Tilburg School of Economics and Management

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"Does the risk-adjusted performance of American actively managed equity ETFs outperform comparable passively managed ETFs and their benchmark?"

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Topic: Active vs passive management

Abstract

Many studies examine the performance of active and passive investing. However, there is no clear answer which of these strategies is performing better. This paper seeks to bring new evidence in this area by analysing the performance of actively and passively managed Exchange Traded Funds (ETFs) and to find whether there is a relationship between fund returns and fund flows. The results suggest that on average actively managed funds fail to outperform their benchmark and their passive pair by comparing gross returns and risk-adjusted returns and combining them with the standard deviations and betas result in a lower Sharpe and Treynor ratios. Furthermore, actively managed ETFs fail to deliver a positive and significant alpha in one factor and three factor pricing model is implying that managers do not possess superior skills nor market timing abilities. The results from the market timing regression have the same outcome. Finally, this study fails to find any significant relationship between fund returns and fund flows.

Key words: Active versus passive management, active ETFs, passive ETFs, risk-adjusted performance, rating performance, market timing

Table of contents

1. Introduction

There are two main approaches when it comes to investing funds. On the one hand there are actively managed portfolios, where the management of the fund is trying to outperform the market by continuously searching for opportunities and making changes in the structure of the portfolio. On the other hand, passively managed portfolios follow the market efficiency hypothesis (Basu, 1977) under which prices of securities in an efficient capital market always fully reflect all available information and therefore there is no other strategy that can outperform the market. Usually passive investing means long term investing.

In line with these views there is an ongoing debate over which strategy is better and behind both approaches stands a large volume of studies. However, the focus of my research project is on a particular part of funds - exchange traded funds (ETFs). Passive ETFs are securities designed to behave the same way as a specific index or collection of different securities. Contrarily, active ETFs can deviate from their initial passive pair in order to beat their benchmark and follow a specific objective.

My main purpose is to investigate whether actively managed ETFs outperform passively managed ETFs. This research differs from the paper by Rompotis (2013) which analyses the performance of ETFs, with a larger sample and a new estimator who examines the connection between returns and fund inflows and outflows. My incentive to get involved into this research area is the lack of new papers on this topic in the recent years and to find whether returns depend on fund flows.

The resulting main research question of this thesis is the following: *"Does the risk-adjusted performance of American actively managed equity ETFs outperform comparable passively managed ETFs and their benchmark?"*

The remainder of this study is organized as follows. Section 2 defines active and passive investing performance, the key characteristics of ETFs and the overall performance of active and passive ETFs. Section 3 states the hypothesis based on the existing literature. Section 4 describes the methodology used in analyzing the performance of the funds. Section 5 describes the data, presents the results and analyzes the findings. Section 6 discusses the limitation of this this thesis and the implications of the results. Finally, section 7 concludes.

2. Literature review

2.1 Active versus passive investing

There are two main approaches when it comes to investing funds. On the one hand there are actively managed portfolios, where the management of the fund is trying to outperform the market by continuously searching for opportunities and making changes in the structure of the portfolio. On the other hand, passively managed portfolios follow the market efficiency hypothesis (Basu, 1977) under which prices of securities in an efficient capital market always fully reflects all available information and therefore there is no other strategy that can outperform the market. In line with these approaches there is an ongoing debate over which strategy performs better.

There have been numerous studies to investigate whether actively managed funds do add value. For example, Ippolito (1989) analyses the performance of 143 mutual funds over a 20-year timespan. One of the key findings provide evidence that risk-adjusted performance of mutual funds, net of fees and expenses but with load charges, outperforms index funds.

Grinblatt and Titman (1989) employed a different assumption in the analysis which presumes that if managers have superior talent in investing they should also have higher fees. Implying the assumption results in comparing gross returns with the benchmark. The findings point that active investing does add value especially in aggressive-growth and growth strategies. Furthermore, both strategies give the highest abnormal profits although they have the highest expenses as well.

In contrast an extensive literature has been developed on passive management performance. For instance, Jensen (1968) analyzed the performance of 115 mutual funds. Essentially the author hopes to find connection between market predictability and buy and hold the market policy. As a result, funds underperform on average, with or without accounting for fees and expenses.

Blake, Elton and Gruber (1993) have driven the debate further by focusing on bond mutual fund performance. The research proves that mutual fund performance is lacking behind to the corresponding index and the absence of strong evidence of price predictability when using past

returns. In addition, one percentage point increase in expenses leads to the same decrease in returns.

The presented study by Malkiel (1995) confirmed the findings about actively managed funds not delivering positive returns on risk adjusted base and suggest investments in low cost funds. Moreover, the realized persistence in returns is a cause of survivorship bias.

Gruber (1996) work on this subject ties well with previous studies. The analysis found no superior returns of actively managed mutual funds, compared to their benchmarks and corresponding passive fund. In addition, the partly predictable performance is explained as sophisticated investors who is going to react on information about the net asset value.

Carhart (1997) research finds no evidence of superior investment skills in the management of mutual funds. The reason which explains returns are common factors in stock returns, fees and expenses. Although the model is not able to clarify on the strong underperformance of the worst performing funds.

A more recent study by French (2008) analyzes the cost savings of a passive investment in comparison to an active one. The findings suggest passive investment increases annual returns by 67 basis points, under reasonable assumptions.

In a work presented by Wermers, R., & Jones, R. W. (2011) they conclude that risk adjusted returns, across time and managers, averages close to zero, net of fees and other expenses.

My study is going to focus now on Exchange Traded Fund (ETF) performance and later is going to return to a specific part of active and passive management.

2.2 Key characteristics and performance of ETFs

An exchange traded fund is a collection of securities that try to duplicate an index (passive ETF) or to follow an objective (active ETF). The creation of new ETF requires several steps. In the first one, the sponsor, usually investment bank or fund, decides what is going to be the structure of the fund and what securities to include. The sponsor hands in the required documents to the regulatory body (Security exchange commission) to approve the creation of the fund. In the next step, the new fund enlists the Authorized Participants, which are institutional investors or market makers. They are going to deposit the creation basket, which is a bundle of securities

and cash in return for shares. Now the Authorized Participant have the shares and chooses whether to sell or to hold them.

