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PERFORMANCE OF ACTIVELY MANAGED EXCHANGE TRADED FUNDS IN THE USA

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Introduction

Exchange Traded Funds (hereby ETFs) were introduced to the global financial scene in 1993 with the emergence of SPDR ("spider") – and ETF created by the American Stock Exchange, tracking the S&P 500 index. With their low expense ratio (compared to the widespread passive mutual funds), and the possibility the trade to be executed on a daily basis, thus providing higher liquidity, ETFs became more popular in the next years. The investment opportunities provided by the ETFs are well diversified – one can invest in equity, bonds, currency, real estate, commodities, fund of funds, etc.

The purpose of this thesis is to examine the performance of the active ETFs in the United States. In 2008 the Securities and Exchange Commission (SEC) allowed US fund sponsors to offer active ETFs, provided several requirements – some of which are daily disclosure of information, weights of assets held, and information to be publicly accessible. This resulted in a financial instrument that can combine the best features of both active and passive investment – transparency and diversification of assets, by beating the benchmark and generating alpha. By this action, SEC encouraged the trading with active ETFs. In the beginning of 2010 their number is 15 (Vossestein, 2010), and by the beginning of 2015 it counts to 120. It is obvious that the active ETFs market in the USA is growing with tremendous speed, which indicates that research on the matter is useful and essential for investors.

To the best of our knowledge, there are two empirical research papers already written by Rompotis (2009a) and Vossestein (2010). Both test the performance of active ETFs, compared to benchmarked index and to a corresponding passive ETF. The methodology they use is quite similar - they both compare the ETFs based on risk-adjusted performance, rating performance, tracking error, and performance of ETFs in bear and bull market conditions. However, because of the recent implementation of active ETFs, the researches of Rompotis and Vossestein imply a relatively small sample (3 and 5 active ETFs, respectively) for a 7-month period (Rompotis) and 18-month period (Vossestein). Another specificity of their papers is that they examine the performance of active ETFs during the global financial crisis 2008-2009. Because of the necessity for an empirical research on a sample with more observations and for a period that is

not as volatile as in financial crisis, I have decided to base my Master's thesis on that matter. Moreover, from the observed by Rompotis and Vossestein active ETFs, only the real estate one is still active.

This study is divided as follows: the next section presents a detailed literature review on active vs. passive investment, passive and active ETFs, and their performance. Afterwards, a brief description of the current actively-managed ETFs market and the data of the empirical research. After that the methodology used for the analysis will be presented, followed by the results explanation. In the conclusion the findings will be summarized and suggestions for future research will be given.

Literature Review

One of the reasons I have picked this topic for my Master thesis is that actively managed exchange traded funds, as a relatively new phenomenon, have not been widely discussed and investigated. The very first research paper on the topic is done by (Rompotis G. , 2009a), which was less than a year after the Security and Exchange commission introduced the instrument. The paper is investigating the performance of 3 active ETFs for a period of 6 months. The second paper is the Master thesis of Floris Vossestein (Vossestein W. F., 2010), from the Erasmus University. The thesis is investigating 5 ETFs for the period of 2008 till 2010.

Another source of information and research performed on active ETFs is coming from iShares. The company is executing a weekly report, with the newest trends, movements and changes in the active ETF market in the USA. A summarized report is available for public use, however a detailed version is restricted for financial professionals only.

Therefore, the literature review below will show not only the papers written for active ETFs performance, but also where the topic stands on the global active versus passive investment picture. The chapter will be divided into three sections – active versus passive investment in

general (mutual funds), characteristics of ETFs and the performance of the passive ones versus index mutual funds, and performance of active ETFs, where the two papers mentioned above will be described in a more detailed manner.

Active versus passive investment

The topic of active against passive management is widely researched topic, and there are numerous papers presented. Most of them focus on mutual funds and investigate their performance compared to the corresponding market indices. The research papers include information dating back to 1970s from hundreds and thousands of mutual funds.

In 1993 Blake, Elton and Gruber (Blake, Elton, & Gruber, 1993) present a research on the performance of bond mutual funds. Despite the growing volume of the market, back in that time the topic is not as excessively investigated as the performance of stock mutual funds. The authors use two different samples – the first one is comprised of monthly returns of 46 non-municipal bond funds from 1979 to 1988, and the second one is comprised of all bond funds existing in the end of 1991. The methodology involves a time-series regression model using the funds' excess returns, a mixture of selected benchmark indices and a risk-free asset. The final results that the authors obtain show a strong trend – most of the bond funds underperform the corresponding indices. The interesting part is that the underperformance value is approximately equal to the management fees, which indicates that before applying the expenses, the funds will perform almost as good as the indices. The regression alpha indicates that 1 p.p. increase in the management fee, leads to 1 p.p. decrease in the return, therefore low-skilled forecasting investors should be picking low-expense funds.

Following the controversial literature presented in the 1970s through 1990s, Malkiel investigates the equity mutual fund market (Malkiel, 1995). The author is concerned by the fact that all good performing mutual funds tend to perform well in the future. The author picks annual returns of equity mutual funds, both existing and defaulted, between 1971 and 1991, and examines the record in the context of Capital Asset Pricing Model, using the returns of the funds, the market (indices), and the risk-free return. The study looks if the alpha is positive,

thus indicating for positive risk-adjusted returns. The results obtained confirm the statement that good funds continue to perform well, but that is mostly due to the fact that studies choose mutual funds that have survived the period, thus exposing the studies to survivorship bias. However, Malkiel argues that this relationship might not be robust, because it is only persistent in 1970s, but not in 1980s.

Since all of the studies suggest that open end actively managed mutual funds actually offer a negative risk-adjusted return and it is more beneficial to invest in an index fund, Martin J. Gruber (Gruber, 1996) has tried to understand the puzzle why managers still buy these mutual funds. The author examines 270 equity mutual funds from the period of 1985 to 1994, using time series regression involving excess return from a four index model. Gruber confirms previous findings that on average actively managed mutual funds do not offer better return than the market indices. However, future performance can be predicted by the past performance due to the buy and sell price of the funds, which are equal to the net asset value. Sophisticated investors do recognize that information and would act upon it, so their cash flows in and out of the funds would generate positive result over the ten year period investigated.

Characteristics of ETFs and the performance of the passive ones versus index mutual funds

One of the first papers to document the performance of ETFs and compare them to mutual funds is written by Dellva, 2001. The author does a very narrow-sampled research, by picking one equity mutual fund (Vanguard Index 500 Fund, VFINX) and two ETFs that try to replicate S&P 500 – SPRD (NYSE:SPY) and iShares S&P 500 Fund (NYSE:IVV), and compares them on a cost base. He confirms that on annual basis ETFs have less expenses, however small investor would still prefer the equity mutual funds due to the lower transaction costs. Kostovetsky wrote another early document that investigates the comparatively new phenomenon by that time – the ETFs. The author compares them to the equity index mutual funds using two samples – one period, and multi-period. He also presents the qualitative differences between the ETFs and the index mutual funds. Poterba & Shoven (2002) test the first ETF – SPDR, and its performance relative to the largest equity index fund – Vanguard

Index 500, for the period 1994-2000. The results show that the ETF has slightly lower after-tax and pre-tax returns.

Four authors (Elton, Gruber, Comer, & Li, 2000) also examine the characteristics and return of equity ETF - SPDR ("Spider") and comparing it to the equity index S&P 500. The instrument is traded at any point during the day for a price close to the net asset value. The authors find out that on average the passive ETF underperforms the index by 28.5 basis points. As an explanation they point out the management fee of 18.45 basis points and the loss of return from dividend reinvestment of 9.95 basis points. These restrictions have been overcome by the newer products (e.g. webs).

G.L. Gastineau (Gastineau, 2004) looks on the performance of equity ETFs from a different prospective. The author compares the passive equity ETFs with the conventional index funds, claiming that the products are excellent substitutes. Gastineau points out that the tax efficiency and lower expense ratios of the ETFs, taking into consideration the stock market decline in 2000, have resulted in not that material differences, compared to the conventional index funds. The author suggests that likewise conventional index funds, ETFs can benefit and outperform their benchmarks by reorganising underlying stocks. By doing this, ETFs will not replicate perfectly their benchmarks, which is a step towards active investing.

Ilan Guedj and Jennifer Huang (Guedj & Huang, 2009) present a detailed paper on the comparison between open-end equity mutual funds (OEF) and the index exchange-traded funds. The authors express their concern that OEFs have higher trading costs than the ETFs, and compare both instruments in terms of liquidity. Guedj and Huang investigate 296 OEFs and 320 ETFs from the period starting 1992 until 2006. The results point out that investors with higher liquidity would benefit more if they invest in OEFs, due to the partial insurance against future liquidity shocks. Counter wise, it is more suitable for less liquid investors to invest in ETFs, as they have more correlated liquidity shocks and the underlying indices are narrower and more specific. This statement is confirmed by Svetina and Wahal (2008), whose research comprises of 584 bond and equity ETFs. The authors find out that 83% of the ETFs are following a specific, narrow segment of the corresponding market.

Gerasimos Rompotis is the author of one of the existing scientific researches done on the performance on actively managed ETFs, which will be described in further details later in the thesis. He has also done several papers on the performance of passive ETFs compared to the corresponding indices. Such is "An Empirical Look on the Exchange Traded Funds" in 2007 (Rompotis G. G., 2007). The paper looks at 30 equity ETFs listed on AMEX and NASDAQ for the period from March 2001 to July 2002, and the underlying indices, which results in total 313 observations. Rompotis examined the performance of the ETFs with standard methodological approach – single regression model, daily percentage return and standard deviation, and three types of tracking error. Similar to prior studies, with the calculation of percentage rates for performance and risk, Rompotis finds out that ETFs slightly underperform the corresponding indices. As far as tracking error is concerned – the results show slight deviation from the indices (between 0.51% and 0.60%).

