Return in Investing in Equity Mutual Funds from 1990 to 2009

Lam H. Nguyen, McNair Scholar
The Pennsylvania State University

McNair Faculty Research Adviser:
James Miles, Ph.D.
Professor of Finance, Joseph F. Bradley Fellow of Finance
Department of Finance
Smeal College of Business
The Pennsylvania State University

Abstract:

Mutual fund is a financial institution that pools money from many small investors to invest in securities such as stocks, bonds and money market instrument. Actively managed mutual funds are funds that try to outperform a particular benchmark index, such as the S&P 500. Using different financial models such as CAPM, Fama-French 3-Factors model and Carhart 4-Factors Model to evaluate the performance of actively managed mutual funds from 1990 to 2009, this study found that only a small number of funds can actually outperform their benchmarks. Moreover, there are evidences showing that those superior performances are due to luck and not skills. Finally, the study found that there is a significant negative relationship between fund returns and factor measured fund expenses including expenses ratios and fund turnovers.

1/Introduction:

Mutual funds are financial institutions that pool money from many small investors to invest in securities such as stocks, bonds, and money market instruments. Mutual funds provide many benefits to small investors such as better diversification for their portfolios, lower transaction costs and higher liquidity for their assets. In 1970, there were only 361 mutual funds with more than 10 million accounts and 48 billion dollars in asset under management. In 2007, there were 8,726 funds with more than 289 million accounts and more than 10 trillion dollars in asset (Investment Company Institute.)

When an investor looks around for a mutual fund to invest her money, she will encounter two major types of mutual funds: index mutual funds and actively managed mutual funds. An index mutual fund is a fund that aims to deliver to its investors a return of a particular benchmark index such as the S&P 500 Index. Managers of index funds do not need to have any superior stock picking skills, because they only need to build and hold a portfolio that replicates the index they are tracking. A major advantage of an index fund is that it is able to keep its cost low, because managers do not need to spend much money on equity researches or trading cost. On the other hand, an actively managed mutual fund is a fund that actively trades securities in order to earn a return that is higher than the market return. Managers of an actively managed mutual fund generally want to buy winners and sell losers, and they have to spend money to hire security analysts to do equity researches. Thus, an active fund generally incurs a higher expense than an index fund, but its investors also have a chance of beating the market. Naturally, an average investor will be left with two major questions. The first question is whether she should invest in

an index fund that can only earn an average return but has lower cost or in an actively managed mutual fund that has higher cost but may deliver a return higher than the average of the market. Then, if she decides to invest in an actively managed mutual fund with the hope of beating the market, she then will have to choose from a universe of thousands mutual funds. And the second question is whether there is any rule to predict which mutual fund will deliver a higher-than-average return. My study aims to answer those two problems above by using the same methodology as those of Malkiel (1995) along with Fama-French 3-Factors and Carhart 4-Factors models with data from a more recent period, namely from 1990 to 2009.

2/Literature Review:

Jensen (1964) recognized that people could not simply look at returns on their investments to judge whether mutual fund managers had done good jobs. Those mutual funds that earned high returns might take on more risk in their investments by buying risky assets, and there were a high chance that they might go bankrupt in a next period. Therefore, Jensen developed the model that can take into account the risk of the mutual fund portfolios when he computed the returns for those funds. His study included 125 mutual funds from 1945 to 1964, and he found that mutual funds actually could not earn returns high enough to cover their costs. His findings were consistent with the studies of Treynor (1965) and Sharpe (1966).

Using a different approach, Mark Grinblatt and Sheridan Titman (1992) found that mutual fund managers really have abilities to earn abnormal returns, and there is persistence in mutual fund performance. But in 1995, Burton G. Malkiel (1995) pointed out that the study of Grinblatt and Titman suffered from survivorship bias. Survivorship bias occurred in any study that used only a sample of funds that were still in operations and excluded funds that were dead or merged to other funds. Those dead or discontinued funds usually had very poor performances, thus excluding them from a sample would make the performance of the mutual fund industry appeared better than it really was. Then, Malkiel conducted a research that used a sample including both dead and surviving mutual funds from 1971 to 1991. He found that on average mutual funds underperformed their benchmarks both before and after operating expenses. In fact, operating expenses played a very important role in the performance of mutual funds.

Jegadeesh and Titman (1993) found that a strategy of buying winner stocks and selling loser stocks from a previous year can earn significant positive return, and they named it the momentum strategy. Mark M. Carhart (1997) adds the momentum factor discovered by Jegadeesh and Titman (1993) to the Fama-French 3-Factor model in order to come up with the 4-Factors model. Then he uses that model to measure the performance of different portfolios of mutual funds formed on previous year returns. He found that common risk factors in stock returns and operating expenses can explain almost the persistence in mutual fund performance. However, his study cannot explain why there is a strong persistence in inferior performance among the worst segment of the mutual fund industry.

Berk and Green (2004) develop a simple model of actively managed portfolios based on the relationship between fund past performance and fund flow. Their model suggests that the vast majority of funds produce enough returns to cover for their expenses, but the market mechanism of performance chasing has made their superior returns disappear, and thus no persistence can exist. Chen, Hong, Huang and Kubik (2004) found that there is indeed a diseconomies of scale in fund performance, especially in funds that have to invest in small and illiquid stocks, suggesting that the erosion of performance superiority is due to liquidity.

