The Costs and Benefits to Fund Shareholders of 12b-1 Plans: An Examination of Fund Flows, Expenses and Returns

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Executive Summary

Rule 12b-1, promulgated pursuant to the Investment Company Act of 1940, allows mutual fund advisers to make payments from fund assets for the costs of marketing and distribution of fund shares under the auspices of 12b-1 plans. The original justification for the plans, as put forth by the mutual fund industry in the 1970s, was that such fees help attract new shareholders into funds through advertising and by providing incentives for brokers to market the fund. Arguably, asset growth from any means benefits shareholders through economies of scale in management expenses and lower flow volatility, which decreases liquidity costs for the fund. If, through 12b-1 plans, funds are able to increase the rate at which their assets grow, then shareholders may be able to attain these cost reductions sooner than by investing in a fund with no 12b-1 plan. However, the costs must decrease sufficiently to cover the cost of the plan, and the benefits of the cost reductions must be passed onto shareholders, or shareholders will not be better off.

Opponents of the rule argue that there is no evidence that 12b-1 plans are successful at growing funds or that shareholders benefit from such plans. Furthermore, they argue that there is a conflict of interest from allowing fund advisers to use fund assets to pay for attracting new investors, since fund advisers earn fees based on assets under management.

This paper addresses whether 12b-1 plans are successful in leading to faster asset growth and whether the shareholders that pay for 12b-1 plans receive any net benefits from the plans. The paper finds that while funds with 12b-1 plans do, in fact, grow faster than funds without them, shareholders are not obtaining benefits in the form of lower average expenses or lower flow volatility. Fund shareholders are paying the costs to grow the fund, while the fund adviser is the primary beneficiary of the fund's growth.

I. Introduction

Since their inception in 1980, 12b-1 plans,[1] designed to provide a fund adviser with resources to pay for the distribution and marketing of a fund, have been marked by controversy. However, in recent months, lawmakers, investor advocacy groups and the financial press have elevated the din to a dull roar.[2] Spurred by the revelation of scandals in the mutual fund industry, such as late trading, market timing and selective disclosure of portfolio holdings, several aspects of the mutual fund industry are being examined, including shareholder fees.

Fund advisers annually deduct 12b-1 fees from fund assets. According to an ICI survey of 95 member funds in 1999, 63% of 12b-1 fees are used for compensation of broker-dealers and related expenses, 32% are used to cover the administrative expenses of maintaining shareholder accounts, and 5% are used to pay for advertising and sales-promotion expenses.[3]

Thus, the primary use of revenues raised through 12b-1 fees is to create incentives for brokers to distribute the fund. Additionally, advertising increases investor awareness of the fund, which in turn increases flows into the fund.[4] Taken together, the incentives and advertising may stimulate asset growth and thereby lead to scale economies. In theory, asset growth allows the fixed costs of fund management to be spread across more assets, resulting in a lower average cost of fund management per dollar invested.[5] If the

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[1] Investment Company Act Release No. 11414 (October 28, 1980).

[2] For example, see Karl Scannell, "Some Mutual-Fund Fees Face the Smell Test", Wall Street Journal, December 16, 2003; Brooke Masters, "Counting the Cost of Fund Fees", Washington Post, December 4, 2003; Carla Fried, "Pressure Builds To Cut Fund Fees", New York Times, January 11, 2004. Also, in a January 14, 2003 letter to the General Accounting Office, Representatives Michael Oxley and Richard Baker requested a study of "[t]he role of 12b-1 fees, and whether modifications may be needed to rule 12b-1 to reflect changes in the manner in which funds are marketed and distributed." They additionally requested a study of the effectiveness of the rule in providing economies of scale in expenses. In a March 26, 2003 letter to the U.S. Securities and Exchange Commission, Representative Baker called for an analysis of whether the rule should be updated in light of changes in fund distribution practices. Additionally, New York Attorney General Eliot Spitzer is forcing mutual fund companies to lower their fees as part of settlement cases. For instance, Alliance Capital Management agreed to cut fees by 20% and freeze them for five years.

[3] Compensation of broker-dealers and related expenses include payments to broker-dealers for sale of fund shares; reimbursements to the fund's distributor for financing charges arising from advances made to broker-dealers for the sale of fund shares; and compensation of in-house personnel. Administrative expenses include compensation to third parties for record keeping and other services provided to current fund shareholders. Advertising and other sales-promotion activities include expenses for the printing and mailing of prospectuses and sales materials to prospective investors. See "Background Information About 12b-1 Fees", Investment Company Institute Mutual Fund Connections, February 2003.

[4] Jain and Wu (2000) find that funds that advertise receive significantly higher inflows of cash than funds that do not advertise.

[5] It is well documented that there are economies of scale in mutual fund fees at the fund level and the fund complex level. See Latzko (1999), Dermine and Roller (1992), Baumol (1982), Collins and Mack (1997), and Wang (2002).

asset growth is successful, this should translate into a lower expense ratio and higher expected net returns, all other things equal.[6]

Additionally, 12b-1 fee incentives potentially lead to a steady inflow of cash, reducing the volatility of fund deposit and redemption flows. Lower flow volatility may reduce the liquidity costs to the fund's shareholders, increasing expected returns. With low flow volatility, a fund can hold less cash and invest a larger percentage of its assets into higher yielding securities. Furthermore, such funds incur lower transactions costs associated with unexpected flows.

The debate over 12b-1 plans stems from a lack of clear evidence demonstrating that shareholders actually do obtain benefits from the hypothesized asset growth and reduced flow volatility. The use of fund assets to market the fund leads to an inherent conflict of interest between fund advisers and shareholders. Fund advisers earn fees based on assets under management. Asset growth increases the fees collected by the adviser. Thus, while current shareholders incur the costs to grow the fund, it may be that the adviser is the primary beneficiary of the resulting growth.

This paper addresses whether shareholders do, in fact, reap the benefits of 12b-1 plans. Prior studies have provided evidence that shareholders are not receiving sufficient benefits from expense scale economies to offset the 12b-1 fee.[7] In fact most of the studies show that expense ratios are higher for funds with 12b-1 fees by almost the entire amount of the fee. This study confirms these results using a more recent dataset. Moreover, it extends the analysis to the effect of 12b-1 plans on asset growth and flow volatility. The results show that 12b-1 funds do experience higher annual net inflows than comparable non-12b-1 funds. However, it would take decades of sustained growth at typical 12b-1 fund growth rates for a fund to be able to achieve sufficient scale economies to offset 12b-1 fees. Finally, there is no evidence that funds with 12b-1 plans have lower deposit and redemption flow volatility, lower cash balances or higher returns.

In all, the evidence demonstrates that 12b-1 plans are successful at attaining faster asset growth; however, shareholders do not obtain any of the benefits from the asset growth. This result validates the concerns raised by opponents of 12b-1 plans about the conflicts of interest created by these plans.