Jack Aber, Dan Li and Luc Can (Aber, Li, & Can, 2009) study the price volatility and tracking performance of equity ETFs compared to conventional index mutual funds. The authors have selected 4 equity ETFs of the sponsor with most ETFs on the current market – iShares. Three of the ETFs are US based (IVV, IWF and IWM) and the fourth is international (EFA). The ETFs track S&P500, Russell 1000, MSCI US Small Cap and MSCI EAFE indices. Aber, Li and Can analyse the ETFs based on premiums/discounts, daily returns and tracking error. The results of the empirical research state that due to the tendency of overvaluing ETFs compared to their Net Asset Value, they were more likely to be traded at premium than discount. The fluctuation of the daily price was large for the sample period (approximately 6 years, depending on the fund's inception date), which implies that active traders would be able to maximize return. However, similar to prior research, the authors confirm that the conventional index mutual funds tend to track their benchmarks better than the ETFs.

Another empirical research on iShares ETFs is performed by Tzu-Wei Kuo and Cesario Mateus (Kuo & Mateus, 2006). The authors use 20 country-specific exchange traded funds of the company and study their performance between July 2001 and June 2006. Kuo and Mateus use a complexed methodology, including Treynor, Sharpe and Sortino ratios for risk-adjusted

performance measurement. The results indicate that sometimes the country-specific ETFs can beat the US market index (S&P 500). The authors find also that the past performance of the investigated iShares ETFs can be used for future predictions.

ETFs paper world-wide related

Gerasimos Rompotis (Rompotis G. , ETFs vs. Mutual Funds: Evidence from the Greek Market, 2011) reviews the performance of passively managed equity ETFs compared to open-ended mutual funds in the Greek market for the period of January 2008 till December 2009. The author uses one ETF (ALPHA ETF FTSE ATHEX 20) and four mutual funds that use the same benchmark – one managed passively and three managed actively. Rompotis uses descriptive statistics (daily percentage return and risk, risk/return ratio in terms of average percentage return and median percentage return), standard regression analysis and three different methods for calculation of tracking error. Rompotis confirms prior research done (Dellva, 2001) for the lower expenses the ETF provides compared to mutual funds. However, the ETF is underperforming both the benchmark and the mutual funds, which confirms prior research done by Elton (2002) and Gastineau (2004). Rompotis finds out that in terms of tracking error APLHA ETF is better tracker than the mutual funds.

Blitz, Huij and Swinkels (Blitz, Huij, & Swinkels, 2009) present a paper that investigates the performance of Europe-listed equity ETFs and European index mutual funds. In line with the prior studies, the authors find out differences in the funds' performance, which is explained by the differences in expense ratios. However, the authors argue with the expenses considered under "total expense ratio". The research shows that there are substantial performance differences among index funds and ETFs that cannot be explained by their expense ratios. Blitz, Huij and Swinkels suggest re-consideration of the expenses falling under "total expense ratio", and more specifically - dividend withholding taxes. More detailed and refined measurement of funds' costs will suggest better understanding and explanation of performance. Similar findings were documented by Lars Bassie (Bassie, 2012), who investigates the tracking performance of 40 European passively managed ETFs. The author is aiming to explain the determinants that drive and influence the ETFs when tracking their benchmark. Bassie finds out that the total expense ratio is negatively affecting the tracking performance. On average, the ETFs

underperformed their benchmarks by 2.59%. Most of the tracking errors were stable over time, and where larger deviations occurred, they were mostly event-driven.

Robert Engle and Debojyoti Sarkar (Engle & Sarkar, 2006) develop a complexed statistical approach that corrects some of the measurements under NAV calculation in order to study the magnitude of premiums and discounts. They use 21 US equity ETFs and 16 international equity ETFs for the period April to September 2000. The authors confirm prior studies that standard deviation of the premium is larger for international ETFs (average of 77 bps) than for US ETFs (average of 14 bps). The American ETFs have a price that is closer to their true NAV, which is not the case for international ETFs and they are less actively traded.

One of the newest research analyses conducted on ETFs' performance is done by Marius Dethleffsen and Markus Rudolf (Dethleffsen & Rudolf, 2012) who investigate 122 European equity and bond ETFs. The authors form 7 different hypotheses comparing the ETFs using 4 regression models: 2 tracking error models and 2 price deviation models. The relevant for the current research hypotheses concern the tracking errors. Dethleffsen and Rudolf find out that one of the most important factors that influence the tracking error levels are the total expense ratio and the volatility of the corresponding benchmark. The authors confirm that high tracking error usually leads to higher price deviations. They also find out that the fluctuations of the benchmark return don't influence the ETF return, as this is not a factor affecting the difficulty of replicating the benchmark.

A step away from the European and US market is the research done by David Gallagher and Reuben Segara (Gallagher & Segara, 2004) on the ETFs listed on the Australian Stock Exchange. For the performance measurement the authors use two different kinds of tracking error – (1) daily average absolute tracking error based on the absolute difference in the returns of the ETFs and the benchmark, and (2) tracking error based on the standard deviation of the difference in the returns of the ETFs and the benchmark. The results that Gallagher and Segara obtain for the half-year period examined range from 0.0167% to 0.8280% for the tracking error, which indicates that in general ETFs cannot perfectly match the performance of the benchmarks. Based on the results, the authors claim that except one ETFs, the rest neither

systematically outperform nor underperform the corresponding benchmark, which means that long-term strategies would still achieve investment results very similar to the benchmark.

Literature on the performance of actively-managed exchange traded funds

As pointed out earlier in the thesis, to the best of our knowledge, there are two empirical research papers done on the actively-managed exchange traded funds in the United States. The first one is done by Gerasimos Rompotis (Rompotis G. , 2009a), and the second one is the Master's thesis of Floris Vossestein from the Erasmus School of Economics in 2010. Both measure very short period of time and limited amount of ETFs. Below the data, methodology and results both authors obtain will be summarized.

As a senior auditor in KPMG Greece, Rompotis conducted the very first research on the performance of active equity and bond ETFs in the US market (Rompotis G. , Active vs. Passive Management: New Evidence from Exchange Traded Funds, 2009). In the literature review, the author summarized one of the most significant and widespread papers on active vs passive investment matter, the majority of which are also included in my thesis – Blake (1993), Malkiel (1995), Gruber (1996), etc. Due to the specificity of the methodology, Rompotis also reported other scientific research, which are not relevant for this thesis. As far as the methodology is concerned, the author uses four methods to test the ETFs' performance. The first one is a standard linear regression measuring the risk-adjusted return in Jensen's model, also used in this Master's thesis. Positive and significant alpha results would indicate that the managers add value and do outperform the index. The second method is the rating performance, by using the total percentage returns, the Sharpe ratio and the Treynor ratio, where the author would expect the higher the ratios, the better the performance. All of these are also used in this thesis. The third method used by Rompotis is including the three tracking error estimations, also used in this thesis. The difference in this method is that he compares active ETFs, indices and passive ETFs, thus he would expect that the tracking errors of the passive ETFs would be much lower than the active ones, as the passive are trying to perfectly replicate the indices.

Rompotis investigates the market timing ability of the fund managers – a method developed by J.L. Treynor and K.K. Mazuy (Treynor & Mazuy, 1966), which implies the measurement whether managers efficiently increase the exposure of the portfolio on equities before market accessions, or decrease it before recessions. However, it should be pointed out that the market timing ability is affected by several factors – the investment objective of the fund, restricted or unrestricted usage of leverage and derivatives, etc.

The author uses very small sample, consisting of three PowerShares' actively managed ETFs – Active AlphaQ Fund, Active Alpha Multi-Cap Fund and Active Low Duration Fund. The benchmarks used by these funds are Nasdaq 100, Russell 3000 and Barclays Capital 1-3 Year US Treasury. The passive ETFs that were trying to replicate the mentioned indices were PowerShares Trust Series 1, iShares Russell 3000 Index Fund, iShares Barclays 1-3 Year Fund. For market index, the author has used S&P 500. The total sample used by Rompotis is starting from May 2008 until November 2008, studying the daily returns of the described active and passive ETFs, and the indices (148 observations for each).

Considering the methodology used, for the first method Rompotis confirms the prior research papers done by Malkiel, Gruber, Blake and Elton (1993-1996), which state that both passive and active ETFs fail to produce any material above-normal return higher than the benchmarked index. The beta coefficient for two of the three active ETFs are higher than their passive pairs, which indicates larger aggressiveness for the active ETFs compared to the passives. The underperformance of the active ETFs compared to the passive ones and the indices is confirmed by the ratings method – Sharpe and Treynor ratios, and the total return for the period.

In terms of tracking errors, the author's results indicate that actively managed ETFs show higher tracking errors than the passives in all of the estimations, which is normally expected and means that their returns deviate more from the benchmark. When equity ETFs are compared to bond ones, the results indicate lower tracking errors for the bond funds, which implies the bond ones are less risky and expensive than the equity. Overall, Rompotis confirms the findings of prior empirical researches that active management is underperforming the active

management. However, the sample of active ETFs and the short period of time is a prerequisite to dive deeper into the active ETFs market and to study their performance in the future.

A step forward to the analysis on the performance of actively managed ETFs was done by Floris Vossestein (Vossestein F. W., 2010), in his Master thesis from the Erasmus School of Economics. Vossestein managed to build on Rompotis' empirical research not only by adding to the methodology and expanding both the number of ETFs and the period examined. The author presents a detailed explanation on the creation and redemption process, describing all the steps and parties involved. He also does a short explanation on the ETF industry, involving both the passive ETF market and the growing active ETF market, the types of ETFs and the overall development and trends in the industry. Vossestein writes a very detailed literature review, comparing the active vs. passive investment in general, the passive ETFs vs. mutual funds, involving papers on the characteristics of ETFs, and the active vs. passive ETFs.