In the opposite case where the sponsor decides to redeem part of the shares or to liquidate the ETF, the reverse process begins. The sponsor creates a redemption basket which replicates the ETF and the position is going to be closed after the Authorized Participant returns the shares.

The following section presents a literature review on passive ETF performance and comparison with Passive Index funds.

In another work related to this subject Poterba and Shoven (2002) analyze before tax and after tax returns of the SPDR (one of the first ETFs) and the Vanguard Index mutual fund. The results recognized similar returns to S&P 500.

Gastineau (2004) further explores the performance of passive funds. The research shows that ETFs underperform on average if compared to an index funds pair. Explanation for this performance is non-reinvestment of dividends and the strong mirroring policy.

In addition, Rompotis (2008) found that ETFs and corresponding Index fund does not have statistically significant differences in return or risk. Moreover, ETFs have higher tracking error which again is not significant.

2.3 Active ETFs versus passive ETFs

The debate between active and passive ETFs management is rather one sided and relatively recent. The first active ETF was available to buy in the middle of 2008 and was an unattractive instrument until few years later when it started to gain popularity.

One of the first academic papers which evaluated the returns of active ETFs was done by Rompotis (2011a) where he used the S&P 500 index as a benchmark. As a result, active ETFs underperformed the index.

Rompotis (2011b) made a further progress to explore active ETFs and analysed the performance with their benchmark and with a passive ETF pair. The results were in the same context as actively managed ETFs failed to outperform again. The same conclusions were made in a later paper (Rompotis 2013).

Schizas (2014) continued the work on this topic. In short he found that active ETFs underperform their passive pair and have a higher volatility.

Rompotis (2015) used a different methodology in his recent paper where he discovered that the risk adjusted returns do not add value on average. Although, active ETFs are less risky than the corresponding indexes. Furthermore, managers of active ETFs are less aggressive when it comes to decision making.

In contrast Garyn-Tal build an investment strategy on R squared in active ETFs. He used a four factor model to analyze the strategy and identified positive risk adjusted returns.

3. Hypothesis development

The objective of actively managed fund is to beat the market or in other words to deliver a positive alpha. If the market is efficient Fama (1965) and the ETFs are well priced, then every portfolio should have an alpha no different than zero. Thus I believe that the funds which are going to be analysed in my research are not going to deliver a statistically significant alpha, as well as their passive pair. It is a reasonable assumption for the passive pair because it mimics the market but the active funds should have one because they try to gain excess returns. In conclusion my first hypothesis is:

Hypothesis 1: Actively and passively managed ETFs are not going to have a statistically significant alpha.

Risk-adjusted return is a perfect measure of fund performance because it comes net of fees and expenses. In line with Hypothesis 1 this is going to result in that actively managed ETFs should make riskier investments to compensate for the higher fees and expenses in comparison to the passive ones. This is going to lead to higher volatility and higher beta and with riskier strategies active ETFs would not be able to outperform their benchmark. As a result, my second hypothesis is:

Hypothesis 2: Risk adjusted returns of actively managed ETFs are going to underperform their corresponding passively managed ETF.

- *Hypothesis 2a: The Sharpe ratio is going to be higher for passive ETFs than to active ETFs.*

- *Hypothesis 2b: The Treynor ratio is going to be higher for passive ETFs than to active ETFs.*

Market timing ability can be considered as an essential skill for active managers as they try to gain profit from market movements. However, many research papers provide evidence for the absence of such skills. For example, Rompotis (2011b) analysed the performance of active and passive ETFs and confirmed that both funds do not possess positive market timing ability. Therefore, my forth hypothesis is as follows:

Hypothesis 3: The market timing ability of actively managed ETFs is going to be negative.

4. Methodology

4.1 Risk-Adjusted performance

- To measure the ability of managers to outperform the market I use the risk adjusted returns to apply them into the Jensen`s alpha model:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_i\left(R_{m,t} - R_{f,t}\right) + \varepsilon_{i,t}$$

Where $R_{p,i}$ denotes the weekly fund returns adjusted with fees, expenses and dividends for passive and active ETF i. R_m is the market risk premium which is value-weighted average of weekly returns from NYSE, NASDAQ and AMEX composite indexes. The R_f is the risk free rate is computed as the weekly returns on a 1 month Treasury bill rate. Both the Market risk premium and Risk free rate are taken from the site of Kenneth French with link in the appendix. The coefficient $\alpha_{p,i}$ measures the stock selection ability of managers and the market timing as well. If alpha is positive, it means that a manager possesses superior management skills and he is able to beat the market. On the contrary, if alpha is negative it means that the managers' performance is worse than the market performance. The coefficient $\beta_{p,i}$ measures the systematic risk of the ETF and evaluates how sensitive is the fund to market movements. Finally $\varepsilon_{p,i}$ represents the residuals of the regression.

- For the second model I use the Fama and French three factor model described below:

$$R_{p,i} - R_{f,t} = \alpha_i + \beta_i\left(R_{m,t} - R_{f,t}\right) + s_i(SMB) + h_i(HML) + \varepsilon_{p,i}$$

Where $R_{p,i}$, R_m, R_f, and $\varepsilon_{p,i}$ are defined as above.

SMB is the size premium or small market capitalization minus big market capitalization stocks. Furthermore, HML is the value premium or high book to price ratio minus ow book to price ratio stocks. Both of them measure the historic excess returns. The coefficient $s_{p,i}$ represents the loading for the average excess return on portfolios with small market capitalization stocks over big market capitalization stocks. The $h_{p,i}$ coefficient shows the loading for the average excess return on portfolios with growth stocks over value stocks. Again, SMB and HML variable found on the website of Kenneth French.

