

2011

"Does It Pay to Be Informed?" Expenditure Efficiency in the US Mutual Fund Industry

Jan Cerny
Gettysburg College
Class of 2011

Follow this and additional works at: <http://cupola.gettysburg.edu/ger>

 Part of the [Finance Commons](#), [Growth and Development Commons](#), and the [Public Economics Commons](#)

Share feedback about the accessibility of this item.

Cerny, Jan (2011) ""Does It Pay to Be Informed?" Expenditure Efficiency in the US Mutual Fund Industry," *Gettysburg Economic Review*: Vol. 5, Article 5.

Available at: <http://cupola.gettysburg.edu/ger/vol5/iss1/5>

This open access article is brought to you by The Cupola: Scholarship at Gettysburg College. It has been accepted for inclusion by an authorized administrator of The Cupola. For more information, please contact cupola@gettysburg.edu.

"Does It Pay to Be Informed?" Expenditure Efficiency in the US Mutual Fund Industry

Abstract

The mutual fund industry would like us to believe that fund expenses are justifiable by their extensive management expertise, security analysis and the consequent delivery of returns that exceed the market performance. Management know-how is costly and thus it drives up the expenditure of actively managed mutual funds and potentially lowers their net returns. Nevertheless the fund managers argue that their contributions to the returns fully outweigh their costs and in general their trading strategies add value to the investors. On the other hand many academics hold that such claims are fundamentally misleading and actively managed funds cannot continuously outperform a market index. [*excerpt*]

Keywords

Mutual fund, equity fund, investment returns, investment strategy, investment portfolio, stock market, expenditures

“Does It Pay to Be Informed?”
Expenditure Efficiency in the US Mutual Fund Industry
Jan Cerny

Introduction

The mutual fund industry would like us to believe that fund expenses are justifiable by their extensive management expertise, security analysis and the consequent delivery of returns that exceed the market performance. Management know-how is costly and thus it drives up the expenditure of actively managed mutual funds and potentially lowers their net returns. Nevertheless the fund managers argue that their contributions to the returns fully outweigh their costs and in general their trading strategies add value to the investors. On the other hand many academics hold that such claims are fundamentally misleading and actively managed funds cannot continuously outperform a market index (See: Carhart 1997, Jensen 1968, Malkiel 2003, Sharpe 1964).

This study aims to provide additional insight into the debate by examining the performance of US equity mutual funds over the period of 2002 – 2010. I carry out empirical analysis to evaluate relative performance of the funds and test whether managers can justify their expenses and fees by higher risk adjusted returns. This provides valuable implications about the validity of the Efficient Market Hypothesis (EMH) as developed by Sharpe (1964) and is beneficial to the broad public that engages in various fund-picking strategies.

The preponderance of studies regarding mutual fund performance indicates that the topic is of crucial importance to the academics, practitioners and general public. Unlike most of the previous works, I do not focus on individual characteristics of funds that could be used for prediction of future returns. Instead,

I examine the performance of the mutual fund market as a whole and test the efficiency of resource expenditure across the industry over a period that is yet to be fully covered by the researchers. I explore the concept of costly information in financial markets and hypothesize that the market is in informational equilibrium where resources are spent efficiently.

For fund expenditure to be “efficient”, it must satisfy the equilibrium condition that the marginal cost equals marginal benefit. Return maximization is the proclaimed primary goal of mutual funds and so the funds should generate new expenses only if such expenses are offset by resulting higher returns. Thus, in theory, any extra research and trading may take place only if they add value to the fund. If such activities that are inevitably costly do not add enough value to outweigh their cost, the industry does not spend their resources efficiently. Such finding would suggest investors should focus on funds that minimize their expenditure to the point where the marginal cost of their activities equal their marginal benefit.

In addition to examining the EMH, analyzing performance of the funds and efficiency of their expenditure, this study provides insight into the controversial assumption of perfect investor rationality. Theoretically, assuming perfect information and rational consumers, investors would not pay high fees to mutual fund managers unless the managers could deliver (or create credible expectation of) returns that would exceed the management costs. In other words, if active trading did not add value, rational consumers would adjust in a long run and seek alternative investment strategies which would diminish the demand for actively trading funds.

In the first section of this paper, I review past literature and examine its contributions and shortcomings. In the second section I discuss the theoretical

background of informational equilibrium and resource expenditure efficiency. Next I introduce the Capital Asset Pricing Model (CAPM) and develop its extended version that I employ in my panel data analysis. Subsequently I discuss my data in the third section and present the empirical evidence in the fourth section. Lastly, I point out the limitations of my work and draw conclusions regarding my hypotheses.

Literature Review

The ability of mutual fund managers to earn excess risk-adjusted returns¹ has been of great interest to researchers for years. Prior to the 1990s the general consensus of academics was that investors are not able to earn such returns and no fund characteristics could substantially aid them in predicting which managers will become the next winners or losers. Nonetheless, numerous studies after 1990 arrived at opposite conclusions, claiming that returns on mutual funds and underlying securities are predictable to a certain degree. These researchers concluded that some types of analysis and trading activity allow for superb returns, which supports the case of “skilled managers” (Malkiel 1995). The literature on the performance of asset management strategies and mutual funds that is relevant to this study can be divided into three general categories:

1.) Testing the efficient market hypothesis (EMH).

