Fixed Income Exchange Traded Funds and the value add of Active Management

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Abstract

This research paper examines if there is a significant difference in return between actively managed and passively managed fixed income Exchange Traded Funds (ETFs) and evaluates the ability of active fixed income ETF managers to time the market. The research uses nineteen actively managed ETFs and compares them to eight passive counterparts and eight benchmarks. The results validate the expectations of underperformance of actively managed ETFs respective to their passive counterpart and their benchmark. The results show that active ETF managers do not possess significant market timing skills.

Key words: Exchange Traded Funds, ETFs, fixed income, active management, passive management, market timing

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1. Introduction

This research paper examines if there is a significant difference in return between actively managed and passively managed fixed income Exchange Traded Funds (ETFs) and evaluates the ability of active fixed income ETF managers to time the market. Although actively managed fixed income ETFs are growing in popularity, no research has been done specifically about the effectiveness of actively managing fixed income ETFs.

To determine whether there is a significant difference in the returns of actively and passively managed fixed income ETFs, data from Datastream, Bloomberg, Yahoofinance.com and the etfdatabase (etfdb) will be used. Active ETFs will be compared to their passive counterpart sharing a similar benchmark. To rate the performance of ETFs, total percentage return will be used as well as the Sharpe ratio, Treynor ratio and Jensen's alpha. A market timing regression will be done to determine whether active ETF managers have the ability to time the market.

An interesting thought is that while ETFs are the product of research that shows the advantages of passive investing, actively managed ETFs are introduced into the market and are gaining popularity.

1.1 Exchange Traded Funds

In January of 1993 the S&P 500 Depository Receipt (SPDR), managed by State Street Global Advisors, was launched on the American market. This fund would be the first of its kind of what we now call Exchange Traded Funds (ETFs). Prior to launching the SPDR ('spider'), many attempts have been made by money managers to create a product like an ETF, with the Index Participation Shares for the S&P500, launched in 1989 being the product closest to modern ETFs (Gastineau G. L., 2010).

1.2 Creation of ETFs

An ETF can be characterized as a "portfolio-in-a-single-share" (Gastineau G. L., 2001). With ETFs investors can invest in, and follow returns of an index without having to buy all the shares, bonds or other investment types in that index, which is physically impossible for a single investor. ETFs are traded on the stock exchange, like regular stocks, but different than regular stocks, ETFs are created based on a 'basket' of regular stocks, bonds or other investment types.

This ‘basket’ is created by the ETF issuer (or sponsor) and Authorized Participants (APs), often market makers. Authorized Participants are appointed by the ETF issuer to obtain the underlying assets needed to create the ETF. The ETF issuer than exchanges that ‘basket’ of assets with ETF-units (shares). The market makers can now start trading the shares (ETF-units) on the stock exchange with investors. To make sure the ‘basket’ always reflects the index it is tracking, the process of exchanging assets with ETF-units occurs every day, after the close of the respective stock exchange.

ETFs can hold physical stocks of the underlying benchmark, but they can also make use of derivatives, such as futures, forwards, options and swaps, making the ETF ‘synthetic’. The use of derivatives can make it easier to create a tracker that simulates the return of an index, hence it is often seen that an ETF follows a mixed strategy of physical underlying stock combined with derivatives (Wiandt & McClatchy, 2011).

1.3 Physical versus Synthetic ETFs

As mentioned in section 1.2, the basket of securities underlying the ETF can be either physical, synthetic or a combination of the two. The basket underlying a physical ETF holds, as the name suggests, physical securities of the benchmark it tracks. A synthetic ETF makes use of derivatives of the benchmark. Using derivatives enables exposure to markets in which it is hard or nearly impossible to purchase physical securities. Besides exposure to otherwise inaccessible markets, synthetic ETFs are in general more accurate in tracking index return and therefor can have a reduced tracking error. The flipside of a synthetic ETF is that it is a complex structure and therefor does not offer the same transparency that a physical ETF does (Wiandt & McClatchy, 2011).

1.4 ETFs versus Mutual Funds

The idea to pool money with other investors in a balanced portfolio is an ancient one. The first record of an investment fund resembling our current mutual funds, dates back to 1774. Just after the financial crisis of 1772-1773, the Dutch broker Abraham van Ketwich founded a mutual trust fund, suitably referred to as *Eendragt Maakt Magt*, “Unity Creates Strength”. The fund allowed small (private) investors to pool their money and allocate there investment in ways they could not have done otherwise (Rouwenhorst, 2004). Current mutual funds still function in the same

way as the original trust fund of Ketwich. By purchasing units in the fund of choice, investors get the exposure they prefer.

Both ETFs and mutual funds allow investors to combine resources to invest in a diverse portfolio they could not have done otherwise. The difference between the two lies in the creation of the funds. Mutual funds are solely created by the companies that manage the funds, hence when entering a mutual fund, the investor trades with the fund manager. ETFs on the other hand make use of intermediaries, the Authorized Participants. These intermediaries enable the ETFs to be traded on the exchange, so that the counterparty of a trade in ETFs is another investor, not the fund manager. This feature of being able to obtain a diversified portfolio that trades on the exchange, without the costs of entering a mutual fund, makes ETFs a popular and easy accessible investment tool to investors.

1.5 Active and Passive ETFs

We can divide the ETF group into multiple separate groups. The most obvious separation is categorizing the underlying of the ETF, being equity, bonds, commodities et cetera.

If we look further into those categories, we find two differently managed groups of ETFs; the original passively managed ETFs and the more recent actively managed ETFs. The latter only exists since 2008 and there is still an ongoing debate whether these active managed ETFs are creating value or whether this group is actually destroying investor value by the fees they are charging. At the roots of this debate lays the everlasting believe or disbelieve in efficient markets; are our markets able to incorporate all information such that prices not only reflect current state but also believes about future growth?

2. Literature Review

Since the introduction of the first actively managed ETF in 2008, the market has gone through a lot of turbulence and hit bottom low in the financial crisis. All this action may have overshadowed the interest of researchers to investigate the effect of active management on ETF returns. The research that has been done focusses solely on the first active ETFs (Rompotis, 2009; Schizas, 2011).

This study contributes to the debate between active and passive investing and uses ETFs as a tool for this research. Therefore, to give a total overview of previous literature, this section will not only focus on the little research done on active ETFs, but will also review the studies done in the field of performance valuation, comparing actively managed funds with passively managed funds.

2.1 Passive versus Active Management

At the roots of the debate between active versus passive management, lays the everlasting believe or disbelieve in efficient markets. Are our markets able to incorporate all information such that prices not only reflect current state but also believes about future growth?

Malkiel (1995) finds that actively managed mutual funds underperform the benchmark portfolios. Malkiel is the first to highlight the importance of survivor bias and supports his findings with a unique data set that not only includes funds currently in existence, but all mutual funds existing per year of the study, 1971 to 1991.

In 2003, Malkiel further defends the idea of passive management. He states that even in inefficient markets no profitable investing strategy arises. In his study Malkiel compares the median return of actively managed large cap equity funds with the returns from the S&P500 Index. Furthermore he shows that in the period between 1970 through 2001, only few mutual funds achieved returns above the returns of the index.