- I would like to expand the Fama and French three factor model by adding the weekly change in outstanding shares.

$$R_{p,i} - R_f = \alpha_{p,i} + \beta_{p,i}(R_m - R_f) + s_{p,i}(SMB) + h_{p,i}(HML) + \delta_{p,i}(\Delta Shares) + \varepsilon_{p,i}$$

Where $R_{p,i}$, R_m, R_f, SMB, HML and $\varepsilon_{p,i}$ are defined as above. $\Delta Shares$ represents the weekly change in outstanding shares and stands like a proxy for fund inflows and outflows. I chose outstanding shares as a proxy because ETFs have to follow an objective or an index. In order to keep the price from fluctuating the ETF have to issue more shares when there is a high demand or to liquidate share when there is high supply. The coefficient $\delta_{p,i}$ measures the relationship between ETF returns and shares outstanding.

4.2 Rating performance

- Comparison of the risk-adjusted returns of the ETFs over the examined period.

- Sharpe ratio – measure of accumulated excess returns to the risk.

$$SR_{p,i} = \frac{\bar{R}_{p,i} - \bar{R}_f}{\sigma_{p,i}}$$

Where $\bar{R}_{p,i}$ stands for average net of fees weekly returns of the ETFs, $\bar{R}_f$ is average weekly risk free rate and $\sigma_{p,i}$ is the standard deviation of the ETFs return. Higher Sharpe ratio means better performance of the ETFs.

- Treynor ratio:

$$T_{p,i} = \frac{\bar{R}_{p,i} - \bar{R}_f}{\beta_{p,i}}$$

Where $\bar{R}_{p,i}$, $\bar{R}_f$ are defined like above and $\beta_{p,i}$ is the systematic risk of ETFs. Repeatedly, higher Treynor ratio is a sign of better performance.

4.3 Market timing ability

- In order to test the market timing ability of ETFs I use the Treynor and Mazuy model.

$$R_{p,i} - R_f = \alpha_{p,i} + \beta_{p,i}(R_m - R_f) + \gamma_{p,i}(R_m - R_f)^2 + \varepsilon_{p,i}$$

Where $R_{p,i}$, R_m and R_f are the same as above. The coefficient $\gamma_{p,i}$ measures the curvature of the regression line. If $\gamma_{p,i}$ is positive the estimated equation describes a convex upward-sloping regression line that would indicate the successful managerial investment strategy.

I want to note that passive ETFs should not have positive alpha nor market timing ability because they try to mimic the market however I am going to analyse their performance in order to see how well they pursue their benchmark.

4.4 Assumptions

I use the Ordinary Least Square (OLS) approach for all the regressions above. In order to use this approach, I have to apply the Gauss-Markov assumptions for the OLS estimators which are required for interpreting the results. Under those assumptions the OLS estimators are the Best Linear Unbiased Estimators (BLUE).

I exploit time-series variation on returns. The fundamental assumptions of linearity, stationarity and weekly dependence are going to be tested by using the Dicky Fuller test and by plotting the residuals of the regressions. Because of the nature of data, heteroscedasticity can occur and if that happens I am going to use robust standard errors. Furthermore, in some of the regressions it is possible to find autocorrelation which leads to even more biased standard errors. In order to have unbiased standard errors I am going to use the Newey West method. In this way I believe that the estimators are going to be truly the best fit to the model. Finally, I use panel data regression with fixed effects to ensure that heteroscedasticity and autocorrelation are not

going to occur. The reason of doing this is to get a complete picture of the relationship between the returns and the analysed factors.

5. Data, descriptive statistics and results from the analysis

5.1 Data

The sample I use consists of two types of U.S. issued ETFs. On the one hand there are active ETFs and on the other hand, I have picked passive ETFs with similar characteristics to the active ones like asset classes, asset size, sector and region all which have at least 5-year history. As a result, I have gathered information about 12 active and 12 passive ETFs from the period 02.04.2014-27.03.2019. I chose to download the historical prices and expense ratios from yahoo finance (link in the appendix) for his high reliability and proven quality, except for 1 (ETF fund ticker DBLV from NASDAQ). Furthermore, I downloaded the Kenneth French market risk premium, size premium and value premium from his site (link in the appendix). I chose K. French data for my research as for his contribution to finance theory and the accessibility of the data. I got the data for fund inflows and outflows proxy for DataStream from where I could get all types of specific fund characteristics.

Table 1 presents short description of the ETFs which are going to be analyzed in the following sections.

Table 1 – Description of ETFs

The table below presents ETF names, ticker, type of assets, active since, expense ratios (net), average volume and net assets (10.07.2019). All of the data is from yahoo finance.