Keith Cuthbertson, Dirk Nitzsche, and Niall O'Sullivan (2006) summarized almost all the researches that have been done in mutual funds performance in their paper, and they found that there were 2%-5% mutual funds that actually earned returns higher than their benchmarks, and 30%-40% mutual funds underperformed their benchmarks. They also found that there was little evidence in the persistence of winning funds, but there were many evidences indicating the persistence among losing funds. All those losing funds tended to have too much operating expenses, portfolio turnovers, and load fees. Thus, they advised investors to hold funds that have low costs, and avoid holding funds that were losing money.

Recently, Fama and French (2010) use bootstrap simulation to measure the performance of actively managed mutual fund. They found that there are evidences of inferior and superior performance when they measure funds' performance using gross returns. However, in term of net return, few funds can actually deliver risk-adjusted returns to investors due to the high cost of active management.

My study analyzes the performing of mutual funds during 1990 through 2009, using Survivor-Bias-Free Mutual Fund Database from Center for Research in Security Prices (CRSP). The third section discusses the dataset I employ and how I arrive at my sample. The fourth section takes a closer look at mutual fund performance by using the CAPM, Fama-French 3-Factors Model and Carhart 4-Factors Model. This study updates the findings of previous studies that mutual fund on average cannot earn excess returns higher than that of the market. In the fifth section, the persistence of mutual fund performance is analyzed, and I also simulate returns from a strategy of buying mutual funds with best performance in past years. The overall finding is that there is no evidence to suggest that past winner would be future winner, but there is evidence that past losers would be future losers. The sixth section discusses the relationship between mutual fund returns and their expenses ratios, management fee and fund turnover. This study found that there is a negative correlation between fund returns and fund expenses ratios, and fund turnovers, and there is a positive correlation between returns and management fee. The conclusion section summarizes the results.

3/ Data:

Survivorship bias is one of the most important problems in evaluating mutual fund performances. It refers to the fact that mutual fund records were used in the past did not include funds that had been liquidated or merged with other funds, referred to as dead funds. Most of the dead funds had very inferior performances, and by extracting them from a dataset, a mutual fund industry would appear better than it actually is. Indeed, Brown, Ibbotson and Ross (1992) found that a sample truncated by survivorship bias can give rise to the appearance of performance persistence. To avoid that problem, I employ the data from The CRSP Mutual Fund Database, which is a survivor-bias-free database originally developed by Mark M. Carhart in 1995, and subsequently updated quarterly since then. The database consists of data about all open-ended mutual funds in the U.S. since 1962. To better evaluate the performance of mutual funds, I limit my research to diversified equity mutual funds, and exclude all the international funds, global funds, sector funds, index funds or enhanced-index funds. To arrive at my sample, I use the Strategic Insight Code and Wiesenberger Code for years before 1999, and Lipper Asset Code and Lipper Objective Code for years after 1999. Specifically, from 1990 to 1992, I select funds that are classified either as GCI, IEQ, LTG, MCG, or SCG by the Wiesenberger Code. From 1992 to 1998, I select funds that are classified either as AGG, FLX, GRI, GRO, ING or SCG by the Strategic Insight Code. Finally, for the year of 1999 to 2009, I remove all the funds that are

institutional funds or funds that are closed to investors to limit the number of funds in my sample. After that, I select funds that are classified either as MCGE, MLGE, SCCE, SCGE, MCCE, LCGE, MCVE, MLCE, SCVE, LCCE, SESE, FX, MLVE, LCVE, or EIEI by the Lipper Objective Code. Moreover, it must be noted that there are many funds that offer multiple class shares (class A, class B, class C, class I…) in order to address the needs of investors whose objectives and investment horizons vary. The returns on different class shares of the same fund are only slightly different due to the difference in expenses and load charges. Because those class shares are recorded as different funds in the CRSP database, I only keep one class share for funds that offer multiple class shares in my sample in order to avoid multiple counting for a same fund.

4/Mutual Fund Performance from 1990 to 2009:

My first research objective is to find out whether an average mutual fund manager can produce excess returns over their benchmarks. It is important to use a benchmark to evaluate the performance of mutual funds, because one cannot judge the quality of a fund just by simply looking at a fund return. In fact, a mutual fund manager can produce high return by taking excessive risks. For example, if two fund managers, A and B, both earned returns of 20 percent on their investments. But then, we knew that manager A had taken an investment that only had 10 percent chance of winning, while manager B had taken the one that had 90 percent of winning. It would be obvious that manager B was a far better one because she earned the same returns with lower risk taken. Thus, it is important to take into account risks in evaluate mutual fund performances. Moreover, suppose that a mutual fund delivers to its investors a 10 percent return, but in that same year, the return of the overall market is 40 percent. It would be hard to say that a mutual fund manager is worth the money investors are paying for, and that is another reason why investors should look at excess returns. In order to compute the risk-adjusted return for a fund, I employ all three models: the Capital Asset Pricing Model (CAPM), the Fama-French Three-Factors Model, and the Carhart Four-Factors Model.

Carhart 4-Factors Model:

$$\text{Excess Return} = \alpha + \beta1*(Rm-Rf) + \beta2*(SMB) + \beta3*(HML) + \beta4*(MOM) + \varepsilon$$

The Fama-French 3-Factors Model is the Carhart 4-Factors Model without the Momentum factor. The CAPM is the Carhart 4-Factors Model without SMB, HML and MOM. SMB stands for Small-Minus-Big, and it is designed to capture the difference in returns between stocks of small companies and those of big companies. HML is High-Minus-Low, and it is intended to show the difference in returns between value stocks and growth stocks. MOM is momentum factor, which shows the returns coming from the strategy of buying winners and selling losers from previous year. An advantage of the 4-Factors and 3-Factors Model over the CAPM is that those models not only take into account the risk of the market but also the risks by holding firms with small market capitalization, and firms that have high book-to-market value ratios. The momentum factor in the 4-Factors model also controls the returns earned by fund managers by holding stocks that have high returns in the previous periods. The parameter of interest here is a constant (α) in the model, because it is a portion of a fund performance that cannot be explained by the risks taken by a fund manager. Thus, it is supposed to represent a manager's skill. If the constant for a particular fund is not significantly different from zero, then it will indicate that a fund manager's skill in has not added any value to a portfolio's return.

