gains measure loses power in 2000 and 2001 is not just the result of the lack of covariates in the estimated regression. Table 9 is similar to Table 8, except that it includes a variety of covariates, such as the capital gain overhang, lagged inflow, fund age, fund size, and expense ratios. The results for the 1993-1999 sample are again similar to the findings in Bergstresser and Poterba (2002), while the findings for the longer sample are again somewhat different and suggest weaker effects of tax burdens on inflows.

The empirical findings suggest an interesting challenge to the analysis of taxes and investor behavior. The “backward-looking” measure of fund tax burdens has a statistically significant, and substantively important, effect on inflows for both the 1993-1999 and 1993-2001 samples. Yet the coefficient on the forward-looking tax rate measure changes substantially from the first sample to the second. This may be due to the presence of many funds with capital gains realization rates that are within the unit interval, but near the edges. The CGRR measure is may not be very informative when values in these ranges are generated by unrealized losses. It may be that investors simply extrapolate a fund’s tax burdens to the future, which could explain the stronger performance of the backward-looking measure.

We re-estimated the regressions in Table 9 on the sub-sample of fund-years which had net positive unrealized capital gains. In the 1993-1999 period, the coefficients on the tax burden measures are very similar to those estimated on the entire sample and are significant at the 10% level - -3.33 on the ‘backward’ measure and -2.14 on the ‘forward’ measure. In the 1993-2001 period the coefficient on the

‘backward’ measure was -1.96 and the coefficient on the ‘forward’ measure was -0.196. Neither of these coefficients was statistically significant at the 10% level. This analysis suggests that there is more behind the inability of the ‘forward’ tax burden to explain fund inflows during 2000 and 2001 than the fact that we do not accurately model the treatment of capital losses in our calculation of CGRR.

The continuing strong predictive performance on the backward-looking capital gains measure, coupled with the deterioration in predictive performance of the forward-looking measure, is a bit of a puzzle. One possible interpretation is that investors who already own shares in a fund are less reluctant to sell shares of funds which have recently distributed significant amounts of capital gains; the marginal taxes incurred by from selling out positions in a fund fall as the fund distributes increasing amounts of gains.

## **5. Conclusion and Directions for Future Work**

This paper has attempted to formulate a prospective measure of the tax burden faced by taxable investors in mutual funds. Past research on the effect of taxes on mutual fund manager and investor behavior suffered from the fact that measures of investors’ tax liabilities did not model expectations about these liabilities. However, to properly evaluate the effect of taxes on investor behavior one must try to get a measure of investor beliefs about taxes at the time these investors made decisions about where to invest their money.

Our new tax burden measure is prospective in that it models individual mutual funds’ capital gains realization behavior, and using the simple assumption that a fund’s last period capital gains realization rate will be its next period capital gains realization rate we have calculated a ‘forward-looking’ effective tax rate on capital gains. We model investor expectations as following the simple rule of expecting next period’s return to equal last period’s return and to be made up of dividends and capital gains in the same proportions as in the last period. Based on these assumptions, we calculate a tax burden measure which is ‘forward-looking’ in its treatment of capital gains taxes.

In the process of calculating these prospective tax burdens we explored the cross-sectional and time-series variation in the capital gains realization rates of a sample of broad domestic equity mutual

funds. We discovered, perhaps unsurprisingly, that funds with higher turnover rates had higher capital gains realization rates. Funds with new managers also had higher capital gains realization rates as new managers tend to shift investing strategies, resulting in the sale of assets that had accrued gains. We also discovered that within funds there is substantial variation in capital gains realization ratios. This is especially true when asset prices fluctuate greatly, as they did from 1999 to 2001, when the U.S. stock market saw a massive decline in equity prices after a long period of stock price growth in the late 1990s. Variation in capital gains realization ratios within mutual funds is driven both by changes in manager trading and investing strategy and by the prices of the funds assets and flow of money into the fund.

We compared the performance of the forward-looking tax burden measure with a more standard backward-looking measure for forecasting fund inflows. Funds with higher backward-looking or forward-looking tax burdens experienced lower inflows in the 1993-1999 period, although for the 1993-2001 sample, we found strong effects only for the backward-looking measure.