Active ETF name	Ticker	Type	Active since	Expense ratio	Average volume	Net assets
First Trust North American Energy Infrastructure Fund	EMLP	Equity	20.06.2012	0.95%	384,57	2.51b
Strategy Shares U.S. Market Rotation Strategy ETF	HUSE	Equity	23.07.2012	1.13%	61,822	125.79m
AdvisorShares Ranger Equity Bear ETF	HDGE	Inverse Equity	26.01.2011	2.72%	323,914	135.79m
First Trust BuyWrite Income ETF	FTHI	Equity	06.01.2014	0.85%	12,311	68.83m
AdvisorShares DoubleLine Value Equity ETF	DBLV	Equity	04.10.2011	0.96%	2,196	61.39m
Invesco Active U.S. Real Estate ETF	PSR	Equity	20.11.2008	0.35%	9,469	67.43m
SPDR MFS Systematic Core Equity ETF	SYE	Equity	08.01.2014	0.60%	4,916	39.1m
Invesco S&P 500 Downside Hedged ETF	PHDG	Equity	05.12.2012	0.39%	3,651	37.99m
WisdomTree U.S. Quality Shareholder Yield Fund	QSY	Equity	23.02.2007	0.38%	999	39.02m
SPDR MFS Systematic Growth Equity ETF	SYG	Equity	08.01.2014	0.61%	1,014	34.36m
SPDR MFS Systematic Value Equity ETF	SYV	Equity	08.01.2014	0.60%	2,785	33.76m
First Trust Hedged BuyWrite Income ETF	FTLB	Equity	06.01.2014	0.85%	1,57	8.89m
Mean				0.87%		
Passive ETF name						
Global X MLP ETF	MLPA	Equity	18.04.2012	0.45%	610,485	915.83m
iShares Select Divident ETF	DVY	Equity	03.11.2003	0.39%	435,617	16.38b
ProShares Short Midcap 400	MYY	Inverse Equity	19.06.2006	0.95%	7,850	10.38m
SPHB Invesco S&P 500® High Beta ETF	SPHB	Equity	05.05.2011	0.25%	233,359	158.29m
VONV Vanguard Russell 1000 Value ETF	VONV	Equity	20.09.2010	0.12%	65,308	3.85b
iShares U.S. Real Estate ETF	IYR	Equity	12.06.2000	0.43%	6,915,096	4.71b
Vanguard Value ETF	VTV	Equity	26.01.2004	0.04%	1,229,066	80.26b
SPLV Invesco S&P 500® Low Volatility ETF	SPLV	Equity	05.05.2011	0.25%	2,818,525	11.6b
iShares Edge MSCI USA Size Factor ETF	SIZE	Equity	16.04.2013	0.15%	33,004	382.29m
iShares Russell 1000 Growth ETF	IWF	Equity	22.05.2000	0.20%	1,551,508	48.65b
QDYN FlexShares Quality Dividend Dynamic Index Fund	IWD	Equity	22.05.2000	0.20%	1,674,459	43.83b
ONEQ Fidelity NASDAQ Composite Index Track	ONEQ	Equity	25.09.2003	0.21%	43,211	2.08b
Mean				0.30%		

5.2 Descriptive statistics

Table 2a and table 2b are describing the key characteristics of the ETFs.

Table 2a – Descriptive statistics for active ETFs.

The table presents the mean, standard deviation, median, minimum and maximum of active ETFs weekly return and the number of observations for each fund.

Ticker	Mean	St.Dev	Median	min	max	N
EMLP	0.051%	2.18%	0.216%	-7.66%	7.4%	261
HUSE	0.004%	1.95%	0.186%	-10.62%	6.1%	261
HDGE	-0.178%	2.36%	-0.452%	-6.57%	11.88%	261
FTHI	0.042%	1.8%	0.098%	-9.9%	9.23%	261
DBLV	0.09%	1.91%	0.193%	-11.13%	5.67%	261
PSR	0.189%	1.88%	0.377%	-8.168%	5.52%	261
SYE	0.467%	2.27%	0.529%	-12.12%	14.24%	261
PHDG	0.037%	1.12%	0.118%	-4.24%	3.61%	261
QSY	0.141%	1.92%	0.243%	-9.35%	8.04%	261
SYG	0.208%	1.96%	0.467%	-9.44%	4.99%	261
SYV	0.171%	2.07%	0.285%	-14.42%	7.93%	261
FTLB	0.101%	1.59%	0.204%	-7.5%	4.93%	261
Mean	0.11%	1.92%	0.21%	9.26%	7.46%	261

Table 2b – Descriptive statistics for passive ETFs.

The table presents the mean, standard deviation, median, minimum and maximum of passive ETFs weekly return and the number of observations for each fund.

Ticker	Mean	St.Dev	Median	min	max	N
MLPA	-0.11%	3.97%	0.108%	-32.6%	14.32%	261
DVY	0.108%	1.5%	0.21%	-6.36%	3.95%	261
MYY	-0.173%	1.98%	-.042%	-5.49%	10.03%	261
SPHB	0.115%	2.98%	0.411%	-18.04%	8.29%	261
VONV	0.128%	1.71%	0.28%	-9.44%	4.36%	261
IYR	0.167%	1.95%	0.324%	-10.38%	4.71%	261
VTV	0.159%	1.71%	0.299%	-9.19%	4.23%	261
SPLV	0.205%	1.35%	0.182%	-6.22%	3.57%	261
SIZE	0.21%	1.76%	0.32%	-8.58%	10.16%	261
IWF	0.223%	1.92%	0.452%	-9.34%	4.63%	261
IWD	0.197%	2.12%	0.478%	-9.34%	6.3%	261
ODEQ	0.184%	2.17%	0.483%	-9.34%	6.75%	261
Mean	0.12%	2.09%	0.29%	-11.9%	6.78%	261

As a result of the data shown above, it is evident that on first sight passively managed funds outperform on average their active pair with 0.01% on weekly basis. However actively managed fund tend to be less risky (standard deviation) on average by 0.1%. Finally, it is important to note that from table 1 passively managed funds are less expensive on average 0.30% compared to the active ones 0.87%

5.3 Results from regression analysis

In this section I present the results of risk-adjusted performance, rating performance and market timing ability of actively and passively managed funds.

The results of the first measure of risk-adjusted performance are presented in table 2.

Table 2. Single factor model, Regression results

This table represents the results from a single factor pricing model. The excess weekly return (return minus risk free rate) has been adjusted from fees and expenses and regressed on the market risk premium. Beta accounts for the systematic risk. Alpha is the coefficient of the regression and measures the market timing ability of the funds and the stock selection ability. Bellow all variables are standard errors. R squared measures the explanatory power of the regression. All funds have 261 observations (2014-2019).

