Preliminary – Comments Welcome

TAXES AND THE TRADING BEHAVIOR OF MUTUAL FUND INVESTORS AROUND FUND DISTRIBUTION DATES

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October 2006

ABSTRACT

Capital gain distributions by open-end mutual funds accelerate the capital gains tax liability of their taxable investors, thereby reducing their after-tax return. Investors can reduce this acceleration by delaying the purchase of fund shares until after capital gain distributions tax place. Tax-exempt investors, including individual investors who hold mutual funds in their IRAs, Keogh plans, and 401(k) accounts, have no such disincentives to invest prior to distributions. This paper examines data on fund inflows and outflows, and account openings and closures, at a sample of open-end mutual funds offered by a single fund complex. The data display a significant increase in inflows to taxable accounts, and an increase in the number of new accounts opened, in the weeks following distribution dates relative to the weeks prior to distributions. These findings are consistent with the hypothesis that at least some taxable investors adapt their portfolio trades to reduce their tax liabilities.

We are grateful to Joel Dickson, Jiekun Huang and seminar participants at Boston College for comments, to the fund family that provided data to make this project possible, and to the National Science Foundation (Poterba) for research support.

The behavior of share prices around ex-dividend days provides an opportunity to derive a market-based measure of the relative valuation of dividends and capital gains. Volume patterns around these days offer insight on the stability of investor clienteles, and the extent to which taxable events such as dividend payments induce trading. Allen and Michaely (2003) survey the voluminous literature on the behavior of share prices and trading volume around ex-dividend days. Many, but not all, studies find elevated trading rates around ex-dividend days, along with share price movements that are consistent with the formation of tax-based investor clienteles and the influence of at least some taxable investors on asset prices. One important question that previous research has not been able to answer completely is whether the composition of the investors in a security changes around the ex-day. If the investors who hold a security on its ex-dividend day are not the same as the investors who hold the security on other days, then ex-day share price movements may not indicate the tax status of the investors who hold the security at other time periods.

One empirical strategy for evaluating clientele stability compares the composition of investors in a stock before and after the introduction of a dividend. This test can be implemented by comparing snapshots of the set of investors who hold shares in a firm at different points in time. Before the dividend is initiated, all of the stock's return takes the form of capital gains; afterwards, part of the return is a taxable dividend. Several recent studies find that when firms that have not paid dividends institute a regular dividend, the fraction of the firms stock held by institutional investors rises. This finding is consistent with taxable individual investors selling the stock, while institutional investors who are often not taxed on dividend income or capital gains become the new holders. While suggestive, these results could be due to factors other than tax-related clientele formation. Some institutional investors, for example, may face constraints that limit the fraction of their portfolio that can be held in zero-dividend stocks. Dividend initiation may also change the set of stock analysts that follow a firm, thereby altering the firm's visibility in the investment community.

A second empirical strategy for evaluating clientele formation involves analysis of trading records for different types of investors. Graham and Kumar's (2006) analysis of how individual

investor characteristics are correlated with trading decisions around ex-dividend days is the best example of this approach. The study examines trading records from a retail brokerage firm and finds that older and lower income investors are more likely to purchase stocks before ex-dividend days than afterward. Under the assumption that these two groups of investors face lower marginal income tax rates on dividend income than do other types of investors, the findings are consistent with the hypothesis that investors in lower tax brackets are more likely to purchase stocks prior to ex-dividend days than are their higher-tax rate counterparts. While this study suggests that clientele patterns may vary around ex-dividend days, the link between clientele status and tax circumstances is oblique because the data set does not include any information on investors' marginal tax rates. If the older investors with investments at the brokerage firm that provided the data are higher net worth investors than their younger counterparts, for example, then even after they are retired they may face marginal tax rates that are similar to those of their younger, still-working counterparts. The absence of detailed tax rate information leads to potential measurement error with regard to tax rates, at a minimum, and it could lead to systematic biases in the conclusions.

This paper presents direct evidence on how tax rules affect investor trading decisions. It focuses on how the trading behavior of taxable individual investors varies around the dates of taxable mutual fund distributions. We analyze whether taxable individual investors within a single mutual fund complex are less likely than non-taxable investors to purchase mutual fund shares just before a taxable distribution. Analogously, we study whether taxable investors are more likely to sell just before taxable distributions than are their tax-exempt counterparts. This paper offers new evidence on the broad question of whether tax clienteles are stable over time, as well as on the specific issue of how taxation affects mutual fund investors.

We identify the tax status of mutual fund by distinguishing investments through tax-deferred accounts, primarily IRAs and Keogh plans, from traditional taxable accounts. While we cannot be certain of the marginal tax rate that applies to taxable investors, we are confident that on average the marginal tax rate on taxable accounts is substantially higher than that on tax-deferred accounts.

The paper is divided into five sections. The first describes the tax treatment of mutual fund investors and explains how a mutual fund capital gain distribution accelerates the capital gains tax liability of a taxable investor. Section two describes the data set that we analyze. The third section presents our findings on the differences between inflows and outflows from mutual fund accounts before and after taxable distributions. This section reports results for both taxable and tax-deferred accounts. Section four examines the pattern of account openings and closings before and after the distribution dates. This provides some evidence on whether investors who are new to the fund, or investors who already have accounts, are generating the inflow and outflow patterns we observe. The last section summarizes our findings and offers several suggestions for future work.

1. Tax Treatment of Capital Gains on Mutual Fund Holdings

Open-end mutual funds are subject to a number of special tax rules that make the tax liability of fund investors a function of the fund manager's decisions about when to realize capital gains, as well as the investor's decision about when to buy and sell funds. Several studies, including Barclay, Pearson, and Weisbach (1998), Bergstresser and Poterba (2002) and Dickson, Shoven, and Sialm (2000), have described these tax rules and the incentives that they create for fund investors. When a fund sells assets with accrued capital gains, it must make a taxable capital gain distribution to its shareholders. The shareholders are in turn taxed on these distributions even if they do not sell their shares in the fund. The shareholder's basis in the fund is increased by the amount of the distribution, which reduces the capital gains tax due whenever the shareholder sells her position in the fund. By accelerating the payment of capital gains taxes, however, the tax treatment of distributions increases the tax burden on mutual fund shareholders.

Taxable mutual fund shareholders might pursue a number of strategies to reduce the distribution-induced increase in their tax burden. First, they might select mutual funds that have low rates of capital gain realizations. Second, when purchasing fund shares, they might try to delay their purchases until after a distribution date, thereby avoiding capital gain distributions. Distributions are not completely predictable, but the time of the distributions for a given fund is typically stable from

year to year. In addition, the amount of the distribution is usually announced prior to the distribution, so investors have an opportunity to modify their trading behavior accordingly. The shareholder benefits from such a strategy depend on the investor's prospective trading behavior as well as that of the mutual fund manager.