The above analysis demonstrates that the original justifications for 12b-1 plans are not valid. However, current proponents of 12b-1 plans provide a different

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[6] However, there is some evidence that funds may also experience diseconomies of scale. The diseconomies appear in higher transactions costs from larger position sizes and fewer profitable investment ideas as the fund grows. See e.g. Perold and Salomon (1991) and Chen, Hong, Huang and Kubik (2003).
[7] For example, see Ferris and Chance (1987), Trzcinka and Zweig (1990), Chance and Ferris (1991), McLeod and Malhotra (1994), Collins and Mack (1997), Malhotra and McLeod (1997), and Dellva and Olson (1998).

justification. They maintain that 12b-1 plans allow funds to offer alternative ways for investors to pay for distribution. Most funds with 12b-1 fees offer different "classes" of a fund portfolio that have unique fee structures.[8] An investor with a short expected holding period might find it more beneficial to invest in Class C shares in which there is no upfront fee, but high annual fees. Alternatively, a long-term investor would earn higher holding period returns by investing in Class A shares, which charge a large up-front fee and then small annual fees.[9]

There are several differences between loads and 12b-1 fees that make 12b-1 plans an inappropriate means for investors to pay load fees. First, there is a significant difference in the level of transparency between loads and 12b-1 fees. The load charge is clearly stated on the confirmation statement that the investor receives from his broker. Alternatively, the investor is never explicitly told the total amount of 12b-1 fees that he has paid, annually or in aggregate. As shown in Barber, Odean and Zheng (2002), investors are significantly less sensitive to operating expenses that are hidden in volatile returns than they are to "salient in-your-face expenses."[10] Thus investors may not choose the class that maximizes their expected holding period returns because of their different perceptions of the fees.

Second, 12b-1 plans provide investors with less control over the amount that they ultimately pay for distribution than loads. Loads are a fixed amount charged at the account level, and each investor pays only for his costs. On the other hand, 12b-1 fees are charged annually at the fund level, and investors may pay for other investors' costs. Because 12b-1 fees are charged for as long as the investors stays in the fund, the aggregate amount that investors pay increases as their holding period increases and typically as their asset levels rise.[11] Additionally, because the fees are deducted at the fund level, some investors subsidize the costs of other investors. For example, small accounts typically cost more, as a percent of the account size, than large accounts. Yet both investors with small account and with large accounts pay the same percent.

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[8] The typical structure for a multiple class fund includes A, B and C class shares, along with an occasional institutional or retirement class. Class A shares often include a high front-end load with a nominal 12b-1 fee. Class B shares have a contingent deferred sales load, plus a large 12b-1 fee. The load decreases with each year in which the investor continues in the fund, until eventually decreasing to zero, typically about 6 years from purchase date. After about 8 years, Class B shares convert to Class A shares, reducing the 12b-1 fee to Class A levels. Class C shares usually have a large 12b-1 fee and a small contingent deferred sales load (1%) that is eliminated after a 1-year holding period.

[9] Collins (2004) shows that investors can earn different holding period returns by investing in different share classes. An investor can choose a class such that the fees are paid in the way that maximizes her expected holding period return.

[10] Barber, Odean and Zheng (2002), p. 2.

[11] Rule 12b-1 provides that funds can charge a dollar amount of fund assets to cover marketing and distribution costs. These fees are disclosed as a percentage of assets. In reality, the <u>percent</u> charged remains fairly stable through time, even as the asset levels change.

Finally, conflicts of interest between fund advisers and shareholders that do not exist for loads exist under 12b-1 plans. Almost all share classes charge some 12b-1 fee. Given the lack of evidence that these fees benefit shareholders in any other way, one has to question whether the level of 12b-1 fees are in the best interest of shareholders. The opacity of the fees makes it difficult for shareholders to monitor this conflict themselves.

II. Background on 12b-1 plans

The Investment Company Act of 1940 bans the use of fund assets to pay for fund distribution. In the late 1970's, however, the fund industry was experiencing a significant and consistent outflow of cash from its funds. The investors that remained in the funds were paying increasingly higher expenses, as the fixed costs of the funds were spread over ever fewer shareholders. The industry asked the SEC to allow advisers to use fund assets to pay for distribution costs. This would allow funds to compete on a more level playing field with other investment products that did not charge upfront loads, leading to a net cash flow into funds and scale economies for shareholders.[12] The SEC adopted Rule 12b-1 in October 1980.[13]

Rule 12b-1 permits funds to bear distribution expenses provided that they are properly disclosed and regulated. Plans designed pursuant to the guidelines in Rule 12b-1 allow mutual funds to deduct an annual fee from net assets, a portion of which is paid to brokers to compensate for distribution costs.[14] This annual fee is included in the reported expense ratio,[15] thus initially increasing the expense ratio of the fund when a plan is implemented. Although originally meant as a short-term solution to the high level of net redemptions in 1970's, 12b-1 fees now play an integral role in the distribution of a majority of fund portfolios. Indeed, the entire class system of funds is built around the 12b-1 fee. Under the directives of Rule 12b-1, the fund's board is obligated to regularly reevaluate the benefits of the plan to the fund shareholders. Should the board deem that a 12b-1 plan is no longer appropriate for its shareholders, the class system of the fund portfolio, if applicable, would need to be reorganized.

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[12] For a detailed discussion Rule 12b-1 and the events leading up to its adoption, see, "Protecting Investors: A Half Century of Investment Company Regulation", Division of Investment Management, United States Securities and Exchange Commission, May 1992.

[13] Investment Company Act Release No. 11414, 45 FR 73898.

[14] A typical arrangement between a fund adviser and a broker provides for the broker to be compensated with an initial sales charge and an annual commission as a percentage of assets invested through the broker. Brokers are compensated for the sale of Class A and B shares through a high initial sales commission and a small (usually 0.25%) annual commission paid for by a 12b-1 plan. Class C shares often provide for a small initial commission of about 1% and an annual commission of 1% paid for by a 12b-1 plan. See O'Neal (1999) for a detailed discussion of the incentives provided to brokers from 12b-1 plans.

[15] The expense ratio of a fund includes three components: an advisory fee; administrative fees, such as legal and accounting costs; and 12b-1 fees. For multiple class shares, the advisory fee is always the same across classes. Administrative fees and 12b-1 fees can differ across classes, although the administrative fee is very often the same.

Are 12b-1 plans in the best interests of shareholders? As noted above, the original justification for 12b-1 plans was these fees encourage brokers to market the fund, resulting in increased assets under management and generating subsequent economies of scale redounding to the benefit of investors. The hope is that the lower cost of fund management (on a per dollar basis) associated with the scale economies eventually offsets the cost of the 12b-1 plan. Additionally, proponents maintain that 12b-1 plans lead to more stable inflows to the fund, reducing the fund's need to maintain a high cash balance to manage its liquidity requirements from net redemptions.[16] This would allow the fund to invest more assets into higher yielding securities, increasing gross returns.[17] Furthermore, lower flow volatility decreases the fund's total cost of providing liquidity to its shareholders through lower transactions costs.

This study empirically tests whether, and to what extent, the benefits of 12b-1 plans actually accrue to shareholders by examining cross-sectionally the relation between 12b-1 plans and fund flows, expense ratios and returns. Others have studied the impact of 12b-1 fees on expenses and have consistently shown that 12b-1 fees only serve to increase expenses.[18] This study adds to our understanding of the impact of 12b-1 fees on shareholders in two ways. First, a more recent dataset is used. The most recent data employed in the previous studies is from 1994. This sample runs from 1997 through 2002. Given the short history of 12b-1 plans, updating the data is important to ensure that prior results are not specific to the time period studied.

Second, the analysis is extended to examine the relation between 12b-1 plans and fund flows. Prior evidence on the link between 12b-1 plans and fund flows is mixed. Trzcinka and Zweig (1990) and Chance and Ferris (1991) find no relation between 12b-1 plans and faster asset growth. As will be discussed later in the paper, this result may be driven by their measure of asset growth. Nanda, Wang and Zheng (2003) and Barber, Odean and Zheng (2002) find that multiple class funds and 12b-1 funds, respectively, grow more quickly than single class and non-12b-1 funds. The results from this study are consistent with latter two papers. Additionally, prior studies have largely ignored the possible benefits of 12b-1 plans from lower flow volatility.[19]

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[16] See Edelen (1999) for an analysis of the cost to fund shareholders of providing liquidity.
[17] However, this relation between cash and gross returns may no longer hold. In recent years, fund managers have been less concerned about maintaining high cash balances because they can now easily enter into futures contracts on an index of interest and earn similar returns to the invested assets.
[18] See *supra* note 7.
[19] Trzcinka and Zweig (1990) recognize this potential benefit, but test it only indirectly through returns.