Eugene Fama gave birth to the EMH in the 1960s claiming that, under the semi-strong version of the hypothesis, security prices instantly reflect all available public information. Consequently there is no information that the traders could employ to outsmart or time the market. Thus any charting or fundamental analysis will fail to generate substantial risk-adjusted excess

¹ Returns in excess of the risk free rate on Treasury Bills are generally referred to as “excess returns”

returns. The weak form of the EMH holds that there are no patterns in stock prices and so the active management is likely going to significantly increase expenses while only marginally contributing to returns. Therefore, no one is able to systematically benefit from the inefficiencies of the market and no research or expertise can enhance the fund returns over several years.

Ever since its creation, EMH has been tested by hundreds of empirical studies that aimed to determine the extent to which markets are efficient. The early tests focused on charting and technical analysis, that are often associated with active trading, and found most such techniques utterly worthless in predicting future price movements (Karz 2010). However, the professionals practicing these arguably futile methods have not been driven out of the market and so, under the assumption of consumer rationality, their service must be considered valuable. In reality most financial institutions continue to spend billions to support their technical analysis departments.

Academics have also identified several anomalies and patterns that would allow active traders to capture substantial risk-adjusted excess returns, such as the “size effect” or the “January effect”. Nevertheless, many studies concluded that once such patterns are documented and made public, the investors exploit these new opportunities to the extent that the patterns disappear or become unprofitable. The academic research also points out the paradox of EMH. This paradox states that, if all investors believed that markets were efficient, no one would spend resources on thorough asset analysis, and so the market would effectively become inefficient. Thus, the fund managers who do not believe in market efficiency and carry out asset research in pursuit of outperforming the benchmarks play a crucial role in actually making the market efficient. Overall, academic research and back-testing provided a relatively strong support for the validity of EMH across different periods and diverse markets. Therefore, high expenses generated

by active management research are not likely to be sufficiently offset by their higher returns.

2.) Existence of manager stock picking or market timing skills.

Many researchers designed empirical studies to test the existence of skill or talent of portfolio managers that would enable the funds to pick the winning stock or to properly time their market entry and exit points. Generally, the scholarly literature refutes the concept of superior stock picking skills as a determinant of fund returns (See the renowned study by Carhart 1997 or Henriksson 1984). Nonetheless, a limited number of studies argue that some managers do possess exceptional skills that allow them to exceed the market returns with some level of persistence (See: Gray and Kern 2010). Hendricks and Zeckhauser (1991), for example, examined the period of 1975-88 and found that extensive research and active management strategy of mutual funds could yield an excess return of 3% to 4% every year net of expenses. If such skills did exist my analysis should indicate that at least some funds were able to significantly outperform the market after expenses.

3.) Persistence in mutual fund performance.

A large body of literature focuses on the persistence in mutual fund performance claiming that, if there were outstanding actively trading mutual fund managers, it would be likely that their excess returns would display some level of continuity. Said differently, good players would be expected to win more often than others. Nonetheless, past research does not support the existence of long term persistence in mutual fund returns and the higher the expenses the shorter the persistence in positive returns usually is. For example Carhart (1997) documented that, even though some evidence for short term persistence of returns can be found, future performance of mutual funds is almost impossible to predict.

In addition to this wealth of academic literature, thousands of investment practitioner articles discuss approaches that should allow investors to select the best mutual funds based on their history or characteristics. This literature often holds turnover and expense ratios to be substantial determinants of fund returns. Some suggest that low turnover (buy-and-hold strategy) and low expenses are desirable while others believe that high turnover (active trading) may be an indicator of sound strategy and that higher transaction costs of frequent trading are fully offset by increased returns. This segment of the literature fails to reach a consensus regarding the role of expenses in determination of returns and often suffers from severe methodological problems such as omission of survivorship bias, which leads to false sense of return predictability (Peterson et al. 2002)

Methodology

This study builds on the theories developed by Grossman and Stiglitz (1980) and Ippolito (1989) who introduce the concept of costly information into the debate over the validity of EMH. Grossman and Stiglitz assert that EMH cannot hold since prices cannot reflect all available information, because if they did, traders who spent resources on obtaining such information would not receive any compensation (1980). I apply this framework on the equity mutual fund market and focus on the role of expenditure that is associated with the acquisition of information. Most of the “active trading” strategies rely on the premise of special skill or information of the managers. These strategies are bound to be very costly as they are characterized by notably high turnover, which increases transaction costs, and higher management fees, resulting from employment of larger amounts of human capital (Sharpe 1991, Carhart 1997). It follows, that for these strategies to be successful, their benefit needs to outweigh their cost. Conversely, passive management strategies such as indexing could be classified as a buy-and-hold

strategy with a predictably low portfolio turnover and low expenses. Thus observing a negative relationship between expenses (indicating information acquisition) and the excess returns would suggest that active management at its high levels does not add value to investors and passive investment strategies should be pursued.