In my study, I evaluate the performance of all diversified equity mutual funds from January 1990 to December 2009. My sample has 3,475 mutual funds, and I require a fund to

have at least 30 monthly observations in order to be included in a sample. Moreover, in order to control for "incubation bias" created by the mutual fund industry, I follow the method of Fama and French (2010) which is only observe the returns of a fund when it passes a particular benchmark of asset under management. The benchmark I use in my study is ten millions in 2009 dollars. If the fund passes a ten million benchmark and then falls back below, it is still included in the sample. I use all three models to compute the alphas for each fund, and then count the number of funds that have significantly positive or significantly negative alphas at the five percent level. If the market efficient hypothesis is true which means that mutual fund performance can be explained by luck, we will expect that about five percent of funds will earn significantly positive risk-adjusted gross return and another five percent earn significantly negative risk-adjusted gross return. Also, fund performance measured by net return must be worse than that measured by gross return. Table 1 displays the summary of alphas measured by all three models. When measured by net return, the average annually alphas measured by all three models are negative which means that funds on average have not been able to produce risk-adjusted returns for their investors. Also, the fact that the average annually alphas decline from CAPM to 3-Factors and then 4-Factors model are expected because the 3-Factors and 4-Factors model are able to control for more risk factors. Moreover, when measured by net return, out of 3475 funds in the sample, only a small number of them have alphas that are positive and statistically significant at the five percent level, but about one-fifth of them have alphas that are negative and statistically significant. For example, using CAPM, 219 out of 3475 mutual funds in a sample have significantly positive alphas at a 5 percent level, and the numbers of funds that produce significant risk-adjusted returns get even smaller when I use the Fama-French 3-Factors model or Carhart 4-Factors model. When measured by gross return, however, a number of funds that earn significantly positive risk-adjusted return are higher than five percent, and the number of funds that earn significantly negative risk-adjusted return is still higher than five percent. And the average annually alpha of all funds in a sample is also positive, indicating that actively managed mutual funds are able to collectively earn a small amount of risk-adjusted return. As a result, the performance of mutual funds measured by gross returns cannot be explained by the efficient market hypothesis. Overall, the evidences show that only a small number of funds are able to produce risk-adjusted returns on their investments, but their abnormal returns are captured by the fund managers in term of fund expenses instead of distributing to investors.

5/The Persistence of Mutual Fund Returns:

My second research objective is to find out whether there is persistence in mutual fund performance, and whether there is a strategy of buying mutual funds that can produce returns higher than that of the value-weighted S&P 500 Index. I use the value-weighted S&P 500 Index as a benchmark for this study because the S&P 500 is the most widely tracked index in the market, and it represents about 70 percent of the stock market. Needless to say, the first index fund was a fund that tracked the return of the S&P 500 Index. In addition, a comparison between actively manage mutual funds and the S&P 500 Index will provide more benefits to investors who are considering whether they should invest in an index fund or an actively managed mutual fund, because the majority of people are indexing their money on the S&P 500 Index.

Table 1

This table shows the summary of mutual fund performances using alphas measured by the CAPM, Fama-French 3-Factors model and Carhart 4-Factors model from January 1990 to December 2009. The sample consists of 3475 equity diversified mutual funds that have at least 30 monthly observations. The number in parentheses is the percentage of funds that have significantly positive or negative alphas at 5 percent level as the total number of funds in the sample.

	Positive and Significant	Negative and Significant	Average Annually Alpha
Net Return			
CAPM	219	505	-0.63%
	(6.30%)	(14.53%)	
3-Factors	143	731	-1.17%
	(4.12%)	(21.04%)	
4-Factors	135	728	-1.23%
	(3.88%)	(20.95%)	
Gross Return			
CAPM	455	212	0.68%
	(13.09%)	(6.10%)	
3-Factors	404	319	0.13%
	(11.63%)	(9.18%)	
4-Factors	409	301	0.07%
	(11.77%)	(8.66%)	

In order to evaluate the persistence in mutual fund performance, I first test if mutual fund who has won in past year can continue to be winner next year. I do the test twice using two different definitions of winners. In the first test, I define a winner as a fund that delivers return higher than a median return of all funds in that year. In the second test, I define a winner as a fund that beats the S&P 500 Index in that year. Second, I form different portfolios made of top performing mutual funds in one year, and see whether those portfolio can earn excess returns over the market next year. The overall finding is that there is no evidence to say that past winners will continue to be future winners, but there is evidence about the persistence of losers. It also implies that the strategy of buying top-performing mutual funds cannot work well for investors.

5.1/ Tests of Persistence of Fund Performance from 1990 to 2009:

In this study, I obtain the sample of all diversified equity mutual funds in each year from 1989 to 2008, computing their excess net return over that of the S&P 500 Index in order to determine winners and losers. And then, I follow those funds to next year to see how many of them will continue to be winners and how many of them will continue to be losers. I also compute the Z-statistics to see whether the percentage of repeated winners and losers are

significantly different from 50 percent. If the percent of repeated winner or loser is significantly different from 50 percent, it will indicate the persistence of fund performance.