III. Data

The fund data for January 1997 through December 2002 are obtained from the Morningstar Principia monthly discs.[20] This sample includes approximately 20,000 fund portfolio years. All funds with missing observations for expense ratio and portfolio objective are excluded. Years in which a fund was closed to new investment are also eliminated, since that affects fund flows in a manner unrelated to 12b-1 plans.

Many fund portfolios contain multiple classes of shares that differ only in distribution method, which affects costs and net returns for each class. This study addresses the effect of 12b-1 fees on flows, expenses and returns. Since 12b-1 fees differ for each class, it may seem logical to evaluate each class separately. However, it's the aggregate impact on portfolio assets that lead to economies of scale, cash levels, liquidity costs and returns.[21] Therefore, asset-weighted average values are calculated for the expense ratio, 12b-1 fees, loads and annual returns for the fund portfolio. All of the tests will be conducted at the portfolio level using asset-weighted average values for multiple class portfolios.

The funds are divided into categories based on the portfolio objective stated in their prospectus. "Bond funds" include municipal, convertible, corporate, multisector, and government funds. "Hybrid funds" include asset allocation and balanced funds. "Equity funds" include growth, growth and income, income, equity income, aggressive equity, and small company funds. "Foreign funds" include foreign bond funds and foreign equity funds. "Specialty funds" include all funds with a stated specialty investment objective.

Table 1 provides some descriptive statistics for funds with and without 12b-1 plans.[22] 12b-1 funds are of similar size, but are older, on average, with significantly

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[20] The Morningstar discs do not contain information on dead funds, creating a survivor bias in the data. The Office of Economic Analysis has reconstructed the Morningstar database to include funds that are merged, liquidated or have changed names to greatly reduce this bias.

[21] For instance, consider a portfolio with a typical class structure as described in footnote 8. Let's assume that Class A comprises 70% of the portfolio, Class B comprises 20% and Class C comprises 10%. Class B and C have a 1% 12b-1 fee and Class A has a .25% 12b-1 fee. If 12b-1 fees increase inflows to the fund, then Class B and C shares should have large positive inflows and Class A shares should have small positive inflows, as compared to similar non-12b-1 funds. However, Class B and C are a smaller proportion of the total portfolio assets, muting the affects of 12b-1 fees. The relation between 12b-1 fees and economies of scale would be distorted when compared to a fund with a 1% 12b-1 fee that comprises 100% of the portfolio assets.

[22] Funds may adopt 12b-1 plans without actually charging any fees. The 12b-1 fee reported by Morningstar is the maximum 12b-1 fee that the fund is allowed to charge based on its prospectus, not the actual fee. The reported expense ratio contains only the actual 12b-1 fee.

higher expense ratios than non-12b-1 funds.[23] Remarkably, the average expense ratio for 12b-1 funds exceeds that of non-12b-1 funds by more than the average 12b-1 fee. Since fund expenses include 12b-1 fees, these results suggest that 12b-1 fees, on average, do not reduce fund expenses, even after deducting the 12b-1 fees.[24] Although this table provides only unconditional means that do not control for various cross-sectional differences in funds, these numbers offer a first glimpse at a result that will be addressed more rigorously in the next section.

IV. Measuring Scale Economies for 12b-1 Funds

Proponents of 12b-1 plans contend that the 12b-1 fees provide incentives to brokers to aggressively market the fund, leading to faster asset growth than if the fund had no 12b-1 plan and, ultimately, to economies of scale in expenses.[25] This paper first addresses whether funds with 12b-1 plans do, in fact, grow faster than funds without 12b-1 plans.

a. 12b-1 Plans and Fund Flows

Consistent with Sirri and Tufano (1998), net fund flows are calculated as the percent change in monthly assets not attributable to returns on the portfolio securities, as depicted in the following equation:

$$Flow_{i,t} = \frac{TNA_{i,t} - TNA_{i,t-1} * (1 + R_{i,t})}{TNA_{i,t-1}}$$

where $FLOW_{i,t}$ is the monthly net flows into fund i on day t, $TNA_{i,t}$ is fund i's total net asset on day t and $R_{i,t}$ is the net monthly return to fund i on day t. As in Sirri and Tufano (1998), the top and bottom 1% of the flow values are eliminated to account for data errors and fund mergers.[26]

The model used in this paper to explain net fund flows is as follows:

$$Flow_{i,t} = \alpha + \beta_1 * 12b-1Fee_{i,t} + \beta_2 * AnnualNet\ \mathrm{Re}turn_{i.t-1} + \beta_3 * ExpenseRatio_{i.t-1} +$$
$$\beta_4 * FrontLoad_{i.t} + \beta_5 * BackLoad_{i.t} + \beta_6 * Assets_{i.t} + \beta_7 * Age_{i.t} + \sum_{j=8}^{11} \beta_j * Investment\,Objective_{i,t}$$

[23] For purposes of this study, 12b-1 funds are defined as fund portfolios for which a 12b-1 plan has been adopted. As discussed later in the paper, the analysis is conducted at the fund portfolio level, not the fund class level.
[24] For funds with no 12b-1 plan, the share distribution costs are paid for directly by the adviser and thus not included in the expense ratio.
[25] However, it is unclear why an investor would prefer to pay extra annual expenses to help a small fund grow when she could simply invest in a larger fund that has already attained scale economies.
[26] Most of the data errors in net assets are due to a decimal being shifted by one place in either direction.

where $Flow_{i,t}$ is the net flow for fund i in year t, 12b-1 fee, Annual Net Return, Expense Ratio, Front Load, and Back Load are the asset-weighted averages for fund i's portfolio in year t, (Annual Net Return and Expense Ratio are the prior year's values), Assets and Age are for the fund portfolio[27], and Investment Objective is an indicator variable for each of the objectives explained above.[28]

The model includes control variables thought to affect fund flows, other than 12b-1 fees. A high return or low expense ratio last year may attract more investors this year. Portfolio asset size and age are included to control for how well known the fund may be to investors. Finally, since many 12b-1 funds also have front and deferred loads, these variables are included to control for the impact of loads on flows not due to 12b-1 fees. The expected relation between flows and loads is ambiguous. On one hand, if brokers steer investors towards funds with higher loads, then we would see a positive relation. Alternatively, if investors prefer to pay lower loads, all other things equal, then we would see a negative relation.

Table 2 displays the results of the model estimation of the impact of 12b-1 fees on annual percentage flows. The results indicate that larger funds, younger funds and funds with higher prior year net returns experience higher net flows. Loads are negatively related to flows, although the relation is statistically weak. Finally, consistent with the above line of reasoning, funds with 12b-1 plans obtain significantly higher annual net flows than do funds without 12b-1 plans. Fund portfolios with a weighted-average 12b-1 fee of 0.34% had 4% higher flows than similar non-12b-1 funds.[29,30] This is significant considering that the average net flow is 8% annually. Funds with 12b-1 fees thus have grown more quickly than funds with no 12b-1 fees. This result provides an impetus to further investigate whether 12b-1 funds have the ability to earn sufficient scale economies from this growth to offset their 12b-1 fees, and where the average 12b-1 fund is in this process.