Active Ticker	Alpha	Beta	R squared	Passive Ticker	Alpha	Beta	R squared
EMLP	-0.105 (-0.097)	0.761*** (0.1)	0,3773	MLPA	-0.345* (0.18)	1.187*** (0.273)	0.2768
HUSE	-0.162 (0.066)	0.816*** (0.056)	0.5406	DVY	-0.039 (0.044)	0.714*** (0.046)	0.6966
HDGE	0.022 (0.08)	-1.14*** (0.064)	0.7236	MYY	0.01 (0.043)	-1.046*** (0.043)	0.8594
FTHI	-0.119*** (0.039)	0.792*** (0.072)	0.596	SPHB	-0.188 (0.084)	1.547*** (0.079)	0.8305
DBLV	-0.062 (0.056)	0.742*** (0.084)	0.4653	VONV	-0.058* (0.034)	0.922*** (0.042)	0.8941
PSR	0.091 (0.106)	0.454*** (0.06)	0.18	IYR	0.048 (0.112)	0.563*** (0.093)	0.258
SYE	0.091*** (0.121)	0.687*** (0.325)	0.282	VTV	-0.028 (0.032)	0.927*** (0.036)	0.9058
PHDG	-0.053 (0.053)	0.412*** (0.03)	0.419	SPLV	0.079 (0.055)	0.606*** (0.046)	0.626
QSY	-0.049 (0.046)	0.942*** (0.07)	0.7427	SIZE	0.044 (0.059)	0.814*** (0.054)	0.6634
SYG	0.051 (0.06)	0.937*** (0.02)	0.7042	IWF	0.013 (0.033)	1.051*** (0.036)	0.924

SYV	0.083 (0.072)	0.838*** (0.001)	0.5044	IWD	0.017 (0.094)	0.891*** (0.071)	0.546
FTLB	-0.035 (0.042)	0.652*** (0.044)	0.5185	ODEQ	0.003 (0.097)	0.897*** (0.071)	0.529
Panel regression	0.001 (0.03)	0.574*** (0.017)	0.2678	Panel regression	-0.037 (0.032)	0.756*** (0.018)	0.3625

**** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

The single factor pricing model fails to prove any significant excess return on average. The average alpha estimator is insignificant for both ETFs which is in favor of the market efficient hypothesis and in line with *Hypothesis 1*. In other words, this mean the U.S. market is efficient and investors have low or no chance to make superior returns. Furthermore, managers do not show any evidence on average of their selective abilities. The overall ETFs follow the market returns which is reasonable and expectable for passive ETFs however active ETFs should have positive and significant alphas as they try to beat the market. As a result, this is a bad sign for active ETF managers as they fail to justify the higher fees and perform worse than their benchmark.

The systematic risk represented by the beta and for all funds is statistically significant at the 1% level. On average passively managed funds have higher betas (0.574) in comparison to active ones (0.756) which suggest that active funds are more conservative in their investment decisions. This means that managers do not want to invest in securities with high volatility and do not want to bear more risk. Overall this may be the result of the uncertainty on the financial markets and the absence of strong growth and stability after the crisis.

The next tables present the results of a three factor pricing model.

Table 3a – active, Three factor pricing model, Regression results

This table presents results form a three factor pricing model. The weekly excess returns have been adjusted net of fees and expenses and then regressed on the beta (market risk premium), SMB variable (small minus big market capitalization) and HML (high book to price ratio minus low book to price ratio). Standard errors are below all variables. The R squared is the explanatory power of the regression. All funds have 261 observations (2014-2019).

Active Ticker	Alpha	Beta	SMB	HML	R squared
EMLP	-0.087	0.795***	-0.085	0.323***	0.409
	(0.097)	(0.094)	(0.094)	(0.118)	
HUSE	-0.176***	0.829***	-0.099	-0.093	0.5463
	(0.067)	(0.061)	(0.067)	(0.068)	
HDGE	-0.02	-1.069***	-0.47***	-0.213***	0.7817
	(0.072)	(0.063)	(0.05)	(0.064)	
FTHI	-0.103**	0.798***	0.026	0.189***	0.6101
	(0.039)	(0.077)	(0.06)	(0.058)	
DBLV	-0.033	0.737***	0.11	0.279***	0.495
	(0.055)	(0.083)	(0.09)	(0.078)	
PSR	0.088	0.453***	-0.006	-0.037	0.181
	(0.115)	(0.099)	(0.096)	(0.108)	
SYE	0.334***	0.648***	0.188	-0.067	0.2927
	(0.123)	(0.106)	(0.147)	(0.066)	
PHDG	-0.05	0.419***	-0.019	0.059	0.423
	(0.057)	(0.06)	(0.058)	(0.053)	
QSY	-0.038	0.964***	-0.06	0.199***	0.7586
	(0.047)	(0.068)	(0.066)	(0.046)	
SYG	0.003	0.935***	-0.044	-0.181***	0.7131
	(0.06)	(0.059)	(0.069)	(0.047)	
SYV	0.024	0.85***	0.02	0.294***	0.53
	(0.072)	(0.09)	(0.091)	(0.08)	
FTLB	-0.018	0.646***	0.078	0.146**	0.5314
	(0.042	(0.048	(0.071	(0.065	
Panel regression	0.005	0.584***	-0.031	0.074***	0.27
	(0.03)	(0.018)	(0.026)	(0.026)	

*** *Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

Table 3b – passive, Three factor pricing model, Regression results

This table presents results form a three factor pricing model. The weekly excess returns have been adjusted net of fees and expenses and then regressed on the beta (market risk premium), SMB variable (small minus big market capitalization) and HML (high book to price ratio minus low book to price ratio). Standard errors are below all variables. The R squared is the explanatory power of the regression. All funds have 261 observations (2014-2019).