The results in this paper suggest several directions for further research. The most significant need is the conceptual development of forward-looking measures of capital gains tax burdens that recognize the role of capital loss carry-forwards within mutual funds. Our tax measure allows for fund-specific variation in the probability of realizing an accrued capital gain. This approach can offer a reasonable guide to the expected present discounted value of future taxes for a fund that is accruing capital gains and that has a stock of accrued but unrealized capital gains. For a fund that is accruing losses, however, the concept of the gain realization rate is not relevant. Rather, one needs to estimate how the accrual of an additional gain today will affect the expected present discounted value of future taxes over the time that the investor holds his fund shares. This requires analyzing whether the accruing losses can be used to offset previously-accrued but unrealized gains, and if they cannot be, modeling when the fund is likely to exhaust its loss carry-forwards and to return to taxable status. This will require analyzing not just the past relationship between fund returns and investor taxes, but also including information on the stock of realized and unrealized loss carry-forwards in the tax burden computation. An acceptable measure should

provide insight on investor tax burdens both in rising stock markets, when most funds are generating gains, but also in falling markets, when capital losses exceed capital gains.

Another issue which could be explored in future research is whether differences in the capital gain realization rates across funds are due to manager style and preferences, or whether they are due to fund characteristics and objectives, perhaps related to investor clienteles. We find that some types of funds, particularly index funds and those that market themselves as tax-managed, have low capital gain realization rates. We have not explored the variation in CGRR more generally within the set of actively managed funds that do not fall into these categories. Data on the identity of managers at individual funds would make it possible to investigate these issues.

## REFERENCES

- Bailey, Martin (1969), "Caital Gains and Income Taxation," in M. Bailey and A. Harberger, eds., The Taxation of Income from Capital (Washington: Brookings Institution).
- Barber, Brad, Terrance Odean, and Lu Zheng (2000). "The Behavior of Mutual Fund Investors." Mimeo, University of California - Davis.
- Barclay, Michael, N. Pearson, and Michael Weisbach (1998), "Open End Mutual Funds and Capital Gains Taxes," Journal of Financial Economics 49, 3-43.
- Bergstresser, Daniel, and James Poterba (2002), "Do After-Tax Returns Affect Mutual Fund Inflows?" Journal of Financial Economics 63 (March 2002), 381-414.
- Carhart, Mark (1997), "On Persistence in Mutual Fund Performance," Journal of Finance 52 (1), 57-82.
- Chevalier, Judy and Glenn Ellison (1997), "Risk Taking by Mutual Funds as a Response to Incentives," Journal of Political Economy 105, 1167-1200.
- Dickson, Joel, and John Shoven (1995). "Taxation and Mutual Funds: An Investor Perspective," in J. Poterba, ed., Tax Policy and the Economy, Volume 9 (Cambridge: MIT Press), 151-181.
- Dickson, Joel, John Shoven, and Clemens Sialm (2000), "Tax Externalities of Equity Mutual Funds," National Tax Journal 53 (3, part 2), 607-628.
- Gruber, Martin (1997), "Another Puzzle: The Growth in Actively Managed Mutual Funds," Journal of Finance 51, 783-810.
- Hendricks, Darryll, Jayendu Patel, and Richard Zeckhauser (1994), "Investment Flows and Performance: Evidence from Mutual Funds, Cross-Border Investments, and New Issues," in Ryuzo Sato, Richard Levich, and Rama Ramachandran, eds., Japan, Europe, and International Financial Markets: Analytical and Empirical Perspectives (Cambridge: Cambridge University Press).
- Investment Company Institute (1999). The Mutual Fund Fact Book. (Washington: ICI).
- Jeffrey, Robert and Robert Arnott, 1993, Is your alpha big enough to cover its taxes?, Journal of Portfolio Management (Spring), 15-25.
- Poterba, James (1999), "Unrealized Capital Gains and the Measurement of After-Tax Portfolio Performance," Journal of Private Portfolio Management 1 (Spring), 23-34.
- Poterba, James (2001), "Taxation, Risk Taking, and Household Portfolio Behavior," in A. Auerbach and M. Feldstein, eds., Handbook of Public Economics, Volume 3 (Amsterdam: North Holland, forthcoming).
- Poterba, James, and Andrew Samwick (2001). "Taxation and Household Portfolio Composition: Evidence from Tax Reforms in the 1980s," Journal of Public Economics (forthcoming).
- Sirri, Erik, and Peter Tufano (1998), "Costly Search and Mutual Fund Flows," Journal of Finance 53, 1589-1622.

