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Performance Evaluation of Mid-Cap Retail Equity Mutual Funds

Abhay Kaushik

Corresponding Author: Department of Accounting, Finance and Business Law, Radford University, Radford, USA. Phone Number +1-540-831-6426

Abstract

Mid-cap funds invest in stocks with a market cap between $2 billion and $10 billion. Some of the mid-cap firms recently overcame their small-cap status, but are still in the high growth mode with a better market positioning and stronger balance sheet. Because of their size and status, mid-cap stocks offer a unique platform to portfolio managers of mid-cap funds to earn superior returns by using their selectivity skills. This study analyzes the performance and persistence of performance of 257 U.S. domiciled retail mid-cap funds from January 2000 to December 2017. The results of this study suggest that despite the interesting platform offered by these stocks, it is not easy for fund managers to pick the stocks that beat the market. The results of this study show that mid-cap funds do not outperform the market and their poor performance persists over time.

Keywords: *Equity Mutual Funds, Performance, Persistence of Performance.*

JEL classification*: G10, G11, G12.*

Introduction

Actively managed portfolios, also known as mutual funds, are important tools used by both well-informed investors, such as institutional investors, and less informed investors such as individuals and households. These funds are also popular with people who are investing in retirement accounts. Given the constant demand for this investment vehicle, it is not surprising that despite its huge size, this sector of the economy has grown by double digits for the past several years. According to the Investment Company Institute (ICI), by year-end 2017, nearly $49.3 trillion in assets was managed by all funds combined worldwide, $22.1 trillion of which was managed by funds in the U.S. alone. Mutual funds had the lion's share managing $18.7 trillion. By the end of 2000, mutual funds combined in the U.S. were managing $6.96 trillion. In other words, the assets under management increased by 166% or 9.21% average annual growth rate.

There are various reasons why people from different backgrounds and different investment objectives invest their disposable income into mutual funds, but it is fair to say that mutual funds provide diversification and an acceptable level of risk-adjusted returns at a very low cost. However, the existing literature suggests that investors do not earn superior returns after incorporating expenses, and alpha (selectivity skill of a fund) of most of these funds is either zero or negative after incorporating factors with known biases. But, there are studies that confirm that not all funds lack skills, and there are a number of managed portfolios that generate superior returns after expenses and netting the effects of known biases. The major argument in favor of no selectivity skill rests on the assumption that markets, especially developed markets, are efficient, and it is hard to beat markets. However, the same literature also suggests that efficient markets offer opportunities to pick stocks that generate above average returns over the long-term and given the nature of mutual funds that do tend to invest for long term; the efficient market argument does not fit the bill. In other words, if portfolio managers are stock pickers, then, on average, they should be able to pick stocks that have upside potential and be able to beat passive indices long term. The other argument suggests that funds that generate higher returns attract more new money from new investors and that causes superior returns to dissipate because fund managers have limited good ideas and their own excess demand decreases future returns from those few outperforming stocks.

In this study, we are analyzing the performance of U.S. domiciled mid-cap funds from January 2000 to December 2017. Mid-cap funds are portfolios that invest in firms with a market cap between $2 billion and $10 billion. The reason to analyze mid-cap funds and the choice of time period stems from a variety of reasons. First, the U.S. economy experienced a minor and a major recession during this period. Second, the U.S. economy bottomed out at the end of 2008 and since then, the stock market in the U.S. has been generating high double-digit growth rate. This period is important because we want to know how active management performs when the economy is experiencing volatility. Finally, the argument of efficient markets is even stronger when the market in general is growing at a higher rate. Therefore, it is interesting to see whether the argument of efficient market holds or if fund managers were able to pick the right stocks even during the high growth period. Second, we are using mid-cap funds because most of the existing research is based on either large-cap funds or small-cap funds. Large-cap firms because of their sheer size and impact on markets always attract the attention of both researchers and investors. Small-cap firms have the ability to grow at a faster rate and become a prime takeover target, and therefore they attract the attention of researchers for analytical purposes. Mid-cap stocks, on the other hand, are in between these two extremes and thus are not so visible in the broader research. However, mid-cap firms offer a unique platform to both portfolio managers and investors. Some of the mid-cap firms recently overcame their small-cap status, but are still in the high growth mode with a better market positioning. It is better market positioning because they are more stable than before and have the ability to obtain additional funding, especially debt, at a lower cost. Because these firms are still enjoying higher growth rate, they are able to generate superior returns than their larger counterparts. Most of these mid-cap firms have strong balance sheets and superior profitability ratios. Fund managers that target these firms can generate superior returns on a more consistent basis than fund managers of large-cap or small-cap funds.