Recognizing the existence of these dissimilar management styles, I make the simplification that the market can be divided into two types of traders: the “informed” and the “uninformed” ones. The “informed” managers believe in existence of some information or skill that can increase their performance even net of expenses. On the other hand, the “uninformed” managers believe that there is no such information that would be worth looking for. Said differently, these traders hold that active management with its extensive research creates more expenses than it can offset by potentially higher returns. Thus the “uninformed” traders generally follow a market index and focus on minimizing their expenses.

In this work I utilize the information equilibrium theory to address the claims of both types of traders. It is clear that acquisition of information and skills requires expenditure of time and other resources. Thus one would not engage in activity such as market research without expectations of appropriate rewards. Rational agents are on average able to learn from their experience. Therefore if the agents did not receive any rewards for their expenditure, they would no longer pursue the path that proved fruitless. Given these assumptions, in equilibrium, the marginal return to additional research or information will equal its marginal cost. In such equilibrium, all incentives to get more or less informed diminish.

Applying this framework to the EMH, it seems plausible that managers are able to outperform the market before expenses. Nevertheless, the risk-

adjusted excess returns disappear after the as the expenses are subtracted from the higher returns. If the managers that focus on costly research and trading were able to outperform the market net of expenses on continuous basis the relationship between their expenses and returns would be positive. Conversely, if the traditional form of EMH holds, trading on special skill or information is essentially a losing game as such practice can only increase expenses without enhancing the returns, which reflects a negative relationship between expenses and fund performance. Lastly, if the market is in informational equilibrium, there will be no relationship between expenses and returns net of fees as any excess returns created by extensive research will be exactly offset by higher cost.

In this work I test this relationship over a broad sample of 500 mutual funds. First, I employ the renowned Capital Asset Pricing Model (CAPM) as developed by Sharpe (1964) to analyze the actual performance of the funds. I estimate the following time series regression model for each fund in the dataset:

$$(1) R_{jt} - R_{ft} = \alpha + \beta (R_{mt} - R_{ft}) + \mu$$

Where R_{jt} is a return on a mutual fund net of fees in period t , R_{ft} is a risk free interest rate at year t and R_{mt} is a return on a broad market portfolio such as the S&P 500. This model is widely accepted in the financial industry and allows me evaluate the relative risk-adjusted performance of the mutual funds. According to Sharpe (1964), the return on a security or a fund less the risk free rate is directly proportionate to the amount of risk that the fund takes on. This relies on the observation that investors need to be rewarded for taking on extra risk. Such reward is known as the CAPM risk premium. Thus risk, measured by the coefficient β , is the major determinant of returns. In general, β represents the sensitivity of expected excess returns on a fund or an asset j to the expected market returns, which is expressed by the following relationship:

The unexplained portion of the regression, reflected in the intercept α , is then attributed to management skill and expertise. Positive alphas indicate that a fund was able to outperform the market on risk adjusted basis. Nevertheless, the EMH clearly suggests that the expected value of alpha is zero because, on average, funds cannot outperform the market as there is no information or practice that would enable them to continuously do so.

If active management and research do not add value, funds engaging in such practices will systematically underperform the index funds and will likely display significantly negative alphas as a result of high expenditures. However, in informational equilibrium, both actively managed and index funds will perform comparably, resulting in alphas that are mostly indistinguishable from zero. Furthermore, the average coefficient of β across the funds should be equal to unity as a random broad sample of widely diversified funds should in essence mimic the market, possessing on average as much risk as the market itself.

Thus I hypothesize the following:

$$H1: E(\alpha) = 0$$

$$H2: E(\beta) = 1$$

In the second part of the paper I use the respective alpha and beta estimates from (1) to examine the role of expenses and turnover in determination of fund returns. Inspired by Jensen and Ippolito, I expand the CAPM model by including the turnover and expense ratios of funds as well as the variable BMktRF ($=\beta_j*(Rm_t - Rf_t)$), which is a multiple of estimated beta of a fund and the market return in excess of the risk free rate². I construct a pooled dataset of the sample and estimate the following OLS panel regression model:

$$(2) R_{jt} - Rf_t = b \beta_j*(Rm_t - Rf_t) + \tau \text{turnover}_{jt} + e \text{expense}_{jt} + y \text{Year} + f \text{Fund} + \mu$$

2 For detailed discussion, see the data section.

Where *Year* and *Fund* are dummy variables unique to each fund and time period. These variables address the problem of correlation of the residuals. The coefficient β_j estimated in regression (1), becomes a part of an explanatory variable³. The way β_j is estimated in (1) results in the fact that the coefficient b on the variable $\beta_j \cdot (R_{m_t} - R_{f_t})$ should be statistically insignificant in difference from unity and so this coefficient is not key for the inference about my hypotheses.