Table 2 shows the result when I use Median Return as a benchmark to define winners and losers. A winner is defined as a fund that outperforms a median return of their peers in that year. A loser is a fund that either underperforms a median return or cannot survive until the end of next year. For example, in the period 1989 to 1990, there are 340 funds that earn returns higher than the median of their peers in 1989, and out of those 340 winners, there are 186 funds continue to be earn above-median return of their peers in 1990. As a result, the percent of repeated winner is 54.71 percent, and the Z-statistic indicates that it is significantly different from 50 percent at a 5 percent level. Thus, there is persistence in winner in the period 1989-1990. Similarly, we can also see that there is persistence in loser in the period 1980-1990, because the percent of repeated loser is 58.06 percent and it is significantly different from 50 percent at the 5 percent level. From Table 2, we can see that there are 13 years out of 20 in which past losers would be future losers, and there are 11 years in which past winners would be future winners. The result in table 2 suggests that there are indeed some years that have persistence in winner, but investors must remain cautious when making a decision to invest in past winners for several reasons. First, winners in table 2 are funds that beat the median return of their peers, and it may happen that the median return of actively manage mutual funds in a sample is lower than the return of the market. For that reason, the fact that a fund can continuously beat the average returns of their peers does not guarantee that a fund is a better choice than an index fund that deliver market returns. Second, although the persistence in winner is strong in 1990s and the first half of 2000s, it completely disappears in recent years. In fact, from 2005 to 2009, winners in one period tend to be losers in the next period and vice versa. Therefore, going forward, investors cannot know with certainty whether the persistence in winner will continue to persist in order to take advantage of it.

Table 2

Test of Persistence of Fund Performance from 1990 to 2009: Using median excess return as a benchmark to define winner and loser.

This table presents two-way tables of ranked total returns over one-year intervals. Years when there is persistence in winner are highlighted in green. Years when there is persistence in losers are highlighted in yellow. The returns that are used are net returns.

		Next Year			
Initial Year		Winner	Loser	Percent of Repeated Winner/Loser	Z-Test Repeat Winner/Loser
1989	Winner	186	154	54.71%	1.74
	Loser	143	198	58.06%	2.98
1990	Winner	131	118	52.61%	0.82
	Loser	115	135	54.00%	1.26
1991	Winner	169	178	48.70%	-0.48
	Loser	170	178	51.15%	0.43

1992	Winner	270	136	66.50%	6.65
	Loser	128	279	68.55%	7.48
1993	Winner	226	222	50.45%	0.19
	Loser	207	242	53.90%	1.65
1994	Winner	286	241	54.27%	1.96
	Loser	223	304	57.69%	3.53
1995	Winner	322	258	55.52%	2.66
	Loser	230	350	60.34%	4.98
1996	Winner	405	231	63.68%	6.90
	Loser	213	424	66.56%	8.36
1997	Winner	406	315	56.31%	3.39
	Loser	291	430	59.64%	5.18
1998	Winner	539	265	67.04%	9.66
	Loser	265	540	67.08%	9.69
1999	Winner	248	603	29.14%	-12.17
	Loser	552	299	35.14%	-8.67
2000	Winner	650	240	73.03%	13.74
	Loser	185	705	79.21%	17.43
2001	Winner	700	262	72.77%	14.12
	Loser	221	741	77.03%	16.77
2002	Winner	429	567	43.07%	-4.37
	Loser	505	492	49.35%	-0.41
2003	Winner	646	354	64.60%	9.23
	Loser	319	681	68.10%	11.45
2004	Winner	625	372	62.69%	8.01
	Loser	322	675	67.70%	11.18
2005	Winner	489	500	49.44%	-0.35
	Loser	438	551	55.71%	3.59

2006	Winner	305	632	32.55%	-10.68
	Loser	567	371	39.55%	-6.40
2007	Winner	358	618	36.68%	-8.32
	Loser	557	415	42.70%	-4.55
2008	Winner	281	654	30.05%	-12.20
	Loser	551	384	41.07%	-5.46

Table 3 shows the result when I use positive excess return over the S&P 500 Index as benchmark to define winners and losers. A winner is a fund that outperforms the S&P 500 Index in that year, and a loser is a fund that either underperforms the S&P 500 Index or cannot survive until the end of next year. For example, in the period 1989-1990, there are 122 funds that beat the S&P 500 Index in 1989, and 62 out of 122 funds continue to beat the index in 1990. The percent of repeated winner is 50.82 percent, but the Z-statistic indicates that it is not significantly different from 50 percent. Thus, there is no evidence for the persistence of winner in the period 1989-1990, but there is evidence for the persistence in loser as percent of repeated losers is significantly different from 50 percent at the 5 percent level. From Table 3, we can see that there are 15 years in which there is persistence in losers and there are 6 years in which there is persistence in winners. Table 3, thus, is more helpful for an investor who is thinking about investing in an index fund. The findings imply that if an investor picks a fund that has beaten the S&P 500 Index in that year to invest, her chance of beating the S&P 500 Index in the next year will be significantly lower than 50 percent in most cases. Furthermore, if she picks a fund that is beaten by the market to invest, hoping that the fund will turn around, she will more likely to earn a return that is lower than the market next year. For that reason, investors should not invest their money to funds that are beaten by the market because the odd is not in their favors.

Table 3

Test of Persistence of Fund Performance from 1990 to 2009: Using positive excess return over the S&P 500 as a benchmark to define winner and loser

This table presents two-way tables of ranked total excess returns over the S&P 500 over one-year intervals. Years when there is persistence in winners are highlighted in green. Years when there is persistence in losers are highlighted in yellow. The returns that are used are net returns.