In this study, we are trying to fill the gap by analyzing performance of mid-cap funds from the selectivity skill perspective of fund managers. There is a concern among market commentators about picking good quality mid-cap stocks without adding extra cost. Their concern comes from the belief that mid-cap stocks are not widely followed by analysts. Therefore, getting information and doing quality research requires both more time and cost. In this study, we are trying to determine if mid-cap fund managers can pick quality stocks for their portfolios and still generate superior alpha. Second, we want to know whether the performance persists over time.

Literature Review

In the seminal paper by Jensen (1968), he reported that mutual funds do not outperform the market and any positive alpha is only by chance. Jensen showed that after incorporating expenses and the market-related effects, any excess return simply dissipated. Jensen's findings were supported by a number of academic

studies that concluded that actively managed funds do not outperform passive indices (Bogle, 1998; Bollen and Busse, 2006; Hooks, 1996; Ippolitio, 1989; Wermers, 2000). In another seminal paper, Carhart (1997) documented underperformance of actively managed mutual funds after including expenses. The results indicated a one-for-one negative impact of expenses on a fund's performance. Carhart's study suggested that fund managers do not have any skills or any other informed strategy to beat the market. However, Grinblatt and Titman (1992) provided evidence of superior stock picking skills of fund managers. Wermers (1997) also provided evidence of selectivity skills of fund managers. However, his results indicated no alpha once momentum effects were incorporated. Kaushik (2013) showed that certain styles of actively managed funds can outperform passive indices for international equity funds. In a related study, Kosowski, Naik, and Teo (2007) analyzed hedge funds and concluded that bootstrap and Bayesian methods are better suited for estimating performance and persistence of performance for their sample funds.

The other strand of literature analyzes persistence of performance. For example, Bollen and Busse (2005) analyzed the persistence effect for 230 mutual funds. They used rank portfolio approach to estimate the persistence effect and found no persistence effect. But, their results also suggested some level of short-term persistence for their sample funds. In another study, using rank portfolio approach, Huij and Verbeek (2007) analyzed 6,400 U.S. equity mutual funds and found persistence effect for only one group of funds. Persistence of performance was also measured for bond funds. For example, Blake et al. (1993) found no persistence of performance for bond funds.

Methodology of Analysis

This study analyzes U.S. domiciled mid-cap equity retail funds. The period of this study is from January 2000 to December 2017. The data for this study is taken from the Morningstar Direct database. Since this study analyzes U.S. domiciled mid-cap equity retail funds, any fund that was classified as institutional, index, international, or global was removed from the selection process. Further, we ensured that sample funds have at least 90% investment in equity. Since many funds issue multiple classes of shares but all of them have claims on the same assets, consistent with the existing literature, we selected funds with the oldest share class. Finally, we select any fund that is classified as mid-cap retail fund under the Morningstar Category during the period of the study in order to avoid any survivorship bias. Our final sample consists of 298 funds from all three styles, namely value, blend, and growth. Consistent with the existing literature, we removed the funds that have less than a 36-month history of returns. Our final sample consists of 257 funds for empirical purposes. The market returns, risk-free rate, and factors mimicking portfolios based on size, value, and momentum are taken from Kenneth French's website.

Table 1 shows descriptive statistics of sample funds. For example, on average, a fund generated a return of 7.72% over the 18-year period. Sample funds saw a great level of volatility. For example, the highest return of 34.04% is observed in 2013, whereas the lowest of -47.87% was in 2008. This large swing is not surprising as the U.S. economy suffered a great recession for almost 18 months, starting in December 2007 and lasting until June 2009. The average market return over the same period was 6.79%. The risk-free rate of return generated an average return of 1.58% during the period of this study. Average returns generated by portfolios mimicking size, value, and momentum were 3.39%, 3.95%, and 2.05%, respectively.