Passive Ticker	Alpha	Beta	SMB	HML	R squared
MLPA	-0.29	1.213***	0.064	0.672***	0.3134
	(0.182)	(0.285)	(0.166)	(0.235)	
DVY	-0.023	0.73***	-0.02	0.232***	0.728
	(0.051)	(0.041)	(0.043)	(0.044)	
MYY	-0.035	-0.988***	-0.383***	-0.223***	0.9189
	(0.032)	(0.041)	(0.037)	(0.033)	
SPHB	-0.134*	1.525***	0.256***	0.471***	0.8692
	(0.076)	(0.082)	(0.054)	(0.069)	
VONV	-0.038	0.95***	-0.057**	0.313***	0.9398
	(0.031)	(0.036)	(0.023)	(0.026)	
IYR	0.04	0.56***	-0.015	-0.097	0.261
	(0.114)	(0.101)	(0.095)	(0.101)	
VTV	-0.018	0.968***	-0.14***	0.268***	0.9491
	(0.028)	(0.032)	(0.019)	(0.026)	
SPLV	0.061	0.646***	-0.225***	-0.017	0.6623
	(0.052)	(0.045)	(0.04)	(0.048)	
SIZE	0.051	0.815***	0.018	0.071	0.6655
	(0.058)	(0.057)	(0.045)	(0.053)	
IWF	-0.019	1.059***	-0.132***	-0.298***	0.9589
	(0.029)	(0.034)	(0.019)	(0.023)	
IWD	-0.006	0.879***	-0.02	-0.292***	0.571
	(0.093)	(0.085)	(0.11)	(0.053)	
ODEQ	-0.022	0.888***	-0.04	-0.297***	0.552
	(0.097	(0.086	(0.115	(0.055	
Panel regression	-0.036	0.77***	-0.057**	0.066**	0.366
	(-0.36)	(0.019)	(-0.058)	(0.028)	

**** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

The analysis shows similar results with the single factor pricing model in respect to alpha and systematic risk. Again there is no evidence of superior management skills or good market timing (insignificant alpha) which supports *Hypothesis 1*. The beta coefficient of the active ones is still less than the passive ones which suggest conservative investment decisions. However, there is strong relationship between the performance of the ETFs and the three factor Fama-French model. On the one hand the value factor is positive and statistically significant at 1% level for the active ETFs which implies that on average active ETFs invest more in value companies or indexes rather than in growth companies or indexes. This is another sign of taking less risky investment decisions as value companies are safer than growth companies. On the other hand, passive ETFs have a negative 5% significant level in size factor which implies that on average the analysed passive funds follow indexes with negative size exposure. In other words, the indexes follow large cap stocks rather than small cap stocks. Furthermore, there is positive significant relationship at 1% level with the value factor. Again this indicates that on average the analysed funds tend to follow indexes with positive value exposure. As a result, the Fama-French three factor model gives higher explanatory power to the analysis uncovering the specific investment strategy of the funds.

Tables 4a and 4b presents the regression results of adding change of shares to the model.

Table 4a, Three factor pricing model and net change in issued and redeemed shares, Regression results

This table presents results form a three factor pricing model for active ETFs. The weekly excess returns have been adjusted net of fees and expenses and then regressed on the beta (market risk premium), SMB variable (small minus big market capitalization), HML (high book to price ratio minus low book to price ratio) and change in shares, used as a proxy for fund inflows and outflows. Standard errors are below all variables. The R squared is the explanatory power of the regression. All funds have 261 observations (2014-2019).

Active						
Ticker	Alpha	Beta	smb	hml	shares	R squared
EMLP	-0.083	0.795***	-0.086	0.325***	-0.006	0.409
	(0.101)	(0.095)	(0.094)	(0.119)	(0.032)	
HUSE	-0.182***	0.831***	-0.1	-0.093	0.002	0.5476
	(0.067)	(0.061)	(0.067)	(0.068)	(0.001)	
HDGE	-0.019	-1.08***	-0.485***	-0.211***	-0.039	0.7835
	(0.07)	(0.059)	(0.06)	(0.064)	(0.037)	
FTHI	-0.1***	0.798***	0.022	0.19***	-0.001	0.6109
	(0.04)	(0.078)	(0.06)	(0.059)	(0)	

DBLV	-0.027	0.735***	0.109	0.282***	0.017	0.4962
	(0.055)	(0.083)	(0.09)	(0.077)	(0.017)	
PSR	0.085	0.453***	-0.008	-0.035	-0.019	0.182
	(0.115)	(0.099)	(0.096)	(0.109)	(0.013)	
SYE	0.347***	0.648***	0.185	-0.066	-0.012	0.2962
	(0.123)	(0.104)	(0.147)	(0.065)	(0.011)	
PHDG	-0.049	0.419***	-0.019	0.058	0.003	0.4233
	(0.058)	(0.06)	(0.058)	(0.053)	(0.006)	
QSY	-0.04	0.963***	-0.063	0.198***	0.004*	0.759
	(0.048)	(0.068)	(0.067)	(0.046)	(0.002)	
SYG	0.003	0.935***	-0.047***	-0.179	0.003	0.7125
	(0.059)	(0.06)	(0.069)	(0.046)	(0.004)	
SYV	0.024	0.85***	0.02	0.294***	0.001	0.53
	(0.072)	(0.09)	(0.092)	(0.08)	(0.002)	
FTLB	-0.015	0.646***	0.078	0.148**	-0.003	0.5318
	(0.043)	(0.049)	(0.07)1	(0.065)	(0.002)	
Panel regression	0.006 (0.03)	0.584*** (0.018)	-0.032 (0.026)	0.076 (0.026)	0 (0)	0.272

*** *Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

Table 4b, Three factor pricing model and net change in issued and redeemed shares, Regression results

This table presents results form a three factor pricing model for passive ETFs. The weekly excess returns have been adjusted net of fees and expenses and then regressed on the beta (market risk premium), SMB variable (small minus big market capitalization), HML (high book to price ratio minus low book to price ratio) and change in shares, used as a proxy for fund inflows and outflows. Standard errors are below all variables. The R squared is the explanatory power of the regression. All funds have 261 observations (2014-2019).