		Next Year			
Initial Year		Winner	Loser	Percent of Repeated Winner/Loser	Z-Test Repeat Winner/Loser
1989	Winner	62	60	50.82%	0.18
	Loser	187	372	66.55%	7.82
1990	Winner	90	86	51.14%	0.30
	Loser	146	177	54.80%	1.72
1991	Winner	179	181	49.72%	-0.11

	Loser	172	163	48.66%	-0.49
1992	Winner	326	100	76.53%	10.95
	Loser	174	213	55.04%	1.98
1993	Winner	115	445	20.54%	-13.95
	Loser	57	280	83.09%	12.15
1994	Winner	46	176	20.72%	-8.73
	Loser	96	736	88.46%	22.19
1995	Winner	50	126	28.41%	-5.73
	Loser	162	822	83.54%	21.04
1996	Winner	41	234	14.91%	-11.64
	Loser	71	927	92.89%	27.10
1997	Winner	37	99	27.21%	-5.32
	Loser	183	1123	85.99%	26.01
1998	Winner	222	43	83.77%	11.00
	Loser	497	847	63.02%	9.55
1999	Winner	347	425	44.95%	-2.81
	Loser	712	218	23.44%	-16.20
2000	Winner	798	385	67.46%	12.01
	Loser	118	479	80.23%	14.77
2001	Winner	704	325	68.42%	11.81
	Loser	146	749	83.69%	20.16
2002	Winner	482	477	50.26%	0.16
	Loser	574	460	44.49%	-3.55
2003	Winner	746	383	66.08%	10.80
	Loser	288	583	66.93%	10.00
2004	Winner	780	305	71.89%	14.42
	Loser	389	520	57.21%	4.34
2005	Winner	345	892	27.89%	-15.55
	Loser	200	541	73.01%	12.53

2006	Winner	199	394	33.56%	-8.01
	Loser	733	549	42.82%	-5.14
2007	Winner	287	739	27.97%	-14.11
	Loser	422	495	53.98%	2.41
2008	Winner	323	423	43.30%	-3.66
	Loser	778	346	30.78%	-12.89

5.2/Returns from Strategy involving the Purchase of Top Performing Funds:

In this study, I want to test whether the strategy of buying funds with top performance in the past will allow an investor to earn substantial returns in the future. In the first test, at the beginning of each year, I rank all the funds from highest to lowest in term of its excess return over the S&P 500. And then, I see how much an investor can earn by purchasing the top 10, 20, 30 and 40 funds, assuming that there is no switching cost. For example, in 1990, I purchase the top 10 funds in 1989 and hold them for one year. Then, in 1991, I would sell those funds and switch to the top 10 funds in 1990. In the real world, investors may have to pay load charges or taxes when they buy and sell their fund shares, but in this study, I assume that there is no switching cost for the sake of simplicity. As being shown in table 2, there are some years that have persistence in winners in mutual fund performance. As a result, this study aims to test whether an average investor can earn abnormal return by taking advantage of that short-run persistence. Table 4 shows the return from purchasing funds with top one-year performance. We can see that this strategy allow an investors to beat the market in the 1990s in term of five-years average return, but it fails to beat the market in 2000s. Overall, this strategy allows an investor to earn positive excess return over that of the market 10 years out of 20. Thus, the probability of winning is just equal 50 percent, and it may happen simply by chance. Furthermore, although the strategy works very well in 1990s, it fails to work in 2000s, especially in those most recent years. That fact suggests that it is not an answer for investors who are looking for a dependable strategy that can work over time.

In the second test, I identify the top twenty mutual funds in term of annually excess return over the S&P 500 during 10 years from 1990 to 1999, and then I see how those funds would perform in the next ten years. The purpose of this test is to investigate whether there is a long-run persistence in mutual fund performance. Table 5.1 shows the result of this strategy. Out of 20 funds, 7 died and only 2 of the remaining earned positive excess returns during the next ten years. Their rankings in the next ten years also fall dramatically, indicating that this is not a strategy which investors should follow.

Table 4

Simulated Annual Returns – Strategy of Buying Mutual Funds with Best One-Year Performance

This table simulates the excess returns over the S&P 500 that would have earned by investors over various years from 1990 to 2009 from buying funds with the best performance over the past year. In calculating the excess returns, when a fund that is chosen dies in the next year, the return of the market is used as a substitution. The return of the S&P 500 is also provided as a reference to compute the net return earned by investor. The returns that are used are net returns.

Year	Top 10	Top 20	Top 30	Top 40	S&P 500_VW
1990	-8.81%	-4.09%	-3.50%	-2.56%	-3.19%
1991	15.36%	12.56%	10.21%	10.79%	30.67%
1992	3.59%	1.30%	0.90%	0.44%	7.72%
1993	12.37%	11.45%	11.08%	10.39%	9.89%
1994	-0.65%	-0.37%	-1.57%	-1.46%	1.36%
Average	4.00%	3.96%	3.25%	3.36%	8.70%
1995	3.04%	0.13%	-1.31%	-2.24%	37.66%
1996	-12.18%	-7.22%	-6.61%	-6.39%	23.22%
1997	-9.29%	-7.68%	-7.17%	-7.40%	33.61%
1998	-12.12%	-9.28%	-9.03%	-9.56%	29.30%
1999	70.14%	58.05%	52.26%	44.07%	21.35%
Average	4.18%	4.22%	3.46%	2.00%	28.88%
2000	-25.40%	-17.91%	-17.90%	-16.26%	-8.35%
2001	30.63%	33.47%	30.37%	28.35%	-11.90%
2002	11.86%	10.23%	12.31%	11.55%	-21.78%
2003	-50.86%	-36.50%	-25.36%	-16.54%	28.70%
2004	6.55%	5.48%	5.15%	5.76%	10.98%
Average	-10.61%	-4.15%	-1.16%	1.14%	-2.04%
2005	1.99%	4.09%	4.14%	4.61%	5.22%
2006	-2.44%	-2.82%	-3.34%	-3.61%	15.67%
2007	-4.41%	-3.52%	-3.28%	-2.99%	5.75%
2008	-15.20%	-15.24%	-18.16%	-17.40%	-36.46%
2009	-24.60%	-17.42%	-13.39%	-12.40%	26.48%
Average	-9.47%	-7.34%	-7.15%	-6.68%	0.68%

