

MUTUAL FUND TAX EFFICIENCY AND INVESTMENT SELECTION

D. K. Malhotra
Professor of Finance
School of Business Administration
Philadelphia University
School House Lane and Henry Avenue
Philadelphia, PA 19144
Telephone: 215- 951-2813
E-mail: MalhotraD@philau.edu

Rand Martin
Associate Professor of Finance
College of Business
Bloomsburg University of Pennsylvania
400 East Second Street
Bloomsburg, PA 17815
Telephone: 570-389-4761
E-mail: rmartin@bloomu.edu

C. Andrew Lafond
Assistant Professor of Accounting
School of Business Administration
The College of New Jersey
2000 Pennington Road
Ewing, NJ 08628
Telephone: 609-771-2914
E-mail: Lafond@tcnj.edu

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Abstract

We examine six factors that may be important when looking for a more tax efficient mutual fund. We consider the pre- and post-liquidation bases for over 4,000 mutual funds in logical groupings. Our results for turnover show that its effect on tax efficiency depends upon conditions in the securities markets. A falling market leads to greater tax efficiency due to security sales at depressed prices. We have a similar finding for expense categories probably because increased sales leads to higher expenses. We find greater tax efficiency if mutual funds have institutional status, no-loads, and no 12b-1 plan.

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I. INTRODUCTION

Mutual funds continue to be popular as investment vehicles. Evidence of this is the fact that, according to the Investment Company Institute, the total dollars invested through mutual funds increased from \$3.028 trillion in 1995 to \$10.701 trillion as of May 2009. This popularity results largely from the low cost diversification afforded by mutual funds (Weiss, 2005). But, with so many mutual funds available, investors need the best criteria for making selections that fit their needs.

Investors usually select mutual funds based on performance, risk, and investment objective. Two other selection criteria have recently been touted as important. One is the expense ratio which has been the subject of extensive academic research (McLeod and Malhotra, 1994, Malhotra and McLeod, 1997, Bogle, 2006). In recent years tax efficiency has also emerged as a selection criterion of great interest. Tax efficiency is the subject of this study.

Is the attention paid to tax efficiency justified? It may be for investors who are not invested in a tax-exempt fund or in a tax-deferred account such as an IRA. To answer the question for those investors, consider some facts about the taxation of mutual fund returns. Bruce (2003) reports that “the Securities and Exchange Commission says that more than 2.5 percent of the average stock fund's total return is lost each year to taxes, significantly more than the amount lost to fees. The tax bite varies from zero percent for the most tax-efficient funds to 5.6 percent for the least efficient.” Bernard (2006) says that mutual fund investors paid an estimated \$15.2 billion in taxes according to a study conducted by data tracker Lipper, Inc. According to Roger Ibbotson, “roughly 2 percent of pre-tax returns of mutual funds are lost to taxes for those taxpayers in the highest tax bracket” (Tuve Investments, 2007). Discussion of tax

efficiency in the popular press has become so common that in *Kiplinger's Personal Finance* it was said that “tax-efficient investing is the most over-covered topic in the financial press” (Gregory and Savage, 2003). Even with that coverage in the popular press, this topic has received very little attention in academic research. We think tax efficiency is an important topic and that investors should have a better idea of how to look for tax efficient mutual funds. Our purpose in this study is to investigate the likely characteristics of tax-efficient mutual funds that an investor can easily use to select funds.

II. TAXATION OF RETURNS AND AVOIDANCE OF TAXES

Taxes can be incurred on shares of mutual funds in three ways. The first is when a shareholder sells shares for more than the purchase price and thus realizes a capital gain. Incurrence of this tax is under the control of the shareholder since they decide when to sell shares. The second way is taxation of interest and dividends received when shares are not held in a tax-deferred retirement savings account. Mutual funds could be selected that do not pay interest or dividends due to their investment objective. But, if an investor selects funds that generate interest and dividends, tax liability will be incurred. The third type of taxation is caused by mutual fund managers as they turn over the assets of the fund and create capital gains income which may be distributed to shareholders. This is out of the control of the shareholder and is often overlooked by investors as a cause of taxation. Qualified dividends and long-term capital gains get preferential tax treatment at the maximum 15% tax rate; however interest, nonqualified dividends, and short-term capital gains can be taxed as ordinary income.