On the other hand the variables *turnover* and *expenses* play an essential role as they can explain some of the fund performance that was previously captured by alphas. I hypothesize that funds generally spend their resources efficiently. Therefore the coefficient on expenses should be statistically insignificant in difference from zero, supporting the irrelevance of expenses hypothesis. A positive coefficient would suggest that managers are not only able to offset the higher expenses created by research and trading, but that the extra returns of such strategy outweigh the extra costs.

Thus, unlike most studies that simply assume a negative relationship between expenses and returns net of expenses, I test the relationship and hypothesize a neutral impact of expenses on returns:

$$H3: e = 0$$

Lastly, to understand the connection between equations (1) and (2), one should take into account that the first model simply states that returns are determined by the movement of the market and an unexplained cluster of management skill and information. The second regression is then used to analyze this cluster and examine whether some of this unexplained portion of returns is attributable to expenses or fund turnover.

³ Usage of an estimated coefficient as a part of an explanatory variable inevitably injects extra variation in the regression.

Data

In my research it would be optimal to work with monthly Center for Research in Security Prices (CRSP) data that are used in most of the academic studies. However, my data selection is restricted by the research budget as the financial data of the mutual fund industry are generally very costly. I limited the range of my data to eight annual observations in years 2002-2010 for a universe of small-cap growth, large-cap growth, small-cap value and large-cap value equity mutual funds, as supplied by Lipper – the Thompson Reuters Company. Ideally all observation would be included for all time periods to make my panel data balanced. Nevertheless, as I point out in the limitations section, this is not the case and my dataset misses about 7% of its observations.

To construct a sample from this universe of 2191 funds I randomly select 500 mutual funds and categorize them according to their asset classes. The basic version of my dataset includes: fund returns net of expenses, turnover and expense ratios. Furthermore I add the excess return on the market ($R_{m_t} - R_{f_t}$) denoted as $MktRf$. This variable was obtained from online “French and Fama Library” and is constructed as follows (Kenneth R. French - Data Library):

The excess return on the market is computed by subtracting the Treasury bill rate (obtained from Ibbotson Associates) from the value-weighted return on all stocks traded in the United States (obtained from CRSP). This variable is likely to move closely with the excess returns of any particular mutual fund and so I expect it to hold a significant explanatory power.

Furthermore, to answer my research question I construct the dependent variable for excess returns of the funds (*exreturn*) by subtracting the risk free interest rate on ten-year Treasury bills from the percentage return on the fund net

of fees. This provides me with a measure of returns in excess of the risk free rate that the fund was able to capture.

Lastly, it appears that the random sample is fairly representative of the market during the period. The distribution of the sample funds across categories is depicted in Table 1, and Table 2 summarizes my data. For detailed data summary see Appendix 1.

Table 1
Category Frequency in Percentages

	Growth	Value
Large Cap	41%	21%
Small Cap	25%	12%

Table 2
Summary of Data

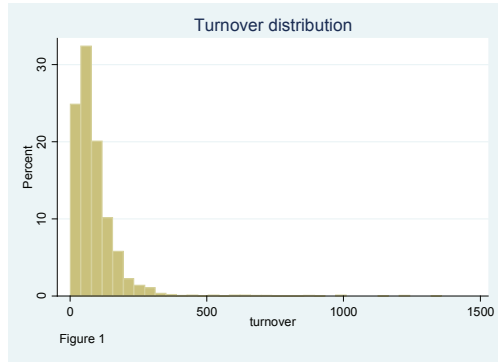
Variable	# Observations	Mean	St. dev	Minimum	Maximum
Exreturn	3701	3.44	25.9	-60.40	164.26
MktRf	4000	3.93	23.18	-39.94	32.12
Turnover	3658	90.82	97.99	1	1359
Expense	3613	1.46	.64	.07	12.42

Table 2 correctly points out that my panel is not balanced as the variables *exreturn*, *turnover* and *expense* are missing 299, 342 and 387 observations respectively. Although some observations are absent, the dataset does not suffer from substantial survivorship bias⁴ as the vast majority of the sample funds survived throughout the examined period. In fact the mean number of periods observed per fund is 7.402 with minimum of 3 and maximum of 8 periods available per funds. Most of the unobserved periods seem to be a result of the simple fact that the fund were not yet in existence in the earlier years of the examined period. I further

⁴ Survivorship Bias refers to a tendency to omit failed mutual funds from performance evaluation. If only funds that were successful enough to survive were included in the sample, the performance results could be skewed upwards as the sample would not reflect the inferior returns of funds that have gone out of business.

examine this potential problem of “creation bias” in the limitations section of this work.