Moreover, I also test the strategy of purchasing the top twenty mutual funds in term of alphas estimated by the Carhart 4-Factors model. Table 5.2 shows the returns earned by investors during the next ten years if they invest in the top twenty mutual funds that have highest alphas. The average alpha of those twenty funds from 1990 to 1999 is 5.13 percent, and it falls to 0.96 percent from 2000 to 2009. Those top funds also suffer a big fall in their rankings in the next ten years, although their average alpha is still positive. Table 5.3 shows the returns earned by investors during the next ten years if they invested in the top twenty mutual funds that have alphas that are positive and statistically significant. During the next ten years, although some of them still earn positive alphas, most of those statistically significant alphas from past period disappear, meaning that those positive alphas are indifferent from zero in the next ten years. Their average ten-years annually returns also fall greatly from 18.28 percent to 2.14 percent. Whether the decline of those alphas is due to the efficiency of the market, meaning mutual fund managers are lucky in one period and unlucky in the next, or due to the market mechanism of investors chasing alphas suggested by Berk and Green (2004) is unclear, but both of the tables show that those high alphas earned by funds in the past are not sustainable in the future.

Table 5.1

Subsequent 2000 to 2009 Performance of Top Twenty Diversified Mutual Funds from the 1990 to 1999 Period

This table shows the excess returns earned over the S&P 500 during the 2000s on the 20 diversified mutual funds with the best returns during the 1990s. Highlighted funds are funds that no longer exist at the end of 2009, thus they do not have a rank. The returns that are used are net returns.

	1990-1999		2000-2009	
Fund Name	**Rank**	**Annually Excess Returns**	**Rank**	**Annually Excess Returns**
RS Investment Trust: RS Emerging Growth Fund	1	9.52%	1116	-4.25%
Spectra Fund, Inc.	2	9.25%	931	-0.94%
Van Kampen Emerging Growth Fund, Inc.	3	8.78%	#N/A	-5.79%
Janus Investment Fund: Janus Twenty Fund	4	7.71%	976	-1.46%
MFS Series Trust II: MFS Emerging Growth Fund	5	6.31%	1101	-3.69%
United New Concepts Fund, Inc.	6	5.89%	707	1.14%
The Managers Funds: Managers Capital Appreciation Fund	7	5.83%	1144	-6.57%
American Century Mutual Funds, Inc.: Ultra Fund	8	5.73%	1041	-2.85%
Putnam OTC & Emerging Growth Fund	9	5.69%	#N/A	-12.72%
Fidelity Advisor Series I: Fidelity Advisor Equity Growth Fund	10	5.33%	1049	-2.76%
INVESCO Stock Funds Inc.: INVESCO Dynamics Fund	11	5.30%	1038	-1.97%
Harbor Fund: Harbor Capital Appreciation Fund	12	5.20%	971	-1.54%
Fidelity Mt. Vernon Street Trust: Fidelity Growth Company Fund	13	5.06%	835	0.22%
The PBHG Funds, Inc.: PBHG Growth Fund	14	4.86%	#N/A	-4.42%
Wells Fargo Funds Trust: Large Company Growth Fund	15	4.82%	1028	-2.28%
Janus Investment Fund: Janus Venture Fund	16	4.79%	1040	-2.10%
Nicholas-Applegate Institutional Funds: Mid Cap Growth Fund	17	4.60%	#N/A	-11.00%
Pilgrim Mutual Funds Trust: Mid Cap Growth Fund	18	4.58%	#N/A	-11.00%
AIM Equity Funds, Inc.: AIM Aggressive Growth Fund	19	4.46%	#N/A	-0.36%
IDEX Series Fund: IDEX JCC Growth Portfolio	20	4.41%	#N/A	-7.70%
Average Excess Returns of 20 Funds		**5.91%**		**-4.10%**
S&P 500 Average Return		18.36%		-0.69%
No. of funds with 10-year record		714		1162

Finally, I test for the strategy of purchasing funds with high betas predicted by the CAPM models by regress the average annually returns of funds to their betas. The slope coefficient of that regression is almost flat, suggesting that there is a very low correlation between a fund's return and its beta. This result is consistent with that of Malkiel (1995). All the evidence in this section suggests that buying mutual funds that had good past records is not a dependable strategy for investors either in the short-run or in the long-run.

Table 5.2

Subsequent 2000 to 2009 Performance of Top Twenty Mutual Funds ranked by Alpha from the 1990 to 1999 Period

This table shows the Alpha measured during the 2000s on the 20 mutual funds that have highest alpha estimated by the Carhart 4-Factors Model. Highlighted fund is a fund that no longer exists at the end of 2009. The returns that are used are net returns.