By the time Vossestein did the empirical research, there were 15 equity and bond actively managed ETFs in the US market. The author adds to Rompotis' paper by using 5 ETFs for the statistical analysis – Active AlphaQ (NYSE:PQY), Active Alpha MultiCap (NYSE:PQZ), Active Low Duration (NYSE:PLK), Active Mega Cap (NYSE:PMA), and Active U.S. Real Estate (NYSE:PSR). The indices used are NASDAQ 100, Russell 3000, Barclays Capital 1-3 Year US Treasury, Russell Top 200, and FTSE NAREIT Equity. The passive ETFs used by Vossestein are PowerShares QQQ (NYSE:QQQQ), iShares Russell 3000 (NYSE:IWV), iShares Barclays 1-3 Yr US Tr (NYSE:SHY), Vanguard Mega Cap 300 (NYSE:MGC), and Vanguard REIT ETF (NYSE:VNQ). The author investigates their performance for the period of May 2008 till October 2009, which creates 380 observations for 4 of the ETFs. The period for Active US Real Estate is from December 2008 till October 2009, which is 232 observations.

Vossestein uses a very solid and sound methodology to test the performance of the funds. The first method is the risk-adjusted performance by the linear regression, used also by Rompotis. He tests the data for two violations – heteroscedasticity and autocorrelation. The second method is the ratings performance, measured by Sharpe, Treynor and Sortino ratios. The third method is testing the performance by the three different types of tracking errors, used by

Rompotis and also for this thesis. What Vossestein adds to the research is measuring the ETFs' performance during different market trends, i.e. bearish and bullish market, using the same three methods explained above. The market reached its lowest point on March 9th, 2009, so the bear market (descending) is from May 2008 till 9th of March 2009, and the bull market (ascending) is from March 9th 2009 till October 2009.

With minor differences, the results that the author obtains, are in line with the prior research of Gerasimos Rompotis (2009). For the risk-adjusted performance, Vossestein's results do not indicate significant underperformance in relation to the benchmarks and the passive ETFs. Beta coefficients for all active ETFs are lower than the passive ones and the benchmarks, which indicates that ETFs are managed less aggressively. Using the ratings performance method, the author finds out that three of the active ETFs underperform the respective passive ones, however it should be pointed out that the period investigated is including a significant market crash and strong post-recovery. In terms of the third method, the author confirms active ETFs have higher tracking errors that the passive ones. Vossestein measures that the lowest tracking error is with the active bond ETF Active Low Duration (NYSE:PLK), which is confirming Rompotis' research (2009a) that bond ETFs have on average lower tracking errors. Overall, Vossestein's results show that actively managed ETFs do underperform passive ones, even for a greater period of time and bigger sample than Rompotis.

Methodology

Risk-adjusted performance

The first method used is the calculation of the Jensen's alpha, which will indicate if active ETFs outperformed the benchmark index. The formula is as follows:

$$R_{p,I} - R_f = \alpha_{p,I} + \beta_{p,I}(R_m - R_f) + \varepsilon_{p,I}$$

where $R_{p,I}$ is the daily returns on the ETFs, R_f is the daily risk-free rate (daily US Treasury Bill in our case), R_m is the return on the index. The coefficient $\alpha_{p,I}$ is the Jensen's alpha. It represents

the deviation of the observed risk-adjusted return from the expected risk-adjusted return (Vossestein F. W., 2010). The coefficient beta $\beta_{p,I}$ (the systematic risk) is measuring the sensitivity of the ETF's returns with the movement of the benchmark index. If alpha is positive, then the fund outperforms the index. It is expected that all actively managed ETFs have positive Jensen's alpha, thus generating better return than the index.

Rating performance

Two rating performance ratios are used in order to add to the risk-adjusted performance examination of the ETFs.

First, the Sharpe ratio is calculated:

$$Sharpe\ Ratio = \frac{R_p - R_f}{\sigma_p}$$

where R_p is the average daily portfolio return of the ETF, R_f is the risk free rate, and on the denominator is the standard deviation of the ETF's excess return on the risk-free rate. Following Vossestein's approach, we've used the revised Sharpe ratio (Sharpe, 1966), as the risk free rate is not risk free rate is not constant during the sample period. The higher the Sharpe ratio is, the better the performance of the ETF.

Afterwards, the Treynor ratio is calculated:

$$Treynor\ Ratio = \frac{\overline{R_{p,I}} - \overline{R_f}}{\beta_{p,I}}$$

where R_p and R_f are the same as above, and beta is the systematic risk of the ETF, which is obtained from the standard linear regression done in method 1. The higher the Treynor ratio, the better the performance of the ETF.

Tracking error

The first tracking error indicator is the residual outcome from the standard regression equation from method 1 – ε. The outcome is automatically generated by Excel regression analysis, but the original equation is as follows:

$$TE_{1,i} = \sqrt{\frac{1}{n-2}\sum_{t=1}^{n}\varepsilon_1^2}$$

where n is the number of observations, ε is the residual from the 1st equation.

The next measure of tracking error calculates the average of the absolute values of daily differences in the returns. The formula is:

$$TE_{2,i} = \frac{1}{n}\sum_{t=1}^{n}\left|e_{i,t}\right|$$

where $e_{i,t}$ is the difference between the daily return R_i and the index return R_m, as explained above.

The third and last measure of tracking error is calculating the standard deviation of return differences of ETFs and market indices. The formula is:

$$TE_{3,i} = \sqrt{\frac{1}{n-1}\sum_{t=1}^{n}(e_{i,t} - \overline{e_i})^2}$$

where the average e is the average return differences over the total sample of n days (Vossestein, 2010).

Logically, the active ETFs are expected to have high tracking errors. Thus they are indicating that unlike passive ETFs, they don't replicate the indices, but they are trying to outperform them.

Market Explanation and Data Description

In this section will be given a brief description of the current market of actively-managed ETFs, presenting the sponsor agencies, all the major exchange traded funds and the different types of active investment they provide. As discussed, the active ETFs are not that popular investment instrument compared to the mutual funds and the passively managed ETFs. According to the Investment Company Institute (ICI), the US mutual fund market amounts to approximately USD 15,7 trillion as of January 2015. Since their introduction in 2008, the active ETFs have grown to almost USD 20 billion ("AdvisorShares"). Compared to the mutual funds' market, the number looks insignificant, however the fast growth and the favorable future potential sets this instrument as an interesting player on the investment market.

As of February 2015, there are 120 actively managed ETFs, with assets under management (AUM) equal to USD 19 211 841 288 (20 Feb 2015, AdvisorShares). The biggest player on the market is PIMCO with a market share of 36,36% and 8 ETFs. At a second place stands First Trust with 6 ETFs more than PIMCO, but almost twice less market share (18,67%). Third and fourth are Wisdom Tree (7,97%) and Advisor Shares (6,92%) respectively. WBI Shares, iShares and State Street complete the 7 biggest sponsors involved in the market, with more than USD 1 billion AUM. There are 17 other sponsors completing the full list of players on the active ETF market. The variety of sponsors in the market is also reflected in the differentiated asset classes. There are several major groups – fixed income, equity, commodities, multi-asset and currency ETFs. For further details on the market as of February 2015, please refer to the table in the appendix.

For the purpose of the empirical research, actively-managed ETFs that have seized operation during the sample period have been included, thus avoiding survivorship bias. The data for the analysis is entirely extracted from Whorton Research database. Following the same approach as Vossestein, 2010, I have used Barclays Aggregate Bond index as a benchmark for the bond ETFs, and S&P500 index as a benchmark for the rest. The sample period is May 2008 for the earliest ones until 31st of December 2014 (68 months), however it is important to mention that not all of the ETFs have existed for the full period of the sample. The result is 128 ETFs, with 69 319 total observations. The full list of ETFs examined with their names, tickers, and sponsors can be found in table 4 in the appendix.

Empirical Results

Risk-adjusted performance

The full results of the standard linear risk-adjusted regression are presented in table 1 in the appendix. The regression is executed on the market indices Barclays US Aggregate Index for the bond ETFs and S&P500 Index for the rest of the ETFs (primarily equity ones). The table shows the alpha coefficient with the probability value, the beta coefficient, R squared and the number of observations for each exchange traded fund. Since we are executing a linear regression with 95% level of confidence, the statistically significant probability values for alpha should be lower than 5%. The results obtained show 81 funds out of 128 that have a p-value below 5%. However, it is important to mention that 8 out of the 81 ETFs with significant results (tickers: IVAL, VALX, ARKK, ARKW, GMOM, QVAL, FBND, FLTB) have less than 60 observations, which is less than 3 months of operation. Thus, their results cannot be considered as fully reliable.

In terms of the alpha coefficient, the results are fully in line with the prior research papers from Romopotis, 2009 and Vossestein, 2010 – the vast majority of active ETFs show negative alpha values, which implies that they fail to outperform the respective market index. Almost half of the ETFs (37) have negative alpha values less than -0.5%, which implies that they barely underperform the indices. The distinguishable ones of them are all WBI Investment ETFs,

PIMCO's Total Return (NYSE:BOND), Enhanced Short Maturity (NYSE:MINT), Intermediate Municipal Bond (NYSE:MUNI), and half of Wisdom Tree's ETFs. Expectedly, all the exchange traded funds that have seized operation, obtain negative values for their alpha coefficients.

There are 4 ETFs with positive and statistically significant alpha coefficients within the 95% level of confidence (Table 1a below) – iShares' Enhanced International Large-Cap (NYSE:IEIL), PIMCO's Global Advantage Inflation-Linked (NYSE:ILB), Validea's Market Legends (NYSE:VALX), and Value Shares' US Quantitative Value (NYSE:QVAL). Validea's and Value Shares' ETFs, however, have respectively 14 and 48 observations, thus their alpha coefficients results cannot be considered fully reliable. Hence, the conclusion from the linear regression is that the best risk-adjusted performance has iShares' Enhanced International Large-Cap ETF with alpha equal to 1.5% over the market index (S&P 500 index). The second best is PIMCO's Global Advantage Inflation-Linked ETF with alpha equal to 1.4% over the market index (S&P 500 index).