To quantify the tax consequences deferring a mutual fund investment until after a taxable distribution, consider an investor who is planning to hold mutual fund shares for exactly twenty years. Further assume that the nominal annual twenty-year interest rate is 100*r percent, and that the mutual fund is about to make a capital gain distribution equal to 100*d percent of its net assets. Further assume that the tax rate on realized capital gains is $\tau_{cg,\,0}$ today, and that it will be $\tau_{cg,\,20}$ twenty years in the future. Normalize the fund's share price prior to the distribution to equal one dollar.

Consider an investor who makes a one dollar investment prior to the capital gain distribution. She purchases one share of the fund, which makes her liable for tax on a capital gain distribution of d dollars. This tax equals τ_{cg}*d. As a result of the distribution, her taxable basis in the fund rises to 1+d. When the fund distributes d dollars per share, its per share price drops from 1 to 1-d. If the investor reinvests the distribution in the fund and draws on other resources to pay her capital gains tax bill, she will have 1+d/(1-d) = 1/(1-d) shares after the distribution. If the fund's assets appreciate at an annual rate of g, then after twenty years the value of the investor's shares will be $(1+g)^{20}$. Her capital gains tax due at the time of sale will equal $\tau_{cg}*[(1+g)^{20} - (1+d)]$. The present value of the tax due on the mutual fund purchase and sale, combining the tax due on the initial distribution and that due when the shares are sold, is:

(1) $$TAX_{\text{buy before distribution}} = \tau_{cg}*d + (1+r)^{-20}*\tau_{cg}*[(1+g)^{20} - (1+d)].$$

This tax burden can be compared with the corresponding burden of another investor who invested one dollar in the same mutual fund immediately after the capital gain distribution. Assume that this investor earns the same pretax returns as the investor who bought prior to the distribution. The value of this investor's holding after twenty years is also $(1+g)^{20}$. In this case, however, the

taxable basis is one dollar, so her capital gains tax liability at the time of sale is $\tau_{cg}*[(1+g)^{20} - 1]$. The present value of her tax payment in this case is:

(2) $TAX_{\text{buy after distribution}} = (1+r)^{-20}*\tau_{cg}*[(1+g)^{20} - 1]$.

The difference between these two present value tax measures equals $\tau_{cg}*d*[1-(1+r)^{-20}]$. There is a simple intuition for this expression. When an investor purchases a fund just prior to a distribution date, she pays an immediate tax of $\tau_{cg}*d$. When she sells the stock, in this example after twenty years, her capital gains tax liability is reduced by the amount that she initially paid in taxes. Thus the taxpayer is extending an interest-free loan of $\tau_{cg}*d$ to the government. The length of this loan, twenty years, determines the cost of the tax acceleration.

For a fund that distributes eight percent of its net assets, a nominal twenty-year interest rate of five percent, and a capital gains tax rate of 20 percent, the lowest top capital gains tax rate during our sample period, the difference equals 0.0099, or just under one percent of the value of the fund purchase. Buying the fund before the distribution is equivalent to paying a 100 basis point load. This "tax load" is an artifact of the tax treatment of mutual funds and their shareholders.

The tax cost of purchasing prior to a taxable distribution is lower when the investor may sell her mutual fund shares shortly after the distribution date, since this reduces the length of the deferral period. We can illustrate this effect by allowing the mutual fund investor to have a probability p of selling her fund shares in each year, conditional on not having sold them by that date. The sale probability is assumed to be independent of the return history of the security; this is an important over-simplification. In this case the expected present discounted value of the difference between the tax burden from buying just before, and just after, a taxable distribution of d is:

(3) $EPDV(p, r, d, \tau_{cg})_{\text{tax differential from distribution}} = \tau_{cg}*d - \Sigma_{j=1}\, p*(1-p)^{j-1}*\tau_{cg}*d*(1+r)^{-j} = \tau_{cg}*d*[r/(r+p)]$.

Note that when p = 1, so that the mutual fund position will be sold with certainty one year after it is purchased, this expression reduces to $\tau_{cg}*d*[r/(1+r)]$. This is the cost, in present value terms, of loaning the tax authority $\tau_{cg}*d$ for one year without interest.

Table 1 reports the value of this expression (3), scaled in this case by d so that the entries show the increased tax burden from buying before a distribution as a fraction of the size of the distribution, for a variety of discount rates, annual turnover probabilities, and capital gains tax rates. The results illustrate that the incremental tax burden as a fraction of the distribution can be substantial when the probability of sale is very low and the nominal discount rate is high. When the sale probability per year is only two percent, for example, and the nominal interest rate is nine percent, and the tax rate on long-term gains is 15 percent, the share of the current tax burden associated with buying a fund share before the distribution date that is an increase in present value tax burden is 12.3 percent. In other cases with lower long-term discount rates, or higher trading probabilities, the tax burden associated with buying before the distribution date is much smaller. Chay, Choi, and Pontiff (2006) provide market-based evidence of the valuation of

Articles by financial planners often warn investors to be aware of purchasing open-end mutual funds before large capital gain distributions. If taxable investors heed such warnings, then after a fund announces a distribution, purchases by taxable investors should decline until after the distribution occurs. Prospective investors may re-time their purchases of shares in the fund making a distribution, and purchase shares after the distribution, or they may purchase shares in a different fund. This is one of the issues we explore below.

2. Account-Level Data on Mutual Fund Shareholders

To study how mutual fund investors alter their patterns of fund purchases and fund sales around distribution dates, we examine summary data on the behavior of mutual fund investors at a single no-load open-end mutual fund complex. The anonymous fund family that provided the data operates with fees and policies that are comparable to industry standards. The fund complex includes approximately ten funds, including both equity and fixed-income funds. We limit our analysis to trades in the equity funds. These funds tend to hold small stocks rather than a broadly diversified market portfolio. These data are the basis for Johnson's (2004, forthcoming) studies of the

heterogeneity in the trading patterns of different investors. There are nearly 50,000 accounts, and close to one million mutual fund transactions, in the database.

The transfer agent for the mutual fund family provided a database consisting of nearly one million transactions in the family of funds between late 1994 and mid-2000. The database includes information on the registration information for each account, as well as on daily net asset values (NAVs) and distributions for each fund. It also records whether shareholders rely on direct or indirect distribution channels for their fund shares. Direct shareholders have completed the fund family's registration materials while indirect shareholders invest through a "fund supermarket" or a brokerage firm. The dataset does not contain information on the individual attributes of the shareholders who trade fund shares indirectly, in particular on whether the account is a tax-deferred account such as an Individual Retirement Account. For the direct shareholders, however, it is possible to distinguish tax-deferred accounts. This is essential to our strategy for identifying the effects of taxes.