	1990-1999		2000-2009	
Fund Name	**Rank**	**Fund Annually Alpha (%)**	**Rank**	**Fund Annually Alpha (%)**
Franklin Custodian Funds, Inc.: Growth Series; Class A Share	1	14.52	383	1.128
RS Investment Trust: RS Emerging Growth Fund	2	6.372	1061	-2.928
United New Concepts Fund, Inc.; Class A Shares	3	6.324	707	-0.468
Berger Omni Investment Trust: Berger Small Cap Value Fund; I	4	5.328	90	3.84
Vanguard PRIMECAP Fund	5	5.16	122	3.132
Weitz Series Fund, Inc.: Value Portfolio	6	5.124	1074	-3.12
MFS Series Trust II: MFS Emerging Growth Fund; Class B Share	7	4.992	604	0.516
Fidelity Advisor Series I: Fidelity Advisor Equity Growth Fu	8	4.932	601	-1.896
Fidelity Puritan Trust: Fidelity Low-Priced Stock Fund	9	4.584	49	5.04
Wells Fargo Funds Trust: Large Company Growth Fund; Class A	10	4.512	766	-0.768
FPA Capital Fund, Inc.	11	4.44	21	5.76
INVESCO Stock Funds Inc.: INVESCO Dynamics Fund	12	4.272	629	-0.132
Mairs & Power Growth Fund, Inc.	13	4.272	235	2.028
Merrill Lynch Phoenix Fund, Inc.; Class A Shares	14	4.248	229	2.1
WM Trust I: Northwest Fund; Class A Shares	15	3.984	199	2.364
AIM Equity Funds, Inc.: AIM Aggressive Growth Fund; Class A	16	3.972	927	-1.656
Strong Common Stock Fund, Inc.	17	3.96	193	2.412
Oppenheimer Main Street Funds, Inc.: Oppenheimer Main Street	18	3.948	828	-1.104
UAM Funds, Inc.: ICM Small Company Portfolio; Institutional	19	3.9	284	1.62
Longleaf Partners Funds Trust: Longleaf Partners Fund	20	3.72	371	1.164
Average Annually Alpha (%)		5.1282		0.9516
Average Annually Alpha of Funds in the Sample (%)				0.1482
No. of Funds with 10-Year Records in the Sample	714		1162	

Table 5.3

Subsequent 2000 to 2009 Performance of Top Twenty Mutual Funds that have positive and significant Alphas from the 1990 to 1999 Period

This table shows the Alphas measured during the 2000s on the 20 mutual that have positive and significant alpha estimated by the 4-Factors Model. Out of 714 funds that have 10-year track record, there are exactly 20 funds that have positive and significant alphas. The returns that are used are net returns.

	1990-1999		2000-2009	
Fund_Name	Fund Annually Alpha (%)	Fund Average Annually Net Return	Fund Annually Alpha (%)	Fund Average Annually Net Return
United New Concepts Fund, Inc.	6.324	24.80%	-0.468	0.35%
Vanguard PRIMECAP Fund	5.16	21.84%	3.132	3.23%
Weitz Series Fund, Inc.: Value Portfolio	5.124	18.13%	-3.12	1.75%
Fidelity Advisor Series I: Fidelity Advisor Equity Growth Fund	4.932	24.21%	-1.896	-3.71%
Fidelity Puritan Trust: Fidelity Low-Priced Stock Fund	4.584	17.48%	5.04	11.04%
Wells Fargo Funds Trust: Large Company Growth Fund	4.512	23.59%	-0.768	-3.30%
Mairs & Power Growth Fund, Inc.	4.272	18.34%	2.028	6.91%
Merrill Lynch Phoenix Fund, Inc.	4.248	15.96%	2.1	2.89%
Strong Common Stock Fund, Inc.	3.96	21.59%	2.412	4.56%
Oppenheimer Main Street Funds, Inc.	3.948	22.58%	-1.104	-0.82%
UAM Funds, Inc.: ICM Small Company Portfolio	3.9	16.19%	1.62	9.70%
The Merger Fund	3.504	10.52%	1.5	4.66%
T. Rowe Price Capital Appreciation Fund	3.288	11.50%	4.692	9.28%
Liberty Funds Trust III: Crabbe Huson Equity Fund	3.264	13.25%	6.78	-7.52%
MFS Series Trust VII: MFS Capital Opportunities Fund	3.216	20.20%	-3.288	-1.13%
Oppenheimer Quest For Value Funds	2.976	16.15%	1.344	3.10%
T. Rowe Price Equity Income Fund	2.832	14.14%	0.576	4.13%
GMO Trust: GMO Growth Fund; Class III Shares	2.808	20.89%	-0.396	-3.33%
Prudential Equity Fund, Inc.; Class A Shares	2.772	15.50%	2.88	2.14%
Frank Russell Investment Company: Equity Q Fund	0.816	18.68%	-0.876	-1.16%
Average Annually Alpha of 20 funds (%)	3.822		1.1094	
Average Annually Return of 20 funds (%)		18.28%		2.14%

6/ The Analysis of Expenses Ratios:

Expenses ratio is the ratio between the fund expenses and its asset under management. A fund's expenses include the money it has to pay for its management company and to advertise the fund to attract new investors. Indeed, mutual fund expenses play a very important role in a fund's performance. In fact, high expenses ratios will consume all the abnormal risk-adjusted returns a fund has earned on its investments. As being shown in section IV, mutual fund performances look better when we measure by gross returns instead of net returns. Malkiel (1995) reported that there is a negative relationship between a fund's total expenses ratio and its performance. However, when expenses ratio is divided into advisory and non-advisory expenses, his study found a negative relationship between non-advisory expenses and fund returns but a positive relationship between advisory and returns. But he noted that a positive relationship might due to incentive feature mutual fund offers to its management company. For example, if a fund has a good year, it will increase its advisory expenses as a bonus to its management company, leading to a positive relationship between advisory expenses and returns.