Elton, Gruber, Das and Hlavka (1993), refute an earlier study done by Ippolito (1989). In that research Ippolito finds evidence supporting the efficiency arguments. Ippolito follows the performance of mutual funds during a 20 year period and states that risk-adjusted returns of mutual funds are comparable to returns of the index. Elton et all find that, when accounting for

non-S&P listed assets, previous findings of Ippolito do not hold. In their similar study using data for the period from 1965 through 1984, they find that mutual fund managers underperform passively managed portfolios.

In 2007, Cremers and Petajisto show a new methodology in measuring the value add of active management. In previous research, active management is measured by comparing tracking error to the benchmark. The researchers add a second measurement and calls it the 'Active Share', which measures the deviation of holdings within the portfolio from the holdings in the respective benchmark. Cremers and Petajisto apply both the tracking error and the Active Share methodology to investigate fund performance. Using data for mutual funds in the period from 1980 through 2003, they find that the Active Share of a mutual fund is a predictor of performance. The study finds that funds with the highest Active Share significantly outperform their respective benchmark and funds with the lowest Active Share underperform their benchmark. These findings highlight the importance of the distinction between purely active management and partially active management.

2.2 Passive ETFs versus Mutual Funds

Both the conventional mutual index funds and passive ETFs follow the returns of their respective benchmark. Hence, with the introduction of the passive ETF the first question raised was whether ETFs would replace the conventional mutual index funds.

Agapova (2011) studies the substitutability of these two investment products and thereby tries to find an explanation of their coexistence. Agapova studies 171 conventional mutual index funds matched to 11 passive ETFs that follow the same index in the period 2000 through 2004. She finds that while the two investment products are substitutes for one another, they are not perfect substitutes. The explanation of the survival of conventional mutual index funds with the existence of passive ETFs can be found in the difference in niche wherein mutual index funds and ETFs operate. Agapova explains the difference in niche by clientele effect.

In 2012, Blitz, Huij and Swinkels compare European index funds and passive ETFs with their respective benchmarks. In their study, they use a total of 40 passive funds over a period from 2003 to 2008. As expected both the index funds and the ETFs underperform their benchmark. Blitz et al show that these differences in return are not just the result of the funds expense ratios,

but that dividend taxes have a significant impact on the performance of both the index funds and the ETFs and therefore can be used as good indicators of performance.

2.3 Active Management and Stock Selection

In 2000, Wermers finds proof of stock-picking skills at active managers of mutual funds. In his research, he studies the performance of 1788 mutual funds between 1975 and 1994, using data obtained from CDA Investment technologies and the CRPS database. The results show that the stocks held by the mutual funds outperformed the market index, partly explained by talents in picking stocks that beat their characteristic benchmark portfolios. Although Wermers shows that managers do have stock picking skills, he also finds that due to expense ratio and transaction costs, these excess returns level out and can be negligible.

In that same year Chen, Jegadeesh and Wermers (2000) find that stocks held by mutual funds do not outperform other stocks. Interestingly enough, the stocks purchased by the mutual funds show returns that are significantly higher than the stocks sold by the funds. These findings suggest stock selection skills. However, Chen et al also find that the extra value add of these selection skills lasts for only the first year following the trades. Chen et all use data from all existing mutual funds in the period between 1975 and 1994.

The findings of both studies support the research done by Grossman and Stiglitz in 1980. In their study the researchers provide a model with an equilibrium that shows that because information is costly, spending resources to obtain that information, would result in no extra compensation.

2.4 Active ETFs, Passive ETFs, Open-end and Closed-end Funds

After the approval of the Securities and Exchange Commission (SEC) of actively managed ETFs being listed in March 2008, Rompotis (2009) was among the first to provide solid research on the effectiveness of actively managing ETFs. Rompotis compares three actively managed ETFs with three passively managed ETFs with the same index of reference. Rompotis uses both the Sharpe ratio and the Treynor ratio to rate and compare the performance of the ETFs. The results of the research show that actively managed ETFs not only underperform their corresponding passive ETF, but also underperform the market indexes.

In 2011, Schizas studies the performance of actively managed ETFs versus passively managed ETFs, mutual funds and hedge funds. In his study he uses data of five active ETFs and their five passive counterparts. To compare the ETFs with mutual funds, Schizas uses Morningstar categories with the same horizon span as the active ETFs. For hedge funds he uses a similar method, using key words denominating the strategy of the active ETFs to find the best match in hedge funds. Schizas finds no difference in excess return between active ETFs and mutual funds or hedge funds, however, he finds a strong link between actively and passively managed ETFs, with a difference in performance in favor of passive ETFs.

While conventional mutual funds are open-end funds, specific niches are often captured using closed-end funds. Harper, Madura and Schnusenberg (2004) investigate whether there is a difference in performance of passive ETFs and closed-end country funds. In their study they use 29 closed-end country funds and compare them to 14 country ETFs. Using data from CRSP and Compustat over a period from April 1996 to December 2001, they find higher mean returns and a higher average Sharpe ratio for the passive ETF than for the closed-end country funds. These findings indicate superior performance of passive ETFs compared to active closed-end funds.

2.5 Fixed Income ETFs

Houweling (2012) studies the performance of ETFs and specifies his research on Fixed Income ETFs. In his research, Houweling uses ETFs that track a benchmark consisting of European or United States based Treasury bonds, Investment Grade credits, Investment Grade corporate bonds or High Yield corporate bonds. His sample consists of 129 ETFs during the period July 2002 through July 2010. Houweling uses net total return of the ETFs and their respective benchmark to study performance. He concludes that Treasure ETFs are able to track their benchmark, while corporate bonds ETFs underperform their benchmarks. Houweling attributes this difference to the higher liquidity and lower prices of the Treasury bonds. The difference in underperformance of corporate bonds ETFs relative to their benchmark can be attributed to transaction costs of the underlying bonds, making ETFs that follow indexes consisting of bonds that have higher trading costs, underperform.

2.6 Market Timing

Henriksson and Merton (1984) use the market timing model introduced by themselves in 1981 to study the ability of portfolio managers to time the market. They use monthly data from 116 open-end mutual funds in the period between February 1968 to June 1980. Henriksson and Merton find that portfolio managers are not successful in showing significant market timing abilities.

Rompotis (2009) studies the market timing skills of the fund managers of three actively managed ETFs. According to Rompotis the active ETF managers do not show any significant skills to time the market. The study uses data from the first three actively managed ETFs during the period 01/05/2008 through 28/11/2008. This period entails the highly volatile period of the financial crisis and the insignificant findings thus suggest that active managers failed in predicting the consequences of the financial crisis and invest accordingly.

3. Hypotheses, Methodology and Data

In this section hypotheses will be formed to answer the research question. These hypotheses are obtained using the literature review in section 2. The hypotheses are accompanied by an explanation of the methodology used. Furthermore a description of the data will be given.

3.1 Hypotheses and Methodology

3.1.1 Hypotheses

This study analyses the impact of active management on the returns of fixed income ETFs. Since the introduction of the first actively managed ETF in 2008, over 120 active ETFs are introduced into the market. Even though actively managed ETFs are still gaining popularity, not a lot of research has been done on the effectiveness of active ETFs versus their passive counterpart. Taken into account that this active investment product is relatively new, plus the fact that, since 2008, the market has gone through a lot of turbulence, the lack of research might be explained.

As mentioned in the literature review in section 2, previous research comparing active ETFs with their passive counterpart focusses solely on the first active ETFs (Rompotis, 2009; Schizas, 2011). Both researchers find that actively managed ETFs underperform compared to passively managed ETFs. Together with the findings of existing literature investigating active versus passive management, the main conclusions are that active managed funds underperform their benchmark more and more often than passive funds.