Information on individual fund trades is aggregated to create daily gross inflows and gross outflows for each fund. Bergstresser and Poterba (2002) demonstrate the importance of distinguishing gross inflows from gross outflows, rather than analyzing only net flows to equity mutual funds. Each flow variable that we consider is defined as a fraction of the fund's net assets at the close of business on the previous day.

Table 2 presents summary statistics on both inflows and outflows to the equity funds in our sample. The first two rows present aggregate information, while the last four focus only on flows from direct investors, who we can identify as trading in a taxable or a tax-deferred account. The average daily inflow is 0.0053 times fund assets, or just over one half of one percent. The average daily outflow is 0.0028 times fund assets, so the net flow to the funds in our sample averages about one quarter of one percent of assets per day. Johnson (2005) compares this finding with other statistics for mutual funds analyzed in other studies, and concludes that these funds are attracting more assets than a typical fund. The average inflow and outflow information conceals substantial variance in daily inflows and outflows. The median inflow and outflow as a fraction of asset value are nearly

identical, and the disparity between the mean and median values of the flow/assets ratios suggests substantial dispersion in the flow variables.

The dispersion of flow values raises concerns about the potential influence of outlying observations on our econometric findings. We therefore construct a trimmed data sub-set by dropping the largest five percent and the smallest five percent of the inflows and outflows. We use the resulting data set, which is ten percent smaller than the full sample, in a number of our analyses below. The threshold for a daily inflow to be in the upper five percent of all days is an inflow of 3.67 percent of fund assets, or roughly seven times the mean daily inflow. The outflow distribution is less skewed. The cutoff point for the top five percent of the outflow distribution is an outflow of 1.77 percent of fund assets.

Table 2 also disaggregates inflows and outflows for the sub-sample of transactions in directly held accounts. This is the subsample of accounts for which the account owner is identifiable, and for which it is also possible to identify whether the account is a taxable or a tax-deferred account. The transactions that are not from directly-held accounts may be processed through mutual fund superstore or through brokerage accounts. The summary statistics reveal that on average the transactions through indirect accounts represent about three quarters of the inflows to the funds in our sample, and a higher fraction of the outflows. The flow measure that we report for inflows from directly held accounts divides this inflow measure by total fund assets, so that the mean inflow to retail taxable and retail tax-deferred accounts could be added together to find the total inflow to all retail accounts. These summary statistics raise the interesting possibility that mutual fund sales are disproportionately likely in accounts that are managed by financial intermediaries.

Table 2 presents summary information on fund inflows. Several other attributes of the data sample we analyze bear discussion. The average daily return on the equity funds in our sample is , but In addition to the summary information in Table 1, several other types of data underlie our analysis. With respect to fund returns, the mean equity return on the funds in our sample is 0.084 percent per day. Multiplying by an average of 252 trading days per year, this translates to an average annual

return of 21.2 percent. The standard deviation of returns is 1.24 percent per day. This corresponds to an annual standard deviation of 19.7 percent for fund returns. The corresponding benchmark returns for the equity funds in our sample average 16.6 percent, with an annual standard deviation of 16.6 percent. Thus the average return on the sample funds exceeded the benchmark returns, but with significantly greater volatility.

In most years, each of the funds in our sample makes a single distribution in December, although there are several years in which some funds make two distributions. When there are two distributions, the first distribution usually occurs in the second half of the year, and the second occurs in December. To assess the extent to which the fund family we study is representative of other fund families, we tabulated the distribution of months when equity mutual funds made distributions in calendar year 2000. December is the most common distribution month: 38.3 percent of all fund distributions occur in December. June is the next most popular month, with 11.4 percent of distributions occurring then, and March (10.2 percent) and September (9.8 percent) are next. The median fund distribution was 3.6 percent of NAV. The average distribution is approximately five percent of fund assets, although several distributions are substantially larger.

3. Returns, Distribution Dates, and Fund Inflows and Outflows

Our analysis of fund inflows and outflows builds on previous work, such as Sirri and Tufano (1998) and Bergstresser and Poterba (2002), which suggests that net fund inflows are sensitive to fund returns. Johnson (2005) presents findings based on the data set we analyze that confirm this relationship for the equity funds in the fund family we analyze. We build on previous work by allowing for unusual trading patterns around distribution dates, but we need to recognize the relationship between fund inflows, fund outflows, and past returns.

3.1 Specification Issues

There are three important choices with regard to the empirical specification of a model for fund flows: the choice of return measures, the lag structure for past returns, and the use of net or gross fund flows. With regard to the first issue, the simplest specification would relate the gross inflow to or

gross outflow from fund i to the lagged return on fund i, denoted $R_{i,t}$. A more expansive specification could include lagged values of fund returns as well as lagged returns on the aggregate equity market or on the fund's benchmark, which we denote by $R_{m,t}$ and $R_{b,t}$, respectively. Yet another possible specification would replace the lagged fund returns and lagged market or benchmark returns by the difference between the fund return and one of these alternative returns. While we focus on econometric models that include lagged fund returns and lagged benchmark returns, but we report sensitivity analysis to other specifications as well.

The second specification issue we consider is the choice of lag structure for returns. In principle one could allow separate coefficients on many lagged returns in a specification like:

$$(4) \qquad \text{NET INFLOW}_{i,t} = \alpha + \sum_{j=0,250} \beta_j * R_{i,t-j} + \sum_{j=0,250} \gamma_j * R_{m,t-j} + \sum_{k=-4,4} \lambda_k * \text{WEEK}_{i,k,t} + \varepsilon_{i,t-j.}$$

In this equation, $\text{WEEK}_{i,k,t}$ is set equal to 1 if day t occurs in a week that is k weeks prior to a distribution date for fund i. Our study is primarily concerned with the coefficients $\{\lambda_k\}$. Even with daily data on fund flows, a specification such as (4) uses up many degrees of freedom if the lag length is substantial. To allow lagged returns to affect fund inflows and outflows for periods as long as a year, but to reduce the number of parameters that we estimate, we constrain the return coefficients at long lags. Specifically, we allow separate coefficients for the flow effect of returns on each of the previous five days, then constrain all returns in the previous three weeks to have an identical effect by including the average return for the previous fifteen trading days, days t-6 to t-20. We also include the average return in each of the previous five months, and the average return over the period between 7 and 12 months earlier. In this way returns for the entire previous year enter the specification. Thus, we would include twelve lagged return variables when explaining the inflow to a fund on the first trading day in January. These variables would be five distinct daily returns, for the last five trading days in December, the average daily return over days t-20 through t-6, five variables corresponding to lagged monthly returns, and one variable measuring the average return over the period between the six month interval that is roughly t-252 through t-127. We experimented with inclusion of returns lagged more

than twelve months and never rejected the null hypothesis that the coefficients on such returns were equal to zero.