Table 1a. The table presents the 4 ETFs with significant alpha coefficients within the 95% level of confidence, their sponsor, the tickers, the corresponding market index, the beta coefficient, the probability value, the adjusted R2, and the number of observations.

Sponsor	Ticker	Market Index	Alpha	Beta	p-Value	R sq adj	Observations
iShares	IEIL	S&P 500 Index	1.505%	2.961	0.012	0.025	213
PIMCO	ILB	S&P 500 Index	1.428%	1.822	0.000	0.107	671
Validea	VALX	S&P 500 Index	0.020%	0.969	0.000	0.921	14
Value Shares	QVAL	S&P 500 Index	0.100%	1.044	0.000	0.940	48

The beta coefficient measuring the systematic risk of a fund, generally shows how volatile is a fund related to a movement of the market. If the outcome from the linear regression analysis give a value for beta equal to 1, this means that the ETF's return will be affected with the same proportion as the market index' one. For the all 81 ETFs with significant values, the average beta coefficient is 1.40. However, it should be pointed out that 80% of them (64 ETFs) have an average beta of 0.93, which means that they move almost proportionally as the market index' movement. There are several extremes that raise the average beta value for the full sample –

12.11 for State Street's Risk Aware Equity ETF (NYSE:RORO), and -13.40 for First Trust's Enhanced Short Maturity (NYSE:FTSM).

Rating performance

In this section will be presented the results obtained for the Sharpe and the Treynor ratios. The full results can be found in table 2 in the appendix. The Sharpe ratio is comparing the exchange traded funds' returns over the risk-free Treasury bill returns. The ratio measures whether the ETFs' sponsors are making significantly greater return by accepting the inherent risk on active investment, as compared to just investing in the risk-free rate Treasury bill. The overall direction of the results is in line with Rompotis and Vossestein's research papers (Rompotis, 2009; Vossestein, 2010) – the actively-managed ETFs fail to perform better than the risk-free Treasury bill. The difference with Vossestein's results is that in our research there are no ETFs with positive Sharpe ratios. 69 out of the 128 ETFs obtain a result for their Sharpe ratio less than -0.5. The values obtained are not that extreme, but still negative – the lowest negative has iShares' Enhanced International Large-Cap (NYSE:IEIL) with -0.239, and the highest negative has Cambria's Global Momentum ETF (NYSE:GMOM) with – 2.314. Taking into consideration that IEIL's Jensen's alpha coefficient is one of the two significant and positive coefficients in the sample, and its relatively low negative Treynor ratio, one could argue that this exchange traded fund is overall the best performing fund.

The difference between the Sharpe ratio and the Treynor ratio is that the second one measures the performance of the ETF against the rate of return of the respective market index (in our cases – Barclays US Aggregate Index and S&P 500 Index). The average Treynor ratio value from all observations is negative – -0.175. Unlike the results we have obtained for the Sharpe ratio, however, with the Treynor ratio we have 25 out of the 128 ETFs positive values. The largest group from the positive ratios consists of bond exchange traded funds – 9 in total. The highest Treynor ratio belongs to Wisdom Tree's Strategic Corporate Bond (NYSE:GLCB) – 14.358, however the values for its beta coefficient are not within the significance 95% confidence level, hence cannot be taken reliably. The highest Treynor ratio value within the 95% confidence level of its beta, has Wisdom Tree's Dreyfus South African Rand ETF (NYSE:SZR) – 2.614.

The results obtained from Sharpe and Treynor ratios confirm the prior research papers from Rompotis, 2009 and Vossestein, 2010 that in general the actively managed ETFs fail to outperform the risk-free Treasury bill and the corresponding market indices.

Tracking error

In this section we will presented the outcome of the tracking error estimations. Theoretically driven, the actively managed ETFs should have higher tracking errors, thus allowing to have higher return. This statement has been confirmed by both Rompotis, 2009 and Vossestein, 2010. We've done three estimates of the tracking error – the first one is the standard error from the linear regression equation, the second one is on the absolute values of the daily returns, and the third one is the square roots of the standard deviations of the differences between the ETFs' returns and the market indices' returns. Likewise with alpha coefficient estimations, another factor that is important to be taken into consideration is the number of observations of each exchange traded fund, as some of them have existed for less than 60 days and their results cannot be taken as fully reliable. The full results, showing the three types of tracking error, can be found in table XXX in the appendix.

In terms of the first tracking error, the range of values from the 73 ETFs with significant probability values and more than 60 observations is from 0.146% to 98.744%, with an average of 30.648%. 20 of the ETFs have alpha coefficient -20% or higher, which indicates that they significantly underperform the market indices. Most of the observed ETFs have similar values for their third type of tracking error. The lowest tracking error 3 value, i.e. the ETF that almost replicates the market indices, is 0.146%. The highest one is 98.872%. The second type of tracking error observes the absolute values of funds' excess returns, thus including both negative and positive values and not allowing some of them to offset each other (Vossestein, 2010). Its highest value is 83.962% and lowest – 0.101%. Worth noting is the ETF with highest positive alpha - iShares' Enhanced International Large-Cap (NYSE:IEIL), which has tracking error values approximating the average for the sample – 27.048% for TE1 and 27.227% for TE1. PIMCO's Total Return ETF (NYSE:BOND) is one of the funds with lowest negative

alpha (-0.002%), and lowest tracking errors – 0.146% for both. This indicates that the fund mostly replicates the market index (Barclays US Aggregate Index), rather than beating it.

Conclusion

In this study we've examined the performance of 128 actively managed exchange traded funds traded in the US market. The ETFs were introduced in 1993 by the inception of SPRD ("the Spider"). However active investment for ETFs (i.e. trying not only to replicate a certain index, but to outperform it) was allowed by the Security and Exchange Commission in 2008. Actively managed ETFs became more popular with the years, due to the daily trading and disclosure, effective diversification and low expense ratio.

Since the actively managed exchange traded funds are relatively new financial instrument, the literature on it is very limited. For that reason, we've presented the available literature on the active versus passive investment topic, characteristics of ETFs and passively-managed ETFs versus passive mutual funds, and performance of actively managed ETFs. For the last topic, there are only two studies available by Romopotis and Vossestein, which were presented in details in the section.

In our study we've focused on measuring the risk-adjusted performance with standard linear regression, the ratings performance using Sharpe and Treynor ratios, and three types of tracking erros. The daily returns of all the ETFs were used and compared to the daily returns of the market index and risk-free rate. For market indices we've used Barclays US Aggregate Bond Index and S&P 500 Index. For the risk-free rate, we've used US Treasury Bill's returns. The earliest examined ETF in our study was introduced in May 2008. The end date of the sample is 31st of December, 2014. The total sample consists of 128 ETFs, with total observations counting to 69 319. This is significant increase in the sample observations and time span, compared to the research papers of Rompotis (2009) and Vossestein (2010).

The results obtained from the empirical research do not differ significantly from the previous two studies. In terms of the risk-adjusted return analysis, the standard linear regression resulted in 81 ETFs with significant p-values for their Jensen's alpha. Four out of the 81 ETFs received positive values for their alpha coefficient. The general observation is that actively managed ETFs fail to outperform the respective market indices, which is confirmed by the previous studies of Rompotis (2009) and Vossestein (2010). The second method used calculates the Sharpe and the Treynor ratios to measure the funds' ratings performance. The Sharpe ratio examines the ETF's performance over the risk-free Treasury bill. The Treynor ratio includes the beta coefficient from the linear regression in order to calculate the systematic risk over the market indices. There are no positive values for the Sharpe ratio, and there are 25 positive values for the Treynor ratio. The overall conclusion from the previous two studies have again been confirmed – the actively managed ETFs on average fail to outperform the US Treasury bill and the market indices.

In the third method we've calculated three types of tracking errors - the standard error from the linear regression equation, the absolute values of the daily returns, and the square roots of the standard deviations of the differences between the ETFs' returns and the market indices' returns. The tracking errors indicate how many standard deviations away is a fund from the market index it's trying to outperform. One might argue that the actively managed ETFs should have high tracking errors, which would allow them to beat the market. The results we've obtained show a wide variety of tracking errors – from 0.146% to almost 99%. The majority of the funds, however, result with negative alpha coefficients, Sharpe and Treynor ratios, which indicates they underperform the market indices with that percentage of tracking errors.

As previously mentioned, the actively managed exchange traded funds are relatively new and almost unexamined phenomenon, which brings a lot of opportunities for further research. We've limited our study to the end of 2014, however the market of active ETFs is expanding and new ETFs emerge almost every week (iShares weekly report). Thus, an increase of the time frame and the number of examined ETFs would present a more accurate picture of their contemporary performance. Furthermore, we've compared the active ETFs to the performance of two of the largest and most consistent market indices – Barclays US Aggregate Bond Index and S&P500 Index. Thus we've omitted comparing some the ETFs to their original benchmark

indices. This is due to the fact that some of the benchmarked indices lacked accurate and full information on their returns. This might not be the case in the future, which gives opportunity for further research. Another approach we've omitted is including passive ETFs to the study. This is because we've aimed to measure the performance of active ETFs with the market indices, and not whether they perform better than passive ETFs. This was done by Vossestein, 2010 and Rompotis, 2009, however the sample in both research papers is very limited. Thus, splitting the ETFs to different clusters, depending on the investment strategy, and comparing them to their passive counterparties would add to the research done so far. Previous study (Vossestein, 2010) included splitting the market in bullish and bearish environment during the financial crisis 2006-2008. By the time there were 15 ETFs, and only 5 were used in the research. Including the rest of the ETFs and comparing them to the market indices would give a better understanding on their performance during the global financial crisis. Another opportunity would be comparing the actively managed ETFs to the actively managed mutual funds, which would show how ETFs perform compared to much larger market.