Since mutual fund rules require that all income earned by a fund be distributed each year to the shareholders, those funds that earn more income through interest, dividends, or capital gains are less tax efficient and create a higher tax liability for the investor. But, there are three

things that investors can do to avoid taxes besides holding shares in tax-deferred retirement savings accounts. One is using index funds. Index funds are more tax efficient than managed mutual funds because their objective to invest according to the representation of securities in indexes requires less frequent trading of securities. Over a long period of time, this buy and hold approach will enhance the overall return on an index fund (Ellentuck, 2004). The second means for avoiding tax is to use mutual funds that have tax efficiency as an objective. These funds reduce a shareholder's taxes by having a lower turnover rate, by investing in non-dividend paying stocks, and by using a strategy of matching losses with gains during a year to minimize the amount of capital gains. These funds also attempt to reduce the incurrence of taxes by discouraging share sales through charging a redemption fee if shares are sold before a specified time period elapses after they are purchased (Ellentuck, 2004). The third means is by using exchange-traded funds. Gardner and Welch (2005) describe these funds by saying that "exchange-traded funds are a basket of securities owned by a mutual fund company, similar to a mutual fund, but differ in how their shares are issued, traded, and redeemed." These funds use a strategy of creating and redeeming shares through in-kind transactions so that sales aren't made and capital gains and other taxable transactions are not created.

In the current study, we do not limit ourselves to an examination of mutual funds that are designed for tax efficiency. Instead, we examine all mutual funds for which we have adequate data in an effort to determine whether certain characteristics can be used to select tax efficient funds.

III. LITERATURE REVIEW

We could find only one academic study that examines after-tax mutual fund returns. Peterson, et al (2002) study the pre-tax returns, after-tax returns, and tax efficiency of 1,170

mutual funds that had diversified U.S. equity investment objectives over the years 1981 to 1998. The authors hypothesize that the important determinants of pre-tax returns would also be the important determinants of after-tax returns. They find that historically tax efficient funds outperform historically tax inefficient funds on an after-tax basis. Funds that experience net redemptions, especially in the case of large cap value funds, subsequently perform worse after-tax than comparable funds that do not have net redemptions. They find that the important determinants of after-tax and pre-tax returns are the level of risk taken, investment style, past pre-tax performance, and expenses. They find that turnover is not related to after-tax returns. Finally, they find that funds with large cash inflows, high expense ratios, or an emphasis on small cap stocks tend to be more tax efficient and to have lower pre-tax returns. The authors take their findings to mean that investors should focus on after-tax returns rather than tax efficiency.

Our study differs from that of Peterson, et al (2002) in three ways. First, we include funds with debt as well as equity investment objectives. Second, we study tax-efficiency on the basis of earnings distributed and on the basis of earnings after distribution and sale of fund shares. And, third, we use a different sample period.

IV. METHOD OF INVESTIGATION

Tax efficiency is typically measured in one of two ways. One is by dividing the after-tax return by the pre-tax return to obtain a tax-efficiency ratio. The other is computation of the return lost to taxes by subtracting the fund's after-tax return from its pre-tax return. This second method is more relevant since the tax-efficiency ratio is not meaningful when the numerator or denominator is negative (Riepe, 2000). As a result, we use the second method. When using this method, a positive difference (pre-tax return minus after-tax return), will mean less tax efficiency

since more return is lost to taxes. A negative result can be had and will be discussed in our empirical results section below. The most desirable result would be a difference of zero meaning that no return is lost to taxes.

We calculate tax efficiency on a pre-liquidation status and on a post-liquidation status for six data. They are (1) turnover, (2) investment style, (3) expense category, (4) institutional or retail status, (5) load status, and (6) 12b-1 plan status. Many institutional investors such as endowment funds and pension funds are tax exempt and would not care about tax efficiency. But, we investigate the effect of the institutional/retail variable because purchase of institutional fund shares is not limited to tax exempt institutions. The only requirement for purchase of those shares is meeting the minimum investment amount.