Table 3 illustrates this basic specification by reporting all of the coefficients from a single regression model in which equation (4) is fit to the net inflows to all of the equity mutual funds in our sample. The net inflow equation is estimated by OLS, with robust standard errors that are consistent even when there is heteroscedasticity. Standard errors are shown in parentheses. The results show that lagged returns on the fund have a positive effect on fund inflows, with the largest effect in the two previous days but very little decay in the effect of returns on net fund inflows at longer lags. The results also show that the return on the benchmark portfolio has a negative effect on fund inflows, so it looks as though investors are performing a relative performance evaluation for the fund.

The final issue of specification concerns the choice between net flows and gross inflows and gross outflows as the dependent variable for analysis. Past studies of mutual fund investor behavior, including those by Bergstresser and Poterba (2002) and Johnson (2004), have highlighted the differences between the sensitivity of inflows and outflows to past returns. In light of this evidence, and since our data make it possible to separate the two flows, we therefore estimate separate regression models for inflows and outflows. Our workhorse specification is a two-equation model of the form:

(5a) $$INFLOW_{i,t} = \alpha_1 + \sum_j \beta_{1j} * R_{i,t-j} + \sum_j \gamma_{1j} * R_{m,t-j} + \sum_{k=-4,4} \lambda_{1k} * WEEK_{i,k,t} + \varepsilon_{1i,t}$$

and

(5b) $$OUTFLOW_{i,t} = \alpha_2 + \sum_j \beta_{2j} * R_{i,t-j} + \sum_j \gamma_{2j} * R_{m,t-j} + \sum_{k=-4,4} \lambda_{1k} * WEEK_{i,k,t} + \varepsilon_{2i,t}.$$

Because similar factors that are omitted from the inflow and the outflow equations are likely to affect both fund flows, for example if favorable or unfavorable news were revealed about the fund family, there is every reason to expect a non-zero covariance between the error terms in the two equations. Because the set of explanatory variables in the inflow and outflow equations are identical, estimating the each equation by ordinary least squares is equivalent to estimating by the Seemingly Unrelated Regression method that recognizes that $Cov(\varepsilon_{1i,t}, \varepsilon_{2i,t}) \neq 0$.

Before turning to our central focus on the differences between inflows and outflows in taxable and non-taxable investor accounts, we present some evidence on the sensitivity of the inflow and outflow models to the choice of alternative specifications of lagged returns. Table 4 presents the coefficients on the various WEEK indicator variables, $\{\lambda_k\}$, from five different specifications of (5a) and (5b) that differ only in the set of lagged return measures that they include. The findings show that the set of coefficients $\{\lambda_k\}$ are similar across specifications. The specification with the highest R2 is the one that includes both fund and market returns, as measured by the CRSP value-weighted index return. A specification with the relative return on the fund versus the market, in which the explanatory variable for returns is the fund return minus the CRSP value-weighted index, has the second highest explanatory power. The next specification is one that includes both the fund return and the benchmark return, unrestricted. Constraining the benchmark return coefficients by including the fund return minus the benchmark return lowers the explanatory power of the equation. Including only the return on the specific fund yields the lowest explanatory power of all of the specifications we considered. While the fit of the various models differs, the coefficients on the indicator variables for weeks around the fund distribution date are very similar across models. That is the key concern for our empirical analysis, and the results suggest that findings about inflow patterns are not likely to be very sensitive to different return specifications.

Recall from our discussion of Table 2 that the dataset we analyze distinguishes transactions in direct accounts, those they have been opened directly with the fund company, from transactions that are submitted by brokers are other financial intermediaries. The latter are "indirect" transactions. We can distinguish direct transactions that tax place in taxable accounts from those that are located in tax-deferred accounts. Since we are interested in identifying how the behavior of taxable investors differs from that of other investors, we focus our analysis on the subset of retail customers who hold accounts directly. To ensure that the patterns that we observe with all inflows and outflows are similar to those for direct investors, Table 5 disaggregates the net flows that we considered in Table 3 into four components that together sum to net inflows: the gross inflow in direct accounts, the gross inflow in

indirect accounts, the gross outflow in direct accounts, and the gross outflow in indirect accounts. The results offer insight on the source of net inflow variation around distribution dates.

The results in Table 5 suggest that inflows in both directly-held and indirectly-held accounts are lower in the four weeks before a distribution date than in the four weeks following a distribution date. Focusing on the results using the trimmed sample, the average of the four coefficients on the indicator variables for the four weeks prior to a distribution is –2.19, compared with -0.56 in the four weeks after the distribution date. For indirectly-held accounts, the absolute difference is almost five times larger, -6.97 versus 1.48, but the standard errors on the coefficients are also somewhat larger than for the directly-held accounts. For outflows, there is evidence of greater outflows after the distribution date for both direct and indirect accounts. For direct accounts, the average of the four pre-distribution coefficients is -0.99, compared with 0.29 for the four subsequent weeks. For indirect accounts the difference is larger, -1.61 versus 1.43. The differences between the pre-distribution and the post-distribution period are even larger when we focus on the full data sample.

3.2 Results Comparing Taxable and Non-Taxable Accounts

The results in Table 5 suggest similar patterns of inflows and outflows around the distribution dates for both direct and indirect accounts. To determine whether taxes contribute to the patterns we observe, we now examine differences between taxable and tax-deferred accounts. Doing this, however, limits our analysis to the sub-sample of directly held accounts, because those are the ones for which we can identify the account's tax status. The hypothesis that taxes contribute to the increase in inflows after distribution dates suggests that we should observe a different pattern of inflows and outflows in taxable and tax-deferred accounts before and after distribution dates. If we observe similar patterns in taxable and tax-deferred accounts, we would then need to search for another factor that influences behavior of both taxable and non-taxable investors.