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APPENDIX

Table 1 – Risk adjusted performance results

The table presents the full results from the standard linear regression executed in method 1. The table shows the sponsor, the tickers of the ETFs, the corresponding market index, the alpha coefficient, the beta coefficient, the probability value, the adjusted R^2, and the number of observations.

Sponsor	Ticker	Market Index	Alpha	Beta	p-Value	R sq adj	Observations
Advisor Shares	AADR	S&P 500 Index	-58.906%	0.269	0.630	-0.001	1120
	ACCU	S&P 500 Index	-64.621%	2.452	0.006	0.009	737
	AGLS	S&P 500 Index	-56.017%	2.301	0.006	0.009	774
	DBIZ	S&P 500 Index	-15.348%	0.034	0.952	-0.002	511
	DIVI	S&P 500 Index	-12.730%	-1.026	0.676	0.002	107
	EPRO	S&P 500 Index	-16.869%	-0.898	0.552	-0.002	272
	FWDB	Barclays US Aggregate Bond Index	-72.258%	1.476	0.076	0.002	888
	FWDD	S&P 500 Index	-75.467%	0.323	0.687	-0.001	888
	FWDI	S&P 500 Index	-82.653%	0.312	0.702	-0.001	888
	GEUR	S&P 500 Index	-14.215%	8.357	0.009	0.026	223
	GIVE	S&P 500 Index	-87.563%	0.962	0.306	0.000	654
	GTAA	S&P 500 Index	-2.558%	0.797	0.000	0.038	1052
	GRV	S&P 500 Index	-41.683%	-1.717	0.002	0.025	353
	GYEN	S&P 500 Index	-16.892%	2.054	0.419	-0.002	223
	HDGE	S&P 500 Index	-0.681%	0.873	0.000	0.742	988
	HOLD	Barclays US Aggregate Bond Index	-91.789%	-0.718	0.838	-0.004	242
	HYLD	S&P 500 Index	-0.725%	1.028	0.000	0.106	1027
	MATH	S&P 500 Index	-39.748%	-0.157	0.804	-0.001	886
	MINC	Barclays US Aggregate Bond Index	-0.019%	0.994	0.000	0.996	450
	MULT	S&P 500 Index	-95.145%	-4.933	0.427	-0.003	122
	QEH	S&P 500 Index	-78.160%	2.175	0.022	0.007	602
	RRGR	S&P 500 Index	-72.581%	3.976	0.002	0.023	349
	TTFS	S&P 500 Index	-21.247%	2.728	0.000	0.022	814
	YPRO	S&P 500 Index	-0.524%	0.831	0.000	0.803	209
	SSAM	S&P 500 Index	-45.494%	6.075	0.000	0.040	356
ARK investments	ARKG	S&P 500 Index	-0.135%	0.936	0.000	0.693	40
	ARKK	S&P 500 Index	-0.183%	0.969	0.000	0.797	40
	ARKQ	S&P 500 Index	-0.417%	0.880	0.000	0.701	63
	ARKW	S&P 500 Index	-0.166%	0.953	0.000	0.691	63
Arrow Shares	DWAT	S&P 500 Index	-11.496%	-0.813	0.771	-0.015	63
Calamos	CFGE	S&P 500 Index	-60.880%	6.757	0.277	0.002	119
Cambria	GMOM	S&P 500 Index	-0.493%	0.861	0.000	0.890	39
Claymore Trust	GIY	S&P 500 Index	-73.563%	2.814	0.001	0.014	695
Columbia	GMMB	Barclays US Aggregate Bond Index	-68.414%	1.889	0.001	0.009	1239
	GMTB	Barclays US Aggregate Bond Index	-63.243%	1.140	0.031	0.003	1239
	GVT	S&P 500 Index	-73.948%	2.033	0.000	0.011	1425
	RPX	S&P 500 Index	-79.127%	0.749	0.162	0.001	1319
	RWG	S&P 500 Index	-73.359%	0.445	0.397	0.000	1319

Table 1 cont.

Fidelity	FBND	Barclays US Aggregate Bond Index	-0.030%	0.994	0.000	0.979	57
	FCOR	Barclays US Aggregate Bond Index	-7.915%	0.708	0.846	-0.017	57
	FLTB	Barclays US Aggregate Bond Index	-0.018%	1.000	0.000	0.980	57
First Trust	FTHI	S&P 500 Index	-46.024%	3.602	0.226	0.002	248
	FTLB	S&P 500 Index	-70.035%	5.397	0.103	0.007	248
	FTLS	S&P 500 Index	-73.248%	-1.996	0.761	-0.012	79
	FTSL	Barclays US Aggregate Bond Index	-0.022%	0.993	0.000	0.995	420
	FTSM	S&P 500 Index	-78.063%	-13.403	0.012	0.052	102
	HYLS	Barclays US Aggregate Bond Index	-0.030%	0.991	0.000	0.988	465
	LMBS	Barclays US Aggregate Bond Index	-141.708%	-11.842	0.319	0.001	38
	EMLP	S&P 500 Index	-0.036%	0.995	0.000	0.981	635
	FDIV	S&P 500 Index	-16.872%	6.071	0.199	0.007	96
	FEMB	Barclays US Aggregate Bond Index	-53.660%	18.577	0.114	0.042	38
	FMB	Barclays US Aggregate Bond Index	-81.626%	-6.798	0.231	0.003	159
	FMF	S&P 500 Index	-78.788%	-1.019	0.424	-0.001	356
	FPE	S&P 500 Index	-0.151%	0.980	0.000	0.964	475
	FTGC	S&P 500 Index	-16.719%	-0.632	0.660	-0.003	299
Flex Shares	RAVI	Barclays US Aggregate Bond Index	-9.439%	5.162	0.000	0.092	557
Franklin	FTSD	Barclays US Aggregate Bond Index	-74.264%	-3.032	0.304	0.000	290
Guggenheim	RIGS	Barclays US Aggregate Bond Index	-0.006%	0.998	0.000	0.993	310
	GSY	S&P 500 Index	-37.256%	1.227	0.000	0.299	1734
Huntington	HECO	S&P 500 Index	-47.721%	2.568	0.003	0.013	636
	HUSE	S&P 500 Index	-53.271%	1.375	0.109	0.003	612
InfraCap	AMZA	S&P 500 Index	-2.832%	0.966	0.000	0.547	62
iShares	COMT	S&P 500 Index	-45.519%	-6.605	0.234	0.009	52
	HYGH	S&P 500 Index	-50.713%	-4.369	0.345	-0.001	150
	IEIL	S&P 500 Index	1.505%	2.961	0.012	0.025	213
	IEIS	S&P 500 Index	-34.924%	-4.211	0.110	0.007	213
	IELG	S&P 500 Index	-11.055%	1.333	0.033	0.008	430
	IESM	S&P 500 Index	-27.377%	2.053	0.030	0.009	430
	LQDH	S&P 500 Index	-47.464%	6.561	0.232	0.003	150
	ALT	S&P 500 Index	-0.328%	0.960	0.000	0.961	886

Table 1 cont.

Pimco	BOND	Barclays US Aggregate Bond Index	-0.002%	0.997	0.000	0.999	689
	DI	Barclays US Aggregate Bond Index	-59.023%	3.327	0.325	0.000	237
	FORX	S&P 500 Index	-26.423%	-0.453	0.540	-0.001	475
	ILB	S&P 500 Index	1.428%	1.822	0.000	0.107	671
	LDUR	Barclays US Aggregate Bond Index	-78.595%	1.255	0.721	-0.004	237
	MINT	Barclays US Aggregate Bond Index	-0.015%	0.998	0.000	0.998	1288
	MUNI	Barclays US Aggregate Bond Index	-0.078%	1.012	0.000	0.449	1279
	SMMU	Barclays US Aggregate Bond Index	-6.200%	3.322	0.000	0.073	1237
	BABZ	Barclays US Aggregate Bond Index	-6.037%	0.828	0.000	0.013	1011
Power Shares	PLK	S&P 500 Index	-50.529%	1.270	0.000	0.274	1227
	PMA	S&P 500 Index	-69.731%	0.938	0.000	0.154	1227
	CHNA	S&P 500 Index	-75.102%	0.651	0.689	-0.003	308
	LALT	S&P 500 Index	-0.641%	0.770	0.000	0.703	150
	PDBC	S&P 500 Index	-36.023%	0.314	0.969	-0.029	6
	PHDG	S&P 500 Index	-0.813%	1.213	0.000	0.059	520
	PSR	S&P 500 Index	-13.127%	1.748	0.000	0.026	1537
ProShares	TYTE	S&P 500 Index	-0.446%	0.845	0.000	0.838	101
Reality Shares	DIVY	S&P 500 Index	0.176%	1.058	0.196	0.169	7
Russel Equity	ONEF	S&P 500 Index	-62.444%	-1.400	0.005	0.006	1169
State Street	GAL	S&P 500 Index	-1.404%	3.621	0.000	0.079	674
	INKM	S&P 500 Index	-0.485%	1.285	0.000	0.068	674
	RLY	S&P 500 Index	-3.467%	2.160	0.000	0.041	674
	RORO	S&P 500 Index	-16.174%	12.116	0.034	0.045	78
	SRLN	Barclays US Aggregate Bond Index	-0.028%	0.991	0.000	0.995	440
	SYE	S&P 500 Index	-71.309%	-4.384	0.148	0.004	246
	SYG	S&P 500 Index	-64.539%	2.970	0.358	-0.001	246
	SYV	S&P 500 Index	-65.297%	-1.096	0.723	-0.004	246
	ULST	Barclays US Aggregate Bond Index	-31.693%	2.525	0.089	0.006	308
Validea	VALX	S&P 500 Index	0.020%	0.969	0.000	0.921	14
Value Shares	IVAL	S&P 500 Index	-0.502%	0.866	0.005	0.716	8
	QVAL	S&P 500 Index	0.100%	1.044	0.000	0.940	48
WBI Shares	WBIA	S&P 500 Index	-0.365%	0.860	0.000	0.855	87
	WBIB	S&P 500 Index	-0.421%	0.853	0.000	0.823	87
	WBIC	S&P 500 Index	-0.430%	0.844	0.000	0.833	87
	WBID	S&P 500 Index	-0.406%	0.865	0.000	0.807	87
	WBIE	S&P 500 Index	-0.327%	0.873	0.000	0.883	87
	WBIF	S&P 500 Index	-0.436%	0.848	0.000	0.857	87
	WBIG	S&P 500 Index	-0.444%	0.840	0.000	0.846	87
	WBIH	Barclays US Aggregate Bond Index	-0.085%	0.971	0.000	0.962	87
	WBII	Barclays US Aggregate Bond Index	-0.057%	0.975	0.000	0.963	87
	WBIL	S&P 500 Index	-0.505%	0.819	0.000	0.818	87

Table 1 cont.