Additionally, several other important observations arise from Table 2. The mean excess return (3.44%) is surprisingly high over a period of several economic slumps. Average turnover of a fund is



90.8%, suggesting that an average fund in the sample turned over about 91% of its holdings during a year. Turnover rate is calculated by dividing the fund’s total sales or purchases (whichever is less) by its average monthly assets. The rate then represents the percentage of the fund holdings that change over the course of the year. Taking this knowledge into account I notice an outlier in the turnover data: 1359. It seems unlikely that a fund would turn all its assets over more than 13 times in a year. In fact, Figure 1 illustrates that only a negligible percentage of the turnover observations are greater than 600. Since the large outlier might impact coefficient estimation I drop the outliers beyond five standard deviations from the mean (turnover of 580). This seems theoretically justifiable as it is improbable that even very active funds would turn their assets over more than six times a year (Wermers 2002). By omitting the potential outliers I drop 23 observations⁵, but the estimates of the model change only very marginally.

To account for the unique characteristics of each fund and each year I construct dummy variables that also enable me to address the problem of correlation between residuals. It is reasonable to assume that the funds are unique as different fund managers arguably possess different skills and employ dissimilar

⁵ Only 0.63% of turnover data is omitted under this restriction.

investment strategies. For the sake of simplicity, I assume that fund managers did not change during the examined period or that if a manager left, the fund carried on the investment strategy, style and know-how of the original manager. This also implies that the targeted level of risk of the fund, reflected by the fund's Beta, has not changed during the period, which is an essential assumption of the CAPM analysis. Using the methodology of Ippolito I test this assumption against my data by running a regression for each fund with a dummy variable D and its interaction term with the $MktRf$ variable. The regression equation takes on the following form:

$$(3) \quad R_{jt} - R_{ft} = \alpha + \beta (R_{mt} - R_{ft}) + c D + d (R_{mt} - R_{ft}) * D + \mu$$

where D is a dummy variable for years 2006-2009. If the coefficient d were statistically significant in difference from zero, the assumption of constant beta would be highly questionable. I find that 82 funds or about 16% of my sample display betas that are not stable at the 95% confidence interval. Exclusion of these funds from my analysis however does not change the results substantially.

Limitations

This study faces several key limitations that need to be addressed. First, due to the nature of my data, I am unable to separate trading costs and management expenses that are both reflected in the total expenses. Such division would enable me to make a stronger argument about the impact of management fees on the risk-adjusted returns. Nonetheless, the correlation⁶ between expenses and turnover, which is directly related to trading costs, is relatively low. Therefore most of the expenses seem attributable to management fees. Consequently my results are mostly indicative of the role of management expenditure in determination of returns.

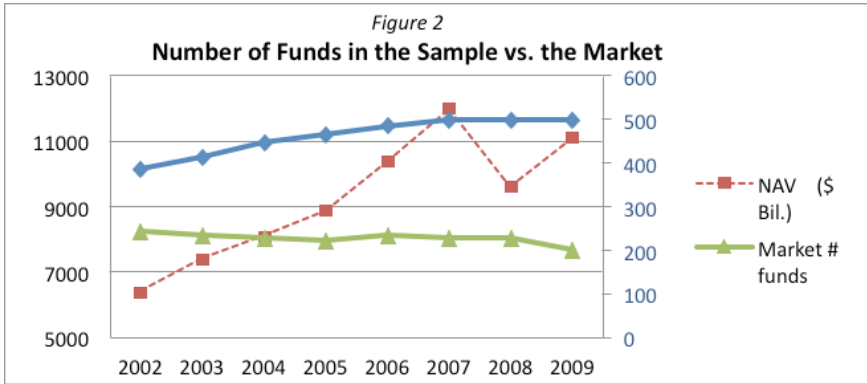
⁶ The correlation coefficient is 0.17

Second, my research faces the “black box” problem for I am unable to ascertain changes in portfolio holdings or drifts in the beta of the funds. In particular, I assume that targeted level of risk (beta) and core investment strategy of the fund remained constant during the period. These assumptions are theoretically sound as most funds position themselves as pursuing a certain investment style and strive to retain this image in the eyes of investors. However, if this were not the case, my estimates of the panel data regression would not accurately reflect the true relationships between the dependent and explanatory variables.

Third, my panel dataset is not balanced and suffers from a survivorship bias. In fact, because of the constrained data selection process I can examine only those funds that were still operating in 2011. Thus no funds in my dataset cease their existence during the analyzed period and 114 funds were not yet in business at the beginning of 2002. As Figure 2 indicates the number of funds in the market declined by approximately 6% over the period 2002-2009, while the number of operating funds in my sample actually increased by 28%. This “creation bias” may skew my results. Nevertheless, it seems to have a relatively minor impact on my estimates and so it does not substantially threaten the credibility of my conclusions. In addition, it is interesting to note that the net asset value (NAV) of the mutual fund industry had been increasing at an unprecedented rate until the financial crisis in 2008.

Fourth, this study can be subject to the criticism that the very limited number of time series observations used for estimation of alphas and betas may cause such estimates to be seriously inaccurate. Although a greater number of observations in the regression analysis would certainly be very beneficial, the utilized dataset should provide a good general sense of the size of the true coefficients. Future research should employ quarterly observations for the given period to produce more accurate estimates of the alphas and betas.