Table 1: Descriptive Statistics for Sample Funds and Market Factors

Year	Ret	RM	RF	SMB	HML	MOM
2000	4.93%	-11.24%	5.74%	-0.25%	37.02%	19.94%
2001	-8.10%	-9.18%	3.71%	19.20%	15.96%	-4.05%
2002	-23.51%	-21.46%	1.62%	5.94%	8.49%	27.81%
2003	32.64%	28.60%	1.02%	19.72%	4.28%	-17.98%
2004	14.52%	11.59%	1.18%	5.02%	6.98%	0.33%
2005	9.94%	6.31%	2.94%	-1.22%	7.68%	13.98%
2006	11.34%	14.63%	4.71%	0.79%	11.93%	-6.51%
2007	9.19%	5.92%	4.57%	-7.01%	-14.45%	21.19%
2008	-47.87%	-42.54%	1.59%	5.90%	2.55%	18.96%
2009	34.04%	27.18%	0.09%	8.16%	-2.95%	-64.43%
2010	22.94%	17.77%	0.10%	12.67%	-3.34%	5.85%
2011	-2.02%	1.83%	0.04%	-4.85%	-8.40%	8.13%
2012	14.57%	15.78%	0.06%	-0.72%	8.05%	-0.13%
2013	31.38%	30.87%	0.00%	5.50%	1.36%	5.76%
2014	8.32%	11.45%	0.00%	-6.60%	-1.70%	1.71%
2015	-2.47%	0.89%	0.01%	-3.61%	-10.12%	20.94%
2016	11.43%	13.33%	0.21%	6.33%	19.28%	-18.66%
2017	17.63%	20.39%	0.79%	-3.97%	-11.56%	4.03%
Average	7.72%	6.79%	1.58%	3.39%	3.95%	2.05%

This table shows the descriptive statistics for sample funds and market-related factors over the period January 2000 to December 2017. Ret is the average monthly return for the given year. RM is the average monthly return of the S&P 500. RF is the average monthly yield for a one-month treasury bill. SMB is the difference in returns between small and large-cap stocks. HML is the difference in returns between high and low book-to-market stocks. MOM is the difference in returns between stocks with high and low past returns.

We follow the existing literature to estimate alpha of sample funds using the Sharpe-Lintner Capital Asset Pricing Model (CAPM) (Lintner, 1965; Sharpe, 1964). The CAPM states that in equilibrium, expected returns are linearly related to their level of risk, more specifically, their beta or systematic risk. The CAPM (single-factor market model) is widely used to estimate Jensen's (1968) alpha.

$$rit - rft = \alpha i + \beta i * RMRFt \quad (1)$$

where rit - rft is the excess return on fund i over the 1-month T-bill rate, αi is the measure of the portfolio's performance (Jensen's alpha), RMRFt = RMt - RFt is the excess return on the market, and βi = is the unconditional measure of risk.

We use monthly observations during the period January 2000 to December 2017. Many studies have shown that there are other known biases that affect returns of a fund. Therefore, consistent with the existing literature, we also use the four-factor model of Carhart (1997), which adjusts a fund's excess return for the Fama-French (FF) factors SMB, HML, and Carhart's momentum in addition to difference in returns between small and large capitalization stocks and the difference in returns between high and low book-to-market stocks.

$$rit - rft = \alpha i + \beta 1i * RMRFt + \beta 2i * SMBt + \beta 3i * HMLt + \beta 4i * MOMt + \varepsilon i, t \quad (2)$$

where RMRFt is the excess monthly return (market return net of monthly T-bill return) on the CRSP Value Weighted Index, SMBt is the difference in returns between small and large capitalization stocks and HMLt is the difference in returns between high and low book-to-market stocks. MOMt is the difference in returns between stocks with high and low past returns.

Monthly SMBt, HMLt, and MOMt factors are taken from the Kenneth French website.

Both equations (1) and (2) estimate alpha and beta. In mutual funds, alpha is more important because a positive alpha shows the positive selectivity skill of the fund managers, whereas a negative alpha corresponds to negative selectivity of fund managers. A zero alpha means that fund managers have no selectivity ability, and they are unable to either underperform or outperform the comparative benchmark.

We use Newey-West regression methodology to control for any heteroscedasticity and auto-correlation in error terms. We estimate alphas overall and separately for each fund. The main question that every researcher would like to ask is whether active fund managers can beat market indices and whether they can earn statistically significant positive alpha.

H0: Markets, especially developed markets, are efficient; therefore, it is not possible for active fund managers to beat the market index.

Ha: Active management consists of skilled people with research and other resources; therefore, they should be able to pick better securities and earn greater returns than the market index.