Following the findings from the above mentioned previous studies regarding passive versus active management and the findings that transaction costs of bonds underlying fixed income ETFs push down performance of fixed income ETFs, it is expected that underperformance of actively managed funds will be found in the relation between active versus passive fixed income ETFs.

Following the findings of Henriksson and Merton and using their model to evaluate market timing abilities, it is expected that no significant evidence will be found to suggest market timing abilities.

These assumptions are shaped in the hypotheses as follows:

H1: Actively managed fixed income ETFs will underperform their passive counterpart and their shared benchmark

H2: Active portfolio managers will not show significant market timing abilities

3.1.2 Methodology

To rate the performance of ETFs, total percentage return will be used as well as the Sharpe ratio, Treynor ratio and Jensen's alpha. The Sharpe ratio gives an estimation of the relative performance, the higher the ratio, the better the ETF performs. The same is true for the Treynor ratio, another ratio to measure performance of the ETF. Jensen's alpha is found using a regression, a positive (and significant) alpha means the portfolio manager is adding value, a negative (and significant) alpha means the portfolio manager is actually destroying value. Lastly the market timing model introduced by Henriksson and Merton (1981) will be used to evaluate the ability of active managers to time the market. The model uses the gamma coefficient to measure the market timing ability of the portfolio manager.

3.1.2.1 Sharpe Ratio

In 1966, William Sharpe introduces a calculation to measure performance of mutual funds. This calculation, the Sharpe ratio, is still widely used in studies researching performance. The Sharpe ratio uses the difference between portfolio return and risk free rate relative to the standard deviation of the portfolio.

The Sharpe ratio is given by the following equation:

$$Sp,i = \frac{Rp,i - Rf}{\sigma p,i}$$

Where *Rp,i* represents the average daily portfolio's return for the ETF i, and *Rf* denotes the average daily risk-free rate. $\sigma p,i$ denotes the risk of the ETF, given by the standard deviation of ETF's i return.

3.1.2.2 Treynor Ratio

The Treynor ratio uses a similar approach to measuring performance as the Sharpe ratio. The difference between the Sharpe ratio and the Treynor ratio is the measure of risk used. The Treynor ratio uses systematic risk as a risk measure instead of the standard deviation used by the Sharpe ratio.

The Treynor ratio is given by the following formula:

$$Tp,i = \frac{Rp,i - Rf}{\beta p,i}$$

Where *Rp,i* represents the average daily portfolio's return for the ETF i, and *Rf* denotes the average daily risk-free rate. $\beta p,i$ denotes the systematic risk of ETF's i return.

3.1.2.3 Jensen's Alpha

To determine performance of mutual funds, Jensen (1972) studied the CAPM model and added alpha to measure the difference of the expected risk adjusted return and the actual risk adjusted return observed.

Jensen's alpha is derived from a regression performed by the following model:

$$Rp,i - Rf = \alpha p,i + \beta p,i(Rm - Rf) + \epsilon p,i$$

Where *Rp,i* represents the average daily portfolio's return for the ETF i, and *Rf* denotes the average daily risk-free rate. $\beta p,i$ denotes the systematic risk of ETF's i return. *Rm* denotes market return and Jensen's alpha is given by $\alpha p,i$. A positive (and significant) alpha means the portfolio manager is adding value, a negative (and significant) alpha means the portfolio manager is actually destroying value.

3.1.2.4 Market Timing Regression

Following the model of Henriksson Merton (1981), market timing is measured using the following regression:

$$Rp,i - Rf = \alpha p,i + \beta p,i(Rm - Rf) + \gamma p,i\,(Rm - Rf)^2 + \epsilon p,i$$

This regression evaluates the timing ability of ETF managers. *Rp,i* represents the average daily portfolio's return for the ETF i, *Rf* is the daily risk-free rate, *Rm* denotes the market's return, in this case the return of the benchmark. The timing ability is measured by the gamma estimate outcome of the regression.

3.2 Data and descriptive statistics

To perform the study described in section 3.1.2, data is obtained using data from Thomson Datastream, Bloomberg, YahooFinance, the etfdatabase (etfdb) and ETF factsheets. Nineteen active bond ETFs are investigated over the period of one year, from 13/10/2014 through 12/10/2015, European date notation. To account for possible dividends, stock splits, interest and capital gains, daily total returns are used for the analysis. For eighteen active ETFs, data is obtained for the total sample period, 252 observations. Since the SPDR DoubleLine Total Return Tactical (TOTL) was incepted on 02/23/2015, only 160 observations are obtained for this active ETF.

To match the active ETFs to their respective benchmark, the ETF factsheets are used. Using the benchmark, I find the passive ETF that replicates the returns and risk-profile of the benchmark. Following this strategy, eight unique benchmarks and their eight corresponding passive ETFs remain.

Table 1 gives an overview of the passive- and active ETFs with their respective benchmark. The table contains descriptive data such as the mean, median, standard deviation, the minimum and the maximum daily return of the active ETFs, their passive ETFs counterpart, their shared benchmark and the risk-free rate.

The results in table 1 suggest that our sample suffers from skewness. In a normal distribution it is assumed that median and mean are equal, causing a skewness to be zero. The table shows results of means being different from their median, indicating skewness. To test for this a Jarque-Bera test will be done in section 3.2.1.

Table 1

Descriptive Statistics

This table reports the mean, median, standard deviation, the minimum and the maximum daily return of the active ETFs, their passive counterpart, their shared benchmark and the risk-free rate during the period 13/10/2015 - 12/10/2015