**Table 1. Capital Gains Realization Rates for the Largest 20 Domestic Equity Mutual Funds in 2001**

Mutual Fund Name	Net Assets in 2001 (\$ millions)	Average (1993-2001)	Capital Gains Realization Rates (%)								
			2001	2000	1999	1998	1997	1996	1995	1994	1993
Fidelity Magellan Fund	79,515	25.01	2.67	9.61	15.63	8.83	40.60	69.48	14.96	34.80	28.48
Vanguard Index 500 Fund	73,151	1.22	0.00	0.00	1.69	0.79	1.79	1.48	0.86	3.96	0.44
American Funds Investment Company of America Fund	54,008	18.54	7.37	57.25	15.26	18.39	16.67	11.73	12.31	14.36	13.51
American Funds Washington Mutual Investors Fund	48,135	15.47	10.18	27.24	23.11	18.42	11.77	13.63	13.42	12.19	9.28
American Funds Growth Fund of America	35,402	19.50	0.00	41.93	16.90	18.32	43.93	12.30	17.18	12.87	12.08
Fidelity Growth and Income Fund	34,255	16.40	2.82	18.47	12.77	10.31	10.63	14.79	14.26	44.85	18.68
Fidelity Contrafund	32,321	26.57	0.00	44.19	27.90	16.72	24.58	35.30	25.54	27.15	37.75
American Century Ultra Fund	26,911	15.83	0.00	33.54	6.03	23.15	37.59	16.70	11.07	14.42	0.00
Janus Fund	25,622	22.98	0.00	56.17	18.85	8.57	37.35	30.67	8.14	21.44	25.59
Fidelity Growth Company Fund	22,742	21.74	NA	25.93	11.76	16.88	23.88	17.23	15.27	34.25	28.74
Vanguard Windsor II Fund	22,429	19.24	3.15	15.96	30.33	24.88	17.14	11.91	12.68	42.38	14.76
Fidelity Blue Chip Growth Fund	21,959	22.24	0.00	14.43	8.31	9.95	15.60	40.77	36.44	22.38	52.28
Fidelity Equity-Income Fund	21,832	15.65	9.52	22.02	19.77	10.68	10.27	15.18	14.01	37.56	1.86
American Funds Fundamental Investor	19,100	23.62	18.75	27.47	21.64	26.37	25.71	24.59	11.28	18.63	38.11
Vanguard PRIMECAP Fund	18,096	8.63	3.81	15.35	12.81	6.76	7.25	7.48	6.77	7.98	9.50
Vanguard Windsor Fund	16,027	39.54	12.40	50.21	35.26	44.13	34.64	20.55	33.33	97.99	27.33
Putnam Voyager Fund	15,953	17.96	NA	32.67	15.62	16.39	16.14	17.91	14.98	18.01	11.94
Vanguard Total Stock Market Index Fund	15,782	2.38	0.00	2.04	2.84	1.46	3.70	3.72	2.91	-----	-----
Fidelity Dividend Growth Fund	15,210	21.98	11.46	21.07	27.98	26.63	33.13	11.63	-----	-----	-----
Janus Twenty Fund	15,082	15.79	0.00	15.07	9.07	1.42	33.17	45.71	25.52	0.00	12.16

A cell with NA indicates that the capital gains realization rate for that fund-year is greater than 100% or less than 0.

