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Active versus Passive Investing

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Abstract

With the increased popularity of passive investing, the long-term investment success of active management is being questioned more frequently. For this reason, this research seeks to find whether actively managed funds produce sufficient returns that cover the fees and management costs associated with them. A comparative analysis was made with 5401 actively managed U.S. mutual funds and several common market indices over three, five, and ten-year time spans ranging from 2012 to 2021. Additionally, an analysis was made comparing active and passive management in the recessionary period of 2007 to 2009. Finally, analysis was conducted on annual holdings turnover rates of different mutual fund types to find the correlation these rates have with performance success.

In all the time periods from 2012 to 2021, active management underperformed overwhelmingly compared to common market indices. This indicated that the U.S. stock market is indeed efficient and there is no potential value to be gained from investing actively. However, in bear market conditions, all categories of actively managed mutual funds outperformed the S&P 500 index most of the time. This supported the idea that in bad market conditions, active management is a very attractive investment style. Furthermore, analysis of annual holding turnover rates found that actively managed funds that were less active tended to perform the best.

I deduced that the best investment strategy is a passive approach. Even though the analysis of bear market conditions indicated otherwise, I concluded that there are too many variables when trying to exploit this potential value. Investors would need to know both when to invest and what sectors to invest in, which is much easier said than

done. Overall, most investors are better off betting on the success of the entire U.S. stock market and the easiest way to do so is through passive investing vehicles.

Section 1: Introduction

In the present financial market, the public is offered more investment options than ever before. The two biggest U.S. stock exchanges currently account for almost 40 trillion dollars by market cap, and that number is exponentially growing each year. The investment market is not only extremely important to those with careers in finance, but to all individuals. With the rapid increase in investment options, it is crucial for all of the working public to understand their options if they choose to invest their money.

Generally speaking, there are two investment strategies: active and passive management. Some investors choose to put their funds in more active investment vehicles like mutual funds or individual stocks, while others invest passively in index funds and ETFs. The main difference between these two strategies is their views on the overall market. Often, active investors give their investing dollars to someone, a financial advisor or mutual fund manager, who manages their investments and in return, they charge a fee. Naturally, those who choose this route believe that the overall market is not efficient, and thus believe either a manager or themselves can find value unknown by the majority of investors. Conversely, passive investors believe the total market to be efficient and don't believe additional value can be added. Since they believe this, passive investors choose to invest their money in passive index funds or ETFs that closely mirror a specific market index, such as the S&P 500 or Russell 1000. For this reason, their returns equal the return of the total stock market.

When determining which route to take, investors need to answer a couple of important questions. As mentioned earlier, the most important question to ask is whether they believe the total market in the U.S. is efficient. As implied earlier, people

who believe the market is efficient would align with passive investment beliefs, and those who believe that the market is inefficient align more with active investing beliefs. Additionally, investors need to consider what sectors of the markets they would like to invest in. People who wish to invest in only specific asset sectors or classes would benefit from active investing. On the contrary, those who are looking for a diversified portfolio would benefit from a passive investing approach.

In this thesis, I am going to analyze which investment strategy performs better in U.S. markets. I am going to compare returns net of fees and dividends of actively managed mutual funds to different passive indexes. I will make these comparisons over several different time periods making sure to capture different market conditions. Additionally, I will also analyze the average annual holdings turnover rate to see if more active funds tend to perform better.

1.1 Mutual Fund Category Types and Sizes

Mutual funds are classified by financial professionals in many ways, but the most common way is by the market cap size of the companies they choose to invest in. The most common way they are split is by large, mid, and small-cap. The criteria for each is below:

Large-Cap – Companies with a market value of \$10 billion or more.

Mid-Cap – Companies with a market value between \$2 billion and \$10 billion

Small-Cap – Companies with a market value between \$300 million to \$2 Billion

In addition to size, mutual funds are also commonly classified based on the types of companies they chose to invest in. Funds are classified as either growth, value, or blend funds. The definitions of each type are below:

Growth – Funds that seek to invest in companies that have high earnings and high price to book and price to earnings ratios.

Value - Funds that seek companies that are undervalued. Usually, these companies have low price to book and price to earnings ratios.

Blend – Funds that invest in both value and growth companies.

1.2 Background

Before going into my personal analysis on this topic, it is important to investigate the research that has already been done. The consensus reached from the majority of past studies is that active management does not provide superior performance compared to passive investing.