Trzcinka and Zweig (1990) and Chance and Ferris (1991) also test for a relation between 12b-1 plans and asset growth during the period 1984 through 1988. Neither finds a significant relation, counter to the results in this and other studies. Several factors

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[27] In other words, the asset value is the sum of the assets in the different classes within the portfolio and age is the age of the oldest class within the portfolio.

[28] All of the regression models in this study are estimated separately by year and for the entire period. The yearly regressions indicate the stability of the relations through time. The "All Years" estimation shows the central tendencies of the relations that may not appear in any given year.

[29] The 4% is calculated as the average 12b-1 fee (0.34) times the coefficient on 12b-1 fee (11.98) from the "All Years" model in Table 2.

[30] The 4% finding is consistent with results found by Nanda, Wang and Zheng (2003). They examine changes in cash flows upon adoption of a multiple-class structure. (There is likely a significant overlap between the multiple-class distinction and the 12b-1 distinction). They find that cash flows increase by about 4% annually after adoption.

could account for this disparate outcome. First, the results could reflect differences in the time periods studied. It is possible that the relation between 12b-1 plans and fund flows have changed. Second, the different result could arise from the different method used to calculate asset growth. Both previous studies measure asset growth as the percent change in net assets from one year to the next. This value incorporates changes in assets both from investment returns and from purchase and redemption flows. The method used in this study nets out the affect of returns on the change in assets to focus the measure on changes in fund flows. The different calculation method could lead to the dissimilar outcome in two ways. Netting out the effect of volatile returns on asset growth likely reduces the volatility of the asset growth measure. The lower volatility may increase the ability of the model estimation to detect a significant relation, if one exists. Furthermore, if 12b-1 plans affect returns in the opposite direction that they affect fund flows, the two opposing forces will offset each other, leading to a result of no significant relation.

b. 12b-1 Plans and Economies of Scale

The relation between average expenses and asset size is concave. That is, when funds are very small, even small additions to assets are likely to provide large reductions in expenses per dollar invested. However, as funds grow, each additional dollar of assets lowers expenses less than the dollar before. At some point, expenses will change very little with each dollar growth in assets. Given the decreasing returns to scale, a relevant question is whether funds have the ability to generate sufficient scale economies to offset 12b-1 fees.

To determine whether a fund can attain a size such that economies of scale offset the 12b-1 fee, expense ratios for 12b-1 and non-12b-1 funds of similar size and investment objective are compared.[31] Portfolio objective and size are chosen since they likely have the largest impact on the expense ratio of the fund. For instance, the average large bond fund almost certainly has a lower expense ratio than the average small foreign equity fund, all else equal. To do the comparison, the funds are first sorted based on each fund's investment objective as defined in the data section. Then the funds within each investment objective are sorted into size quintiles. Finally, the funds within each investment objective and size quintile are separated based on whether they were 12b-1 funds or not. If the largest 12b-1 funds have higher expense ratios than the smallest non-12b-1 funds, then one can conclude that scale economies sufficient to offset 12b-1 fees are not feasible.

Table 3 shows the results of this analysis. For all investment objectives, both 12b-1 and non-12b-1 funds exhibit economies of scale in expenses. As the funds get

[31] The use of fund expense ratios to estimate scale economies implicitly assumes that any scale economies received by the fund adviser are passed onto fund shareholders.

larger, the expense per dollar invested decreases. For 12b-1 funds, the scale economies are not produced by a reduction in the 12b-1 fee. In fact, 12b-1 fees change very little as funds get larger, as is evidenced in the last column of Table 3. Therefore, the scale economies must originate in the fund management portion of the expense ratio. A key question is whether 12b-1 funds can generate enough economies of scale in fund management expenses to offset the 12b-1 fee.

To answer this question, it is necessary to compare the expense ratio of the smallest non-12b-1 fund to the largest 12b-1 fund within each investment objective. If the largest 12b-1 funds have expense ratios that are lower than the smallest non-12b-1 funds, then one could conclude that it is possible for a fund to achieve sufficient scale economies to offset the 12b-1 fee. This does not appear to be the case for bond funds. Panel A of Table 3 shows that the average expense ratio for the largest size quintile of 12b-1 funds is significantly larger than that of the smallest size quintile of non-12b-1 funds. Bond funds apparently are not able to generate sufficient economies of scale to offset the 12b-1 fees. This is not surprising since bond funds already have the lowest average expense ratio of any objective. Significant scale economies will be harder to produce for these funds.

For the other investment objectives, the magnitude of expenses for the largest 12b-1 funds is roughly similar to or smaller than the expenses of the smallest non-12b-1 fund. Consequently, these funds seem able to grow large enough to offset the 12b-1 fees; however, they have to grow several thousand times larger than comparable non-12b-1 funds to achieve the sufficient scale economies just to offset the fee. With additional net flows of only 4% of assets per year, it would take the average 12b-1 specialty fund 24 years to attain a size where expense ratio is of comparable magnitude with the average specialty non-12b-1 fund. It would take the average equity fund 62 years, the average hybrid fund 68 years and the average foreign fund 111 years to generate sufficient scale economies. Given that shareholders average holding period is only 7 years, most of the shareholders that paid the extra fee to facilitate the fund growth will never recoup those costs.[32] It should be noted that it obviously is not possible for all 12b-1 funds to experience such growth. If 12b-1 plans are not meant to, or are not successful at, attracting new money into mutual funds, then they merely serve to shift existing money among the funds.

Our above estimates of the number of years it would take the average 12b-1 fund to grow sufficiently assume that non-12b-1 funds would not grow at all. However, over the years examined in this study, non-12b-1 funds have had positive annual flows of approximately 4%. If a non-12b-1 fund was able to grow without a 12b-1 plan such that

[32] Sirri and Tufano (1998) cite that the average mutual fund shareholder's holding period is 7 years.

it moved from the first to the second size quintile, the fund's shareholders would be significantly better off, on average, than if the fund had instituted a 12b-1 plan and moved into the largest size quintile.[33] This is true for all investment objectives.

The logical conclusion of this analysis is that, although it is theoretically possible for most types of funds to generate scale economies through asset growth to offset 12b-1 fees, it is not an efficient use of resources. First, it is not possible for all 12b-1 funds to grow sufficiently, leaving many shareholders paying higher fees into funds that will never attain an adequate size. Second, it only is possible for the small subset of funds that are in the smallest size quintile at the time that they institute the 12b-1 plan. Finally, any given fund will likely not attain an adequate size within any one investor's typical holding period and, for some types of funds, within an investor's lifetime. The above discussion highlights the difficulty of using 12b-1 plans to grow the assets of a fund to earn scale economies in expense ratios sufficient to offset the fee.

The next part of the analysis examines the relation between 12b-1 fees and expense ratios.

The model of expense ratio used in this paper is as follows:

$$ExpenseRatio_{i,t} = \alpha + \beta_1 * 12b-1Fee_{i,t} + \beta_2 * FlowVolatility_{i.t} + \beta_3 * Turnover_{i.t} + \beta_4 * Cash_{i.t-1} +$$
$$\beta_5 * FrontLoad_{i.t} + \beta_6 * BackLoad_{i.t} + \beta_7 * Assets_{i.t} + \beta_7 * Age_{i.t} + \sum_{j=9}^{12} \beta_j * Investment\,Objective_{i,t}$$

where Expense Ratio, 12b-1 fee, Front Load, Back Load, Assets, Age and Investment Objective are as described in the flow equation. Flow volatility is the standard deviation of monthly net flows for fund i in year t, turnover is the annual turnover, and cash is last year's end-of-year cash balance for fund portfolio i.