	Name	Symbol	Mean	Median	Stdev	Min	Max	Obs.
Active ETF	Columbia Core Bond Strategy Fund	GMTB	0,011	0,000	0,319	-1,500	1,500	252
Passive ETF	iShares Yield Optimized Bond	BYLD	0,004	0,000	0,287	-2,130	2,140	252
Benchmark	Barclays U.S. Universal Index	LHMUSUN	0,034	0,140	1,008	-2,700	2,370	252
Active ETF	Columbia Intermediate Municipal Bond Strategy Fund	GMMB	0,008	0,000	0,273	-1,450	1,460	252
Passive ETF	Market Vectors Intermediate Municipal	ITM	0,012	0,060	0,322	-0,850	0,820	252
Benchmark	Barclays 1-15 Year Municipal Bond Index	LH15MUN	0,015	0,010	0,174	-0,520	0,640	252
Active ETF	Fidelity Corporate Bond ETF	FCOR	-0,001	0,020	0,304	-0,830	0,940	252
Passive ETF	iShares Core U.S. Credit Bond ETF	CRED	0,003	0,050	0,466	-1,410	1,650	252
Benchmark	Barclays U.S. Credit Bond Index	LHCRPBD	0,057	0,515	7,649	-20,400	17,480	252
Active ETF	Fidelity Total Bond ETF	FBND	0,002	0,025	0,236	-0,720	0,840	252
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	0,012	0,050	0,351	-0,930	0,960	252
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	0,149	0,600	4,399	-11,790	11,270	252
Active ETF	First Trust High Yield Long/Short ETF	HYLS	0,012	0,000	0,442	-1,220	1,700	252
Passive ETF	SPDR® Barclays High Yield Bond ETF	JNK	-0,016	-0,040	0,607	-2,120	2,770	252
Benchmark	Barclays U.S. Corporate High Yield Index	LHYIELD	-0,073	0,170	4,159	-16,620	19,240	252
Active ETF	FlexShares Ready Access Variable Income Fund	RAVI	0,002	0,000	0,066	-0,250	0,270	252
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,001	0,000	0,017	-0,050	0,050	252
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,000	0,000	0,003	-0,010	0,010	252
Active ETF	Guggenheim Enhanced Short Duration Bond ETF	GSY	0,005	0,000	0,045	-0,110	0,130	252
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,001	0,000	0,017	-0,050	0,050	252
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,000	0,000	0,003	-0,010	0,010	252
Active ETF	iShares Short Maturity Bond ETF	NEAR	0,003	0,000	0,047	-0,150	0,140	252
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,001	0,000	0,017	-0,050	0,050	252
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,000	0,000	0,003	-0,010	0,010	252
Active ETF	Madrona Global Bond ET	FWDB	-0,004	0,000	0,397	-1,450	1,850	252
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	0,012	0,050	0,351	-0,930	0,960	252
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	0,149	0,600	4,399	-11,790	11,270	252
Active ETF	Peritus High Yield ETF	HYLD	-0,086	0,000	0,868	-5,050	6,170	252
Passice ETF	SPDR® Barclays High Yield Bond ETF	JNK	-0,016	-0,040	0,607	-2,120	2,770	252
Benchmark	Barclays U.S. Corporate High Yield Index	LHYIELD	-0,073	0,170	4,159	-16,620	19,240	252
Active ETF	PIMCO Enhanced Short Maturity Strategy Fund	MINT	0,001	0,000	0,041	-0,150	0,120	252
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,001	0,000	0,017	-0,050	0,050	252
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,000	0,000	0,003	-0,010	0,010	252

Table 1 - Continued

Descriptive Statistics

This table reports the mean, median, standard deviation, the minimum and the maximum daily return of the active ETFs, their passive counterpart, their shared benchmark and the risk-free rate during the period 13/10/2015 - 12/10/2015

	Name	Symbol	Mean	Median	Stdev	Min	Max	Obs.
Active ETF	PIMCO Intermediate Municipal Bond Strategy Fund	MUNI	0,006	0,005	0,235	-0,770	0,680	252
Passive ETF	Market Vectors Intermediate Municipal	ITM	0,012	0,060	0,322	-0,850	0,820	252
Benchmark	Barclays 1-15 Year Municipal Bond Index	LH15MUN	0,015	0,010	0,174	-0,520	0,640	252
Active ETF	PIMCO Short Term Municipal Bond Fund	SMMU	0,004	0,000	0,113	-0,360	0,380	252
Passive ETF	iShares Short-Term National AMT-Free Muni Bond	SUB	0,002	0,000	0,099	-0,260	0,310	252
Benchmark	Barclays 1 Year Municipal Bond Index	LHMUN1Y	0,005	0,000	0,037	-0,140	0,120	252
Active ETF	PIMCO Total Return ETF	BOND	0,013	0,030	0,338	-0,910	0,990	252
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	0,012	0,050	0,351	-0,930	0,960	252
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	0,149	0,600	4,399	-11,790	11,270	252
Active ETF	RiverFront Strategic Income Fund	RIGS	0,008	0,020	0,350	-0,950	1,310	252
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	0,012	0,050	0,351	-0,930	0,960	252
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	0,149	0,600	4,399	-11,790	11,270	252
Active ETF	Sage Core Reserves ETF	HOLD	0,000	0,000	0,063	-0,360	0,320	252
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,001	0,000	0,017	-0,050	0,050	252
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,000	0,000	0,003	-0,010	0,010	252
Active ETF	SPDR DoubleLine Total Return Tactical	TOTL	0,005	0,035	0,167	-0,480	0,460	160
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	0,012	0,050	0,351	-0,930	0,960	252
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	0,149	0,600	4,399	-11,790	11,270	252
Active ETF	SPDR SSgA Ultra Short Term Bond ETF	ULST	0,001	0,000	0,095	-0,400	0,300	252
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,001	0,000	0,017	-0,050	0,050	252
Benchmark	Barclays US Treasury Bellwether 3 Month	LHTBW3M	0,001	0,000	0,009	-0,030	0,030	252
Active ETF	YieldPro ETF	YPRO	-0,008	0,000	0,298	-0,820	1,280	252
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	0,012	0,050	0,351	-0,930	0,960	252
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	0,149	0,600	4,399	-11,790	11,270	252
Risk-free Rate	3 Month U.S. Treasury Bill		0,019	0,020	0,001	-0,030	0,060	252

3.2.1 Normality check

To test if the data follows a normal distribution, the Jarque-Bera Test will be used. The Jarque-Bera test is developed by Jarque and Bera in 1980 and uses the kurtosis and skewness values of the sample data to test whether the data set is normally distributed.

The Jarque-Bera test is performed using the following formula:

$$JB, i = \frac{n}{6}\left(S^2 + \frac{K^2}{4}\right) \sim X^2(2)$$

Where n represents the number of observations, S denotes the skewness of the sample and K denotes the sample excess kurtosis. In a normal distribution, skewness is zero and kurtosis three, excess kurtosis thus refers to the total kurtosis measured minus three. The Jarque-Bera test has an asymptotic chi-square distribution with two degrees of freedom. For the Jarque-Bera test to give reliable results, the sample set needs to include more than 50 observations. The test will reject the hypothesis of a normal distribution if the values of the test are greater than 9.21 (1% significance level) or 5.99 (5% significance level).

In 1964, Eugene F. Fama found, in his Ph.D. Dissertation, that monthly stock returns are quite symmetric around their means, but have more outliers than one would expect in a normal distribution. These outliers cause the distribution to suffer from positive excess kurtosis, or fat-tails. Fama concludes that investors should be aware of extreme returns, both positive and negative.

Following the central limit theorem, when the research sample is big enough, a normal distribution can be assumed. However, accounting for the central paradox of active management, it is expected that the active ETFs in the sample will not follow a normal distribution. The central paradox of active management entails the believe that an investor will only choose for active management if he or she believes that that active manager will produce results above average

returns. But at the same time, this is mathematically impossible for all active managers, since it is true that roughly half of the active managers must underperform the average returns.

Skewness measures the deviation of the mean from the median. In a normal distribution mean and median are equal and the skewness is zero. It is expected that active management will result in a mean deviating from the median, resulting in skewness for the actively managed ETFs, both negative and positive.

Table 2 shows the outcome of the normality check. As expected most of the ETFs in the sample show positive excess kurtosis, meaning the funds returns have fat-tails containing more outliers than one would expect in a normal distributed sample. When using a 1% and 5% significance level, the hypothesis of a normal distribution is rejected for twelve of our nineteen active ETFs. When using a 10% significance level, for thirteen of the active ETFs there is enough evidence to reject the null hypothesis of a normal distribution.

For two of our eight passive ETFs we have enough evidence to reject the null hypothesis of normal distribution at a 1% significant level. For the other six passive ETFs no relation is found on any level of significance to assume a not normal distribution. For five of the eight benchmarks we reject the null hypothesis at a 1% significance level.

As expected, the results show skewness differentiating from zero. In a normal distribution it is assumed that median and mean are equal, causing a skewness to be zero. In this sample a negative or positive skewness means that the mean is less or more than the median. Furthermore, the results indicate that the returns in the sample show positive excess kurtosis, causing the distribution to suffer from fat-tails. These findings are in line with the results of Fama (1964).