In an earlier study by Kenneth French titled “Presidential Address: The Cost of Active Investing”, French analyzed the active vs passive debate. In his studies, he provided a theory that he believed explained why active investors commonly underperform passive investors. He calls the theory the no net-of-transfer assumption (French K., 2008). It suggests that any gain from an active investor comes from the loss of another active investor. In sum, this means that active investors are paying management fees and expenses but on average are not receiving a benefit. He estimated that from 1980-2006, active investors committed around \$102 billion dollars attempting to achieve higher returns outside of management fees and costs.

Additionally, in a study done by Nobel-Prize Eugene Fama alongside Kenneth French titled “Luck versus Skill in the Cross-Section of Mutual Fund Returns”, the two found that before fees the performance of U.S. equity mutual funds is close to that of the entire market (Fama & French, 2010). However, after fees were accounted for, they concluded the same as past studies: active investing consistently underperforms passive investing.

The research done by economists French and Fama helps provided investors with the knowledge and proven benefits of passive investing. With this increase of studies coming to this same conclusion, one would expect the popularity of passive investing to grow. A study done by the Journal of Finance Economics showed support for this. This study found that “indexed equity funds (index funds and exchange-traded funds) have grown from about 14% of assets under management in 2002 to about 22% in 2010” (Cremers, 2016).

Another thing highlighted numerous times in studies done by Fama and French is how much investors lose out from active management fees and expenses. In his study done in 2008, he found that “management fees and expenses for mutual funds fell from 2.08% of assets under management in 1980 to 0.95% in 2006” (French, 2008). This dramatic fall off indicates that many mutual funds, over time, are utilizing more passive strategies.

Section 2: Analysis

2.1 Data Set

The data used for this research was obtained from Yahoo Finance. This data contains historical returns as well as other financial measurements for 23,783 U.S.

mutual funds from January 1, 2000, until December 31, 2021. Morningstar was used to obtain both the ticker and fund names of the 23,783 funds.

Certain observations were deleted based on the following criteria:

- All funds must have been active from 2007
- All funds must have a category type and size
- All funds must have an average ten year, five year, and three year return listed
- All funds must have a ticker listed on Morningstar
- All funds must have an annual holdings turnover rate of 30% or higher

After narrowing down based on the criteria above, 5401 funds remained. The breakdown of the funds is shown below.

Breakdown of Active Mutual Funds by Type and Size

	Large	Mid	Small	Total
Growth	728	347	257	1332
Value	774	465	580	1819
Blend	1361	623	266	2250
Total	2863	1435	1103	5401

2.2 S&P 500 Comparisons

The main goal of every actively managed fund is to beat the market to make their specific fund look more attractive for investors to buy. Because of this, it is useful to compare the average yearly returns of these funds to indices that reflect the overall market. The most popular of which is the S&P 500 which is an index that contains the 500 largest companies by market cap sold on stock exchanges in the U.S. The S&P 500 is a capitalization-weighted index, meaning that the larger market cap companies hold more weight in the index's performance.

In the analysis below I compared the average yearly return of all the active funds to the S&P 500 average yearly returns over three, five, and ten-year time periods. The three-year period ranges from 1/2018 to 12/2021, and the average yearly return of the S&P 500 was 25.90% yearly including dividends. The five-year period ranges from 1/2016 to 12/2021, and the average yearly return of the S&P 500 was 19.06% yearly including dividends. The ten-year period ranges from 1/2012 to 12/2021, and the average yearly return of the S&P 500 was 17.19% yearly including dividends. The percentage of funds that outperformed the index are broken down by type and size below:

Percentage of Funds that Outperformed S&P 500 Over 10 Year Period

S&P Avg. = 17.19	Large	Mid	Small
Growth	29.39%	4.32%	5.83%
Value	0.13%	0.43%	0.00%
Blend	1.40%	0.96%	0.75%

Percentage of Funds that Outperformed S&P 500 Over 5 Year Period

S&P Avg. = 19.06	Large	Mid	Small
Growth	23.35%	8.07%	8.17%
Value	0.00%	0.00%	0.17%
Blend	0.88%	0.01%	1.12%

Percentage of Funds that Outperformed S&P 500 Over 3 Year Period

S&P Avg. = 25.9	Large	Mid	Small
Growth	16.62%	10.37%	7.78%
Value	0.00%	0.00%	0.00%
Blend	0.51%	0.32%	0.37%

Overall, most of the actively managed funds failed to outperform the S&P 500 over all time periods. Large growth generated the highest percentage of funds that beat

the market over all time periods, while all sizes of both value and blend funds performed quite poorly. This comes as no surprise as the majority of the companies listed on the S&P 500 are classified as large growth stocks. Even still, the large growth funds failed to outperform over 70% of the time over all time periods. These findings support that the U.S. stock market is indeed efficient and there is not a lot of potential to add value by actively investing over the long run.