This model is very similar to the typical models used in the prior studies that test whether 12b-1 plans lead to sufficient scale economies from asset growth to offset the fee. The problem with this model is that it includes asset size as an independent variable. The 12b-1 fee is hypothesized to work through asset size to affect the expense ratio. Thus including asset size in the model controls for the relation between 12b-1 fees and expenses that we are trying to test for. In other words, the coefficient on the 12b-1 fee

[33] For instance, in Panel B of Table 3, a non-12b-1 fund in quintile 1 has an average size of $16.27 million and an average expense ratio of 1.28%. If it were able to grow without a 12b-1 plan such that it moved from quintile 1 to quintile 2, the fund's expense ratio would fall to 0.95%, on average. This value is significantly lower than if it instituted a 12b-1 plan and were able to grow such that it moved into quintile 5.

does not capture the effect of 12b-1 fees on expense ratio through asset size. I include this model in the paper only as a means of comparison to other work.[34]

One would expect that funds with highly volatile flows are likely more expensive to manage than those with low flow volatility, and actively managed funds as measured by turnover are likely more expensive than passive funds. Additionally, funds with more of their assets in cash may invest less time into portfolio management than funds with less cash, and are therefore less expensive to manage. Finally, 12b-1 fees should increase the expense ratio one-for-one, when asset size and the factors are held constant.

Table 4 displays these results. As expected, funds with high flow volatility and high turnover have higher expense ratios. Additionally, funds with loads tend to have higher expense ratios than no-load funds. Finally, consistent with the predictions, funds with 12b-1 expenses have significantly higher expense ratios than non-12b-1 funds. For every 100 basis points of 12b-1 fees, expense ratios are higher by 91 basis points, all other things equal.[35, 36]

The overall results of this analysis show that shareholders, on average, are not receiving sufficient scale economy benefits to offset the costs of the plans, consistent with the results of prior studies. Thus, shareholders do not benefit from 12b-1 plans through lower expense ratios. Do they receive benefits in the form of higher returns?

V. 12b-1 Plans and Investment Returns

In addition to the expense scale economies, proponents of 12b-1 plans maintain that the plans smooth flows for funds, reducing the amount of cash required to handle unpredictable redemptions and lowering transactions costs to deal with unexpected flows. Lower required cash reserves increase the percentage of assets that funds can invest in higher yielding securities, leading to higher long-run returns. Additionally, lower flow

[34] The model is also estimated excluding asset size from the equation. However, it is not clear that this is an appropriate solution. We know from the results in Table 3 that asset size significantly impacts expense ratio. 12b-1 fees are likely a very small factor in this relation. Thus excluding asset size from the equation leaves a significant portion of the expense ratio unexplained. The end result is a severe omitted variables problem.

[35] The coefficient is significantly less than 1. A possible explanation stems from the use of maximum 12b-1 fees instead of actual 12b-1 fees. If actual 12b-1 fees charged are less than the maximum allowable, then the coefficient should be less than 1.

[36] The coefficient on 12b-1 fees in the model estimated without asset size as an independent variable is 0.97, insignificantly different from 1.

volatility reduces transactions costs from unexpected flows not covered by cash on hand. Ultimately, lower flow volatility generates higher expected returns.[37]

Trzcinka and Zweig (1990) also recognized in their study that 12b-1 plans may stabilize fund flows such that these funds can hold less cash or incur lower transactions costs, leading to higher gross returns. However, the authors never directly test whether flows are more stable for 12b-1 funds. They assume it to be true and go to the next step of testing for lower cash balances and higher gross returns. Yet, the authors also acknowledge the difficulties in finding a relation between gross returns and 12b-1 plans, even if one existed. The high volatility of gross returns obscures relations between relatively stable 12b-1 fees and returns using traditional statistical techniques. Therefore, they conclude that finding no relation does not necessary mean that there is no relation. This highlights the importance of including the intermediary step of testing for a relation between 12b-1 plans and flow volatility. It provides an insight into whether there may be a significant relation between gross returns and 12b-1 plans even if one is not found directly.

a. 12b-1 Plans and Flow Volatility

Do 12b-1 plans reduce flow volatility? Flow volatility is modeled as follows:

$$FlowVolatility_{i,t} = \alpha + \beta_1 * 12b-1Fee_{i,t} + \beta_2 * FrontLoad_{i.t} + \beta_3 * BackLoad_{i.t} + \beta_4 * Assets_{i.t} + \beta_5 * Age_{i.t} + \sum_{j=6}^{9} \beta_j * Investment\,Objective_{i,t}$$

It can be expected that loads reduce flow volatility to the fund since active trading in load funds is expensive and thus not likely to be done often. Additionally, it is likely that smaller funds will have higher flow volatility since even small dollar inflows and outflows will be a larger percent of a small fund. The direction of the relation between age and flow volatility is unclear, ex-ante. Younger funds may have higher flow volatility since it may take some time for a fund to develop a loyal, long-term shareholder base, although this is just speculation.

Table 5 displays the results of the estimation of a flow volatility model. As predicted, larger funds, older funds, and funds with loads experience lower flow volatility.[38] Moreover, there is weak evidence that 12b-1 fees actually increase flow

[37] Our hypothesis is that lower flow volatility decreases the dollar transactions costs incurred by funds. Ideally, to test this hypothesis, we would examine the relation between flow volatility and transactions costs. However, transactions costs are not disclosed by funds, but are incorporated into asset prices. Therefore, lower transactions costs should be revealed through higher gross returns.

[38] Other than compensation for brokers, loads may serve to reduce liquidity costs as well. Since active trading in load funds can be expensive, shareholders in load funds tend to be longer-term investors (Chordia (1996)). Class A shareholders will only find it beneficial to pay high up front costs and lower

volatility. The coefficient on 12b-1 fee is positive in all years and significant for three of the six years. These results indicate that 12b-1 plans are not successful in stabilizing fund flows and may, in fact, destabilize flows. Since there is some evidence showing that flow volatility is higher for 12b-1 funds, then these funds should have higher cash balances and/or lower gross returns as well.

b. 12b-1 Plans and Cash-On-Hand

To examine cash-on-hand, cash is modeled as follows.[39]

$$Cash\ Balance_{i,t} = \alpha + \beta_1 * 12b-1Fee_{i,t} + \beta_2 * AnnualFlows_{i.t} + \beta_3 * Turnover_{i.t} +$$
$$\beta_4 * FrontLoad_{i.t} + \beta_5 * BackLoad_{i.t} + \beta_6 * Assets_{i.t} + \beta_7 * Age_{i.t} + \sum_{j=8}^{11} \beta_j * Investment\ Objective_{i,t}$$

Higher net flows and higher turnover should lead to more cash-on-hand. Additionally, load funds should keep less cash since they have lower flow volatility, as seen in Table 5. Table 6 shows the results. Consistent with the above presumptions, higher flows and turnover do lead to higher cash balances. Furthermore, load funds tend to keep less cash-on-hand. Finally, despite have higher flow volatility, cash balances are not related to 12b-1 fees. The coefficients on the 12b-1 fee variables are insignificant in all but one year and insignificant overall. Trzcinka and Zweig (1990) also find that cash balances do not differ between 12b-1 and non-12b-1 funds.

c. 12b-1 Plans and Gross Returns

The final part of the analysis is to examine whether 12b-1 plans affect gross returns. Based on the previous results of the effect of 12b-1 fees on flow volatility and cash balances, 12b-1 funds should exhibit lower gross returns. There is some evidence that these funds have higher flow volatility but no differences in cash balances. If flow volatility leads to higher transactions costs, then 12b-1 funds should earn lower gross returns.