Table 2

Normality Check

$JB,i = n/6\ (S^2+K^2/4)$

This table shows the skewness, excess kurtosis and Jarque-Bera values for the active ETFs, passive ETFs and their benchmarks. In the Jarque-Bera formula Skewness is denoted as S and excess Kurtosis as K.

***Statistically significant at a 1% level. **Statistically significant at a 5% level. **Statistically significant at a 10% level.

Symbol	Name	Symbol	Skewness	Excess Kurtosis	Jaque-Bera	P-value
Active ETF	Columbia Core Bond Strategy Fund	GMTB	-0,024	6,606	458,239***	0,000
Passive ETF	iShares Yield Optimized Bond	BYLD	-0,124	24,185	6142,107***	0,000
Benchmark	Barclays U.S. Universal Index	LHMUSUN	-0,268	-0,006	3,027	0,220
Active ETF	Columbia Intermediate Municipal Bond Strategy Fund	GMMB	-0,176	13,379	1880,748***	0,000
Passive ETF	Market Vectors Intermediate Municipal	ITM	-0,270	-0,001	3,063	0,216
Benchmark	Barclays 1-15 Year Municipal Bond Index	LH15MUN	0,106	1,326	18,943***	0,000
Active ETF	Fidelity Corporate Bond ETF	FCOR	-0,217	0,538	5,015*	0,081
Passive ETF	iShares Core U.S. Credit Bond ETF	CRED	-0,076	0,576	3,724	0,155
Benchmark	Barclays U.S. Credit Bond Index	LHCRPBD	-0,232	-0,059	2,304	0,316
Active ETF	Fidelity Total Bond ETF	FBND	-0,398	0,880	14,774***	0,001
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	-0,182	-0,123	1,553	0,460
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	-0,242	-0,004	2,461	0,292
Active ETF	First Trust High Yield Long/Short ETF	HYLS	0,155	1,249	17,384***	0,000
Passive ETF	SPDR® Barclays High Yield Bond ETF	JNK	0,225	2,725	80,103***	0,000
Benchmark	Barclays U.S. Corporate High Yield Index	LHYIELD	0,284	4,358	202,770***	0,000
Active ETF	FlexShares Ready Access Variable Income Fund	RAVI	0,138	2,864	86,959***	0,000
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,041	-0,107	0,190	0,909
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,209	6,125	395,779***	0,000
Active ETF	Guggenheim Enhanced Short Duration Bond ETF	GSY	0,153	-0,084	1,056	0,590
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,041	-0,107	0,190	0,909
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,209	6,125	395,779***	0,000
Active ETF	iShares Short Maturity Bond ETF	NEAR	-0,194	0,427	3,488	0,175
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,041	-0,107	0,190	0,909
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,209	6,125	395,779***	0,000
Active ETF	Madrona Global Bond ET	FWDB	0,310	3,100	104,941***	0,000
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	-0,182	-0,123	1,553	0,460
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	-0,242	-0,004	2,461	0,292
Active ETF	Peritus High Yield ETF	HYLD	-0,180	17,600	3253,830***	0,000
Passice ETF	SPDR® Barclays High Yield Bond ETF	JNK	0,225	2,725	80,103***	0,000
Benchmark	Barclays U.S. Corporate High Yield Index	LHYIELD	0,284	4,358	202,770***	0,000

Table 2 - Continued
Normality Check
$JB,i = n/6\ (S^2+K^2/4)$

This table shows the skewness, excess kurtosis and Jarque-Bera values for the active ETFs, passive ETFs and their benchmarks. In the Jarque-Bera formula Skewness is denoted as S and excess Kurtosis as K.
***Statistically significant at a 1% level. **Statistically significant at a 5% level. **Statistically significant at a 10% level.

Symbol	Name	Symbol	Skewness	Excess Kurtosis	Jaque-Bera	P-value
Active ETF	PIMCO Enhanced Short Maturity Strategy Fund	MINT	-0,182	1,030	12,520***	0,002
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,041	-0,107	0,190	0,909
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,209	6,125	395,779***	0,000
Active ETF	PIMCO Intermediate Municipal Bond Strategy Fund	MUNI	-0,092	0,150	0,595	0,743
Passive ETF	Market Vectors Intermediate Municipal	ITM	-0,270	-0,001	3,063	0,216
Benchmark	Barclays 1-15 Year Municipal Bond Index	LH15MUN	0,106	1,326	18,943***	0,000
Active ETF	PIMCO Short Term Municipal Bond Fund	SMMU	0,072	0,367	1,631	0,442
Passive ETF	iShares Short-Term National AMT-Free Muni Bond	SUB	0,140	0,466	3,106	0,212
Benchmark	Barclays 1 Year Municipal Bond Index	LHMUN1Y	0,240	1,236	18,465***	0,000
Active ETF	PIMCO Total Return ETF	BOND	-0,032	0,060	0,081	0,961
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	-0,182	-0,123	1,553	0,460
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	-0,242	-0,004	2,461	0,292
Active ETF	RiverFront Strategic Income Fund	RIGS	-0,004	1,391	20,3145***	0,000
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	-0,182	-0,123	1,553	0,460
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	-0,242	-0,004	2,461	0,292
Active ETF	Sage Core Reserves ETF	HOLD	-0,739	12,037	1544,292***	0,000
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,041	-0,107	0,190	0,909
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,209	6,125	395,779***	0,000
Active ETF	SPDR DoubleLine Total Return Tactical	TOTL	-0,331	0,048	2,929	0,231
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	-0,182	-0,123	1,553	0,460
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	-0,242	-0,004	2,461	0,292
Active ETF	SPDR SSgA Ultra Short Term Bond ETF	ULST	-0,303	1,378	23,796***	0,000
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,041	-0,107	0,190	0,909
Benchmark	Barclays US Treasury Bellwether 3 Month	LHTBW3M	0,307	1,816	38,586***	0,000
Active ETF	YieldPro ETF	YPRO	0,018	1,500	23,640***	0,000
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	-0,182	-0,123	1,553	0,460
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	-0,242	-0,004	2,461	0,292

4. Empirical results

In this section the results of the different measures of return stated in section 3 will be given. In the results a significance check will be done to examine whether the obtained values of the coefficients of the variables can be interpreted as evidence of structural validity.

4.1 Performance Regression Results

Table 3 presents the results of the Jensen's alpha performance regression. The risk-adjusted daily return of active and passive ETFs is regressed on the risk-adjusted daily return of their benchmarks. Rp,i represents the average daily portfolio's return for the ETF i, Rf is the daily risk-free rate, Rm denotes the market's return, in this case the return of the benchmark. The P-value evaluates the difference of the alpha estimates from zero and the beta estimates from unity. The R^2, or the coefficient of determination, measures how well the model used explains the variation. R^2 is obtained by dividing the explained variation by the total variation. A higher R^2 thus indicates a higher percentages of the total variation to be explained by the model.

In correspondence to the research of Rompotis (2009), most of the alpha estimates of both the active and passive ETFs are negative and the statistical significance of these alpha estimates is very poor. Four out of the nineteen active ETFs show significant results, but only at a 10% significance level. All having a negative alpha indicating that the returns of these active ETFs are significantly less than those of their respective benchmark.