Wisdom Tree	SZR	S&P 500 Index	-34.874%	0.902	0.000	0.141	1118
	ALD	Barclays US Aggregate Bond Index	-0.046%	0.991	0.000	0.989	954
	AUNZ	Barclays US Aggregate Bond Index	-3.353%	1.281	0.000	0.513	1641
	BZF	S&P 500 Index	-0.078%	0.998	0.000	0.998	1670
	CCX	S&P 500 Index	-23.242%	0.016	0.968	-0.001	1074
	CEW	S&P 500 Index	-0.264%	0.968	0.000	0.973	1424
	CRDT	Barclays US Aggregate Bond Index	-103.112%	-7.624	0.235	0.003	147
	CYB	S&P 500 Index	-0.074%	0.997	0.000	0.998	1670
	ELD	Barclays US Aggregate Bond Index	-0.065%	0.991	0.000	0.984	1107
	EMCB	Barclays US Aggregate Bond Index	-0.032%	0.994	0.000	0.988	708
	GLCB	S&P 500 Index	-97.680%	-0.068	0.957	-0.003	335
	ICN	S&P 500 Index	-6.275%	0.969	0.000	0.517	1670
	RRF	Barclays US Aggregate Bond Index	-84.466%	-0.884	0.292	0.000	872
	USDU	S&P 500 Index	-0.273%	0.907	0.000	0.848	260
	WDTI	S&P 500 Index	-0.335%	0.941	0.000	0.934	1003
	EU	S&P 500 Index	-44.871%	0.328	0.358	0.000	1670
	JYF	S&P 500 Index	-45.047%	2.179	0.000	0.020	1142

Table 2 – Ratings performance

The table presents the results from the calculation of the Sharpe and the Treynor ratios, the sponsors, the tickers of the ETFs, the beta coefficients, and the number of observations.

Sponsor	Ticker	Beta	Sharpe Ratio	Treynor Ratio	Observations
Advisor Shares	AADR	0.269	-0.677	-2.247	1120
	ACCU	2.452	-0.796	-0.312	737
	AGLS	2.301	-0.719	-0.290	774
	DBIZ	0.034	-0.330	-4.608	511
	DIVI	-1.026	-0.268	0.099	107
	EPRO	-0.898	-0.309	0.161	272
	FWDB	1.476	-0.813	-0.533	888
	FWDD	0.323	-0.799	-2.376	888
	FWDI	0.312	-0.858	-2.689	888
	GEUR	8.357	-0.488	-0.044	223
	GIVE	0.962	-0.927	-0.956	654
	GTAA	0.797	-0.363	-0.081	1052
	GRV	-1.717	-0.478	0.171	353
	GYEN	2.054	-0.376	-0.109	223
	HDGE	0.873	-1.102	-0.052	988
	HOLD	-0.718	-0.905	1.249	242
	HYLD	1.028	-0.415	-0.053	1027
	MATH	-0.157	-0.517	2.492	886
	MINC	0.994	-0.945	-0.034	450
	MULT	-4.933	-0.847	0.168	122
	QEH	2.175	-0.890	-0.405	602
	RRGR	3.976	-0.867	-0.216	349
	TTFS	2.728	-0.472	-0.123	814
	YPRO	0.831	-1.894	-0.033	209
	SSAM	6.075	-0.867	-0.274	356
ARK investments	ARKG	0.936	-1.859	-0.034	40
	ARKK	0.969	-2.021	-0.034	40
	ARKQ	0.880	-1.849	-0.032	63
	ARKW	0.953	-1.691	-0.029	63
Arrow Shares	DWAT	-0.813	-0.260	0.113	63
Calamos	CFGE	6.757	-0.804	-0.115	119
Cambria	GMOM	0.861	-2.314	-0.038	39
Claymore Trust	GIY	2.814	-0.879	-0.241	695
Columbia	GMMB	1.889	-0.824	-0.422	1239
	GMTB	1.140	-0.750	-0.615	1239
	GVT	2.033	-0.878	-0.426	1425
	RPX	0.749	-0.855	-1.114	1319
	RWG	0.445	-0.795	-1.707	1319

Table 2 cont.

Fidelity	FBND	0.994	-2.305	-0.031	57
	FCOR	0.708	-0.274	-0.142	57
	FLTB	1.000	-2.285	-0.031	57
First Trust	FTHI	3.602	-0.633	-0.156	248
	FTLB	5.397	-0.863	-0.158	248
	FTLS	-1.996	-0.726	0.342	79
	FTSL	0.993	-0.894	0.002	420
	FTSM	-13.403	-0.539	-0.450	102
	HYLS	0.991	-0.974	-0.036	465
	LMBS	-11.842	-1.035	0.087	38
	EMLP	0.995	-1.107	-0.047	635
	FDIV	6.071	-0.447	-0.052	96
	FEMB	18.577	-1.142	-0.061	38
	FMB	-6.798	-0.696	0.094	159
	FMF	-1.019	-0.787	0.739	356
	FPE	0.980	-0.980	-0.038	475
	FTGC	-0.632	-0.315	0.236	299
Flex Shares	RAVI	5.162	-0.452	0.093	557
Franklin	FTSD	-3.032	-0.708	0.216	290
Guggenheim	RIGS	0.998	-0.897	-0.032	310
	GSY	1.227	-0.623	-0.502	1734
Huntington	HECO	2.568	-0.665	-0.232	636
	HUSE	1.375	-0.665	-0.433	612
InfraCap	AMZA	0.966	-1.247	-0.031	62
iShares	COMT	-6.605	-0.417	0.040	52
	HYGH	-4.369	-0.513	0.091	150
	IEIL	2.961	-0.240	-0.022	213
	IEIS	-4.211	-0.387	0.056	213
	IELG	1.333	-0.320	-0.115	430
	IESM	2.053	-0.469	-0.166	430
	LQDH	6.561	-0.690	-0.097	150
	ALT	0.960	-1.410	-0.074	886
Pimco	BOND	0.997	-1.204	-0.048	689
	DI	3.327	-0.731	-0.207	237
	FORX	-0.453	-0.405	0.547	475
	ILB	1.822	-0.316	-0.039	671
	LDUR	1.255	-0.841	-0.656	237
	MINT	0.998	-1.192	-0.059	1288
	MUNI	1.012	-0.806	-0.060	1279
	SMMU	3.322	-0.427	-0.079	1237
	BABZ	0.828	-0.326	-0.125	1011

Table 2 cont.

Power Shares	PLK	1.270	-0.740	-0.485	1227
	PMA	0.938	-0.868	-0.516	1227
	CHNA	0.651	-0.797	-1.184	308
	LALT	0.770	-2.011	-0.033	150
	PDBC	0.314	-0.498	-1.179	6
	PHDG	1.213	-0.292	-0.043	520
	PSR	1.748	-0.419	-0.139	1537
ProShares	TYTE	0.845	-1.795	-0.030	101
Reality Shares	DIVY	1.058	-0.720	-0.012	7
Russel Equity	ONEF	-1.400	-0.581	-1.429	1169
State Street	GAL	3.621	-0.358	-0.051	674
	INKM	1.285	-0.337	-0.051	674
	RLY	2.160	-0.326	-0.063	674
	RORO	12.116	-0.556	-0.038	78
	SRLN	0.991	-0.973	-0.033	440
	SYE	-4.384	-0.657	0.134	246
	SYG	2.970	-0.763	-0.246	246
	SYV	-1.096	-0.681	0.568	246
	ULST	2.525	-0.510	-0.156	308
Validea	VALX	0.969	-1.477	-0.019	14
Value Shares	IVAL	0.866	-1.815	-0.021	8
	QVAL	1.044	-1.666	-0.028	48
WBI Shares	WBIA	0.860	-1.651	-0.028	87
	WBIB	0.853	-1.659	-0.029	87
	WBIC	0.844	-1.679	-0.029	87
	WBID	0.865	-1.630	-0.029	87
	WBIE	0.873	-1.647	-0.028	87
	WBIF	0.848	-1.706	-0.029	87
	WBIG	0.840	-1.702	-0.029	87
	WBIH	0.971	-1.731	-0.025	87
	WBII	0.975	-1.711	-0.025	87
	WBIL	0.819	-1.725	-0.030	87

Table 2 cont.

Wisdom Tree	SZR	0.902	-0.613	2.614	1118
	ALD	0.991	-1.123	-0.043	954
	AUNZ	1.281	-0.372	-0.147	1641
	BZF	0.998	-0.420	-0.151	1670
	CCX	0.016	-0.407	-15.008	1074
	CEW	0.968	-1.245	-0.065	1424
	CRDT	-7.624	-0.857	0.110	147
	CYB	0.997	-0.420	-0.151	1670
	ELD	0.991	-1.157	-0.054	1107
	EMCB	0.994	-1.228	-0.049	708
	GLCB	-0.068	-0.977	14.358	335
	ICN	0.969	-0.431	-0.215	1670
	RRF	-0.884	-0.831	0.911	872
	USDU	0.907	-1.452	-0.030	260
	WDTI	0.941	-1.129	-0.049	1003
	EU	0.328	-0.581	-1.429	1670
	JYF	2.179	-0.676	-0.277	1142

Table 3 – Tracking errors – the table presents the three types of tracking errors calculated, the sponsor, the ticker, the alpha coefficient, and the number of observations.