Lastly, my analysis faces several econometric problems. Researchers have abundantly documented that using pooled data of this kind is likely to result in positive correlation among residuals. The often complex correlation between the residuals across time and across the industry would have a diminishing impact on the size of the standard errors of the estimates and could occur through two avenues: The error terms may be correlated for a group of funds during a given year (due to the value and small stock effects etc.) or may be serially correlated for a specific fund (high performers may have generally positive residuals) (Ippolito 1989). I address this issue by including dummy variables for years and funds as well as using HAC standard errors.



Results

First, let us focus on the relative performance of funds across the time period to understand the patterns in their returns. Table 3 provides an overview of the coefficients alpha and beta estimated for each fund using the CAPM model (1). As I expected, the mean beta is close to the beta of market which is a unity. This finding supports my hypothesis H2 that on average the widely diversified funds hold as much risk as the market itself does (H2: $E(\beta) = 1$).

Furthermore, the average alpha of the sample is negative, suggesting that the funds on average slightly underperformed the market on risk adjusted

basis. Nonetheless, a more useful approach to evaluate the validity of this claim is to test whether the individual alphas of the particular funds are lower than zero. The results of this analysis are summarized in Table 4. This table also includes a comparison with the results of Ippolito (1989) and Jensen (1964) who employed a similar methodology in their prominent studies.

Table3
Overview for the Sample

	Obs	Mean	St. Dev.	Min	Max
Alpha	500	-0.62	2.56	-11.47	8.51
Beta	500	1.05	0.18	0.49	1.71

Table4
Analysis of Estimated Alphas:*

	Zero	Negative	Positive	Total	Mean Alpha	Mean Beta
My results (2002-09)	485	10	5	500	-0.62	1.05
Ippolito (1965-84)	127	4	12	143	0.81	0.88
Jensen (1945-1964)	98	14	3	115	-1.1	0.84

**calculated at 95% confidence interval*

Proportions of Samples:

	Zero	Negative	Positive
My results (2002-09)	97%	2%	1%
Ippolito (1965-84)	89%	3%	8%
Jensen (1945-1964)	85%	12%	3%

Table 4 clearly indicates that the vast majority, 97% of the sample, neither outperformed nor underperformed the market at a 95% confidence interval. This observation supports my hypothesis H1 that on average mutual funds neither outperform nor underperform the market after expenses (H1: $E(\alpha) = 0$). It is worth noting that two percent of the sample funds underperformed the market significantly while one percent of the funds substantially outperformed the benchmarks. These findings are generally in accord with the results of Ippolito and Jensen, although their proportions of the samples that displayed alphas

indistinguishable from zero are smaller. This fact may be attributable to numerous factors ranging from very dissimilar market and economic conditions involving financial uncertainty to shortcomings of my data.

Additionally, I estimate the mean alphas and turnover ratios by different fund categories to examine potential patterns in the industry. The results of this estimation are reported in table 5.

Table 5

Mean Estimated Alphas by Categories:			Mean Turnover by Categories:		
	Growth	Value		Growth	Value
Large Cap	-1.25	-1.01	Large Cap	94.04	58.26
Small Cap	-0.15	1.27	Small Cap	122.23	71.92

The table provides several appealing observations. The largest negative alphas on average were documented in the large cap growth category while small cap value category displayed on average the greatest positive alphas. Since most of the security research and information is readily available in the large cap growth category, it is reasonable to assume that the marginal return on research and information is the lowest in the category. This would be especially true if mutual fund managers who actually carry out the research would be slower to act on certain information than public traders. Conversely, information is generally scarce among small cap stocks and particularly in the small cap value category. Therefore marginal return to research could be the highest in this stock class, enabling mutual fund managers to truly benefit from their security analysis and trading expertise.

Such hypotheses are generally supported by my findings. The large mean alpha in small cap value category indicates that the fund managers in this equity class were able to beat the “uninformed” market after expenses. Generally one can notice that the mean alphas, as indicators of management skill, are on

average lower in the large cap segments than in the small cap categories. This observation might be partially caused by so called “size effect” which states that small cap stocks generally outperform large cap stocks. This anomaly to the CAPM model has been widely documented. French and Fama for instance argue that on average holding small stock enables an investor to capture greater excess returns than holding other asset classes for any given level of risk (1992). The size effect represents a premium that is not associated with management skills. Therefore, the alphas of funds focused on small cap stocks may be overstated. To test this claim I estimate the CAPM model (1) with *SMB* as an explanatory variable. The variable *SMB* is constant for every year and reflects by how much the small cap market portfolios, constructed by French and Fama, outperformed the large cap market portfolios (Kenneth R. French - Data Library). Under such estimation the disparity among the alphas largely disappears and the alphas become generally more negative, except for the category large cap growth, where the mean alpha slightly increases. The results of this estimation are presented in Appendix 3.