Passive Ticker	Alpha	Beta	smb	hml	shares	R squared
MLPA	-0.429	1.217***	0.062	0.672***	0.156	0.3159
	(0.272)	(0.287)	(0.166)	(0.234)	(0.145)	
DVY	-0.021	0.73***	-0.019	0.232***	-0.002	0.728
	(0.052)	(0.041)	(0.043)	(0.044)	(0.011)	
MYY	-0.034	-0.987***	-0.383***	-0.222***	-0.001	0.9183
	(0.031)	(0.042)	(0.037)	(0.034)	(0.001)	

SPHB	-0.138*	1.528***	0.253***	0.467***	0.003	0.869
	(0.077)	(0.083)	(0.055)	(0.068)	(0.004)	
VONV	-0.037	0.95***	-0.056**	0.313***	-0.002	0.9398
	(0.031)	(0.036)	(0.023)	(0.026)	(0.002)	
IYR	0.041	0.559***	-0.011	-0.1	-0.009	0.2615
	(0.114)	(0.101)	(0.097)	(0.101)	(0.018)	
VTV	-0.034	0.967***	-0.138***	0.268***	0.044**	0.9497
	(0.032)	(0.032)	(0.019)	(0.026)	(0.018)	
SPLV	0.06	0.646***	-0.224***	-0.015	0.012	0.6624
	(0.052)	(0.046)	(0.04)	(0.048)	(0.036)	
SIZE	0.05	0.815***	0.019	0.07	0	0.6655
	(0.058)	(0.057)	(0.046)	(0.055)	(0)	
IWF	-0.021	1.06***	-0.139***	-0.293***	0.082	0.9595
	(0.03)	(0.035)	(0.024)	(0.026)	(0.074)	
IWD	-0.015	0.879***	-0.021	-0.296***	0.063)	0.571
	(0.097)	(0.085)	(0.111)	(0.052)	(0.145)	
ODEQ	0.057	0.904***	-0.041	-0.278***	-0.189**	0.568
	(0.102)	(0.086)	(0.117)	(0.056)	(0.086)	
Panel regression	-0.036	0.77***	-0.058***	0.067***	0	
	(0.032)	(0.019)	(0.028)	(0.028)	(0)	0.366

*** *Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

Analyzing the data from the new regression it is easy to notice that the alphas, betas, smb and hml coefficients have changed slightly when adding the net change in shares variable. Furthermore, the explanatory power has hardly improved and the coefficient of net change in shares is insignificant. As a result, this thesis fails to find on average any significant relationship between ETFs return and fund inflows and outflows.

5.4 Rating performance

As mentioned above the rating performance is going to be evaluated on risk-adjusted returns, standard deviation, Sharpe ratio and Treynor ratio. Table 5 summarizes the results.

Table 5, Summary of rating performance

This table presents results of the average weekly risk adjusted performance and standard deviation of actively and passively managed ETFs. Betas are taken from the Fama-French three factor pricing model. The Sharpe ratio, calculated as risk-adjusted returns, divided by their standard deviation. Treynor ratio, calculated as risk-adjusted performance, divided by their beta.

Active Ticker	Adj return	Standard deviation	Beta	Sharpe ratio	Treynor Ratio	Passive Ticker	Adj return	Standard deviation	Beta	Sharpe	Treynor ratio
EMLP	0.038	2.177	0.795	0.017	0.047	EMLP	-0.123	3.966	1.217	-0.031	-0.101
HUSE	-0.012	1.951	0.831	-0.006	-0.014	EMLP	0.084	1.506	0.730	0.056	0.116
HDGE	-0.191	2.376	-1.080	-0.080	0.177	MYY	-0.182	1.990	-0.987	-0.092	0.185
FTHI	0.027	1.830	0.798	0.015	0.033	SPHB	0.087	3.018	1.544	0.029	0.056
DBLV	0.058	1.933	0.735	0.030	0.079	VONV	0.091	1.742	0.950	0.052	0.096
PSR	0.123	2.121	0.850	0.058	0.145	IYR	0.120	1.995	0.559	0.060	0.214
SYE	0.268	2.013	0.648	0.133	0.413	VTV	0.122	1.762	0.967	0.069	0.126
PHDG	0.010	1.133	0.648	0.009	0.015	SPLV	0.170	1.369	0.646	0.124	0.262
QSY	0.112	1.967	0.963	0.057	0.116	SIZE	0.171	1.820	0.815	0.094	0.209
SYG	0.186	2.004	0.935	0.093	0.199	IWF	0.186	1.990	1.060	0.093	0.175
SYV	0.144	2.133	0.850	0.068	0.170	IWD	0.184	1.993	0.879	0.092	0.209
FTLB	0.069	1.651	0.646	0.042	0.108	ODEQ	0.174	2.040	0.904	0.085	0.192
Mean	0.069	1.941	0.635	0.036	0.124	Mean	0.090	2.099	0.774	0.053	0.145

The first notable thing from the table is that the risk-adjusted performance on average of the actively managed ETFs is 0.021% lower on weekly basis than the passive ones. Furthermore, the standard deviation is lower as well making the active funds riskier. This leads to a higher Sharpe ratio on average for the passive ETFs or in other words, passive ETFs have better return-risk tradeoff. This is in support of *Hypothesis 2a* implying that active ETFs underperform on average comparable passive ETFs. Regarding *Hypothesis 2b* it is clear that the beta of the active ETFs is slightly higher but the higher risk-adjusted return compensates for the lower beta of the passive ETFs which leads to higher Treynor ratio for the passive funds. As a result, the data supports both of the hypothesis and the conclusion is that on average active ETFs underperform their corresponding passive pair.

5.5 Market timing ability

The following table presents the results of the market timing ability regression.

Table 6, Market timing ability of active and passive ETFs

This table summarizes the results of the market timing regression in which the risk-adjusted return of the ETFs is regressed on the market risk premium and on the market risk premium squared. This is going to show whether there is an upward or downward convex in ETF returns.