Sponsor	Ticker	Alpha	Tracking error 1	Tracking error 2	Tracking error 3	Observations
Advisor Shares	AADR	-58.906%	89.255%	55.412%	89.324%	1120
	ACCU	-64.621%	95.810%	72.081%	95.985%	737
	AGLS	-56.017%	92.487%	62.544%	92.633%	774
	DBIZ	-15.348%	46.926%	12.175%	47.063%	511
	DIVI	-12.730%	38.248%	8.194%	38.373%	107
	EPRO	-16.869%	46.982%	12.072%	47.120%	272
	FWDB	-72.258%	96.750%	74.583%	96.768%	888
	FWDD	-75.467%	96.296%	72.965%	96.334%	888
	FWDI	-82.653%	98.042%	80.296%	99.736%	888
	GEUR	-14.215%	74.613%	35.043%	75.521%	223
	GIVE	-87.563%	99.416%	87.902%	99.416%	654
	GTAA	-2.558%	17.369%	1.961%	17.392%	1052
	GRV	-41.683%	60.739%	23.246%	62.881%	353
	GYEN	-16.892%	59.851%	20.555%	59.875%	223
	HDGE	-0.681%	2.086%	1.566%	2.149%	988
	HOLD	-91.789%	99.492%	87.250%	99.541%	242
	HYLD	-0.725%	12.517%	1.382%	12.517%	1027
	MATH	-39.748%	75.735%	35.152%	75.878%	886
	MINC	-0.019%	0.218%	0.170%	0.219%	450
	MULT	-95.145%	98.333%	81.121%	98.708%	122
	QEH	-78.160%	98.744%	83.962%	98.872%	602
	RRGR	-72.581%	98.115%	83.254%	98.848%	349
	TTFS	-21.247%	70.241%	29.306%	70.579%	814
	YPRO	-0.524%	0.647%	0.534%	0.702%	209
	SSAM	-45.494%	96.498%	79.250%	97.980%	356

Table 3 cont.

ARK investments	ARKG	-0.135%	0.960%	0.749%	0.974%	40
	ARKK	-0.183%	0.753%	0.568%	0.758%	40
	ARKQ	-0.417%	0.939%	0.722%	0.977%	63
	ARKW	-0.166%	1.041%	0.821%	1.051%	63
Arrow Shares	DWAT	-11.496%	36.026%	6.753%	36.165%	63
Calamos	CFGE	-60.880%	97.374%	75.802%	97.977%	119
Cambria	GMOM	-0.493%	0.472%	0.351%	0.521%	39
Claymore Trust	GIY	-73.563%	98.170%	82.445%	98.484%	695
Columbia	GMMB	-68.414%	96.482%	74.076%	96.664%	1239
	GMTB	-63.243%	93.413%	64.719%	93.476%	1239
	GVT	-73.948%	98.056%	80.625%	98.222%	1425
	RPX	-79.127%	97.564%	78.016%	97.596%	1319
	RWG	-73.359%	95.498%	70.552%	95.559%	1319
Fidelity	FBND	-0.030%	0.193%	0.151%	0.193%	57
	FCOR	-7.915%	37.448%	7.157%	37.448%	57
	FLTB	-0.018%	0.189%	0.127%	0.173%	57
First Trust	FTHI	-46.024%	88.709%	53.645%	88.847%	248
	FTLB	-70.035%	98.504%	82.590%	98.859%	248
	FTLS	-73.248%	95.376%	66.205%	95.506%	79
	FTSL	-0.022%	0.267%	0.203%	0.268%	420
	FTSM	-78.063%	81.215%	44.557%	84.210%	102
	HYLS	-0.030%	0.409%	0.298%	0.410%	465
	LMBS	-141.708%	101.098%	100.150%	102.770%	38
	EMLP	-0.036%	0.584%	0.441%	0.585%	635
	FDIV	-16.872%	70.837%	29.937%	71.658%	96
	FEMB	-53.660%	98.882%	113.657%	103.506%	38
	FMB	-81.626%	92.412%	62.193%	93.269%	159
	FMF	-78.788%	95.940%	72.376%	96.280%	356
	FPE	-0.151%	0.722%	0.550%	0.726%	475
	FTGC	-16.719%	47.622%	12.727%	47.726%	299

Table 3 cont.

Flex Shares	RAVI	-9.439%	66.586%	27.414%	68.777%	557
Franklin	FTSD	-74.264%	92.818%	63.129%	93.281%	290
Guggenheim	RIGS	-0.006%	0.317%	0.235%	0.318%	310
	GSY	-37.256%	82.713%	41.872%	83.319%	1734
Huntington	HECO	-47.721%	89.202%	55.324%	89.443%	636
	HUSE	-53.271%	89.525%	55.235%	89.539%	612
InfraCap	AMZA	-2.832%	1.656%	1.335%	1.910%	62
iShares	COMT	-45.519%	63.724%	23.878%	64.939%	52
	HYGH	-50.713%	78.045%	37.715%	78.401%	150
	IEIL	1.505%	27.048%	4.140%	27.227%	213
	IEIS	-34.924%	60.569%	21.072%	61.134%	213
	IELG	-11.055%	47.893%	12.383%	47.909%	430
	IESM	-27.377%	72.261%	31.118%	72.366%	430
	LQDH	-47.464%	92.485%	61.687%	92.808%	150
	ALT	-0.328%	0.998%	0.744%	1.020%	886
Pimco	BOND	-0.002%	0.146%	0.101%	0.146%	689
	DI	-59.023%	94.313%	66.439%	94.409%	237
	FORX	-26.423%	61.271%	21.647%	61.522%	475
	ILB	1.428%	21.483%	3.015%	21.748%	671
	LDUR	-78.595%	98.240%	79.759%	98.241%	237
	MINT	-0.015%	0.203%	0.154%	0.203%	1288
	MUNI	-0.078%	5.601%	0.319%	5.601%	1279
	SMMU	-6.200%	59.183%	20.377%	60.324%	1237
	BABZ	-6.037%	31.686%	5.517%	31.696%	1011
Power Shares	PLK	-50.529%	89.268%	57.063%	90.029%	1227
	PMA	-69.731%	95.025%	68.898%	95.062%	1227
	CHNA	-75.102%	97.021%	74.937%	97.028%	308
	LALT	-0.641%	0.693%	0.532%	0.764%	150
	PDBC	-36.023%	76.505%	34.168%	76.513%	6
	PHDG	-0.813%	17.548%	1.862%	17.566%	520
	PSR	-13.127%	57.235%	18.747%	57.365%	1537
ProShares	TYTE	-0.446%	0.572%	0.452%	0.620%	101
Reality Shares	DIVY	0.176%	1.842%	1.550%	2.054%	7
Russel Equity	ONEF	-62.444%	85.168%	41.827%	80.727%	1169

Table 3 cont.

State Street	GAL	-1.404%	49.468%	13.936%	50.561%	674
	INKM	-0.485%	18.706%	2.158%	18.740%	674
	RLY	-3.467%	40.903%	9.295%	41.226%	674
	RORO	-16.174%	81.458%	45.243%	84.735%	78
	SRLN	-0.028%	0.242%	0.182%	0.244%	440
	SYE	-71.309%	89.647%	56.255%	90.229%	246
	SYG	-64.539%	95.739%	70.285%	95.812%	246
	SYV	-65.297%	91.695%	59.515%	91.781%	246
	ULST	-31.693%	77.254%	36.496%	77.388%	308
Validea	VALX	0.020%	0.370%	0.283%	0.373%	14
Value Shares	IVAL	-0.502%	0.523%	0.470%	0.615%	8
	QVAL	0.100%	0.438%	0.364%	0.444%	48
WBI Shares	WBIA	-0.365%	0.561%	0.423%	0.604%	87
	WBIB	-0.421%	0.628%	0.463%	0.670%	87
	WBIC	-0.430%	0.598%	0.458%	0.648%	87
	WBID	-0.406%	0.671%	0.530%	0.704%	87
	WBIE	-0.327%	0.503%	0.389%	0.542%	87
	WBIF	-0.436%	0.548%	0.421%	0.599%	87
	WBIG	-0.444%	0.569%	0.432%	0.623%	87
	WBIH	-0.085%	0.276%	0.207%	0.280%	87
	WBII	-0.057%	0.274%	0.200%	0.276%	87
	WBIL	-0.505%	0.612%	0.466%	0.677%	87
Wisdom Tree	SZR	-34.874%	74.541%	34.192%	74.613%	1118
	ALD	-0.046%	0.400%	0.288%	0.401%	954
	AUNZ	-3.353%	35.361%	7.577%	36.249%	1641
	BZF	-0.078%	1.525%	0.921%	1.526%	1670
	CCX	-23.242%	57.404%	18.759%	57.576%	1074
	CEW	-0.264%	0.820%	0.601%	0.836%	1424
	CRDT	-103.112%	98.375%	81.836%	98.989%	147
	CYB	-0.074%	1.436%	0.911%	1.439%	1670
	ELD	-0.065%	0.589%	0.427%	0.590%	1107
	EMCB	-0.032%	0.440%	0.318%	0.441%	708
	GLCB	-97.680%	99.983%	93.510%	100.092%	335
	ICN	-6.275%	33.593%	6.665%	33.611%	1670
	RRF	-84.466%	96.965%	76.682%	97.246%	872
	USDU	-0.273%	0.733%	0.571%	0.754%	260
	WDTI	-0.335%	1.048%	0.740%	1.078%	1003
	EU	-44.871%	80.641%	41.827%	80.727%	1670
	JYF	-45.047%	88.220%	54.439%	88.497%	1142