**Table 2. How Sample Size Varies with Data Restrictions**

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	<b>Total</b>	<b>1993</b>	<b>1994</b>	<b>1995</b>	<b>1996</b>	<b>1997</b>	<b>1998</b>	<b>1999</b>	<b>2000</b>	<b>2001</b>
Domestic equity funds	21,792	882	1,121	1,412	1,707	2,265	2,808	3,193	3,858	4,546
Age >= 3	15,437	662	750	920	1,168	1,548	1,886	2,325	2,857	3,321
Inflow < 1,000%	14,993	644	717	878	1,151	1,529	1,837	2,277	2,761	3,199
Non-institutional fund	12,344	605	647	756	965	1,273	1,512	1,834	2,181	2,571
Has Morningstar rating	12,335	602	647	755	964	1,273	1,512	1,834	2,180	2,568
CGRR between 0 and 100%	11,216	575	589	730	945	1,245	1,401	1,762	1,800	2,169
Not missing any RHS variable used in any regression	7,172	0	510	627	840	969	1,139	1,389	1,343	355

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Data are from Morningstar.

**Table 3. Total Capital Gains and Dividend Distributions in Sample with CGRR between 0 and 100% (N = 11,216)**

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	<b>Total Dividend Distributions (\$ millions)</b>	<b>Total Capital Gains Distributions (\$ millions)</b>	<b>Total Year-End Net Assets (\$ millions)</b>
1993	8,890	26,376	459,591
1994	7,407	21,411	431,629
1995	10,683	42,519	719,815
1996	12,654	70,356	985,370
1997	13,879	122,898	1,346,780
1998	13,721	104,714	1,705,238
1999	13,691	169,482	2,226,994
2000	13,476	182,877	1,980,574
2001	10,772	18,512	1,652,854

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**Table 4. Summary Statistics for Sample with CGRR between 0 and 100% (N = 11,216)**

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<b>Panel A - Observations weighted equally</b>					
	<b>Mean</b>	<b>Standard Deviation</b>	<b>25th percentile</b>	<b>Median</b>	<b>75th percentile</b>
%					
Pretax return	11.0	21.8	-3.39	11.8	23.6
Dividends as a percentage of net assets	0.573	0.964	0	0.046	0.884
Capital gains distributions as a percentage of net assets	7.10	8.35	0.695	5.22	10.6
Capital gain overhang	16.3	39.8	9.0	20.0	30.0
Capital gains realization rate	22.4	21.3	3.14	18.9	33.7
Backward-looking tax burden	2.09	2.68	0.24	2.16	3.77
Forward-looking tax burden	2.03	2.97	0	1.56	3.81
Net inflow	20.0	75.7	-11.5	1.24	25.4

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<b>Panel B - Observations weighted by beginning-of-year net assets</b>					
	<b>Mean</b>	<b>Standard Deviation</b>	<b>25th percentile</b>	<b>Median</b>	<b>75th percentile</b>
%					
Pretax return	8.98	20.6	-7.98	10.0	23.4
Dividends as a percentage of net assets	0.906	1.01	0	0.663	1.46
Capital gains distributions as a percentage of net assets	6.58	6.22	1.38	5.47	9.61
Capital gain overhang	23.2	20.9	14.0	25.0	36.0
Capital gains realization rate	20.2	18.8	6.03	16.1	28.4
Backward-looking tax burden	1.86	2.47	-0.118	2.09	3.64
Forward-looking tax burden	1.82	2.76	0	1.47	3.81
Net inflow	4.48	28.6	-8.00	-0.270	11.6

---

**Table 5. Annual Means for Sample with CGRR between 0 and 100%**

**Panel A - Observations weighted equally**

Year	N	Pretax return	CGRR	Backward tax burden	Forward tax burden
1993	575	13.40%	22.30%	2.84%	2.29%
1994	589	-1.67	29.5	0.944	0.009
1995	730	30.8	20.9	4.77	4.78
1996	945	18.5	27.1	3.73	3.17
1997	1,245	23.7	26.3	3.74	4.01
1998	1,401	14.8	22.0	2.27	2.19
1999	1,762	27.4	21.6	3.75	3.83
2000	1,800	-0.236	32.8	0.811	-0.291
2001	2,169	-9.83	9.15	-0.790	0.058