Active					Passive				
Ticker	Alpha	Beta	Timing	R squared	Ticker	Alpha	Beta	Timing	R squared
EMLP	-0.107	0.762***	0.001	0.3773	MLPA	-0.321*	1.177***	-0.007	0.2769
	(0.121)	(0.093)	(0.025)			(0.189)	(0.243)	(0.058)	
HUSE	-0.125	0.8013***	-0.011	0.5417	DVY	-0.045	0.716***	0.002	0.6966
	(0.088)	(0.015)	(0.063)			(0.063)	(0.039)	(0.016)	
HDGE	0.101	-1.177***	-0.023	0.7267	MYY	0.014	-1.048***	-0.001	0.8594
	(0.083)	(0.058)	(0.017)			(0.045)	(0.041)	(0.011)	
FTHI	-0.071	0.773***	-0.014	0.5981	SPHB	-0.182**	1.544***	-0.002	0.83
	(0.059)	(0.071)	(0.014)			(0.073)	(0.067)	(0.021)	
DBLV	-0.033	0.73***	-0.009	0.4659	VONV	-0.051	0.919***	-0.002	0.8941
	(0.106)	(0.031)	(0.066)			(0.033)	(0.029)	(0.01)	
PSR	0.047	0.472***	0.013	0.182	IYR	0.043	0.565***	0.001	0.258
	(0.126)	(0.078)	(0.03)			(0.117)	(0.077)	(0.027)	

SYE	0.451*** (0.123)	0.634*** (0.073)	-0.037 (0.027)	0.2908	VTV	-0.028 (0.028)	0.927*** (0.026)	0 (0.01)	0.9058
PHDG	-0.085* (0.05)	0.425*** (0.046)	0.009 (0.015)	0.421	SPLV	0.092 (0.056)	0.6*** (0.037)	-0.004 (0.015)	0.627
QSY	-0.034 (0.065)	0.936*** (0.061)	-0.004 (0.019)	0.7429	SIZE	0.096 (0.072)	0.793*** (0.054)	-0.015 (0.013)	0.6632
SYG	0.113* (0.06)	0.898*** (0.05)	-0.028*** (0.01)	0.7116	IWF	0.066** (0.032)	1.029*** (0.027)	-0.016* (0.008)	0.9266
SYV	0.155** (0.067)	0.774*** (0.064)	-0.046** (0.022)	0.5197	IWD	0.065 (0.096)	0.872*** (0.059)	-0.014 (0.02)	0.548
FTLB	0.041 (0.057)	0.621*** (0.042)	-0.022* (0.013)	0.5248	ODEQ	0.047 (0.103)	0.878*** (0.059)	-0.013 (0.02)	0.53
Panel data	0.049 (0.035)	0.554*** (0.018)	-0.014*** (0.005)	0.271	Panel data	-0.017 (0.037)	0.748*** (0.02)	-0.006 (0.006)	0.364

**** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

The results from the table are similar to the previous regressions regarding the alphas and the betas of the funds. However, the negative and significant coefficient of market timing in active ETF risk-adjusted performance implies that on average the convexity of returns is negative at 1% significant level. As a result, managers of actively managed ETFs show inability to predict market movements which is in support of *Hypothesis 3.* On the other hand, the timing ability of passively managed ETFs on average is insignificant and close to zero implying that passive ETFs mirror the market.

6. Limitations and implications

6.1 Limitations

There are few limitations in order to make complete analysis of active exchange traded funds. At the current time of this thesis there are around 280 existing active ETFs in the United States. For the purpose of making a good analysis of the performance of them it is essential to have enough historical data. However, almost all of the funds are found in the last five years which makes the study biased. Therefore, I believe in a few years doing a similar research in this topic is going to result in a more complete and detailed work. Furthermore, this thesis focuses only

on equity ETFs although many of the funds follow bond indexes. This can be an interesting topic for future extension of the analysis of actively managed ETFs. Finally, this research concentrates only on U.S. market which does not give a full picture of the active ETFs performance. Adding more markets to the analysis is going to make a full image of the industry.

6.2 Implications

I believe that my work can contribute to society regarding investing decisions in ETFs not only for investment banks and institutions but for the individual investors as well. Furthermore, this study can be a leading point for future analysis of the industry as it explains specific part of the ETFs market.

7. Conclusion

This study aims to extend the debate on active versus passive management and more specifically to the performance of active and passive ETFs. As a conclusion the descriptive statistics showed that on average actively managed funds have lower gross return and higher standard deviation in comparison to the passive ones. Moreover, the regression results in a single factor model implying that the risk-adjusted performance of active ETFs on average fail to deliver positive and significant alpha. This means that managers do not possess superior management skills and that the U.S. market is efficient. As for the passive funds the results follow the theory with statistically insignificant alpha or in other words they mirror the market. In respect to the systematic risk (beta) the statistically significant coefficient can be interpreted that on average passive ETFs bear more risk than the active ones. The analysis then continues with the Fama-French three factor pricing model which explains the returns for both investment strategies better. The statistically significant coefficient of HML for active ETFs and on the other hand HML and SMB coefficients for passive ones mean that the analyzed funds on average invest in value companies and big market capitalization companies. However, the results from the regression remain the same for the alphas and betas. Regarding the rating performance, active ETFs have lower risk-adjusted returns and higher standard deviation on average when comparing them to the passive ETFs. This leads to higher Sharpe ratio for the passively managed ETFs. As for the Treynor ratio the smaller betas of active ETFs could not

compensate for the lower risk-adjusted returns and consequently the ratio is higher for the passive funds. In addition, this thesis fails to find on average statistically significant relationship between ETF returns and fund flows. Finally, the results from the market timing regression show that on average active ETFs have statistically insignificant alphas and statistically significant negative convex implying inability of managers to time the market. On the other hand, as expected passively managed ETFs have on average statistically insignificant alphas again resulting that they copy the market.

Appendix

Data (Risk-free rate, Market Risk Premium, SMB, HML):

https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Fund historical prices and expenses – https://finanace.yahoo.com

Fund historical prices – https://nasdaq.com

Fund issued and redeemed shares (DataStream) - https://www.infobase.thomsonreuters.com/

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