The second objective of this study is to estimate whether performance—over or under—is a one-time effect or if this persists. We follow the existing literature to estimate the persistence effect. Rank portfolio approach is more appropriate for this type of study because we are interested in evaluating whether top performers continue to outperform in the subsequent period (and if underperformers continue to underperform in the next period). Rank portfolio approach creates a time series of such extreme performers and therefore makes a clear distinction between extreme performers. In order to create a time series for these two extreme performers, at the beginning of each period, we rank sample funds based on returns and create quintiles. Quintile 5 (Q5) is the group of funds that belong to top bracket earners (top 20% returns) in that period, whereas quintile 1 (Q1) is the group with lowest bracket of return earners. Since funds' returns may change over time, we use dynamic strategy and repeat the step every year. The first formation period is January 2001 and the last formation period January 2017. This rank portfolio approach gives us a time series of two extreme returns (one series that contains funds with top 20 percent returns earners and the other with the lowest 20 percent returns earners) generated related funds. We use equation 2 to estimate alpha of both quintiles. If alpha of Q5 is positive, then that means funds that generate positive returns in the previous period tend to carryover their superior performance to the next period, and if Q1 generates negative alpha, then that suggests that poor performers in the previous period also continue with their poor performance to the next period.

Both analysts and researchers would like to know whether the abnormal performance –under or over- persists over time.

H0: Even if actively managed funds are able to beat the market index, the outperformance is merely by chance, and therefore, superior performance will not persist over the next period.

Ha: Active fund managers have selectivity skills, and therefore their outperformance should persist over time.

Findings

The results are presented in table 2. Panel A documents results for the single-factor model. The results show that, on average, the overall alpha is negative but statistically insignificant. The results show that funds neither outperform nor underperform the passive index. However, results also show that funds' performance is directly dependent on the market volatility. On average, for every 1% increase in market returns, funds' returns increase by 1.1022%, and this association is statistically highly significant. Adjusted R-square of 0.7537 is also very significant because it shows that the market model does explain a great deal of movement for the sample funds. Panel B shows results for the four-factor Carhart model. Results in panel B also document negative selectivity skills of fund managers, but unlike results from the single-factor model, alpha is statistically significant. Results show that, on average, mid-cap funds underperform the passive index by 4.9 basis points per month (58.8 basis points annual equivalent) after incorporating the effects of market and premiums offered by size, value, and momentum factors. Results further show that mid-cap funds' returns are directly proportional to the market, size, and momentum factors, whereas returns have no effect from

value premium. The following table shows the selectivity skills of funds managers of the sample funds during the period January 2000 to December 2017. Selectivity skill is shown by alpha (α) based on single-factor and four-factor models. rit is the excess monthly return of fund i over one-month T-bill return. RMRF is the excess monthly return of the CRSP value-weighted index over the one month U.S. T-bill return. SMB, HML, and MOM are monthly returns of size (the difference in returns between small- and large-cap stocks), book to market (the difference in returns between high and low book-to-market stocks), and momentum (the difference in returns between stocks with high and low past returns) portfolios respectively. The dependent variable is the individual fund's monthly excess return over the corresponding one-month T-bill rate. Alpha is expressed in percent per month. Results are based on Newey-West heteroscedasticity and autocorrelation adjusted standard errors. N is the number of fund month observations.

Table 2: Selectivity Skills of Mid-Cap Funds Managers

Panel A

Single-Factor Model

Model: $rit - rft = \alpha i + \beta 1i * RMRFt + \varepsilon i, t$

Parameter	Estimate	t-value	P-value
A	0.0271	1.90	0.0570
RMRF	1.1022***	210.47	<0.0001
Adj. R2	0.7537		
N	39,467		

***, **, and * show the significance at the 1%, 5%, and 10% level respectively.

Panel B

Four-Factor Model

Model: $rit - rft = \alpha i + \beta 1i * RMRFt + \beta 2i * SMBt + \beta 3i * HMLt + \beta 4i * MOMt + \varepsilon i, t$

Parameter	Estimate	t-value	P-value
A	-0.049***	-3.76	0.0002
RMRF	1.0525***	195.11	<0.0001
SMB	0.3238***	23.19	<0.0001
HML	-0.0059	-0.59	0.5537
MOM	0.0282***	5.16	<0.0001
Adj. R2	0.7887		
N	39,467		

***, **, and * show the significance at the 1%, 5%, and 10% level respectively.

Table 3 shows interesting comparisons at the individual level. For example, positive alpha is observed in 140 funds and negative alpha is observed in 117 funds when the single-factor model is used. These numbers change when the four-factor Carhart model is applied. Positive alpha was displayed in 107 funds, while 150 funds showed negative alpha. Since we are interested in finding the true alpha, i.e. alphas that are statistically significant at least at 90% confidence interval, therefore, we also calculated positive and negative alphas

based on their statistical significance. Out of 107 positive alphas, 15 are statistically significant, and 35 funds have significant negative alpha from 150 negative alpha funds for the four-factor Carhart model. Results are different for the single-factor market model. Out of 227 funds, 140 funds have positive alpha and 117 funds show negative alpha. Thirty-four funds have statistically significant alpha for positive selectivity funds, whereas only 14 funds show statistically negative selectivity skills.