We estimate a four-equation system with equations for inflows and outflows from taxable accounts, and inflows and outflows from tax-deferred accounts. Table 6 presents our findings with regard to inflows, while Table 7 presents findings on outflows. The results suggest that some taxable

investors recognize the "tax load" of taxable distributions in planning their fund trades. In Table 6, the negative coefficients for taxable inflows prior to a distribution are larger in absolute value than any of the other coefficients, and they are statistically significantly different from zero in most cases. In the trimmed sample, for taxable accounts, the average of the four pre-distribution coefficients is -1.26, while the average for the four weeks post-distribution is -0.30. We reject the null hypothesis that the mean of the coefficients before the distribution date is the same as the mean after the distribution date. There is no evidence of any distortions in inflows in tax-deferred accounts around the distribution date. Once again focusing on the trimmed sample, the mean of the coefficients for the four weeks before the distribution is -0.23, compared with -0.21 after the distribution. The pattern is similar whether we focus on the trimmed sample that excludes outlying observations, or on the full sample. We do not reject the null hypothesis that the pre-distribution and post-distribution coefficients are the same for the tax-deferred accounts.

Table 7 presents comparable statistical models for fund outflows. There is modest evidence of an increase in outflows after distribution dates for both taxable and tax-deferred accounts. For taxable accounts, the trimmed sample yields an average coefficient on the four indicator variables for the weeks before a distribution date of -0.463. For the four weeks after the distribution date, the average value is 0.297. For tax-deferred accounts, the corresponding means are -0.170 and -0.079. We cannot reject the null hypothesis that the coefficients on the tax-deferred accounts are the same before and after the distribution date for either taxable or tax-deferred accounts.

There is a substantial correlation between the errors in the inflow equations for both taxable and non-taxable accounts, but much lower cross-correlations elsewhere. For the system of equations estimated on the full data set, without any trimming of outliers, the correlation between the errors in the two inflow equations is 0.42, while the correlation between the errors in the two outflow equations is only 0.08. The other cross-correlations are small, never exceeding 0.05 in absolute value.

The results presented here are likely to understate the importance of tax-motivated trading, because we do not have any way to identify the part of indirect account activity that is due to taxable

accounts. If there are as many taxable account investors in the indirect trade flow as there are in the direct account category, and if their behavior mirrors that of the direct account holders with taxable accounts, then our foregoing estimates of the impact of distribution dates on inflows would understate the actual effect by a factor of two. A larger relative share of taxable investors in the indirect account category would make the effect even greater.

4. Account Openings and Closures

The foregoing results on total gross fund inflows and outflows do not distinguish changes in the behavior of existing account holders from decisions on the part of investors who are opening or closing accounts in the various funds. We explore this issue by studying the number of accounts opened and closed around distribution dates. Because the variable of interest in this case is a positive integer, we model it using a Poisson probability model. This model is widely used in modeling count data such as account openings, but it does impose some restrictive assumptions such as the equality of the mean and variance of the distribution. We shift from daily to weekly time intervals for this analysis. The probability of observing k account openings in a given week is given by $\Pr(Y = k) = e^{-\lambda}\lambda^k/k!$. In this case the expected number of account openings per week is λ. We allow λ to vary as a function of week-specific covariates X_i for week i, and we parameterize $\lambda = e^{X_i\delta}$. We estimate the parameter vector δ by maximum likelihood. We use the same covariates as in our models for fund inflows and outflows: fund-specific intercepts, a set of variables capturing lagged fund and benchmark returns, and a set of indicator variables for up to four weeks before and after a fund distribution date.

It is difficult to interpret the coefficient values for δ, but it is straightforward to consider the ratio of the expected number of account openings when an indicator variable for a particular week is unity to the expected value when that variable is zero. This ratio is $\lambda(X_{i,j} = 1)/\lambda(X_{i,j} = 0) = e^{\delta j}$. It is sometimes called the incidence rate ratio.

Table 8 reports estimates of both the incidence rate ratio and its standard error. In our sample, the mean number of taxable retail account openings per week is 23.3, and the mean number of tax-deferred retail account openings is 6.9. The number of weekly closures averages 17.0 and 4.6,

respectively, so on average the number of accounts is rising during our sample. For taxable retail accounts, the incidence rate ratios for the indicator variables for the four weeks before the distribution date average 0.235, while those for the four weeks after the distribution dates these ratios average 0.736. This suggests that the average number of accounts taxable opened in the month after a distribution date is about three times greater (0.736/0.235 = 3.13) than the number of accounts opened in the month prior to the distribution date. We reject the null hypothesis that the incidence rate ratio is the same before and after the distribution date. The results suggest that taxable investors defer opening new accounts until after the distribution date.

Table 8 also presents results for tax-deferred accounts. There is also evidence of an increase in the number of accounts opened after a distribution, but the disparity between the pre-distribution and post-distribution incidence rate ratios is smaller than for taxable accounts. The average of the four pre-distribution coefficients for tax-deferred account openings is 0.516, compared with 0.749 for the post-distribution period. Thus the ratio of account openings in the four weeks after the distribution date, relative to the four weeks before, is 1.45. There is consequently a more pronounced increase in account openings for taxable than for tax-deferred accounts. The statistically significant difference between the rate of account opening for taxable and tax-deferred accounts is nevertheless a phenomenon that cannot be explained on the basis of tax considerations, since there are no tax incentives for deferred account opening in tax-deferred accounts. One notable feature of the account opening model is that there are more openings around distribution dates, both before and after, than at other times during the year. The incidence rate ratios for both before and after are positive, which means greater account activity.

In addition to information on account openings, Table 8 also presents information on account closures. For taxable accounts, there is an increase in account closures after the distribution date. The incidence rate ratio is 0.96 in the four weeks prior to a distribution date, and it rises to 1.50 in the four weeks after a distribution rate. This suggests roughly a fifty percent increase in closures after in the weeks after a distribution. For accounts held in tax-deferred form, there is virtually no corresponding

increase. Over the four weeks prior to a distribution date, the incidence rate ratio averages 1.06, and over the subsequent four weeks, it averages 1.08. There is no statistically-significant change in the rate of account closures in tax-deferred accounts before or after a realization date.

5. Conclusion and Future Directions

Our findings with respect to the inflows in taxable mutual fund accounts and the decisions of taxable investors about opening new mutual fund accounts are consistent with some investors being aware of the tax consequences of investing in mutual funds prior to taxable capital gain distributions, and modifying their behavior to avoid these effects. Our results suggest that the behavioral effects of taxes are statistically significant, although they are substantively modest.

One important question about our findings is the extent to which they generalize to the broader universe of mutual fund investors. Since the results are based on data from only one mutual fund family, there is a risk that they may not be representative of the broad population of mutual fund investors. Johnson (2005) addresses this issue and suggests that the observed pattern of inflows at the fund family we study is similar to that at other fund families, as documented in previous research. The average turnover rate for the equity funds in our sample is also similar to that for other funds, which also supports the possibility of generalizing these results. It is possible that because our tests focus on the behavior of direct investors, they may not generalize to the behavior of investors who trade through brokers or fund supermarkets. It is impossible to definitively resolve the question of whether the findings based on this fund family are unusual without similar data from other fund families, ideally with different types of fund offerings and different potential investor clienteles.