Turnover correctly reflects the phenomenon that value investors tend to wait more and trade less than growth investors. The growth investors believe that they can frequently trade on certain information even if it is not fully supported by the fundamentals of the stock (Strong 2004). For these reasons the turnover of growth funds is generally higher than turnover of value funds. Additionally, I would expect the mean turnover on the large cap growth category to be the highest because abundant information that one can trade on is available and because most day trading strategies focus on this asset class. Nevertheless, this is not the case and small cap value segment actually displays the highest mean turnover. This seemingly puzzling fact is not extremely surprising as even the most prominent researchers fail to reach a consensus regarding the relationship between returns, asset classes and fund turnover.

Considering these observations about the actual performance of the funds over the examined period I further analyze the role that expenses and turnover play in determination of these returns. I estimate the panel data regression (2) for each of the fund classes large cap growth (LG), large cap value (LV), small cap growth (SG) and small cap value (SV) as well as for the entire sample. In the estimation for particular fund classes I omit the fund and year dummy variables as most of the dummy variables would be dropped due to collinearity. Nevertheless, for the overall sample I run regressions both with (Overall 1) and without (Overall 2) the dummy variables. Additionally, I employ HAC standard errors in all my estimations because my sample suffers from severe heteroscedasticity. The results are presented in Table 6.

Table 6
Estimated Coefficients by Categories:

<i>Dependent variable: Exreturn = $R_{jt} - R_{ft}$</i>						
	LG	LV	SG	SV	Overall 1	Overall 2
BMktRf	1.00** (0.008)	1.00** (0.007)	1.00** (0.012)	1.00** (0.022)	1.00** (0.054)	1.00** (0.006)
Expenses	-1.14** (0.391)	-0.50* (0.291)	0.74 (1.456)	0.00 (1.257)	3.89 (2.819)	0.12 (0.701)
Turnover	0.00 (0.002)	0.00 (0.002)	0.00 (0.002)	0.00 (0.005)	0.00 (0.003)	0.00 (0.001)

** Statistically significant at 95% confidence level

* Statistically significant at 90% confidence level

In parenthesis: Standard Errors

Overall 1: Dummy variables for years and funds were employed

Overall 2: No dummy variables were employed

Several important observations arise from the results. The coefficient on BMktRf, which represents the CAPM market premium ($R_m - R_f$) multiplied by the previously estimated beta of the fund, is not statistically significant in difference from one. This is exactly what I expected because beta is originally estimated as a coefficient on MktRf. Thus there will likely be a one to one relationship between BMktRf and excess returns.

In the regressions for the entire sample, the coefficients on expenses are statistically insignificant in difference from zero which supports my hypothesis that the impact of expenses is in essence neutral ($H_3: e = 0$). The coefficients obtained from the sub-samples of asset classes are in size similar to the coefficient on estimation with no dummy variables. Therefore, it appears that the relatively high coefficient on expenses in estimation of Overall 1 is purely due to the inclusion of dummy variables for years and funds.

More interestingly, the coefficient e is negative and statistically significant in difference from zero in the large cap categories while remaining insignificant in the small cap categories. This finding supports the proposed theory that the lack of readily available information in the small cap categories increases the marginal returns on information and consequently enables managers to offset their research and management expenses by resulting higher returns. In contrary, it seems that, in the large cap segment, research and active trading that drive expenses are likely to lower the net returns of the funds, which supports the EMH. These findings are not impacted by the size effect and hold among several model specifications.

Turnover seems to be almost perfectly neutral across the entire sample and the sub-categories because the estimated coefficients are indistinguishable from zero. This would imply that the amount of trading itself does not have a substantial impact on the returns. Additionally, turnover is a proxy for trading expenses that are already incorporated in the expense ratios. Therefore, as I have noted before, one may expect high correlation between the variables turnover and expenses. Nevertheless, the relatively low correlation coefficient of these variables (0.17) indicates that most of the expenses are due to research and management fees rather than trading expenses. In future, it would be beneficial to obtain data for management fees and expenses separately as this would strengthen my inference from the empirical results.

Conclusion

Combining the analysis of individual fund and market performance, it is clear that most of the funds across different asset classes neither substantially outperformed nor underperformed the market on risk-adjusted basis during the period 2002-2009. I document that although this was true for a majority of the funds, some asset classes yielded greater risk adjusted excess returns than others. In fact, the estimation of individual fund's alphas indicates that funds in the small cap categories outperformed those in the large cap segment of the market on risk adjusted basis. This could be caused by the fact that small stock tends to generate greater returns than other asset classes, for any given level of risk. This so called "size effect" is confirmed by my empirical analysis and artificially inflates the alphas of managers who focus on small cap stocks. Using the French and Fama methodology, I find that the differences in alphas diminish after I account for the size effect. This suggests that, abstracting from the size effect, the managers on average performed comparatively well in all of the categories.