Mutual fund's turnover measures how often the portfolio manager trades securities in his or her portfolio. On one hand, a high portfolio turnover will result in high trading costs and lower returns on a portfolio. However, mutual fund manager can argue that a high turnover will lead to high returns because a fund will execute a trade only when an expected return is higher than the trading cost.

This section looks at the relationship between mutual fund returns and their expenses ratios and their turnovers. Table 6 shows the regression results of a fund's average annual returns on its expenses ratios. Consistent with the Malkiel's study in 1995, this study found that a one percent increases in total expense ratios decreases a fund net return by 1.95 percent, and a fund gross return by 0.95 percent. When expenses ratio is divided into management fee and other fees, this study also found a positive relationship between management fee and returns but a negative relationship between other fees and returns. It must be noted that a positive relationship between management fee and net return is not significantly different from zero in net return, but a negative relationship between other fees and returns are statistically significant in both net and gross returns. A negative relationship is expected because there is no reason to think that a fund's non-advisory fee, such as advertising expenses, can lead to higher returns for its investors. Furthermore, when controlled for fund turnovers, this study found that both fund turnovers and other fees have a significantly negative relationship with returns measured in both net and gross returns. Management fee is found to have a positive relationship with a fund's returns. Specifically, a one percent increase in management fee will lead to .54 percent increase in a fund's net return and 1.6 percent increase in gross returns. Thus, the results of this study suggest that fund management fee can lead to an increase in fund performance, but fund turnover and non-advisory expenses can have significantly negative impacts on fund performance.

Table 6

Regression of Average Annual Returns on Average Annual Expense Ratios

This table shows coefficients and standard errors of regressions where the dependent variable was average annual returns, and independent variables were either total expenses or management fee and other fees. "Other fees" is the difference between total expenses and management fee. There are 3055 funds in the sample that has information about Management Fee, and Fund Turnover. When a fund's Expenses Ratios, Management Fee or Turnover are missing, the average value of that fund is used as a substitution. The t-statistics to test whether the parameter is statistically significant is put in parentheses.

	Total Expense Ratio	Management Fee	Other Fees	Fund-Turnover	R-Squared
Net Return	-1.95				0.0541
	(-11.1)				
		0.16	-3		0.1
		(0.66)	(-15.28)		
		0.54	-2.69	-0.61	0.12
		(2.13)	(-13.45)	(-5.98)	
Gross Return					
	-0.95				0.01
	(-5.36)				
		1.23	-2.04		0.06
		(4.92)	(-10.12)		
		1.6	-1.72	-0.61	0.08
		(6.12)	(-8.42)	(-5.8)	

7/Conclusion:

In conclusion, my study has confirmed the findings of previous works that the majority of mutual funds fail to beat the market average, and there is no dependable rule to predict winner funds. Indeed, only a small number of funds can earn significantly positive risk-adjusted returns in their investments, and fewer of them can deliver those risk-adjusted returns to their investors because expense ratios have eaten up most of their abnormal returns. This study also found that there are some funds that can actually have abilities to earn abnormal returns for investors. Once again, strategies of buying funds that have good past performance fail to be a dependable strategy for investors in both short-run and long-run. In fact, there are some years that have persistence in winners but there is no evidence that investors can take advantage of that short-run persistence. In addition, there are strong evidences that loser funds will likely to be losers. Moreover, management fee is found to have a positive relationship with fund returns, but total expense ratios and fund turnovers are found to have a strong negative relationship with fund returns. The implication for investors in mutual funds is to avoid funds that have poor past records and funds that have high expenditures in non-advisory expenses and high portfolio turnovers. For an average investor, putting her money into an index fund is a right strategy.

References:

Berk, Jonathan B., and Richard C. Green, 2004, Mutual fund flows in rational markets, Journal of Political Economy 1269-1295.

Brown, Stephen J., Roger G. Ibbotson, and Stephen A. Ross, 1992, Survivorship bias in performance studies, The Review of Financial Studies 5, 553-580.

Carhart, Mark M., 1997, On persistence in mutual fund performance, Journal of Finance 52, 57-82.

Chang, Eric C., and Wilbur G. Lewellen, 1984, Market timing and mutual fund investment performance, Journal of Business 57, 57-72.

Chen, Joseph, Harrison Hong, Ming Huang, and Jeffrey D. Kubik, 2004, Does Fund Size Erode Mutual Fund Performance? The Role of Liquidity and Organization, American Economic Review; Vol. 94 Issue 5, p1276-1302, 27p, 10 Charts

Fama, Eugene F. and Kenneth R. French, 2010, Luck versus Skill in the Cross-section of Mutual Fund Returns, The Journal of Finance, Vol.LXV, No.5, 1915-1947.

Grinblatt, Mark, and Sheridan Titman, 1989, Mutual fund performance: An analysis of quarterly holdings, Journal of Business 62, 393-416.

Invesment Company Institute. 2007 Mutual Fund Fact Book, 47th ed. Washington, DC, 2007.

Jegadeesh, Narasimham, and Sheridan Titman, 1993, Returns to buying winners and selling losers: Implications for stock market efficiency, Journal of Finance 48, 93-130.

Jensen, Michael C., 1968, The performance of mutual funds in the period 1945-1964, The Journal of Finance 23, 389-416.

Malkiel, Burton G., 1995, Returns from investing in equity mutual funds 1971 to 1991, Journal of Finance 50, 549-572.

Sharpe, William F., 1966, Mutual fund performance, Journal of Business (Special Supplement) 39, 119-138.

Treynor, Jack L., 1965, How to rate management of investment funds, Harvard Business Review 43, January-February, 63-75.