Pre-liquidation tax efficiency is the total return for 12 months minus the return after tax on distribution. Post-liquidation tax efficiency is the total return for 12 months minus the return after tax on distribution and sale.

To calculate return after tax on distribution and sale, Morningstar says that it “applies the appropriate historical tax rate based on the date of distribution.” The tax rates that Morningstar uses are as follows.

- 35 percent for interest income and dividends that do not qualify for taxation at the lower long-term capital gains tax rate
- 15 percent for dividends that do qualify for the lower long-term capital gains tax rate
- 35 percent for short-term capital gains
- 15 percent for long-term capital gains

We calculate tax efficiency for what we consider to be logical groupings of mutual funds under each of the six data items mentioned above. Listed below is an explanation of how we placed mutual funds into the groupings.

1. **Turnover Level** (Table 2): According to Morningstar, the turnover ratio “loosely represents the percentage of the portfolio’s holdings that have changed over the past year.” We use five turnover percentage ranges to categorize mutual funds: Very Low $\leq 20\%$, Low $> 20\%$ and $\leq 40\%$, Average $> 40\%$ and $\leq 80\%$, High $> 80\%$ and $\leq 150\%$, Very High $> 150\%$.
2. **Investment Style** (Table 3): Morningstar says that mutual funds with an equity style invest in stocks and mutual funds with a fixed-income style invest in bonds. Those with a style of “equity and fixed income” invest in both stocks and bonds and are sometimes called balanced funds.
3. **Expense Category** (Table 4): Morningstar defines an expense ratio as “the percentage of fund assets paid for operating expenses and management fees, including 12b-1 fees, administrative fees, and all other asset-based costs incurred by the fund, except brokerage costs.” They use expense ratios to put mutual funds into four expense categories as follows.
 - Category A: Mutual funds whose expense ratios fall within the cheapest quintile of its type of share class within its comparison group
 - Category B: Mutual funds in the second-cheapest category
 - Category C: Mutual funds with expense ratios falling between the 40th and 60th percentiles of the peer group
 - Category F: Mutual funds with higher expense ratios than the funds in category C

We combine the Morningstar expense category classifications A and B to form our Low expense ratio category and we combine the C and F classifications to form our High expense ratio category.

4. **Institutional / Retail Status** (Table 5): Morningstar defines an institutional fund as one that meets one of three criteria: (1) has the word "institutional" in its name, (2) has a minimum initial purchase of \$100,000 or more, or (3) states in its prospectus that it is designed for institutional investors or those purchasing on a fiduciary basis. We consider all other funds to be retail funds.
5. **Load and No-Load Groupings** (Table 6): Morningstar describes sales fees in this way: "Also known as loads, sales fees represent the maximum level of initial (front-end) and deferred (back-end) sales charges imposed by a fund." To form our Load status categories, we combine the front-end and back-end sales charges reported by Morningstar.
6. **12b-1 Plan Status** (Table 7): Morningstar defines a 12b-1 fee as "a fee used to pay for a mutual fund's distribution costs. It is often used as a commission to brokers for selling the fund."

For each group of funds, we calculate the mean and variance of the tax efficiency results. Then, we compute t-statistics for two-tailed tests of the difference in sample means. We compare the means of tax efficiency measures for each group of funds to the mean tax efficiency of the group that is likely to have the highest tax efficiency. In effect we are testing the following hypotheses about the mean tax efficiency of groups of funds.

1. Turnover Level

$$H_0: \mu_{\text{Very Low}} = \mu_{\text{Low}} = \mu_{\text{Average}} = \mu_{\text{High}} = \mu_{\text{Very High}}$$

$$H_a: \mu_{\text{Very Low}} < \mu_{\text{Low}} < \mu_{\text{Average}} < \mu_{\text{High}} < \mu_{\text{Very High}}$$

2. Investment Style

$$H_0: \mu_{\text{Fixed Income}} = \mu_{\text{Equity \& Fixed Income}} = \mu_{\text{Equity}}$$

$$H_a: \mu_{\text{Fixed Income}} < \mu_{\text{Equity \& Fixed Income}} < \mu_{\text{Equity}}$$