**Panel B - Observations weighted by beginning-of-year net assets**

Year	N	Pretax return	CGRR	Backward tax burden	Forward tax burden
1993	575	14.40%	21.60%	2.99%	2.52%
1994	589	-0.882	29.4	1.09	0.141
1995	730	32.3	18.6	4.96	5.15
1996	945	18.1	25.4	3.57	3.12
1997	1,245	24.9	23.2	3.78	4.13
1998	1,401	19.6	19.2	2.84	2.93
1999	1,762	23.5	18.9	3.39	3.41
2000	1,800	-5.04	30.2	0.393	-0.605
2001	2,169	-13.1	5.83	-1.10	-0.093

**Table 6. CGRR Determinant Regressions**

	Mean	(1)		(2)	
Turnover	0.648	8.98 (1.23)	***	9.37 (1.03)	***
Pre-tax Return	12.3			-0.166 (0.0335)	***
Inflow	5.64			-0.0022 (0.0103)	
Index fund	6.08	-15.5 (2.69)	***	14.1 (2.75)	***
Tax managed fund	0.446	-11.9 (4.06)	***	-10.2 (3.79)	***
Manager tenure < 1 yr	2.15			14.4 (6.97)	**
Manager tenure = 1 yr	6.11			4.52 (2.35)	*
8 < Age <= 16	27.8			-1.79 (1.12)	
16 < Age	55.1			1.35 (1.05)	
Year Dummies?		Yes		Yes	
Style Dummies?		No		Yes	
R <sup>2</sup>		0.288		0.356	
N		8,674		8,674	

Regressions weight observations by beginning-of-year net assets. Standard errors are corrected for clustering at the mutual fund level. The net asset weighted mean of CGRR is 22.3. Sample includes only observations for which CGRR is between 0 and 100% for the period 1993 to 2001.

**Table 7a. Expected PDV Tax Rates on Capital Gains for the Largest 20 Domestic Equity Mutual Funds in 2001**

Mutual Fund Name	Net Assets in 2001 (\$ millions)	Average (1993-2001)	Expected PDV Tax Rate on Capital Gains (%)								
			2001	2000	1999	1998	1997	1996	1995	1994	1993
Fidelity Magellan Fund	79,515	16.55	9.02	15.22	16.95	14.88	19.07	19.71	16.81	18.82	18.45
Vanguard Index 500 Fund	73,151	4.61	0.00	0.00	6.80	3.87	7.06	6.22	4.13	11.05	2.35
American Funds Investment Company of America Fund	54,008	16.71	14.09	19.51	16.88	17.42	17.14	15.99	16.16	16.68	16.48
American Funds Washington Mutual Investors Fund	48,135	16.60	15.45	18.36	18.00	17.43	16.00	16.51	16.46	16.13	15.08
American Funds Growth Fund of America	35,402	15.41	0.00	19.12	17.18	17.41	19.18	16.16	17.23	16.32	16.09
Fidelity Growth and Income Fund	34,255	16.03	9.31	17.43	16.29	15.50	15.62	16.78	16.66	19.21	17.46
Fidelity Contrafund	32,321	16.37	0.00	19.19	18.41	17.15	18.14	18.85	18.23	18.36	18.96
American Century Ultra Fund	26,911	13.17	0.00	18.76	13.16	18.01	18.95	17.15	15.77	16.70	0.00
Janus Fund	25,622	15.54	0.00	19.49	17.49	14.75	18.94	18.60	14.53	17.82	18.23
Fidelity Growth Company Fund	22,742	17.61	NA	18.26	16.00	17.18	18.08	17.24	16.88	18.80	18.47
Vanguard Windsor II Fund	22,429	16.56	9.88	17.01	18.58	18.17	17.22	16.04	16.26	19.13	16.77
Fidelity Blue Chip Growth Fund	21,959	15.44	0.00	16.70	14.62	15.36	16.94	19.08	18.90	17.93	19.41
Fidelity Equity-Income Fund	21,832	15.72	15.19	17.89	17.62	15.64	15.49	16.86	16.60	18.95	7.24
American Funds Fundamental Investor	19,100	17.85	17.47	18.38	17.85	18.30	18.24	18.14	15.84	17.46	18.97
Vanguard PRIMECAP Fund	18,096	14.36	10.85	16.89	16.30	13.70	14.02	14.16	13.70	14.44	15.18
Vanguard Windsor Fund	16,027	18.58	16.19	19.36	18.85	19.19	18.82	17.72	18.75	19.99	18.37
Putnam Voyager Fund	15,953	17.17	NA	18.71	16.95	17.09	17.05	17.35	16.82	17.36	16.05
Vanguard Total Stock Market Index Fund	15,782	7.73	0.00	7.68	9.33	6.15	10.71	10.74	9.46	-----	-----
Fidelity Dividend Growth Fund	15,210	17.52	15.90	17.78	18.42	18.32	18.74	15.96	-----	-----	-----
Janus Twenty Fund	15,082	12.24	0.00	16.84	14.99	6.04	18.74	19.24	18.23	0.00	16.12