Table 3: Comparison of Abnormal Performance across Various Models

MODEL	Number of Funds	Positive	Negative	Significant	Insignificant	Positive and Significant	Negative and Significant
Single-Factor Model alpha	257	140	117	48	209	34	14
Four-Factor Model alpha	257	107	150	50	207	15	35

This table shows the comparison of the abnormal performance of the individual funds across single-factor and four-factor models. Abnormal performance (alpha) is estimated by using single-factor market model and Carhart four-factor model. The table also divides performance based on significant, insignificant, positive, negative, positive and significant, and negative and significant alphas.

Interesting outcomes are obtained from the persistence evaluation. Results in panel A of table 4 show that performance does persist for poor performers. Mid-cap funds that performed poorly in the previous period carried over their poor performance to the next period and, on average, generated -142 basis points in that process. Results of panel A further show that value and momentum effects are directly related to their persistence effect, whereas size premium and market effect are inversely related to their persistence effect. All of these results are statistically highly significant. Results in panel B are also very interesting because they show negative and statistically highly significant alpha for the top performers. On average, funds in Q5 generate
-244.8 basis points over the next period. The results should not be viewed as surprising, as the results from table 2 indicate that in general, funds perform poorly against the passive benchmark. The only surprising element is that better performers in the previous period perform worse than poor performers during the same interval. These results further suggest that performance by fund managers is merely by chance.

The following table shows the persistence of performance of mid-cap funds during the period January 2000 to December 2017. At the beginning of each year, we ranked the sample funds based on their previous year's returns and quintiles are formed. Q1 is the group that consists of funds that are ranked as bottom 20% funds based on previous year's annual returns and Q5 is the group that consists of funds that are ranked as top 20% funds based on previous year's annual returns. We use dynamic strategy to sort these funds and repeated the step every year. Q1 is a series of worst performing funds, and Q5 is a series of best performing funds. A positive α of Q5 and a negative α of Q1 based on the four-factor Carhart model indicate persistence of performance. Panel A reposts persistence of performance for Q1, and panel B reports the same for Q5. Results are based on Newey-West heteroscedasticity and autocorrelation adjusted standard errors. N is the number of fund month observations.

Table 4 : Persistence of Performance

Model: rit - rft = αi + β1i* RMRFt + β2i* SMBt + β3i*HMLt + β4i*MOMt + εi, t

Panel A

Parameter	Estimate	t-value	P-value
A	-0.119***	-3.64	0.0003
RMRF	1.0559***	81.84	<0.0001
SMB	0.3478***	22.76	<0.0001
HML	-0.1242***	-5.59	<0.0001
MOM	-0.0726***	-5.87	<0.0001
Adj. R2	0.8126		
N	6,893		

***, **, and * show the significance at the 1%, 5%, and 10% level respectively.

Panel B

Parameter	Estimate	t-value	P-value
A	-0.204***	-6.98	<0.0001
RMRF	1.0763***	91.59	<0.0001
SMB	0.3627***	29.04	<0.0001
HML	0.01280	0.70	0.4836
MOM	0.1232***	11.26	<0.0001
Adj. R2	0.8236		
N	7,464		

***, **, and * show the significance at the 1%, 5%, and 10% level respectively.

Conclusion

This study analyzes the performance of domestic U.S. based mid-cap retail funds during the period January 2000 to December 2017. Mid-cap funds tend to be the funds that attained this status by overcoming small-cap label mainly by growing quickly or the funds that are still enjoying higher growth but have not yet reached the large-cap status. They tend to have a strong balance sheet and high growth potential, and therefore provide a very interesting platform to portfolio managers to earn higher returns by using their selectivity skills. During the time period of this study, we analyzed the performance and persistence of performance of 257 mid-cap funds. We used both the single-factor market model and the four-factor Carhart model to estimate the performance of these funds. Results indicate that mid-cap funds, in general, underperform against the market. We use rank portfolio approach to evaluate whether the performance persisted over time using time varying dynamic strategy. Results obtained from rank portfolio approach suggest that poor performance persists over time. Results further suggest a strong impact of the market on the performance and persistence of performance of sample funds.

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