3. Expense Category

$$H_0: \mu_{\text{Low}} = \mu_{\text{High}}$$

$$H_a: \mu_{\text{Low}} < \mu_{\text{High}}$$

4. Institutional / Retail Status

$$H_0: \mu_{\text{Institutional}} = \mu_{\text{Retail}}$$

$$H_a: \mu_{\text{Institutional}} < \mu_{\text{Retail}}$$

5. Load and No-Load Groupings

$$H_0: \mu_{\text{No-Load}} = \mu_{\text{Load}}$$

$$H_a: \mu_{\text{No-Load}} < \mu_{\text{Load}}$$

6. 12b-1 Plan Status

$$H_0: \mu_{\text{No 12b-1 Plan}} = \mu_{\text{Has 12b-1 Plan}}$$

$$H_a: \mu_{\text{No 12b-1 Plan}} < \mu_{\text{Has 12b-1 Plan}}$$

IV. DATA

Our data is from *Morningstar Principia* and it covers the years 2006 through 2009. We use nine Morningstar data items to investigate tax-efficiency: turnover, investment style, expense ratio, status as an institutional or retail fund, front-end load, deferred load, 12b-1 plan status, after-tax return on distribution for one year, and after-tax return on distribution and after sale of shares on a one-year basis. We combine front-end load and deferred load in order to put funds in one of two categories: load and no-load. Our data is summarized in Table 1.

<Insert Table 1 about here>

VI. EMPIRICAL RESULTS

Our findings are as follows for the six variables that we investigate with regard to tax efficiency.

1. Turnover Ratio

Table 2 gives our tax efficiency results by turnover level.

<Insert Table 2 about here>

Inspection of Table 2 reveals that mutual funds with lower turnover rates generally lose smaller percentages of return to taxes. For 2006, 2008, and 2009, almost every turnover category has a smaller return loss due to taxes than the next higher turnover category on both the pre-liquidation and post-liquidation bases. We use t-statistics to compare the mean tax efficiency measures for each of the low, average, high, and very high turnover groups to the tax efficiency measures for the very low turnover group for the same year. For these three years, this requires calculating 24 t-statistics. Twenty of those t-statistics show statistically significant differences in means. Each of the higher turnover groups are less tax efficient than the very low turnover group. This result is consistent with our expectation that the fewer the transactions that a mutual fund does, the lower the total capital gains tax.

For 2007, we have negative tax efficiency measures on the post-liquidation basis for all levels of turnover. Negative tax efficiency measures mean that there is a gain when shares are sold. This was triggered because the stock market fell in 2007. These capital losses reduced taxes. Therefore, in years where the stock market goes down, funds with higher turnover ratios can be more tax efficient than funds with lower turnover ratios. We find that funds with low, average, and high turnover levels in 2007 have tax benefits that are great enough to produce a statistically significant difference compared to the mean tax inefficiency measure of the very low

turnover group. The very high turnover group goes in the opposite direction with a loss compared to the very low group. This difference is also statistically significant.

2. Investment Style

Table 3 gives our tax efficiency results by investment style.

<Insert Table 3 about here>

The results in Table 3 show that for all years on the pre-liquidation basis, funds with a fixed income style are more tax efficient than funds with the equity and fixed income style and two of those differences are statistically significant. But, funds with a fixed income style are less tax efficient than funds with the equity style for 2007, 2008, and 2009. All three of those differences are statistically significant.

On the post-liquidation basis, funds with a fixed income style are more tax efficient than funds with the equity and fixed income style for 2006, 2008, and 2009 and those differences are statistically significant. Compared to funds with the equity style, those with the fixed income style are even more efficient for those same three years. For 2007, the results are reversed with both differences being statistically significant.

To explain these results, consider that equity style funds can generate both dividend and capital gain income that must be distributed to investors. The dividends, if qualified and the capital gains distributions are taxed at a maximum preferential tax rate of 15 percent, resulting in less tax for the shareholder. Fixed income funds typically hold bonds that generate interest income. Interest income is taxed at the ordinary income tax rate which typically results in a higher tax liability and therefore lower tax efficiency. This last fact would explain the greater tax efficiency of equity funds on a pre-liquidation basis. We expect that the lower tax efficiency of equity funds on the post-liquidation basis results from having to pay tax on both dividend

income and capital gains income. The reversal of tax efficiency results for 2007 compared to the other years resulted from the decline in the stock market that year. Capital losses on shares that were sold reduced taxes due.