For only one passive ETF the alpha coefficient is significant, at a 5% significant level. The respective passive ETF is the iShares Short-Term Notional AMT-Free Muni Bond, or SUB. The negative alpha, again, shows significant underperformance compared to the benchmark.

Maybe even more interesting than the significant underperformance of the passive ETF, is the insignificant outperformance of active ETFs. Only three active ETFs have small positive alpha's, but none of them is significant enough to provide solid evidence for outperformance. Proponents of active management believe that due to market timing and selection skills, active managers will outperform the market, resulting in higher returns for their investors. The findings in table 3 show that active ETFs do not significantly outperform the benchmark, on the contrary, those ETFs that do show significant results with respect to their alpha coefficient proof that these

active ETFs will leave the investor with a negative excess return compared to the benchmark. These findings are in line with the expectations in paragraph 3.

When looking at the Beta-coefficients, almost all coefficients show significant results at a 10% significance level, both the Beta-coefficients of the active ETFs and the passive ETFs. It is expected that the Beta for passive ETFs is close to one, meaning volatile movements in line with the benchmark. However, the results in table 3 show that most of the passive ETFs have a Beta-coefficient between zero and one, indicating that the returns of the respective passive ETFs are less volatile than those of the benchmark, while still moving in the same direction as the benchmark. One passive ETF has a Beta-coefficient higher than one, significant at a 10% significance level. This ETF, the Market Vectors Intermediate Municipal, or ITM, has a Beta-coefficient of 1.240, indicating more volatile movements in the same direction as the benchmark.

Interestingly, one active ETF has a significant negative Beta-coefficient. The RiverFront Strategic Income Fund ETF, or RIGS, has a Beta of minus 0.014, significant at a 10% significance level. However small, this negative Beta-coefficient indicates that the returns of the active ETF move in the opposite direction of the benchmark.

Table 3
Performance Regression Results
$Rp,i\text{-}Rf = \alpha p,i + \beta p,i\ (Rm\text{-}Rf) + \varepsilon p,i$

This table presents the results of the Jensen's alpha performance regression. The risk-adjusted daily return of active and passive ETFs is regressed on the risk-adjusted daily return of their benchmarks. *Rp,i* represents the average daily portfolio's return for the ETF *i*, *Rf* is the daily risk-free rate, *Rm* denotes the market's return, in this case the return of the benchmark. The P-value evaluates the difference of the alpha estimates from zero and the beta estimates from unity. ***Statistically significant at a 1% level. **Statistically significant at a 5% level. **Statistically significant at a 10% level.

	Symbol	Underlying	α	P-value	β	P-value	R^2	Obs.
Active ETF	GMTB	Barclays U.S. Universal Index	-0,009	0,643	0,039*	0,052	0,015	252
Passive ETF	BYLD	Barclays U.S. Universal Index	-0,017	0,326	0,092***	0,000	0,105	252
Active ETF	GMMB	Barclays 1-15 Year Municipal Bond Index	-0,009	0,596	0,538***	0,000	0,120	252
Passive ETF	ITM	Barclays 1-15 Year Municipal Bond Index	-0,001	0,941	1,240***	0,000	0,455	252
Active ETF	FCOR	Barclays U.S. Credit Bond Index	-0,021	0,136	0,027***	0,000	0,459	252
Passive ETF	CRED	Barclays U.S. Credit Bond Index	-0,018	0,217	0,053***	0,000	0,747	252
Active ETF	FBND	Barclays U.S. Aggregate Index	-0,021*	0,062	0,035***	0,000	0,414	252
Passive ETF	LAG	Barclays U.S. Aggregate Index	-0,016	0,102	0,071***	0,000	0,796	252
Active ETF	HYLS	Barclays U.S. Corporate High Yield Index	-0,002	0,933	0,061***	0,000	0,329	252
Passive ETF	JNK	Barclays U.S. Corporate High Yield Index	-0,026	0,345	0,102***	0,000	0,488	252
Active ETF	RAVI	Barclays 1-3 month U.S. Treasury Bill Index	0,003	0,652	1,060***	0,000	0,074	252
Passive ETF	BIL	Barclays 1-3 month U.S. Treasury Bill Index	-0,002	0,264	0,938***	0,000	0,474	252
Active ETF	GSY	Barclays 1-3 month U.S. Treasury Bill Index	0,005	0,251	1,025***	0,000	0,136	252
Passive ETF	BIL	Barclays 1-3 month U.S. Treasury Bill Index	-0,002	0,264	0,938***	0,000	0,474	252
Active ETF	NEAR	Barclays 1-3 month U.S. Treasury Bill Index	0,001	0,858	0,918***	0,000	0,103	252
Passive ETF	BIL	Barclays 1-3 month U.S. Treasury Bill Index	-0,002	0,264	0,938***	0,000	0,474	252
Active ETF	FWDB	Barclays U.S. Aggregate Index	-0,027	0,244	0,030***	0,000	0,113	252
Passive ETF	LAG	Barclays U.S. Aggregate Index	-0,016	0,102	0,071***	0,000	0,796	252
Active ETF	HYLD	Barclays U.S. Corporate High Yield Index	-0,097*	0,051	0,088***	0,000	0,179	252
Passive ETF	JNK	Barclays U.S. Corporate High Yield Index	-0,026	0,345	0,102***	0,000	0,488	252
Active ETF	MINT	Barclays 1-3 month U.S. Treasury Bill Index	0,000	0,913	0,918***	0,000	0,133	252
Passive ETF	BIL	Barclays 1-3 month U.S. Treasury Bill Index	-0,002	0,264	0,938***	0,000	0,474	252
Active ETF	MUNI	Barclays 1-15 Year Municipal Bond Index	-0,009	0,440	0,785***	0,000	0,341	252
Passive ETF	ITM	Barclays 1-15 Year Municipal Bond Index	-0,001	0,941	1,240***	0,000	0,455	252
Active ETF	SMMU	Barclays 1 Year Municipal Bond Index	-0,013*	0,085	0,177	0,309	0,004	252
Passive ETF	SUB	Barclays 1 Year Municipal Bond Index	-0,016**	0,018	0,081	0,599	0,001	252
Active ETF	BOND	Barclays U.S. Aggregate Index	-0,015	0,218	0,063***	0,000	0,679	252
Passive ETF	LAG	Barclays U.S. Aggregate Index	-0,016	0,102	0,071***	0,000	0,796	252

Table 3 - Continued

Performance Regression Results

$$Rp,i-Rf = \alpha p,i + \beta p,i\ (Rm-Rf) + \varepsilon p,i$$

This table presents the results of the Jensen's alpha performance regression. The risk-adjusted daily return of active and passive ETFs is regressed on the risk-adjusted daily return of their benchmarks. Rp,i represents the average daily portfolio's

	Symbol	Underlying	α	P-value	β	P-value	R^2	Obs.
Active ETF	RIGS	Barclays U.S. Aggregate Index	-0,009	0,673	-0,014***	0,004	0,032	252
Passive ETF	LAG	Barclays U.S. Aggregate Index	-0,016	0,102	0,071***	0,000	0,796	252
Active ETF	HOLD	Barclays 1-3 month U.S. Treasury Bill Index	-0,003	0,596	0,836***	0,000	0,051	252
Passive ETF	BIL	Barclays 1-3 month U.S. Treasury Bill Index	-0,002	0,264	0,938***	0,000	0,474	252
Active ETF	TOTL	Barclays U.S. Aggregate Index	-0,011	0,173	0,029***	0,000	0,660	160
Passive ETF	LAG	Barclays U.S. Aggregate Index	-0,016	0,102	0,071***	0,000	0,796	252
Active ETF	ULST	Barclays US Treasury Bellwether 3 Month	-0,008	0,320	0,568*	0,065	0,014	252
Passive ETF	BIL	Barclays 1-3 month U.S. Treasury Bill Index	-0,002	0,264	0,938***	0,000	0,474	252
Active ETF	YPRO	Barclays U.S. Aggregate Index	-0,030*	0,096	0,020***	0,000	0,089	252
Passive ETF	LAG	Barclays U.S. Aggregate Index	-0,016	0,102	0,071***	0,000	0,796	252

4.2 Performance Rating

Table 4 presents the results of the Total Return, the Sharpe ratio, Treynor Ratio and Jensen's alpha per active ETF, its passive counterpart and their shared benchmark.