A cell with NA indicates that the capital gains realization rate for that fund-year is greater than 100% or less than 0.

**Table 7b. Backward-Looking Tax Burdens for the Largest 20 Domestic Equity Mutual Funds in 2001**

Mutual Fund Name	Net Assets in 2001 (\$ millions)	Average (1993-2001)	Backward-Looking Tax Burdens (%)								
			2001	2000	1999	1998	1997	1996	1995	1994	1993
Fidelity Magellan Fund	79,515	2.61	-1.01	-0.52	3.38	3.98	3.59	3.96	5.11	0.53	4.50
Vanguard Index 500 Fund	73,151	1.92	-0.98	-0.70	2.44	3.20	3.78	2.82	4.37	0.76	1.57
American Funds Investment Company of America Fund	54,008	2.65	0.08	1.35	2.91	3.64	4.44	3.26	4.55	1.13	2.45
American Funds Washington Mutual Investors Fund	48,135	2.80	0.76	2.12	1.42	3.18	4.50	3.57	6.00	1.20	2.43
American Funds Growth Fund of America	35,402	2.90	-1.19	2.27	5.94	4.43	4.06	2.65	4.82	0.84	2.27
Fidelity Growth and Income Fund	34,255	2.42	-0.65	0.83	1.82	3.48	3.72	3.05	4.73	1.61	3.19
Fidelity Contrafund	32,321	2.73	-1.16	0.52	4.32	4.19	3.48	3.94	5.54	0.02	3.72
American Century Ultra Fund	26,911	2.35	-1.46	-1.00	4.53	4.52	4.76	2.57	4.91	0.18	2.18
Janus Fund	25,622	2.59	-2.61	-0.31	6.19	4.27	4.36	4.44	4.29	0.26	2.44
Fidelity Growth Company Fund	22,742	3.45	NA	0.25	8.99	3.56	3.03	2.62	5.11	0.50	3.55
Vanguard Windsor II Fund	22,429	2.70	0.15	2.64	0.75	2.99	4.71	4.05	5.42	1.06	2.58
Fidelity Blue Chip Growth Fund	21,959	2.51	-1.63	-0.59	2.84	3.89	3.39	2.95	4.67	1.41	5.65
Fidelity Equity-Income Fund	21,832	2.49	0.01	1.74	1.93	2.01	3.88	3.48	4.56	1.81	3.01
American Funds Fundamental Investor	19,100	2.82	-0.55	1.39	3.63	2.90	4.25	3.78	4.53	1.09	4.36
Vanguard PRIMECAP Fund	18,096	2.62	-1.15	1.28	5.15	3.09	4.23	2.48	4.30	1.67	2.53
Vanguard Windsor Fund	16,027	3.15	1.04	3.07	2.72	1.07	4.31	4.86	5.74	1.76	3.77
Putnam Voyager Fund	15,953	2.79	NA	-0.79	6.84	3.18	3.32	2.57	5.33	0.80	1.04
Vanguard Total Stock Market Index Fund	15,782	2.02	-0.89	-0.79	2.72	2.68	3.60	2.62	4.21	-----	-----
Fidelity Dividend Growth Fund	15,210	2.61	-0.17	2.18	1.73	4.40	3.99	3.51	-----	-----	-----
Janus Twenty Fund	15,082	3.20	-2.79	-3.01	7.29	7.53	4.64	6.72	8.10	-0.61	0.89