3. Expense Category

Table 4 gives tax efficiency results for our low and high expense ratio categories.

<Insert Table 4 about here>

Tax efficiency results for the expense ratio categories are mixed. One would expect that funds with low expense ratios would have lower turnover in their portfolios and therefore would be more tax efficient. That seems to be true for 2006 on the pre- and post-liquidation bases, for 2008 on the pre-liquidation basis, and for 2009 on the post-liquidation basis. T-statistics show that all of these differences in efficiency are statistically significant.

For 2007 on the pre- and post-liquidation bases and for 2008 on the post-liquidation basis, high expense ratio funds are more efficient than low expense ratio funds and the t-statistics show that all of those differences are statistically significant. We believe this reversal compared to 2006 is also the result of the fall in the stock market in 2007.

4. Institutional or Retail Status

Table 5 gives our tax efficiency results by the institutional and retail status of groups of mutual funds.

<Insert Table 5 about here>

Our results show that retail funds are less tax efficient than institutional funds on both the pre- and post-liquidation bases for all years of the sample period. Those differences in efficiency are statistically significant for all but the 2007 post-liquidation basis.

A likely explanation for our results is found in the differences in retail and institutional funds especially as they affect turnover of securities in their portfolios. These funds usually have a minimum investment requirement and their investment strategy typically involves buying and holding securities. This works to the advantage of their customers which are pension funds, endowments, and high net worth individuals. Those investors will redeem shares less frequently than the public in general. Thus, the buy-and-hold approach leads to a lower turnover rate, lower operating costs, and thus greater tax efficiency. Retail funds cater to individuals and financial advisors. They are characterized by a more active management style, higher risk, a higher turnover rate, and thus lower tax efficiency.

5. Load Status

Table 6 gives our tax efficiency results according to the load status of groups of mutual funds. We separate mutual funds into two broad groups here: load and no-load. A load fund is one for which the buying and/or selling of its shares causes the investor to incur a sales fee which is called a load. For a no-load fund, there is no sales fee involved in transacting in its shares.

<Insert Table 6 about here>

Inspection of Table 6 shows that mutual funds with loads are on average less tax efficient than no-load funds for every year during the sample period on both the pre- and post-liquidation bases. The t-statistics for differences in sample means are all statistically significant. Apparently, mutual funds with sales charges are on average more willing to engage in turnover of their portfolios which in turn reduces tax efficiency.

6. 12b-1 Plan Status

Table 7 gives our tax efficiency results for funds grouped according to whether they have a 12b-1 plan. If a mutual fund has a 12b-1 plan, they charge customers for marketing expenses which are often commissions to brokers who sell shares of the fund.

<Insert Table 7 about here>

Our results show that mutual funds that do not have a 12b-1 plan are more tax efficient than funds with a 12b-1 plan on both the pre- and post-liquidation bases for all years of the sample period. The t-statistics for differences in sample means are all statistically significant. Mutual funds that are willing to pay this additional marketing expense apparently have a higher turnover of securities and thus lower tax efficiency.

VII. SUMMARY AND CONCLUSIONS

We investigate six factors which we have reason to believe could characterize or affect mutual funds as to their tax efficiency. Our measure of tax efficiency here is the percentage of return lost to taxes. One of the factors we investigate, turnover, is actually a determinant of tax efficiency since a higher turnover of securities causes the incurrence of more taxes which in turn reduces return. We evaluate the impact of the other five factors on tax efficiency.

We find tax efficiency to be greater on average for mutual funds that have a lower turnover rate, a fixed income investment style, institutional status, no-load status, and no 12b-1 plan. Mutual funds with low expense ratios will be more tax efficient when the securities markets are rising. This will reverse if markets fall because a tax advantage will be created by capital losses incurred when investors decide to sell shares at depressed prices. Mutual funds whose investment style is a combination of equity and fixed income will have tax efficiency between those of the fixed income and equity styles.