The results validate the expectations of underperformance of active ETFs respective to their passive counterpart and their respective benchmark. Thirteen of the nineteen active ETFs underperform on all or most of the used measurements, compared to their passive counterpart or their respective benchmark.

Noteworthy, three active ETF outperform their passive counterpart as well as their benchmark on all four measurements. The FlexShares Ready Access Variable Income Fund ETF (RAVI), iShares Short Maturity Bond ETF (NEAR) and the PIMCO Enhanced Short Maturity Strategy Fund ETF (MINT) all score better on the four performance rating measures than their passive counterparts or benchmarks do.

The Columbia Core Bond Strategy Fund ETF (GMTB) outperforms its passive counterpart, except on the Treynor ratio, but slightly underperforms its benchmark. The First Trust High Yield Long/Short ETF (HYLS) outperforms its passive counterpart on all measures, but slightly underperforms its benchmark, except on the Treynor ratio. The Guggenheim Enhanced Short Duration Bond ETF (GSY) outperforms its passive counterpart on all measures and outperforms its benchmark on all except the Sharpe ratio measurement.

Table 4

Performance Rating

This table presents the results of the Total Return, Sharpe ratio, Treynor Ratio and Jensen's alpha per active ETF, its passive counterpart and their shared benchmark.

***Statistically significant at a 1% level. **Statistically significant at a 5% level. **Statistically significant at a 10% level.

	Name	Symbol	Total Return	Sharpe	Treynor	Jensen's α
Active ETF	Columbia Core Bond Strategy Fund	GMTB	2,690	-0,027	-0,222	-0,009
Passive ETF	iShares Yield Optimized Bond	BYLD	0,970	-0,054	-0,168	-0,017
Benchmark	Barclays U.S. Universal Index	LHMUSUN	8,630	0,015	0,015	0,000
Active ETF	Columbia Intermediate Municipal Bond Strategy Fund	GMMB	2,050	-0,041	-0,021	-0,009
Passive ETF	Market Vectors Intermediate Municipal	ITM	3,090	-0,022	-0,006	-0,001
Benchmark	Barclays 1-15 Year Municipal Bond Index	LH15MUN	3,660	-0,028	-0,005	0,000
Active ETF	Fidelity Corporate Bond ETF	FCOR	-0,190	-0,066	-0,744	-0,021
Passive ETF	iShares Core U.S. Credit Bond ETF	CRED	0,760	-0,035	-0,308	-0,018
Benchmark	Barclays U.S. Credit Bond Index	LHCRPBD	14,390	0,005	0,038	0,000
Active ETF	Fidelity Total Bond ETF	FBND	0,610	-0,072	-0,483	-0,021*
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	3,060	-0,020	-0,101	-0,016
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	37,530	0,029	0,130	0,000
Active ETF	First Trust High Yield Long/Short ETF	HYLS	2,970	-0,017	-0,124	-0,002
Passive ETF	SPDR® Barclays High Yield Bond ETF	JNK	-4,030	-0,058	-0,346	-0,026
Benchmark	Barclays U.S. Corporate High Yield Index	LHYIELD	-18,380	-0,022	-0,092	0,000
Active ETF	FlexShares Ready Access Variable Income Fund	RAVI	0,440	-0,267	-0,017	0,003
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,130	-1,188	-0,021	-0,002
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,030	-5,654	-0,019	0,000
Active ETF	Guggenheim Enhanced Short Duration Bond ETF	GSY	1,140	-0,326	-0,014	0,005
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,130	-1,188	-0,021	-0,002
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,030	-5,654	-0,019	0,000
Active ETF	iShares Short Maturity Bond ETF	NEAR	0,630	-0,355	-0,018	0,001
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,130	-1,188	-0,021	-0,002
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,030	-5,654	-0,019	0,000
Active ETF	Madrona Global Bond ET	FWDB	-1,070	-0,059	-0,786	-0,027
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	3,060	-0,020	-0,101	-0,016
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	37,530	0,029	0,130	0,000
Active ETF	Peritus High Yield ETF	HYLD	-21,710	-0,122	-1,199	-0,097*
Passice ETF	SPDR® Barclays High Yield Bond ETF	JNK	-4,030	-0,058	-0,346	-0,026
Benchmark	Barclays U.S. Corporate High Yield Index	LHYIELD	-18,380	-0,022	-0,092	0,000
Active ETF	PIMCO Enhanced Short Maturity Strategy Fund	MINT	0,320	-0,438	-0,020	0,000
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,130	-1,188	-0,021	-0,002
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,030	-5,654	-0,019	0,000

Table 4 - Continued
Performance Rating

This table presents the results of the Total Return, Sharpe ratio, Treynor Ratio and Jensen's alpha per active ETF, its passive counterpart and their shared benchmark.

***Statistically significant at a 1% level. **Statistically significant at a 5% level. **Statistically significant at a 10% level.

	Name	Symbol	Total Return	Sharpe	Treynor	Jensen's α
Active ETF	PIMCO Intermediate Municipal Bond Strategy Fund	MUNI	1,560	-0,056	-0,017	-0,009
Passive ETF	Market Vectors Intermediate Municipal	ITM	3,090	-0,022	-0,006	-0,001
Benchmark	Barclays 1-15 Year Municipal Bond Index	LH15MUN	3,660	-0,028	-0,005	0,000
Active ETF	PIMCO Short Term Municipal Bond Fund	SMMU	0,920	-0,139	-0,089	-0,013*
Passive ETF	iShares Short-Term National AMT-Free Muni Bond	SUB	0,530	-0,174	-0,213	-0,016**
Benchmark	Barclays 1 Year Municipal Bond Index	LHMUN1Y	1,320	-0,379	-0,014	0,000
Active ETF	PIMCO Total Return ETF	BOND	3,170	-0,020	-0,107	-0,015
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	3,060	-0,020	-0,101	-0,016
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	37,530	0,029	0,130	0,000
Active ETF	RiverFront Strategic Income Fund	RIGS	2,100	-0,031	0,785	-0,009
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	3,060	-0,020	-0,101	-0,016
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	37,530	0,029	0,130	0,000
Active ETF	Sage Core Reserves ETF	HOLD	0,030	-0,304	-0,023	-0,003
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,130	-1,188	-0,021	-0,002
Benchmark	Barclays 1-3 month U.S. Treasury Bill Index	LHTRB3M	0,220	-5,654	-0,019	0,000
Active ETF	SPDR DoubleLine Total Return Tactical	TOTL	0,790	-0,086	-0,496	-0,011
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	3,060	-0,020	-0,101	-0,016
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	37,530	0,029	0,130	0,000
Active ETF	SPDR SSgA Ultra Short Term Bond ETF	ULST	0,150	-0,197	-0,033	-0,008
Passive ETF	SPDR® Barclays 1-3 Month T-Bill ETF	BIL	-0,130	-1,188	-0,021	-0,002
Benchmark	Barclays US Treasury Bellwether 3 Month	LHTBW3M	0,220	-2,155	-0,018	0,000
Active ETF	YieldPro ETF	YPRO	-2,070	-0,092	-1,377	-0,03*
Passive ETF	SPDR® Barclays Aggregate Bond ETF	LAG	3,060	-0,020	-0,101	-0,016
Benchmark	Barclays U.S. Aggregate Index	LHAGGBD	37,53	0,029	0,130	0,000