Table 4. List of all examined ETFs The table presents all the ETFs included in the empirical research, their sponsor, the ticker, and their full name.**Table 4 cont.**

Sponsor	Ticker	Market Index	Name
Advisor Shares	AADR	S&P 500 Index	WCM/BNY Mellon Focused Growth ADR
	ACCU	S&P 500 Index	Accuvest Global Opportunities
	AGLS	S&P 500 Index	Accuvest Global Long Short
	DBIZ	S&P 500 Index	Pring Turner Business Cycle
	DIVI	S&P 500 Index	Athena High Dividend
	EPRO	S&P 500 Index	Equity Pro
	FWDB	Barclays US Aggregate Bond Index	Madrona Global Bond
	FWDD	S&P 500 Index	Madrona Domestic
	FWDI	S&P 500 Index	Madrona International
	GEUR	S&P 500 Index	Gartman Gold/Euro
	GIVE	S&P 500 Index	Global Echo
	GTAA	S&P 500 Index	Morgan Creek Global Tactical
	GRV	S&P 500 Index	Global Relative Value
	GYEN	S&P 500 Index	Gartman Yen/Euro
	HDGE	S&P 500 Index	Ranger Equity Bear
	HOLD	Barclays US Aggregate Bond Index	Sage Core Reserves
	HYLD	S&P 500 Index	Peritus High Yield
	MATH	S&P 500 Index	Meidell Tactical Advantage
	MINC	Barclays US Aggregate Bond Index	Newfleet Multi-Sector Inc
	MULT	S&P 500 Index	Sunrise Global Multi-Strategy
	QEH	S&P 500 Index	Qam Equity Hedge
	RRGR	S&P 500 Index	Global Alpha & Beta
	TTFS	S&P 500 Index	TrimTabs Float Shrink
	YPRO	S&P 500 Index	YieldPro
	SSAM	S&P 500 Index	Sector SAM ETF
ARK investments	ARKG	S&P 500 Index	Genomic Revolution Multi-Sector
	ARKK	S&P 500 Index	Innovation ETF
	ARKQ	S&P 500 Index	Industrial Innovation
	ARKW	S&P 500 Index	Web X.0
Arrow Shares	DWAT	S&P 500 Index	DWA Tactical
Calamos	CFGE	S&P 500 Index	Focus Growth ETF
Cambria	GMOM	S&P 500 Index	Global Momentum ETF
Claymore Trust	GIY	S&P 500 Index	Enhanced Core
Columbia	GMMB	Barclays US Aggregate Bond Index	Intermediate Municipal Bond
	GMTB	Barclays US Aggregate Bond Index	Core Bond
	GVT	S&P 500 Index	Select Large Cap Value
	RPX	S&P 500 Index	Large Cap Growth
	RWG	S&P 500 Index	Select Large Cap Growth
Fidelity	FBND	Barclays US Aggregate Bond Index	Total Bond
	FCOR	Barclays US Aggregate Bond Index	Corporate Bond
	FLTB	Barclays US Aggregate Bond Index	Limited Term Bond

Table 4 cont.

First Trust	FTHI	S&P 500 Index	High Income
	FTLB	S&P 500 Index	Low Beta Income
	FTLS	S&P 500 Index	Long/Short Equity
	FTSL	Barclays US Aggregate Bond Index	Senior Loan
	FTSM	S&P 500 Index	Enhanced Short Maturity
	HYLS	Barclays US Aggregate Bond Index	Tactical High Yield
	LMBS	Barclays US Aggregate Bond Index	Low Duration Mortgage Opportunities
	EMLP	S&P 500 Index	North American Energy Infrastructure
	FDIV	S&P 500 Index	Strategic Income
	FEMB	Barclays US Aggregate Bond Index	Emerging Markets Local Currency
	FMB	Barclays US Aggregate Bond Index	Managed Municipal
	FMF	S&P 500 Index	Morningstar Managed Futures Strategy Fund
	FPE	S&P 500 Index	Preferred Securities and Income
	FTGC	S&P 500 Index	Global Tactical Commodity Strategy Funds
Flex Shares	RAVI	Barclays US Aggregate Bond Index	Ready Access Variable Income Fund
Franklin	FTSD	Barclays US Aggregate Bond Index	Short Duration US Government
Guggenheim	RIGS	Barclays US Aggregate Bond Index	Riverfront Strategic Income Fund
	GSY	S&P 500 Index	Enhanced Short Duration
Huntington	HECO	S&P 500 Index	Ecological Strategy
	HUSE	S&P 500 Index	US Equity Rotation Strategy
InfraCap	AMZA	S&P 500 Index	InfraCap MLP
iShares	COMT	S&P 500 Index	Commodities Select Strategy
	HYGH	S&P 500 Index	Interest Rate Hedged High Yield
	IEIL	S&P 500 Index	Enhanced International Large-Cap
	IEIS	S&P 500 Index	Enhanced International Small-Cap
	IELG	S&P 500 Index	Enhanced US Large-Cap ETF
	IESM	S&P 500 Index	Enhanced US Small-Cap ETF
	LQDH	S&P 500 Index	Interest Rate Hedged Corporate
	ALT	S&P 500 Index	Multi-Asset Alternative Portfolio Fund
Pimco	BOND	Barclays US Aggregate Bond Index	Total Return Active ETF
	DI	Barclays US Aggregate Bond Index	Diversified Income Active ETF
	FORX	S&P 500 Index	Foreign Currency Strategy Active ETF
	ILB	S&P 500 Index	Global Advantage Inflation-Linked Bond Active ETF
	LDUR	Barclays US Aggregate Bond Index	Low Duration Active ETF
	MINT	Barclays US Aggregate Bond Index	Enhanced Short Maturity Active ETF
	MUNI	Barclays US Aggregate Bond Index	Intermediate Municipal Bond Active ETF
	SMMU	Barclays US Aggregate Bond Index	Short Term Municipal Bond Active ETF
	BABZ	Barclays US Aggregate Bond Index	Build America Bond Strategy Fund
Power Shares	PLK	S&P 500 Index	Active Low Duration Fund
	PMA	S&P 500 Index	Active Mega Cap Fund
	CHNA	S&P 500 Index	China A-Share Portfolio
	LALT	S&P 500 Index	Multi-Strategy Alternative Portfolio Fund
	PDBC	S&P 500 Index	Optimum Yield Diversified Commodity Strategy Portfolio Fund
	PHDG	S&P 500 Index	S&P 500 Downside Hedged Portfolio
	PSR	S&P 500 Index	Active US Real Estate

Table 4 cont.

ProShares	TYTE	S&P 500 Index	North American High Yeld Credit Fund
Reality Shares	DIVY	S&P 500 Index	DIVS
Russel Equity	ONEF	S&P 500 Index	Russel Equity ETF
State Street	GAL	S&P 500 Index	Global Allocation
	INKM	S&P 500 Index	Income Allocation
	RLY	S&P 500 Index	Multi-Asset Real Return
	RORO	S&P 500 Index	SSGA Risk Aware
	SRLN	Barclays US Aggregate Bond Index	Blackstone/GSO Senior Loan
	SYE	S&P 500 Index	MFS Systematic Core Equity
	SYG	S&P 500 Index	MFS Systematic Growth Equity
	SYV	S&P 500 Index	MFS Systematic Value Equity
	ULST	Barclays US Aggregate Bond Index	Ultra Short Term Bond
Validea	VALX	S&P 500 Index	Market Legends
Value Shares	IVAL	S&P 500 Index	International Quantitative Value
	QVAL	S&P 500 Index	US Quantitative Value
WBI Shares	WBIA	S&P 500 Index	WBI SMID Tactical Growth Shares
	WBIB	S&P 500 Index	WBI SMID Tactical Value Shares
	WBIC	S&P 500 Index	WBI SMID Tactical Yield Shares
	WBID	S&P 500 Index	WBI SMID Tactical Select Shares
	WBIE	S&P 500 Index	WBI Large Cap Tactical Growth Shares
	WBIF	S&P 500 Index	WBI Large Cap Tactical Value Shares
	WBIG	S&P 500 Index	WBI Large Cap Tactical Yield Shares
	WBIH	Barclays US Aggregate Bond Index	WBI Tactical High Income Shares
	WBII	Barclays US Aggregate Bond Index	WBI Tactical Income Shares
	WBIL	S&P 500 Index	WBI Large Cap Tactical Select Shares
Wisdom Tree	SZR	S&P 500 Index	Dreyfus South Acrican Rand Fund
	ALD	Barclays US Aggregate Bond Index	Asia Local Debt
	AUNZ	Barclays US Aggregate Bond Index	Dreyfus Australia and New Zealand Debt
	BZF	S&P 500 Index	Brazilian Real Strategy
	CCX	S&P 500 Index	Commodity Currency Strategy
	CEW	S&P 500 Index	Emerging Currency Strategy
	CRDT	Barclays US Aggregate Bond Index	Strategic Corporate Bond
	CYB	S&P 500 Index	Chinese Yuan Strategy
	ELD	Barclays US Aggregate Bond Index	Emerging Markets Local Debt
	EMCB	Barclays US Aggregate Bond Index	Emerging Markets Corporate Bond
	GLCB	S&P 500 Index	Global Corporate ETF
	ICN	S&P 500 Index	Indian Rupee Fund
	RRF	Barclays US Aggregate Bond Index	Real Return Fund
	USDU	S&P 500 Index	Bloomberg US Dollar Bullish
	WDTI	S&P 500 Index	Managed Futures Strategy
	EU	S&P 500 Index	Wisdom Tree European Equity Fund
	JYF	S&P 500 Index	Dreyfus Japanese Yen Fund