A cell with NA indicates that the capital gains realization rate for that fund-year is greater than 100% or less than 0.

**Table 7c. Forward-Looking Tax Burdens for the Largest 20 Domestic Equity Mutual Funds in 2001**

Mutual Fund Name	Net Assets in 2001 (\$ millions)	Average (1993-2001)	Forward-Looking Tax Burdens (%)								
			2001	2000	1999	1998	1997	1996	1995	1994	1993
Fidelity Magellan Fund	79,515	2.73	-0.96	-1.35	4.00	5.01	5.17	2.12	6.28	-0.32	4.57
Vanguard Index 500 Fund	73,151	1.40	0.33	0.30	1.72	1.50	2.79	1.97	2.30	0.66	1.02
American Funds Investment Company of America Fund	54,008	2.70	-0.36	0.91	2.91	4.11	5.32	3.42	5.31	0.39	2.27
American Funds Washington Mutual Investors Fund	48,135	2.89	0.51	1.83	0.42	3.59	5.65	3.71	7.22	0.60	2.49
American Funds Growth Fund of America	35,402	3.36	0.06	1.50	7.69	5.55	5.19	2.51	5.28	0.10	2.40
Fidelity Growth and Income Fund	34,255	2.68	-0.67	-0.18	1.76	4.35	4.87	3.50	6.12	0.65	3.72
Fidelity Contrafund	32,321	3.07	0.14	-1.23	4.51	5.50	4.15	4.07	6.64	-0.20	4.08
American Century Ultra Fund	26,911	2.20	0.00	-3.69	5.42	6.09	4.25	2.41	5.90	-0.62	0.00
Janus Fund	25,622	2.93	0.00	-2.68	8.12	5.77	4.32	3.78	4.96	-0.19	2.26
Fidelity Growth Company Fund	22,742	3.95	NA	-1.16	12.41	4.60	3.39	2.98	6.74	-0.33	2.98
Vanguard Windsor II Fund	22,429	2.84	0.10	3.12	-0.77	3.17	5.90	4.31	6.82	0.16	2.71
Fidelity Blue Chip Growth Fund	21,959	2.93	0.04	-1.68	3.51	5.14	4.66	2.87	5.45	1.75	4.66
Fidelity Equity-Income Fund	21,832	2.42	-0.55	1.60	1.43	2.15	4.90	3.83	5.61	0.38	2.47
American Funds Fundamental Investor	19,100	2.86	-1.47	0.91	4.41	3.20	4.98	3.82	5.66	0.56	3.64
Vanguard PRIMECAP Fund	18,096	3.04	-1.35	0.89	6.69	3.60	5.24	2.71	5.03	1.75	2.78
Vanguard Windsor Fund	16,027	2.93	1.10	3.07	2.35	0.25	4.31	5.01	6.08	0.32	3.87
Putnam Voyager Fund	15,953	3.32	NA	-3.06	9.29	4.00	4.38	2.23	6.70	0.06	2.94
Vanguard Total Stock Market Index Fund	15,782	2.02	0.32	-0.57	2.46	1.79	3.66	2.63	3.89	-----	-----
Fidelity Dividend Growth Fund	15,210	3.28	-0.53	2.26	1.69	6.19	5.24	4.83	-----	-----	-----
Janus Twenty Fund	15,082	3.20	0.19	-5.42	9.73	4.55	5.56	5.55	7.89	0.09	0.70

A cell with NA indicates that the capital gains realization rate for that fund-year is greater than 100% or less than 0.