The results bear on two issues in financial economics that are more general than the behavior of fund investors around mutual fund distribution dates. First, they suggest that the clientele of investors holding securities around distribution dates may be affected by the presence of the distribution. The central empirical question is whether variation in the investor clientele around such event dates is large enough to influence summary measures such as the share price drop on ex-dividend days for dividend-paying common stocks. Our findings suggest relatively modest changes in

trading patterns in the family of mutual funds that we study, but it is possible that larger distributions would trigger larger changes in investor behavior.

Second, the results relate to ongoing public policy discussions about the tax treatment of mutual fund distributions and mutual fund shareholders more generally. Numerous proposals, discussed for example in the Joint Economic Committee (2001), suggest modifying the taxation of investors who receive mutual fund distributions to allow for deferral of the gains on such distributions. In recent years, the competition between traditional open-end mutual fund and exchange traded funds (ETFs), most of which avoid taxation of realized gains by using redemption-in-kind distributions as described in Poterba and Shoven (2002), has drawn new attention to this issue. Fama and French (2006) write that this difference between ETFs and traditional mutual funds "gives ETFs a substantial advantage over traditional open-end funds in the competition for customers." Our results provide evidence that the current taxation of distributions does affect investor behavior. A central but unresolved question is whether the efficiency costs of the resulting distortions are large. If investors simply delay the purchase of a particular mutual fund by a few days or weeks, the efficiency cost can be evaluated by the cost of holding an alternative portfolio that is not the desired one for a modest period of time. The potentially larger efficiency cost, which is also more difficult to evaluate, is the cost associated with investors choosing not to hold taxable mutual funds because of their tax treatment, and holding alternative assets instead.

This paper offers some insight on the behavior of individual investors around pre-announced taxable distribution dates. Because the underlying data are drawn from the administrative records of a single financial services firm, however, it is not possible to track changes within household portfolios. We cannot, for example, analyze whether purchases of mutual fund shares typically coincide with reductions in cash balances, such as funds in money market accounts or checking accounts, or whether they are financed by selling other investments that might be categorized as long-term. At least for the United States, we are not aware of any data sets that make it possible to address more detailed questions of this form.

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Table 1: Present Discounted Value of Tax Saving from Trading After vs. Before Taxable Distribution, Fraction of Fund Distribution

Nominal Discount Rate	Annual Turnover Rate = .02		Annual Turnover Rate = .05		Annual Turnover Rate = .25	
	$\tau_{cg} = .15$	$\tau_{cg} = .28$	$\tau_{cg} = .15$	$\tau_{cg} = .28$	$\tau_{cg} = .15$	$\tau_{cg} = .28$
3%/year	0.090	0.168	0.056	0.105	0.016	0.030
6%/year	0.113	0.210	0.082	0.153	0.029	0.054
9%/year	0.123	0.229	0.096	0.180	0.040	0.074

Source: Authors' calculations as described in the text.

Table 2: Summary Statistics on Daily Fund Inflows and Outflows

	All Observations			Sample Excluding 5% Upper Tail and 5% Lower Tail		
	Mean	Median	Standard Deviation	Mean	Median	Standard Deviation
Inflow	53.02	14.17	295.02	27.39	13.02	37.71
Outflow	27.56	14.39	56.01	19.65	13.72	177.24
Retail Taxable Accounts – Inflow	8.23	0.70	89.52	2.87	0.59	5.47
Retail Taxable Accounts - Outflow	2.83	1.21	6.57	2.08	1.15	2.53
Retail Tax-Deferred Accounts – Inflow	4.78	0.21	119.19	1.24	0.17	2.92
Retail tax-Deferred Accounts- Outflow	1.27	0.19	3.76	0.87	0.18	1.59

Source: Authors' tabulations as described in the text. Each inflow and outflow measure is a daily measure as a percentage of the fund's net asset value at the end of the previous day. The resulting ratio is multiplied by 10,000 so that an entry of 53.02 implies inflows/assets of .0053, or just over one half of one percent of assets.

Table 3: Illustrative Model for Net Equity Fund Inflows

Panel A: Indicator Variables for Weeks Before and After Fund Distribution Date				
	1 Week	2 Weeks	3 Weeks	4 Weeks
Before Distribution	-26.94 (7.63)	-17.50 (7.69)	-20.02 (4.83)	-17.42 (5.03)
After Distribution	-11.03 (6.96)	-14.51 (5.91)	-17.08 (4.48)	-13.99 (7.21)
Panel B: Effect of Lagged Fund and Benchmark Returns on Fund Net Inflows				
	Lagged Fund Return		Lagged Benchmark Return	
Day t-1	8.98 (1.78)		-3.04 (1.78)	
Day t-2	5.45 (1.62)		-3.44 (1.73)	
Day t-3	5.11 (1.33)		-1.57 (1.31)	
Day t-4	4.85 (1.80)		-3.89 (1.76)	
Day t-5	3.78 (1.42)		-1.69 (1.47)	
Days t-6 through t-20	2.73 (0.38)		-1.70 (0.36)	
Month t-2	2.90 (0.43)		-2.10 (0.39)	
Month t-3	2.77 (0.31)		-3.11 (0.38)	
Month t-4	3.68 (0.52)		-3.83 (0.51)	
Month t-5	3.49 (0.43)		-3.65 (0.61)	
Month t-6	3.96 (0.48)		-3.70 (0.57)	
Months t-7 through t-12	2.44 (0.23)		-2.43 (0.25)	

Notes: The dependent variable is the net inflow dividend by fund net asset value, multiplied by 10,000. The first coefficient therefore translates into a 26 basis point decline in fund inflows in the week immediately prior to a fund distribution. Robust standard errors are shown in parentheses.