2.3 Mid and Small-Cap Direct Comparisons

To further evaluate the category types, I wanted to compare both mid and small-cap funds to their passive counterparts. To do this I selected the most common indexes that measure small and mid-cap stocks respectively.

The mid-cap Index I chose was the S&P 400 index. This index contains 400 companies with market caps ranging from 3.7 billion to 14.6 billion dollars. The current median market cap of companies in the index is 5.77 billion dollars and this index accounts for about 7 percent of the total U.S. stock market.

The small-cap index I chose was the S&P 600 index. This index contains 600 U.S. companies with market caps ranging from 850 million to 3.7 billion dollars. The current median market cap for companies in this index is 1.58 billion dollars and it accounts for about 3 percent of the total U.S. stock market.

Below are the comparisons of mid and small-cap funds to their passive index counterparts.

Percentage of Mid-Cap Funds that Outperformed S&P 400 Over Different Periods by Category

Time Periods	10 Year	5 Year	3 Year
Growth	40.34%	59.08%	40.92%
Value	1.08%	0.86%	0.04%
Blend	2.57%	2.73%	0.96%

Percentage of Small-Cap Funds that Outperformed S&P 600 Over Different Periods by Category

Time Periods	10 Year	5 Year	3 Year
Growth	22.57%	53.70%	34.63%
Value	0.00%	1.90%	0.86%
Blend	2.63%	8.65%	0.75%

When compared to their counterparts, active mid and small-cap mutual funds outperformed more often. In the five-year period both mid and small-cap growth funds outperformed their passive counterparts a majority of the time. Again, in this analysis, growth funds did significantly better than both value and blend. These findings reiterate market efficiency; however, the data does indicate that there is potential value in mid and small-cap mutual funds when compared to their counterparts.

2.4 Bear and Bull Market Comparisons

In the previous analyses, we looked at ten, five, and three-year time periods. All these were great markets years. However, history tells us that a recession occurs about once every six years on average. Due to this, it is very important to consider how active and passive investments do in bad market times.

To analyze this, I compared S&P 500 returns to the actively managed fund returns in two three-year time frames, 2007 to 2009 and 2019 to 2021. These periods of time account for a bear market and bull market respectively. From 2007 to 2009 the

S&P 500 averaged a loss of 5.05% yearly including dividends. From 2019 to 2021 the S&P 500 averaged a gain of 25.90% yearly including dividends.

To capture the paired nature of this analysis I calculated frequency tables that reported how often each fund did one of the 4 possible things: outperformed S&P 500 in both the bear and bull market conditions, failed to outperform in both market conditions, outperformed in the bear market but not the bull market, or outperformed in the bull market but not in the bear market. In addition to these tables, I calculated an effect size table to calculate the median amount each type of active fund beat or failed to beat the index.

Below are the results are broken down by fund type and size:

Large Growth Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	16.35%	81.31%
Failed to Outperform Bear	0.28%	2.06%

Median Large Growth Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-5.31%	9.44%

Mid Growth Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	10.37%	88.47%
Failed to Outperform Bear	0.00%	1.16%

Median Mid Growth Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-6.61%	10.82%

Small Growth Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	7.78%	89.88%
Failed to Outperform Bear	0.00%	2.34%

Median Small Growth Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-9.46%	8.31%

Large Value Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	0.00%	87.46%
Failed to Outperform Bear	0.00%	12.54%

Median Large Value Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-17.77%	5.33%

Mid Value Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	0.00%	92.04%
Failed to Outperform Bear	0.00%	7.96%

Median Mid Value Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-21.20%	8.65%

Small Value Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	0.00%	94.48%
Failed to Outperform Bear	0.00%	5.52%

Median Small Value Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-19.74%	9.82%

Large Blend Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	0.15%	95.22%
Failed to Outperform Bear	0.36%	4.26%

Median Large Blend Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-15.29%	6.46%

Mid Blend Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	0.16%	83.46%
Failed to Outperform Bear	0.16%	16.21%

Median Mid Blend Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-19.33%	8.69%

Small Blend Mutual Fund Performance in Different Market Conditions

	Outperformed Bull	Failed to Outperform Bull
Outperformed Bear	0.38%	89.10%
Failed to Outperform Bear	0.00%	10.52%

Median Small Blend Fund Gain (Loss) Compared to S&P 500 in Different Market Conditions

Bull	Bear
-16.79%	6.38%

The findings above indicate that in bear market conditions, there is a lot of potential value in all types of active mutual funds. In every possible type, funds overwhelmingly outperformed the S&P 500 in bear market conditions. Again, this analysis showed that out of all the types, growth funds were the most successful. Value and blend funds provided similar median gains to growth funds in bear markets; however, in bull markets, they underperformed far more than growth.