**Table 8. Basic Inflow Regressions**

	Mean	(1) 1993-1999	(2) 1993-1999	Mean	(3) 1993-2001	(4) 1993-2001
Pre-tax Return (t-1)	21.2	1.35*** (0.145)	1.42*** (0.154)	18.3	0.566*** (0.113)	0.922*** (0.0767)
Backward Tax Burden (t-1)	3.37		-6.27*** (0.808)	2.95		-4.71*** (0.590)
Forward Tax Burden (t-1)	3.34	-4.44*** (0.857)		2.79	-1.04 (0.736)	
R2		0.122	0.120		0.103	0.114
N		5,967	5,967		9,629	9,629

Regressions weight observations by beginning-of-year net assets. Standard errors are corrected for clustering at the mutual fund level. The net asset weighted mean of mutual fund inflows is 7.04 for 1993-1999. The net asset weighted mean of mutual fund inflows is 4.20 for 1993-2001. Sample includes only observations for which the lagged capital gains realization rate is between 0 and 100%.

**Table 9. Inflow Regressions With Covariates**

		(1)	(2)		(3)	(4)
	Mean	1993-1999	1993-1999	Mean	1993-2001	1993-2001
Pre-tax Return (t-1)	21.2	1.44*** (0.241)	1.49*** (0.214)	18.3	0.395*** (0.123)	0.619*** (0.101)
Backward Tax Burden (t-1)	3.37		-3.03*** (1.04)	2.95		-2.60*** (0.638)
Forward Tax Burden (t-1)	3.34	-2.11** (0.982)		2.79	-0.394 (0.686)	
Capital Gain Overhang (t-1)	26.9	-0.268*** (0.0760)	-0.222*** (0.0686)	28.5	-0.0276 (0.0465)	-0.0184 (0.0456)
Inflow (t-1)	19.3	0.161*** (0.0296)	0.159*** (0.0301)	17.2	0.152*** (0.0175)	0.147*** (0.0177)
8 < Age <= 16	29.1	-7.75*** (1.85)	-7.86*** (1.90)	28.7	-6.37*** (1.22)	-6.08*** (1.22)
16 < Age	53.8	-6.74*** (2.04)	-6.65*** (2.09)	54.5	-4.71*** (1.55)	-4.05** (1.53)
Log fund size (t-1)	8.47	-3.15*** (0.447)	-3.21*** (0.443)	8.68	-3.11*** (0.307)	-3.22*** (0.308)
Expense ratio (t-1)	0.931	-5.70*** (1.77)	-6.23*** (1.86)	0.925	-4.85*** (1.31)	-5.10*** (1.28)
Turnover (t-1)	0.667	-0.0250** (0.0124)	-0.0205 (0.0129)	0.662	-0.0239*** (0.0073)	-0.0159 (0.0080)
Load dummy	0.553	2.01* (1.14)	1.52 (1.19)	0.542	3.18*** (0.832)	3.26*** (0.825)
Median market cap	25.94	-0.102** (0.0465)	-0.0939** (0.0473)	33.25	0.00205 (0.0249)	0.00063 (0.0245)
Price/book ratio	6.20	0.941* (0.554)	1.04* (0.546)	6.30	1.53*** (0.461)	1.41*** (0.440)
Morningstar rating	3.77	6.92*** (0.821)	6.43*** (0.834)	3.69	7.52*** (0.589)	7.46*** (0.616)
R2		0.406	0.404		0.345	0.347
N		5,967	5,967		9,629	9,629

Regressions weight observations by beginning-of-year net assets. Standard errors are corrected for clustering at the mutual fund level. The net asset weighted mean of mutual fund inflows is 7.04 for 1993-1999. The net asset weighted mean of mutual fund inflows is 4.20 for 1993-2001. Sample includes only observations for which the lagged capital gains realization rate is between 0 and 100%. Also included in the regressions are style and year dummies.

**Figure 1: Effective Tax Rate on Acruing Capital Gains (EPVCG) as a Function of the Capital Gains Realization Rate (CGRR) and the Nominal Interest Rate,  $r$ .**