Table 4: Robustness of Estimates of Gross Inflows and Gross Outflows in Weeks Before and After Distribution Dates to Alternative Control Strategies for Fund and Market Returns

	Fund Returns	Fund & Benchmark Returns	Fund & Market Returns	Fund – Benchmark Returns	Fund – Market Returns
Inflows, Weeks Relative to Distribution (T)					
T – 4	-5.84 (2.42)	-8.45 (2.37)	-7.12 (2.38)	-9.64 (2.35)	-7.14 (2.35)
T – 3	-6.29 (2.37)	-9.43 (2.33)	-8.50 (2.35)	-10.13 (2.32)	-8.06 (2.31)
T – 2	-7.74 (2.44)	-10.51 (2.40)	-8.53 (2.41)	-11.75 (2.37)	-9.33 (2.37)
T – 1	-6.40 (2.80)	-8.24 (2.76)	-6.38 (2.78)	-9.78 (2.70)	-7.53 (2.72)
T + 1	2.88 (2.96)	0.20 (2.90)	1.50 (2.90)	-2.37 (2.85)	0.63 (2.86)
T + 2	9.33 (2.43)	5.81 (2.41)	5.48 (2.42)	4.16 (2.35)	7.33 (2.35)
T + 3	2.84 (2.34)	-0.05 (2.31)	0.66 (2.39)	-1.07 (2.28)	1.70 (2.28)
T + 4	-0.78 (2.43)	-2.28 (2.38)	-1.24 (2.39)	-2.21 (2.36)	0.24 (2.36)
R2	0.105	0.166	0.166	0.151	0.147
Outflows, Weeks Relative to Distribution (T)					
T – 4	-6.16 (1.52)	-4.64 (1.54)	-4.46 (1.52)	-3.90 (1.51)	-5.37 (1.50)
T – 3	-3.97 (1.49)	-2.43 (1.51)	-2.25 (1.51)	-1.99 (1.49)	-2.83 (1.47)
T – 2	-3.25 (1.54)	-1.63 (1.55)	-2.32 (1.54)	-1.31 (1.53)	-2.61 (1.51)
T – 1	-3.51 (1.76)	-1.60 (1.78)	-2.48 (1.78)	-1.46 (1.74)	-3.01 (1.73)
T + 1	-0.96 (1.86)	0.72 (1.88)	0.55 (1.86)	1.12 (1.84)	-0.53 (1.82)
T + 2	3.21 (1.53)	4.75 (1.56)	4.11 (1.55)	4.57 (1.51)	3.52 (1.50)
T + 3	-1.13 (1.47)	0.047 (1.49)	0.01 (1.49)	0.06 (1.47)	-0.77 (1.45)
T + 4	0.27 (1.53)	1.38 (1.54)	1.07 (1.53)	0.97 (1.52)	-0.03 (1.50)
R2	0.059	0.072	0.090	0.062	0.081

Note: Standard errors are shown in parentheses. All equations include fund-specific intercepts as well as the indicated returns for the previous five days, the next 15 days, and then months t-2, t-3, t-4, t-5, and t-6, and the previous six months. Inflow and outflow equations are estimated in each case by Seemingly Unrelated Regression (SUR). The equations are estimated with daily observations from fall 1994 through summer 2000, trimming the sample to exclude the 5% highest and lowest tail inflows and outflows. See text for further discussion.

Table 5: Fund Inflows and Outflows in Directly-Held and Indirectly-Held Accounts

Independent Variable	Direct Accounts		Indirect Accounts	
	All Observations	Excluding Extreme Flows	All Observations	Excluding Extreme Flows
INFLOWS, Weeks Relative to Distribution (T)				
T – 4	-4.427 (2.143)	-1.429 (0.859)	-18.504 (7.559)	-7.011 (2.040)
T – 3	-5.352 (2.072)	-2.369 (0.846)	-18.956 (7.307)	-7.064 (2.007)
T – 2	-6.111 (2.098)	-3.513 (0.868)	-13.153 (7.403)	-7.000 (2.059)
T – 1	-3.501 (2.446)	-1.437 (0.999)	-15.027 (8.628)	-6.805 (2.371)
T + 1	12.049 (2.534)	-0.168 (1.051)	-10.666 (8.941)	0.365 (2.492)
T + 2	-0.608 (2.126)	-0.169 (0.874)	-4.286 (7.500)	5.980 (2.074)
T + 3	-1.290 (2.054)	-0.684 (0.836)	-15.011 (7.249)	0.604 (1.982)
T + 4	-3.243 (2.111)	-1.237 (0.864)	-9.402 (7.445)	-1.044 (2.049)
R2	0.097	0.095	0.082	0.150
OUTFLOWS, Weeks Relative to Distribution (T)				
T – 4	-1.474 (2.172)	-1.253 (0.597)	-3.736 (3.740)	-3.416 (1.351)
T – 3	-1.889 (2.100)	-1.327 (0.587)	-2.509 (3.616)	-1.128 (1.329)
T – 2	-1.097 (2.127)	-0.717 (0.602)	-0.826 (3.663)	-0.921 (1.364)
T – 1	0.154 (2.480)	-0.644 (0.694)	8.310 (4.270)	-0.965 (1.571)
T + 1	14.296 (2.569)	-1.020 (0.729)	-1.245 (4.424)	1.742 (1.651)
T + 2	4.377 (2.155)	0.652 (0.607)	5.411 (3.711)	4.107 (1.374)
T + 3	2.845 (2.083)	0.444 (0.580)	-2.226 (3.587)	-0.401 (1.313)
T + 4	1.308 (2.140)	1.085 (0.560)	-0.040 (3.684)	0.282 (1.357)
R2	0.021	0.108	0.032	0.057

Note: Standard errors are shown in parentheses. All equations also include indicator variables for each of the funds in the sample, as well as fund and benchmark returns in the five prior days, and months t-1, t-2, t-3, t-4, t-5, and t-6, and the in the year prior to the distribution. The equations in the first and third columns are estimated with the full sample of daily observations between fall 1994 and summer 2000; those in columns two and four are estimated using the sample that trims this data set to exclude the largest 5% of inflows and the largest 5% of outflows. See text for further discussion.