2.5 Annual Holdings Turnover

Annual holdings turnover is a financial metric that measures the percentage rate that a fund replaces its holdings every year. Typically, this measure is between 0 and 1, however, some very aggressive funds turn their total market cap over multiple times per year with the hope of beating the market. Funds that are considered active usually have an annual turnover rate of at least 30% and anything under this is considered more of a passive investment. It is important to consider annual holdings turnover because the more a mutual fund manager turns over stocks, the more trading fees, and short-term capital gains tax they must pay.

To analyze the different annual holdings turnover ratios, I calculated the median of each fund type and category. Additionally, to measure variability, I calculated the interquartile range (IQR). Both the median and IQR were used instead of the mean and standard deviation as this variable had a strong negative skewness. Finally, I also performed linear regression on this variable to explain the extent of its relation to fund returns. The calculations are listed in the tables and graphs below:

Median Annual Holdings Turnover Ratio (IQR) by fund Category and Type

	Large	Mid	Small
Growth	0.50 (0.46)	0.65 (0.51)	0.75 (0.49)
Value	0.69 (0.61)	0.71 (0.68)	0.75 (0.59)
Blend	0.69 (0.57)	0.87 (1.02)	0.74 (0.86)

One glaring finding from the table above is the difference of large growth to all the other funds. Not only did it have the smallest median annual turnover ratio, but it also was the least variable.

Linear Regression

Below is the equation used in regression analysis:

$$Y_i = \beta_0 + \beta_1 + \varepsilon$$

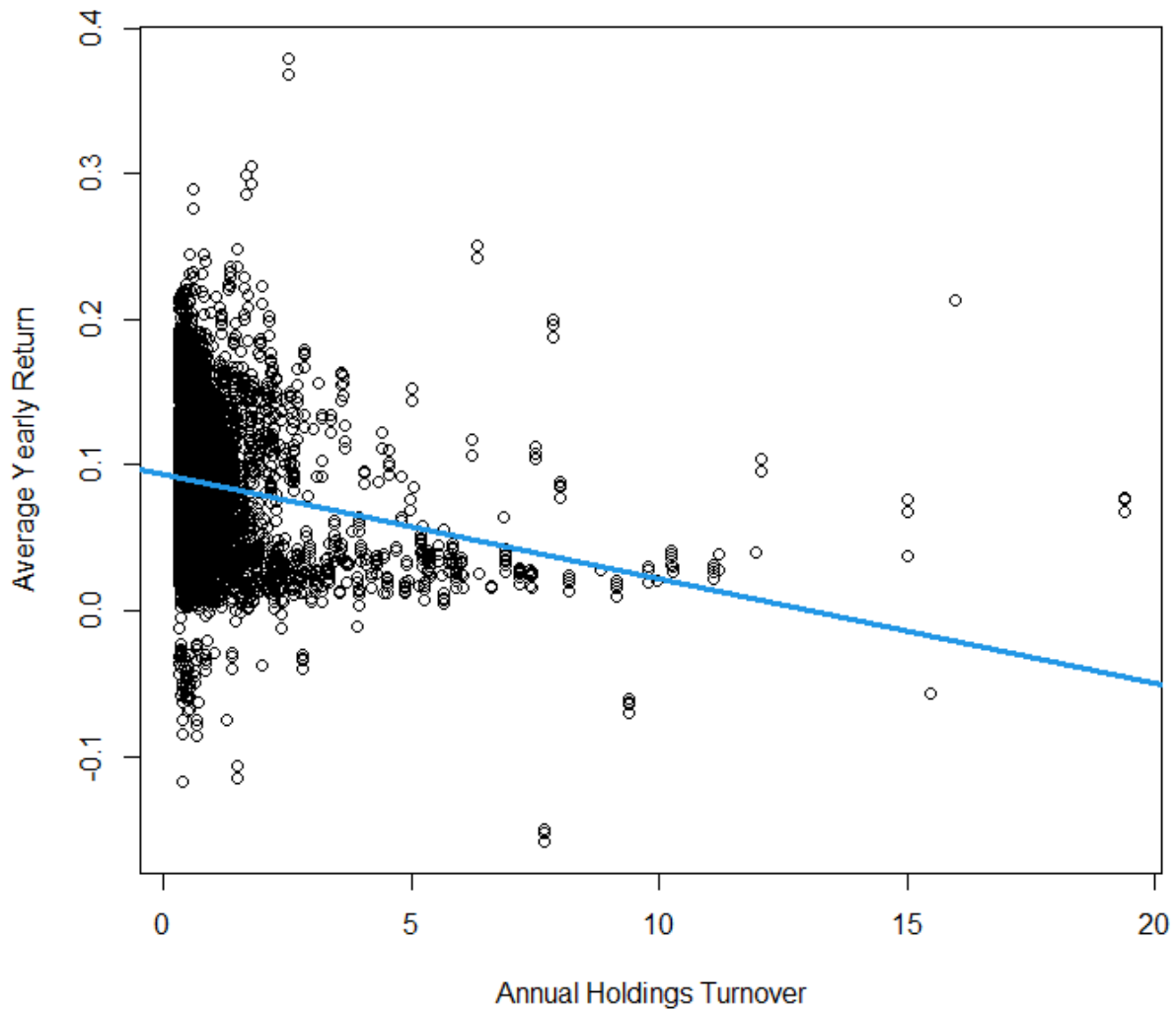
Below I analyzed three different response variables, fund returns in three, five, and ten-year time periods, and their relation to the explanatory variable, annual holdings turnover.