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annual costs if they plan to be in the fund for a long time. Additionally, Class C shareholders should have short investment horizons since it is only beneficial to pay a high annual 12b-1 fee and no load over a high front-end load if the investor plans to be in the fund for a short time. Class B shareholders should optimally have medium investment horizons. However, for multiple share class portfolios, all assets are part of a pool and as such they share portfolio expenses including transactions costs. Shareholders of all classes share all transaction costs generated from active traders in class C shares. Class A (and, to a lesser extent, Class B) shareholders are potentially subsidizing the liquidity needs of Class C shareholders without realizing that they are. Nanda, Wang and Zheng (2003) find some evidence consistent with this hypothesis.

[39] Properly modeling end-of-year cash balances may be difficult since fund managers may alter cash balances higher or lower just prior to public disclosure to reflect what the fund managers want the public to see. This practice is known as window dressing.

Gross return is calculated as net return plus the annual expense ratio. Gross returns, net of the mean gross return to the investment objective, are modeled as follows:

$$MeanAdjustedGross\ Return_{i,t} = \alpha + \beta_1 * 12b-1Fee_{i,t} + \beta_2 * Turnover_{i,t} + \beta_3 * FrontLoad_{i,t} + \beta_4 * BackLoad_{i,t} + \beta_5 * Age_{i,t} + \sum_{j=6}^{9} \beta_j * Investment\,Objective_{i,t} + \sum_{j=10}^{14} \beta_j * Year_{i,t}$$

A year indicator variable in included in the "All Years" model to control for the difference in mean returns from year to year. 2002 is the year excluded from the model estimation.

The results are shown in Table 7. For the "All Years" model, there is no evidence of a significant relation between 12b-1 fees and gross returns, consistent with the results found by Trzcinka and Zweig (1990). However, in the year-by-year analysis the coefficient on 12b-1 fee is negative for 4 of the 6 years. Additionally, 1999 seems to be an anomalous year. The sign of the relation between the independent variables and the mean-adjusted gross returns are opposite from most of the other years. If the 1999 data is eliminated from the "All Years" model, the coefficient of –1.30 on the 12b-1 fee becomes significant.

Taken as a whole, 12b-1 fees appear to increase flow volatility and decrease gross returns. Although these results are not overly strong, it certainly discounts the original justifications made by 12b-1 plan proponents that 12b-1 plans stabilize fund flows and increase gross returns. Shareholders of 12b-1 funds do not obtain any benefits through higher gross returns, and may in fact be harmed.

d. 12b-1 Plans and Net Redemptions

An alternative hypothesis for effect of 12b-1 plans on flows is that, by providing steady inflows of cash, 12b-1 plans reduce the number of times that funds have net redemptions. Unexpected net redemptions can be costly if the fund manager has to sell securities to cover the cash outflow. This leads the fund to incur transactions costs. Also, it potentially takes the asset allocation suboptimally away from the fund manager's investment strategy. Both of these outcomes reduce gross returns.

A test is conducted to determine whether 12b-1 funds incur smaller net redemptions as a percent of assets than non-12b-1 funds. Percent net redemptions are calculated as the sum of dollar flows in months within a year for which there were net redemptions, divided by the average assets for the year. The calculation is as follows:

$$PercentNet\,\mathrm{Re}\,demptions_{i,t} = \frac{\sum_{m=1}^{12} MonthlyFlow_{i,m} * D_{i,m}}{AverageNetAssets_{i,t}}$$

$$\text{where} \quad \begin{array}{l} D_{i,m} = 1 \; if \;\; MonthlyFlow < 0; \\ D_{i,m} = 0 \; if \;\; MonthlyFlow \geq 0 \end{array}$$

The model of percent net redemptions is as follows:

$$PctNetRedemptions_{i,t} = \alpha + \beta_1 * 12b-1Fee_{i,t} + \beta_2 * AnnualNet\ \mathrm{Re}turn + \beta_3 * FrontLoad_{i.t} + \beta_4 * BackLoad_{i.t}$$
$$+ \beta_5 * Assets_{i.t} + \beta_6 * Age_{i.t} + \sum_{j=7}^{10} \beta_j * Investment\,Objective_{i,t}$$

The model is similar to the flow volatility model, except that this includes the annual return since there is likely to be fewer redemptions in years where returns are higher.

The results are in Table 8. There is little evidence that 12b-1 plans lessen net redemptions. The only year for which net redemptions is significantly negatively related to the 12b-1 fee is 2000. Interestingly, that is the same year for which gross returns were most negative for 12b-1 funds. Furthermore, the interpretation of the coefficient suggests that redemptions were only lower for 12b-1 funds by 1% of assets for 2000 and an average of 0.67% annually for all years.[40] Even if net redemptions are consistently lower for 12b-1 funds, it does not translate into higher gross returns, as is evidenced in the previous section.

VI. Conclusions

If 12b-1 plans constitute a net benefit to investors, the amount of the annual fee should be recovered through higher net returns. Higher net returns could derive from either lower expense ratios due to economies of scale or higher gross returns due to the enhanced capacity of funds to either invest in assets with higher yields or reduce transactions costs. Overall, the results are inconsistent with this hypothesis. 12b-1 plans do seem to be successful in growing fund assets, but with no apparent benefits accruing to the shareholders of the fund. Although it is hypothetically possible for most types of funds to generate sufficient scale economies to offset the 12b-1 fee, it is not an efficient use of shareholder assets. No shareholder will be better off investing in a small 12b-1 fund in hopes of helping the fund grow to attain these scale economies.

Furthermore, these higher expenses do not translate into higher gross returns. Indeed, fund flows may be more volatile and gross returns may be lower for funds with 12b-1 plans. These results highlight the significance of the conflict of interest that 12b-1 plans create. Fund advisers use shareholder money to pay for asset growth from which the adviser is the primary beneficiary through the collection of higher fees.

[40] These numbers are calculated by multiplying the average 12b-1 fee (0.34) by the coefficients on the 12b-1fee variables.

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Table 1
Non-12b-1 Funds vs. 12b-1 Funds - Summary Statistics

	Non-12b-1 Funds		12b-1 Funds	
	Mean	Median	Mean	Median
Assets (MM$)[a]	764.53	133.80	719.80	159.50
Expense Ratio[b]	0.91	0.85	1.28	1.19
Age[c]	9.80	7.00	11.16	8.00
12b-1 Fee[d]	0.00	0.00	0.34	0.28
Front Loads[e]	11%		78%	
Contingent Deferred Loads[f]	2%		66%	
Observations	7,633		11,869	

a Assets are the sum of the assets of all classes within a portfolio.
b Expense Ratio is the asset value-weighted expense ratio of the share classes within a portfolio
c Age is that of the oldest class within the portfolio.
d 12b-1 fee is the asset value-weighted 12b-1 fee of the share classes within a portfolio.
e Percent of portfolios with a front load. If even 1 class within a portfolio has a front load, then the portfolio is considered to have a front load.
f Percent of portfolios with a deferred load. If even 1 class within a portfolio has a deferred load, then the portfolio is considered to have a deferred load.

Table 2
12b-1 Fees and Fund Growth

This table reports the results of an ordinary least squares regression of various independent variables on the fund growth exclusive of return. The values are gathered from Morningstar Principia monthly discs for the years 1997 through 2002. The dependent variable is the annual percentage growth in portfolio assets, net of return. The 12b-1 fee is the share classes' asset value-weighted average 12b-1 fee. The annual net return is the share classes' asset value-weighted average net return from the prior year. Expense ratio is the natural log of the share classes' asset value-weighted average expense ratio from the prior year. Front-end load is the asset value-weighted maximum upfront sales charge of all share classes within the portfolio. Contingent deferred load is the share classes' asset value-weighted average maximum deferred sales charge. Portfolio assets are the natural log of the sum of the assets for all classes of a fund portfolio. Age of fund portfolio is the natural log of the age of the oldest class of shares within a portfolio. The regression also contains control variables not reported here. The control variables consist of indicator variables for the investment objective of the fund as contained in the fund's prospectus. * indicates significance at the 5% level.