4.3 Market Timing Regression Results

Table 5 presents the results of the market timing regression. This regression evaluates the market timing ability of active ETF managers. Rp,i represents the average daily portfolio's return for the ETF i, Rf is the daily risk-free rate, Rm denotes the market's return, in this case the return of the benchmark. P-values evaluate the statistical significance of the coefficients. The timing ability is measured by the gamma estimate outcome of the regression. A significant positive gamma coefficient suggests market timing skills of the active manager. Since managers of passive ETFs are not expected to time the market, passive ETFs are not included in this regression results.

The results in table 5 indicate that active ETF managers are not able to time the market. The results show no sign of any significant positive gamma coefficient. The only significant gamma coefficient belongs to the PIMCO Intermediate Municipal Bond Strategy Fund ETF (MUNI) and is negative, indicating an significant inability to time the market at a significance level of 10%.

The results of this regression are in line with previous findings and the market timing hypothesis in section 3.

Table 5

Market Timing Regression Results

$$Rp,i\text{-}Rf = \alpha p,i + \beta p,i\ (Rm\text{-}Rf) + \gamma p,i\ (Rm\text{-}Rf)^2 + \varepsilon p,i$$

This table presents the results of the market timing regression. This regression evaluates the timing ability of active ETF managers. *Rp,i* represents the average daily portfolio's return for the ETF *i*, *Rf* is the daily risk-free rate, *Rm* denotes the market's return, in this case the return of the benchmark. P-values evaluate the statistical significance of the coefficients. The timing ability is measured by the gamma estimate outcome of the regression.

***Statistically significant at a 1% level. **Statistically significant at a 5% level. **Statistically significant at a 10% level.

Symbol	Underlying	α	P-value	β	P-value	γ	P-value	R^2	Obs.
GMTB	Barclays U.S. Universal Index	0,006	0,806	0,035*4	0,082	-0,015	0,297	0,019	252
GMMB	Barclays 1-15 Year Municipal Bond Index	0,002	0,919	0,544***	0,000	-0,340	0,255	0,124	252
FCOR	Barclays U.S. Credit Bond Index	-0,013	0,474	0,027***	0,000	0,000	0,418	0,461	252
FBND	Barclays U.S. Aggregate Index	-0,008	0,578	0,034***	0,000	-0,001	0,108	0,421	252
HYLS	Barclays U.S. Corporate High Yield Index	0,003	0,916	0,061***	0,000	0,000	0,633	0,329	252
RAVI	Barclays 1-3 month U.S. Treasury Bill Index	0,003	0,653	0,978**	0,013	-2,336	0,792	0,074	252
GSY	Barclays 1-3 month U.S. Treasury Bill Index	0,005	0,252	0,778**	0,004	-7,004	0,250	0,141	252
NEAR	Barclays 1-3 month U.S. Treasury Bill Index	0,001	0,858	0,842***	0,003	-2,143	0,738	0,103	252
FWDB	Barclays U.S. Aggregate Index	-0,013	0,648	0,030***	0,000	-0,001	0,417	0,115	252
HYLD	Barclays U.S. Corporate High Yield Index	-0,067	0,212	0,090***	0,000	-0,002	0,141	0,186	252
MINT	Barclays 1-3 month U.S. Treasury Bill Index	0,000	0,912	0,709***	0,004	-5,919	0,284	0,137	252
MUNI	Barclays 1-15 Year Municipal Bond Index	0,004	0,754	0,793***	0,000	-0,444**	0,046	0,351	252
SMMU	Barclays 1 Year Municipal Bond Index	-0,010	0,267	0,147	0,413	-1,907	0,483	0,006	252
BOND	Barclays U.S. Aggregate Index	-0,018	0,236	0,064***	0,000	0,000	0,742	0,679	252
RIGS	Barclays U.S. Aggregate Index	0,000	0,995	-0,015***	0,004	0,000	0,575	0,033	252
HOLD	Barclays 1-3 month U.S. Treasury Bill Index	-0,003	0,597	0,982***	0,010	4,141	0,627	0,052	252
TOTL	Barclays U.S. Aggregate Index	-0,002	0,832	0,029***	0,000	0,000	0,147	0,664	160
ULST	Barclays US Treasury Bellwether 3 Month	-0,009	0,300	0,741	0,131	4,963	0,651	0,014	252
YPRO	Barclays U.S. Aggregate Index	-0,039*	0,086	0,021***	0,000	0,000	0,526	0,091	252

5. Summary, Conclusion and Discussion

This study contributes to the debate between active and passive investing and used ETFs as a tool for this research. This research paper examined if actively managed fixed income ETFs show significantly different returns than their passive counterparts and their respective benchmark and evaluated the ability of active fixed income ETF managers to time the market.

Previous research indicated that actively managed funds underperform the benchmark and their passive counterpart. Moreover, research indicated that active fund managers fail to possess market timing skills.

In this research, data from multiple data sources was used, including Thomson Datastream, Bloomberg and YahooFinance. Nineteen active fixed income ETFs were compared to eight passive counterparts and eight unique benchmarks over the period of 13/10/2014 through 12/10/2014.

The results validate the expectations of underperformance of active ETFs respective to their passive counterpart and their respective benchmark. Thirteen of the nineteen active ETFs underperform on all or most of the used measurements, compared to their passive counterpart or their respective benchmark. The results of the market timing regression did not give any significant results. This indicates that active ETF managers do not possess significant market timing skills. These findings are in line with previous research and validate the hypotheses made in section 3.1.1 .

The sample used in the research did not include the extreme volatile period of the financial crisis. Hence, the findings of this research can either be interpreted as proof that market timing skills do not exist or one could argue that active managers can not significantly outperform the market using market timing skills, because of the efficiency of the market. This is an interesting distinction resulting in the same outcome.

To be able to extract the cause from the outcome that actively managed funds do not outperform passive funds, further research regarding the market timing abilities of active fund managers is recommended. A deep dive into the extra costs of active management compared to the extra revenue of active management is suggested. Extra income could entail securities lending or tax

reclaims. I recognize these features to be potential benefits of active management, which are not entailed in the results analyzed in this research.

Overall, this research is in line with findings of previous literature, stating that actively managed funds underperform their passive counterpart and that there is no significant evidence that would suggest that active managers are able to time the market. Different to prior research, this research adds a very distinctive study focused on solely fixed income ETFs. It therefore highlights in relevance that even in different asset classes active management has not been proven to add value.

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