Linear Regression Results

Time Period	Ten Year	Five Year	Three Year
B ₁ Coefficient	-0.0072 ***	0.0078***	-0.0096***
Correlation Coefficient	-0.20	-0.21	-0.19

***shows significance at $\alpha = 0.01$

Annual Holdings Turnover vs Average Yearly Return over 10 Years



Based on the results above, annual holdings turnover was a significant explanatory variable in all periods. All three of the correlation coefficients were around -0.2, which indicates there is a moderate negative correlation between mutual fund returns and annual holdings turnover. These findings support the belief that passive management is superior to active management.

Section 3 Conclusion

At the start of this thesis, I mentioned a couple of questions individuals looking to invest must answer before choosing between active and passive investing. The first and most important: is the total market efficient? Past research on U.S. market efficiency indicates that it is, and the analysis in my thesis also supports this claim. Actively managed U.S. funds consistently underperform their passive counterparts, suggesting that there is no benefit to an active management style in the U.S. market.

Additionally, a person looking to invest must ask themselves what sectors of the market they want to invest in. Those looking to only invest in certain sectors may benefit from active management. Although active management underperformed overall, my analysis comparing bear and bull market returns suggest that there is a benefit to being more active during recessionary periods. I believe that the improved flexibility of actively managed funds is what leads to them doing better. I recommend that further research should be done to investigate how much more active these mutual funds become during bear markets and what sectors they tend to invest in.

Overall, I conclude that investors looking to maximize their potential gain long-term in the U.S. stock market should choose a passive investing approach. Throughout my analysis, passive investing proved to be far superior to active investing approaches. The one advantage found for active investing was in bear market conditions. All fund types moderately outperformed the S&P 500 during the 2007 to 2009 time period; however, in bull market conditions, they underperformed significantly. Furthermore, to gain the potential benefits of active investing, investors would need to know what

sectors of the market to invest in, and at what time. This is far easier said than done. To eliminate these factors, one is better off betting on the whole market in a passive investment management strategy.

References

- Cremers, Martijn, et al. "Indexing and Active Fund Management: International Evidence." *Journal of Financial Economics*, vol. 120, no. 3, 2016.
- Fama, Eugene F., and Kenneth R. French. "Luck versus Skill in the Cross-Section of Mutual Fund Returns." *The Journal of Finance*, vol. 65, no. 5, 2010.
- French, Kenneth R. "Presidential Address: The Cost of Active Investing." *The Journal of Finance*, vol. 63, no. 4, 2008.
- Cox, Christopher C., "A Comparison of Active and Passive Portfolio Management" (2017). Chancellor's Honors Program Projects.
https://trace.tennessee.edu/utk_chanhonoproj/2073
- Birla, Richa, "Determinants of the Success of Active vs. Passive Investment Strategy" (2012). Business/ Business Administration. 10.
https://scholarsarchive.library.albany.edu/honorscollege_business/10