Independent Variables	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*All Years*
Observations	2,948	2,896	3,324	3,356	3,382	3,274	19,180
Intercept	-2.02*	2.34*	1.37	6.58*	2.87	14.55*	7.34*
12b-1 Fee	**4.07**	**10.11***	**10.89***	**11.03***	**23.32***	**12.80***	**11.98***
Annual Net Return$_{t-1}$	2.28*	0.82*	0.94*	0.61*	0.51*	0.67*	0.48*
Expense Ratio $_{t-1}$	-4.09*	-4.10*	-1.04	-2.48*	-0.77	1.63	-1.68*
Front End Load	-0.22	-0.48	-0.28	0.00	-0.62	-0.19	-0.45*
Contingent Deferred Load	-1.00	-0.80	-0.91	-0.14	-5.49*	-5.84*	-2.56*
Portfolio Assets	2.40*	2.62*	2.45*	2.78*	1.82*	2.43*	2.57*
Age of Fund Portfolio	-12.79*	-11.00*	-11.64*	-12.14*	-8.59*	-9.36*	-10.58*
Adjusted R-square	22.0%	11.3%	16.7%	27.6%	9.78%	17.4%	12.0%

Table 3
Non-12b-1 Funds vs. 12b-1 Funds –
Summary Statistics by Size

Panel A: Bond Funds

	Non-12b-1 Bond Funds				12b-1 Bond Funds				
Size	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	Mean 12b-1 Fee
1	661	20.47	0.74*	7.56	942	22.30	1.05	7.39	0.33
2	539	63.76	0.68	7.27	1065	64.10	1.00	8.81	0.32
3	562	137.39	0.66	8.98	1045	136.81	0.98	9.94	0.29
4	519	305.02	0.60	10.21	1087	301.98	0.98	11.78	0.29
5	591	1629.90	0.55	14.51	1014	1666.64	0.96*	15.49	0.30

Panel B: Hybrid Funds

	Non-12b-1 Hybrid Funds				12b-1 Hybrid Funds				
Size	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	Mean 12b-1 Fee
1	151	16.27	1.28	7.48	177	18.69	1.69	6.33	0.40
2	148	63.27	0.95	9.07	180	63.59	1.48	7.18	0.37
3	102	141.43	0.84	8.09	226	145.52	1.38	9.65	0.37
4	106	379.50	0.73	10.27	222	346.17	1.30	16.52	0.37
5	153	4349.15	0.51	19.20	175	2971.21	1.22	23.35	0.42

a Assets are the sum of the assets of all classes within a portfolio.
b Age is that of the oldest class within the portfolio.
*indicates that the difference between the quintile 1 non-12b-1 fund expense ratio and the quintile 5 12b-1 fund expense ratio is significant at the 5% level.

Table 3 (continued)
Non-12b-1 Funds vs. 12b-1 Funds –
Summary Statistics by Size

Panel C: Equity Funds

	Non-12b-1 Equity Funds				12b-1 Equity Funds				
Size	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	Mean 12b-1 Fee
1	666	19.02	1.41*	7.76	604	20.25	1.68	6.70	0.32
2	613	76.09	1.07	9.15	482	81.53	1.44	9.03	0.33
3	461	213.16	0.97	9.27	809	217.71	1.41	10.68	0.33
4	437	624.02	0.89	11.38	834	625.90	1.28	13.47	0.32
5	482	5529.30	0.69	16.53	789	4723.45	1.20*	23.23	0.38

Panel D: Specialty Funds

	Non-12b-1 Specialty Funds				12b-1 Specialty Funds				
Size	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	Mean 12b-1 Fee
1	69	17.29	1.76*	7.61	108	16.66	1.98	6.03	0.40
2	65	60.86	1.22	9.86	112	60.38	1.69	6.56	0.40
3	72	165.69	1.18	9.42	105	162.40	1.59	8.29	0.44
4	72	400.97	1.13	16.28	105	359.48	1.61	9.52	0.54
5	78	2041.88	0.92	13.15	99	1949.49	1.43*	17.04	0.49

Panel E: Foreign Funds

	Non-12b-1 Foreign Funds				12b-1 Foreign Funds				
Size	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	N	Mean Assets (MM$)[a]	Mean Expense Ratio	Mean Age[b]	Mean 12b-1 Fee
1	191	14.38	1.64*	4.94	326	13.77	2.22	5.39	0.42
2	188	51.38	1.27	6.41	334	50.60	1.83	6.34	0.38
3	230	118.18	1.20	6.81	290	114.36	1.74	7.77	0.41
4	240	285.21	1.08	7.00	280	283.43	1.72	8.27	0.41
5	237	1891.95	0.99	9.32	283	2711.18	1.50*	11.50	0.39

a Assets are the sum of the assets of all classes within a portfolio.
b Age is that of the oldest class within the portfolio.
*indicates that the difference between the quintile 1 non-12b-1 fund expense ratio and the quintile 5 12b-1 fund expense ratio is significant at the 5% level.

Table 4
12b-1 Fees and Expense Ratios

This table reports the results of an ordinary least squares regression of various independent variables on expense ratio. The values are gathered from Morningstar Principia monthly discs for the years 1997 through 2002. The dependent variable is the asset value-weighted annual expense ratio of all share classes within the portfolio. The 12b-1 fee is the share classes' asset value-weighted average 12b-1 fee. Standard deviation of monthly flows is the natural log of the standard deviation of monthly net percent flows to the portfolio from the prior year. Cash is the end-of-year percentage of assets held as cash for the prior year. Front-end load is the share classes' asset value-weighted average maximum upfront sales charge. Contingent deferred load is the share classes' asset value-weighted average maximum deferred sales charge. Portfolio assets are the natural log of the sum of the assets for all classes of a fund portfolio. Age of fund portfolio is the natural log of the age of the oldest class of shares within a portfolio. The regression also contained control variables not reported here. The control variables consist of indicator variables for the investment objective of the fund as contained in the fund's prospectus. * indicates significance at the 5% level.

Independent Variables	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*All Years*
Observations	2,874	2,782	3,207	3,297	3,150	3,143	18,453
Intercept	1.27*	1.26*	1.16*	1.28*	1.34*	1.24*	1.25*
12b-1 Fee	**0.89***	**0.79***	**1.02***	**0.99***	**0.85***	**0.94***	**0.91***
Std. Dev. of Monthly Flows	0.00	-0.00	0.06*	0.02*	0.04*	0.04*	0.03*
Annual Turnover	0.07*	0.08*	0.07*	0.05*	0.06*	0.06*	0.07*
$Cash_{t-1}$	0.00*	-0.00	0.00	0.00	-0.00	0.00*	0.00*
Front-end Load	0.01*	0.02*	0.02*	0.02*	0.03*	0.03*	0.02*
Contingent Deferred Load	0.05*	0.08*	0.04*	0.05*	0.07*	0.07*	0.06*
Portfolio Assets	-0.10*	-0.11*	-0.11*	-0.11*	-0.12*	-0.11*	-0.11*
Age of Fund Portfolio	0.05*	0.07*	0.06*	0.07*	0.07*	0.06*	0.07*
Adjusted R-square	57.7%	52.9%	46.8%	60.6%	44.1%	54.4%	51.9%

Table 5
12b-1 Fees and Flow Volatility

This table reports the results of an ordinary least squares regression of various independent variables on flow volatility. The variables are gathered from Morningstar Principia monthly discs for the years 1997 through 2002. The dependent variable is the natural log of the standard deviation of monthly net percent flows. The 12b-1 fee is the share classes' asset value-weighted average 12b-1 fee allowable in the fund's prospectus. Front-end load is the share classes' asset value-weighted average maximum upfront sales charge. Contingent deferred load is the share classes' asset value-weighted average maximum deferred sales charge. Portfolio assets are the natural log of the sum of the assets for all classes of a fund portfolio. Age of fund portfolio is the natural log of the age of the oldest class of shares within a portfolio. The regression also includes control variables not reported here. The control variables consist of indicator variables for the investment objective of the fund as contained in the fund's prospectus. * indicates significance at the 5% level.