Nevertheless, even after I account for the size effect, the key result indicated by my analysis remains unchanged: Contrary to a popular public view, there does not seem to be a negative relationship between expenses and returns net of fees. The estimated coefficient on expenses that is indistinguishable from zero suggests that the mutual funds on average spend their resources efficiently. In other words fund expenses that generally increase due to research and active management are at least offset by resulting higher returns. This observation holds across all estimations presented in this study and is theoretically justifiable assuming existence of costly information in financial markets.

However, several interesting exceptions arise from the estimations of particular sub-classes. I document a significant negative impact of expenses on

excess returns in the large cap categories, while observing a non-negative effect in the small cap categories. This finding remains unaffected even after accounting for the size effect, suggesting its relative strength.

Therefore, I conclude that, although the semi-strong EMH holds in most cases, the managers focusing on asset classes with low availability of information may experience high returns to information and consequently outperform the market before expenses. In addition, my empirical analysis indicates expenditure efficiency, suggesting that the overall mutual fund market as well as its small cap segment is in a relative informational equilibrium. In such equilibrium the traders carry out just enough research that its marginal cost equals marginal benefit of the information gained.

On the other hand, the large cap class of the mutual fund market does not appear to be in such equilibrium. I find that in this category the increased expenses negatively contribute to the fund returns. Therefore, in large cap, more research and management is unlikely to increase returns. In fact, greater active management is likely to be counterproductive and so I hold that the large cap funds are not spending their resources efficiently. To bring this market segment into equilibrium, rational agents would cut their expenses, decrease the amount of research and human capital they employ or would focus on more profitable market segments. It seems reasonable to believe that the reasons why this has not been the case lie in the problems of imperfect information and bounded rationality. Future research should focus on such differences between the two markets segments and should identify any conditions specific to the large cap funds that could reconcile this disparity.

Bibliography

- Carhart, Mark. "On Persistence in Mutual Fund Performance ." *The Journal of Finance* 52, no. 1 (1997): 57-82.
- Fama, Eugen , and Kenneth French. "The Capital Asset Pricing Model: Theory and Evidence." *Journal of Economic Perspectives* 18, no. 3 (2004): 25-46.
- Fama, Eugen, and Kenneth French. "The Cross-Section of Expected Stock Return." *The Journal of Finance* XLVII, no. 2 (1992): 247-265.
- French, Kenneth. "Kenneth R. French - Data Library." Tuck - MBA program web server. http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html (accessed October 20, 2010).
- Gray, Wesley, and Andrew Kern. "Do Hedge Fund Managers Have Stock Picking Skills?." Social Science Research Network. <http://papers.ssrn.com/abstract=1477586> (accessed September 25, 2010).
- Grinblatt, Mark , and Sheridan Titman. "The Persistence of Mutual Fund Performance." *The Journal of Finance* XLVII, no. 5 (1992): 1977-1984.
- Grossman, Sanford J. and Joseph E. Stiglitz. "On the Impossibility of Informationally Efficient Markets." *American Economic Review*. no 3 (1980): 393-408
- Hendricks, Darryll, Jayendu Patel, and Richard Zeckhauser, "Hot hands in mutual funds: Short-run persistence of performance, 1974-88" Working paper, Harvard University. (1991)
- Henriksson, Roy, D. "Market Timing and Mutual Fund Performance: An Empirical Investigation." *Journal of Business*, 57 (1984), pp. 73-96.
- «Investment Company Institute.» 2010 Factbook. <http://www.icifactbook.org> (accessed September 19, 2010).
- Jensen 1967, Michael. «The Performance of Mutual Funds in the Period 1945-1964 .» *The Journal of Finance* 23, no. 2 (1967): 389-416.
- Karz, Gary. "The Efficient Market Hypothesis." Investor Home . <http://www.investorhome.com/emh.htm> (accessed October 10, 2010).
- Lehmann, Bruce, and David Modest. "Mutual Fund Performance Evaluation: A Comparison of Benchmarks and Benchmark Comparisons." *Journal of Finance* 42 (1987): 233-265.
- Malkiel, Burton. "The Efficient Market Hypothesis and Its Critics." *Journal of Economic Perspectives* 17, no. 1 (2003): 59-82.
- Malkiel, Burton. "Returns from Investing in Equity Mutual Funds 1971 to 1991." *The Journal of Finance* 2 (1995): 549-572.
- Peterson, James, Paul Pietanico, Mark Riepe, and Fran Xu. "Explaining After-Tax Mutual Fund Performance." *The Financial Analysts Journal* 58, no. 1 (2002): 75-86.
- Sharpe, William . "Capital Asset Prices: A theory of Market Equilibrium under Conditions of Risk." *Journal of Finance* 19 (1964): 425-42.
- Sharpe, William. "The Arithmetic of Active Management." *The Financial Analysts' Journal* Vol. 47, (1991): 7-9.
- Strong, Robert A.. *Practical investment management* . 3. ed. Mason, Ohio: Thomson/South-Western, 2004.
- Wermers, Russ. "Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transactions Costs, and Expenses." *The Journal of Finance* 55, no. 4 (2002): 1655-1695.