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Table 1: Summary Statistics for the Data of this Study

		Pre-Liquidation Tax Efficiency	Post-Liquidation Tax Efficiency	12-Month Total Return	Return after Tax on Distribution 1 Year	Return after Tax on Distribution and Sale 1 Year	Front-End Load % Plus Deferred Load %	12b-1 Plan %
2006	Mean	3.36	2.63	7.35	3.99	4.72	1.64	0.42
	Median	2.52	2.22	5.88	2.93	3.66	0.00	0.25
	Std. Dev.	2.61	3.62	8.87	9.04	6.02	2.19	0.38
2007	Mean	1.73	-10.51	-30.94	-32.67	-20.43	1.56	0.40
	Median	1.09	-12.07	-35.74	-37.31	-23.51	0.00	0.25
	Std. Dev.	1.67	5.75	16.03	15.64	10.46	2.16	0.38
2008	Mean	2.55	11.59	30.27	27.72	18.68	1.50	0.39
	Median	1.17	11.18	29.43	26.65	17.87	0.00	0.25
	Std. Dev.	2.84	6.08	16.00	16.04	10.34	2.13	0.38
2009	Mean	2.69	16.73	44.71	42.03	27.99	1.49	0.39
	Median	1.18	17.71	47.93	45.27	29.81	0.00	0.25
	Std. Dev.	3.21	8.51	22.79	22.68	14.62	2.13	0.38

Table 2: Mutual Fund Tax Efficiency by Turnover Level

According to Morningstar, the turnover ratio “loosely represents the percentage of the portfolio’s holdings that have changed over the past year.” We use five turnover percentage ranges to categorize mutual funds: Very Low $\leq 20\%$, Low $> 20\%$ and $\leq 40\%$, Average $> 40\%$ and $\leq 80\%$, High $> 80\%$ and $\leq 150\%$, Very High $> 150\%$. Mean values are percentages of return *lost* due to taxes. They are computed by subtracting after-tax return from total return. T-statistics are for two-tailed tests for the difference in sample means assuming that the sample variances are unequal.

		Pre-Liquidation Tax Efficiency by Turnover Level					Post-Liquidation Tax Efficiency by Turnover Level				
	Turnover Category	Very Low	Low	Average	High	Very High	Very Low	Low	Average	High	Very High
2006	Mean	2.72	3.16	3.65	3.48	3.81	1.33	2.42	2.34	3.80	3.69
	Variance	5.85	5.94	6.86	7.91	6.59	10.71	11.33	14.96	11.88	11.19
	No. Funds	800	890	1269	999	410	800	890	1269	999	410
	T-Stats: Vs Very Low		3.70*	8.18*	6.12*	7.13*		6.74*	6.31*	15.49*	11.68*
2007	Mean	1.68	1.76	1.67	1.56	2.33	-9.69	-10.64	-11.16	-11.72	-6.82
	Variance	2.88	2.57	2.55	2.62	3.62	27.04	27.12	28.33	31.27	51.02
	No. Funds	609	975	1299	1054	477	609	975	1299	1054	477
	T-Stats: Vs Very Low		0.86	-0.11	-1.43	5.79*		-3.54*	-5.70*	-7.43*	7.39*
2008	Mean	2.11	2.26	2.69	2.66	2.87	9.82	11.57	12.56	12.88	9.86
	Variance	6.22	6.92	8.29	8.37	9.60	25.52	35.06	43.18	31.00	38.14
	No. Funds	554	897	1045	998	747	554	897	1045	998	747
	T-Stats: Vs Very Low		1.07	4.14*	3.89*	4.85*		6.00*	9.28*	11.02*	0.14
2009	Mean	2.13	2.33	2.75	2.89	3.15	14.58	16.51	17.89	18.94	13.98
	Variance	7.22	8.21	9.56	10.16	15.89	76.87	60.72	68.22	54.38	94.57
	No. Funds	590	791	1069	1011	735	590	791	1069	1011	735
	T-Stats: Vs Very Low		1.30	4.26*	5.10*	5.56*		4.24*	7.50*	10.16*	-1.19

*Statistically significant at the 5 percent level

Table 3: Tax Efficiency by Investment Style

Morningstar says that mutual funds with an equity style invest in stocks and mutual funds with a fixed-income style invest in bonds. Those with a style of “equity and fixed income” invest in both stocks and bonds and are sometimes called balanced funds.