Independent Variables	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*All years*
Observations	3,054	2,936	3,409	3,401	3,418	3,284	19,502
Intercept	2.35*	2.26*	2.28*	2.37*	2.12*	2.18*	2.21*
12b-1 Fee	**0.05**	**0.12**	**0.17***	**0.21***	**0.17**	**0.29***	**0.17***
Front-end Load	-0.01	-0.03*	-0.03*	-0.05*	-0.06*	-0.11*	-0.04*
Contingent Deferred Load	-0.01	-0.08*	-0.09*	-0.10*	-0.08*	-0.15*	-0.09*
Portfolio Assets	-0.03*	-0.02*	-0.03*	-0.02*	-0.01	-0.05*	-0.02*
Age of Fund Portfolio	-0.09*	-0.11*	-0.10*	-0.10*	-0.18*	-0.16*	-0.15*
Adjusted R-square	44.9%	33.7%	35.5%	39.1%	21.5%	17.6%	26.7%

Table 6
12b-1 Fees and Cash

This table reports the results of an ordinary least squares regression of various independent variables on cash. The variables are gathered from Morningstar Principia monthly discs for the years 1997 through 2002. The dependent variable is the end-of-year cash as a percentage of assets. The 12b-1 fee is the share classes' asset value-weighted average 12b-1 fee allowable in the fund's prospectus. Annual flows are the annual percentage growth in portfolio assets, net of return. Front-end load is the share classes' asset value-weighted average maximum upfront sales charge. Contingent deferred load is the share classes' asset value-weighted average maximum deferred sales charge. Portfolio assets are the natural log of the sum of the assets for all classes of a fund portfolio. Age of fund portfolio is the natural log of the age of the oldest class of shares within a portfolio. The regression also includes several control variables not reported here. The control variables consist of indicator variables for the investment objective of the fund as contained in the fund's prospectus. * indicates significance at the 5% level.

Independent Variables	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*All Years*
Observations	2,855	2,786	3,169	3,137	3,191	3,213	18,351
Intercept	5.34*	2.80*	1.89*	1.04	1.04*	1.23*	1.54*
12b-1 Fee	**-0.30**	**1.32**	**1.76***	**0.18**	**-0.10**	**-0.70**	**0.66**
Annual Flows	0.02*	-0.00	0.01*	0.01*	0.03*	0.03*	0.02*
Annual Turnover	0.32*	1.34*	1.12*	1.15*	1.06*	1.68*	1.14*
Front-end Load	-0.18*	-0.33*	-0.19*	-0.13	-0.32*	-0.38*	-0.26*
Contingent Deferred Load	-0.30	-0.64*	-0.80*	-0.39	-0.30	-0.34	-0.57*
Portfolio Assets	-0.27*	-0.40*	-0.28*	-0.01	-0.06	0.02	-0.14*
Age of Fund Portfolio	-0.23	0.22	0.37	-0.02	0.47*	0.30	0.25*
Adjusted R-square	4.7%	6.8%	7.5%	6.6%	7.4%	9.5%	5.7%

Table 7
12b-1 Fees and Mean-Adjusted Gross Returns

This table reports the results of an ordinary least squares regression of various independent variables on gross returns. The variables are gathered from Morningstar Principia monthly discs for the years 1997 through 2002. The dependent variable is the share classes' asset value-weighted average annual gross return minus the average gross return to all funds in the same objective. The 12b-1 fee is the share classes' asset value-weighted average 12b-1 fee allowable in the fund's prospectus. Front-end load is the share classes' asset value-weighted average maximum upfront sales charge. Contingent deferred load is the share classes' asset value-weighted average maximum deferred sales charge. Age of fund portfolio is the natural log of the age of the oldest class of shares within a portfolio. The regression also includes control variables not reported here. The control variables consist of indicator variables for the year and for the investment objective of the fund as contained in the fund's prospectus. * indicates significance at the 5% level.

Independent Variables	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*All Years*	*All Years Except 1999*
Observations	2,881	2,790	3,212	3,298	3,314	3,222	18,717	15,505
Intercept	0.96	-1.78	-9.84*	1.64	2.64*	-5.03*	-0.22	1.78*
12b-1 Fee	**0.81**	**-0.47**	**3.84***	**-4.68***	**-1.29**	**-1.40**	**-0.46**	**-1.30***
Annual Turnover	-0.43*	0.05	2.82*	-0.23	-0.28	-1.08*	0.15	-0.41*
Front-end Load	-0.07	-0.04	-0.05	0.20	-0.18	0.03	-0.03	-0.03
Contingent Deferred Load	0.03	-0.10	-0.10	0.43	-0.90*	-0.70*	-0.23	-0.27
Age of Fund Portfolio	0.45*	0.97*	-0.95*	-0.26	-0.15	0.45	0.06	0.28*
Adjusted R-square	0.3%	0.1%	3.9%	0.3%	1.2%	2.1%	0.1%	0.1%

Table 8
12b-1 Fees and Net Redemptions

This table reports the results of an ordinary least squares regression of various independent variables on net redemptions. The variables are gathered from Morningstar Principia monthly discs for the years 1997 through 2002. The dependent variable is the sum of dollar flows in months within a year for which there were net redemptions, divided by the average assets for the year. The 12b-1 fee is the share classes' asset value-weighted average 12b-1 fee allowable in the fund's prospectus. The annual net return is the share classes' asset value-weighted average net return. Front-end load is the share classes' asset value-weighted average maximum upfront sales charge. Contingent deferred load is the share classes' asset value-weighted average maximum deferred sales charge. Portfolio assets are the natural log of the sum of the assets for all classes of a fund portfolio. Age of fund portfolio is the natural log of the age of the oldest class of shares within a portfolio. The regression also includes control variables not reported here. The control variables consist of indicator variables for the investment objective of the fund as contained in the fund's prospectus. * indicates significance at the 5% level.

Independent Variables	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*All years*
Observations	3,054	2,936	3,408	3,401	3,418	3,284	19,502
Intercept	-25.07*	-30.2*	-19.97*	-32.52*	-25.39*	-25.84*	-28.71*
12b-1 Fee	**-0.14**	**-0.47**	**-0.49**	**-2.96***	**-1.58**	**-1.37**	**-1.95***
Annual Net Return	-0.30*	-0.50*	-0.90*	-0.25*	-0.14*	-0.01	-0.44*
Front-end Load	-0.11*	-0.07	-0.17*	-0.08	-0.05	-0.09	-0.06
Contingent Deferred Load	-0.05	-0.04	-0.26	0.15	0.49*	0.49*	0.07
Portfolio Assets	0.32*	0.60*	-0.07	-0.24	0.51*	0.20	0.28*
Age of Fund Portfolio	-0.19*	-0.08	0.50*	0.25*	0.18*	0.07	0.04
Adjusted R-square	84.2%	83.5%	95.5%	60.1%	55.2%	36.5%	71.3%