Table 6: Fund Inflows from Taxable and Tax-Deferred Retail Accounts

Independent Variable	Taxable Retail Accounts		Tax-Deferred Retail Accounts	
	All Observations	Excluding Extreme Flows	All Observations	Excluding Extreme Flows
Weeks Relative to Distribution (T)				
T – 4	-3.024 (1.118)	-0.977 (0.281)	-0.013 (0.508)	-0.053 (0.186)
T – 3	-3.667 (1.081)	-1.225 (0.266)	-0.441 (0.491)	-0.478 (0.176)
T – 2	-4.259 (1.095)	-1.506 (0.266)	-1.155 (0.498)	-0.351 (0.176)
T – 1	-2.944 (1.276)	-1.331 (0.318)	-0.801 (0.580)	-0.042 (0.211)
T + 1	-1.532 (1.322)	-0.370 (0.325)	-0.587 (0.601)	-0.085 (0.215)
T + 2	-0.573 (1.109)	0.063 (0.298)	-0.332 (0.504)	-0.431 (0.190)
T + 3	-0.711 (1.072)	-0.384 (0.268)	-0.779 (0.487)	-0.083 (0.177)
T + 4	-1.889 (1.101)	-0.508 (0.281)	-1.039 (0.501)	-0.230 (0.185)
Fund Return				
Day t-1	-17.021 (21.154)	-7.486 (5.413)	1.218 (9.618)	0.312 (3.579)
Day t-2	29.847 (21.165)	-2.238 (5.251)	8.042 (9.622)	0.302 (3.472)
Day t-3	12.655 (21.186)	9.361 (5.392)	6.427 (9.632)	4.474 (3.565)
Day t-4	36.168 (21.213)	9.111 (5.349)	10.187 (9.645)	2.683 (3.537)
Day t-5	57.154 (21.197)	2.174 (5.389)	10.762 (9.637)	-6.521 (3.563)
Month Before Distribution	26.243 (5.131)	4.024 (1.302)	8.711 (2.333)	0.483 (0.860)
Benchmark Return				
Day t-1	17.489 (24.091)	4.978 (6.002)	5.544 (10.953)	3.622 (3.969)
Day t-2	-11.148 (24.198)	2.670 (5.924)	2.632 (11.002)	4.738 (3.917)
Day t-3	0.271 (24.204)	-5.588 (5.985)	-8.654 (11.004)	-6.306 (3.957)
Day t-4	-21.215 (24.226)	-3.291 (5.983)	-5.141 (11.015)	-1.554 (3.956)
Day t-5	-38.137 (24.088)	-2.660 (5.983)	-8.554 (10.952)	2.468 (3.956)
Month Before Distribution	-15.727 (5.891)	-1.807 (1.461)	-8.146 (2.678)	-0.515 (0.966)
R2	0.132	0.129	0.068	0.049

Note: Standard errors are shown in parentheses. All equations include fund-specific intercepts as well as fund and benchmark returns in months t-2, t-3, t-4, t-5, and t-6, and the in the year prior to the distribution. The equations in the first and third columns are estimated with daily observations from fall 1994-summer 2000, while those in columns two and four exclude the 5 percent of the observations with the largest inflows and outflows. See text for further discussion.

Table 7: Fund Outflows from Taxable and Tax-Deferred Retail Accounts

Independent Variable	Taxable Retail Accounts		Tax-Deferred Retail Accounts	
	All Observations	Excluding Extreme Flows	All Observations	Excluding Extreme Flows
Weeks Relative to Distribution (T)				
T – 4	0.113 (0.590)	-0.634 (0.236)	-0.511 (0.287)	-0.252 (0.148)
T – 3	-0.750 (0.570)	-0.422 (0.223)	-0.168 (0.277)	-0.281 (0.141)
T – 2	-0.773 (0.578)	-0.677 (0.223)	-0.323 (0.281)	-0.136 (0.140)
T – 1	-0.049 (0.673)	-0.116 (0.267)	0.058 (0.327)	-0.011 (0.168)
T + 1	-0.457 (0.697)	-0.042 (0.272)	-0.386 (0.339)	0.090 (0.172)
T + 2	1.599 (0.585)	0.302 (0.241)	-0.281 (0.285)	-0.234 (0.152)
T + 3	2.420 (0.566)	0.296 (0.225)	-0.122 (0.275)	-0.204 (0.141)
T + 4	1.016 (0.581)	0.594 (0.235)	0.011 (0.283)	0.031 (0.148)
Fund Return				
Day t-1	-33.878 (11.160)	-18.814 (4.535)	-12.204 (5.429)	-0.400 (2.856)
Day t-2	-8.293 (11.165)	-10.434 (4.399)	5.266 (5.431)	-2.621 (2.771)
Day t-3	-2.673 (11.176)	-6.606 (4.517)	-21.315 (5.437)	-8.541 (2.845)
Day t-4	-7.384 (11.190)	-9.726 (4.481)	3.320 (5.444)	2.789 (2.822)
Day t-5	-11.197 (11.182)	-10.681 (4.514)	-3.101 (5.440)	-7.928 (2.843)
Month Before Distribution	-8.805 (2.706)	-7.854 (1.091)	-7.040 (1.317)	-4.460 (0.687)
Benchmark Return				
Day t-1	30.214 (12.708)	14.785 (5.029)	7.831 (6.182)	-1.989 (3.167)
Day t-2	1.097 (12.765)	4.856 (4.963)	-11.619 (6.210)	-0.672 (3.126)
Day t-3	-0.990 (12.768)	1.214 (5.014)	10.016 (6.211)	2.464 (3.157)
Day t-4	8.147 (12.780)	7.443 (5.102)	-4.291 (6.217)	-5.866 (3.157)
Day t-5	-4.330 (12.707)	4.594 (5.012)	5.542 (6.182)	6.663 (3.157)
Month Before Distribution	8.876 (3.107)	6.031 (1.224)	3.919 (1.512)	3.043 (0.771)
R2	0.050	0.163	0.036	0.049

Note: Standard errors are shown in parentheses. All equations include fund-specific intercepts as well as fund and benchmark returns in months t-2, t-3, t-4, t-5, and t-6, and the in the year prior to the distribution. The equations in the first and third columns are estimated with daily observations from fall 1994-summer 2000, while those in columns two and four exclude the 5 percent of the observations with the largest inflows and outflows. See text for further discussion.

Table 8: Account Opening and Closing Patterns Around Distribution Dates

Independent Variable for Weeks Relative to Distribution Date	Taxable Retail Accounts – Year Effects		Tax-Deferred Retail Accounts – Year Effects	
	Openings	Closings	Openings	Closings
T – 4	0.252 (0.023)	1.019 (0.048)	0.479 (0.054)	0.967 (0.087)
T – 3	0.260 (0.022)	0.997 (0.048)	0.458 (0.051)	1.264 (0.101)
T – 2	0.235 (0.020)	0.929 (0.046)	0.536 (0.053)	1.041 (0.091)
T – 1	0.192 (0.018)	0.875 (0.045)	0.592 (0.056)	0.984 (0.087)
T + 1	0.618 (0.034)	1.277 (0.054)	0.828 (0.074)	0.854 (0.081)
T + 2	0.790 (0.041)	1.550 (0.064)	0.741 (0.067)	1.007 (0.092)
T + 3	0.721 (0.038)	1.751 (0.068)	0.711 (0.065)	1.212 (0.102)
T + 4	0.813 (0.039)	1.409 (0.061)	0.716 (0.064)	1.253 (0.105)
Pseudo-R2	0.497	0.259	0.405	0.104

Note: Entries are implied incidence rate ratios calculated from Poission "regression" models estimated by maximum likelihood. Equations are estimated on weekly data for account openings and closings from fall 1994 through summer 2000. Standard errors for the incidence rate ratios are shown in parentheses.