Mean values are percentages of return *lost* due to taxes. They are computed by subtracting after-tax return from total return. T-statistics are for two-tailed tests for the difference in sample means assuming that the sample variances are unequal.

		Pre-Liquidation Tax Efficiency by Investment Style			Post-Liquidation Tax Efficiency by Investment Style		
	Investment Style	Fixed Income	Equity and Fixed Income	Equity	Fixed Income	Equity and Fixed Income	Equity
2006	Mean	2.68	3.55	3.57	1.89	2.20	2.99
	Variance	3.96	5.44	7.83	3.79	3.12	17.44
	No. Funds	900	441	2850	900	441	2850
	T-Stats: Vs Fixed Income		7.10*	8.86**		2.81*	7.68*
2007	Mean	2.36	2.39	1.38	-2.19	-8.65	-13.61
	Variance	3.52	2.88	2.12	17.06	10.91	9.24
	No. Funds	826	484	2697	826	484	2697
	T-Stats: Vs Fixed Income		0.29	-15.85*		-29.34*	-86.28*
2008	Mean	2.82	3.44	2.27	6.16	11.13	13.70
	Variance	7.90	8.36	7.83	22.87	24.07	29.49
	No. Funds	876	569	2657	876	569	2657
	T-Stats: Vs Fixed Income		4.01*	-5.09*		19.11*	32.66*
2009	Mean	3.07	3.27	2.47	7.29	14.55	20.71
	Variance	12.80	8.71	9.88	59.10	29.64	35.24
	No. Funds	893	485	2701	893	485	2701
	T-Stats: Vs Fixed Income		1.03	-4.80*		18.41*	54.18*

*Statistically significant at the 5 percent level

Table 4: Tax Efficiency of Mutual Funds by Expense Category Groupings

Morningstar defines an expense ratio as “the percentage of fund assets paid for operating expenses and management fees, including 12b-1 fees, administrative fees, and all other asset-based costs incurred by the fund, except brokerage costs.” We combine the Morningstar expense category classifications A and B to form our Low expense category and we combine the C and F classifications to form our High expense category.

Mean values are percentages of return lost due to taxes. They are computed by subtracting after-tax return from total return. T-statistics are for two-tailed tests for the difference in sample means assuming that the sample variances are unequal.

		Pre-Liquidation Tax Efficiency		Post-Liquidation Tax Efficiency	
	Exp. Ratio Group	Low	High	Low	High
2006	Mean	2.51	2.94	7.01	8.21
	Variance	12.67	14.20	77.88	79.47
	No. Funds	3147	1221	3147	1221
	T-Statistics	3.47*		3.99*	
2007	Mean	1.77	1.64	-10.30	-11.03
	Variance	2.78	2.75	34.52	28.92
	No. Funds	3175	1240	3175	1240
	T-Statistics	-2.32*		-3.96*	
2008	Mean	2.27	2.82	13.70	6.16
	Variance	7.83	7.90	29.49	22.87
	No. Funds	2657	876	2657	876
	T-Statistics	5.08*		-39.08*	
2009	Mean	2.72	2.62	16.42	17.39
	Variance	10.83	9.22	77.46	60.80
	No. Funds	2889	1305	2889	1305
	T-Statistics	-0.94		3.58*	

*Statistically significant at the 5 percent level

Table 5: Tax Efficiency of Mutual Funds by Institutional / Retail Status

Morningstar defines an institutional fund as one that meets one of three criteria: (1) has the word "institutional" in its name, (2) has a minimum initial purchase of \$100,000 or more, or (3) states in its prospectus that it is designed for institutional investors or those purchasing on a fiduciary basis. We consider all other funds to be retail funds.

Mean values are percentages of return *lost* due to taxes. They are computed by subtracting after-tax return from total return. T-statistics are for two-tailed tests for the difference in sample means assuming that the sample variances are unequal.

		Pre-Liquidation Tax Efficiency		Post-Liquidation Tax Efficiency	
	Status	Institutional	Retail	Institutional	Retail
2006	Mean	1.86	3.58	1.87	2.75
	Variance	2.02	7.16	11.90	13.22
	No. Funds	566	3802	566	3802
	T-Statistics	23.34*		5.62*	
2007	Mean	1.31	1.84	-32.77	-32.27
	Variance	1.95	2.93	286.10	275.02
	No. Funds	882	3533	882	3533
	T-Statistics	9.57*		0.79	
2008	Mean	0.95	2.78	11.03	11.67
	Variance	1.94	8.51	34.22	37.28
	No. Funds	544	3697	544	3697
	T-Statistics	23.94*		2.38*	
2009	Mean	1.14	2.99	16.04	16.86
	Variance	4.96	10.83	74.17	72.03
	No. Funds	696	3498	696	3498
	T-Statistics	18.37*		2.29*	

*Statistically significant at the 5 percent level

Table 6: Tax Efficiency of Mutual Funds for Load and No-Load Groupings

Morningstar describes sales fees: “Also known as loads, sales fees represent the maximum level of initial (front-end) and deferred (back-end) sales charges imposed by a fund.” To form our Load status categories, we combine the front-end and back-end sales charges reported by Morningstar. Mean values are percentages of return *lost* due to taxes. They are computed by subtracting after-tax return from total return. T-statistics are for two-tailed tests for the difference in sample means assuming that the sample variances are unequal.

		Pre-Liquidation Tax Efficiency		Post-Liquidation Tax Efficiency	
	Group	No-Load	Load	No-Load	Load
2006	Mean	1.74	5.19	1.70	3.68
	Variance	1.74	6.26	10.35	14.19
	No. Funds	2317	2051	2317	2051
	T-Statistics	55.90*		18.60*	
2007	Mean	0.74	2.99	-11.24	-9.59
	Variance	0.67	2.64	31.09	34.00
	No. Funds	2307	1815	2307	1815
	T-Statistics	53.91*		9.18*	
2008	Mean	0.89	4.71	10.61	12.87
	Variance	1.85	7.84	32.55	39.75
	No. Funds	2403	1838	2403	1838
	T-Statistics	53.87*		12.09*	
2009	Mean	0.93	5.05	15.93	17.81
	Variance	2.89	10.63	67.26	77.49
	No. Funds	2410	1784	2410	1784
	T-Statistics	48.69*		7.04*	

*Statistically significant at the 5 percent level

Table 7: Tax Efficiency of Mutual Funds by 12b-1 Plan Status

Morningstar defines a 12b-1 fee as “a fee used to pay for a mutual fund’s distribution costs. It is often used as a commission to brokers for selling the fund.”

Mean values are percentages of return *lost* due to taxes. They are computed by subtracting after-tax return from total return. T-statistics are for two-tailed tests for the difference in sample means assuming that the sample variances are unequal.

		Pre-Liquidation Tax Efficiency		Post-Liquidation Tax Efficiency	
	12b-1 Plan Status	No 12b-1 Plan	Has 12b-1 Plan	No 12b-1 Plan	Has 12b-1 Plan
2006	Mean	1.91	2.88	1.99	2.90
	Variance	12.15	13.23	13.60	13.23
	No. Funds	1125	3243	1384	3287
	T-Statistics	8.03*		2.40*	
2007	Mean	0.88	2.09	-10.99	-10.32
	Variance	1.16	3.03	33.32	32.71
	No. Funds	1211	2910	1211	2910
	T-Statistics	27.11*		3.44*	
2008	Mean	1.05	3.19	10.70	11.97
	Variance	2.70	8.95	35.56	37.05
	No. Funds	1269	2972	1269	2972
	T-Statistics	29.85*		6.31*	
2009	Mean	1.10	3.35	16.06	16.95
	Variance	3.63	11.40	72.48	72.98
	No. Funds	1264	3008	1264	3008
	T-Statistics	27.63*		3.11*	

*Statistically significant at the 5 percent level