Market Sentiment as a Moderator in the Effect of Expenses on Performance of Exchange Traded Funds

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Preface

This Master Thesis in Finance is the final step in order for me to graduate from Tilburg University. I have an interest in Exchange Traded Funds since several years which is why I decided to do a research related to this topic. Although sometimes struggling on a road full of obstacles, I performed this study with a high level of interest and dedication.

This study would not have been a success without the support of several people. In special I would like to thank my supervisor Dr J.C. Kragt in his guidance, involvement, flexibility and feedback throughout the process in my last few months here studying at Tilburg University. Furthermore, I could not have finished this thesis without the support of my family, friends, girlfriend, employer and the flexibility on their behalf.

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Abstract

This study researches the moderating role for market sentiment in the effect of expenses on performance of Exchange Traded Funds (ETFs). 1,465 U.S. listed ETFs are taken into account, yielding 94,127 monthly observations for the period 2007-2017. Initially the study conducts a cross-sectional study where evidence is found for a significant negative effect for expenses on performance of ETFs in bearish markets, and evidence for a significant positive effect for expenses on performance in bullish markets. This study then conducts a panel study in order to gain deeper insights in the relationship between expenses and performance and the moderating role for market sentiment. The panel study confirms a moderating role for market sentiment and finds additional evidence on a significant negative effect for expenses on performance in bearish markets, and weak evidence on a significant positive effect for expenses on performance in bullish markets.

Keywords: ETFs, expenses, performance, bullish, bearish.

Contents

1. Introduction

How do expenses relate to performance? Within the Exchange Traded Fund (ETF) segment this is a question which remains unclear. Traditionally, ETFs are passive instruments which track the performance of an underlying basket of securities. These funds are relatively cheap, where there is an ongoing debate in which the performance of passive instruments is compared to the performance of mutual funds. A mutual fund is actively managed, where active managers for example intend to select the best stocks or to time the market. Such mutual funds are more expensive than ETFs where the debate discusses whether the higher costs result in higher returns. Studies (e.g. Carhart, 1997 and Blake *et* al, 2012) argue that active managers lack skills and underperform. Other studies (e.g. Bolle and Busse, 2001 and Juang *et* al, 2007) argue that the average active manager does have skill, where Berk and Binsbergen (2015) argue that the costs absorb the excess returns. Regarding this debate there are also studies (e.g. Glode, 2010 and Kosowski, 2006) who argue that no distinction is made in market sentiment between bullish and bearish markets, claiming that active managers perform better in a bearish market than in a bullish market.

In the light of the above, this study will do additional research and will focus exclusively on the ETF segment. This study will investigate how expenses relate to performance and whether or not it can be worth it to invest in a more expense ETF rather than a cheaper ETF. Furthermore, this study will take into account the role of market sentiment and will research the following question: *"Is there a difference during bull and bear markets in the effect of expenses on performance of Exchange Traded Funds?"*.

The report will begin with discussing relevant literature. This study will go more in depth on existing literature in order to gain an understanding in the field of ETFs and the ongoing debate. First, the Exchange Traded Fund is introduced. Secondly, the study will go more in depth in the essentials of ETFs, there will be a comparison between ETFs and mutual funds, active and passive management styles are discussed and the final section of the literature review introduces market sentiment.

Insights which are gained in this study will help investors in the decision making process regarding investment choices. There will be an improved understanding of the relationship between expenses and performance for Exchange Traded Funds and there will be more awareness about the role of market sentiment. The additional knowledge can provide insights for investors to judge more critically whether or not a specific investment is considered best.

2. Literature Review

2.1 The Essentials of Exchange Traded Funds

An investor who intends to invest in a well-diversified portfolio of financial instruments has several possibilities. One can decide to compose a portfolio him- or herself by directly buying securities such as corporate stocks, bonds, money market instruments and other assets. However, an investor may not have the time or the knowledge to compose and manage a diversified portfolio. An alternative is to invest in a fund, such as a mutual fund. When investing in a mutual fund your money is pooled with the wealth of other investors and is then collectively invested in securities. The investments are actively managed by professionals of the fund, for which the fund charges a fee to the investor. It comes at a cost to invest in a mutual fund but the investor has his or her money invested responsibly in a diversified portfolio which is managed by knowledgeable professionals. An alternative to mutual funds is exchange traded funds (ETFs).

ETFs are traded like common stock throughout the day and are cheaper in nature relative to mutual funds. An investor can, similar to stocks, directly buy these funds on the market. An ETF is a tracker and mimics for example an index or other specified basket of securities belonging to a specific sector, region or theme. The value of an ETF is determined by the net asset value (NAV) of the underlying assets (Poterba & Shoven, 2002). ETFs represent simplicity, providing the possibility for both high and low wealth retail investors, and institutional investors, to be able to highly diversify investment portfolios. According to Gastineau (2001), investing in an ETF is basically investing in a whole portfolio in a single transaction, where ETFs comply in the same trading rules as regular stock. In nature, ETFs are a low cost passively managed financial product which aim to mimic an index with minimum tracking error (Ben-David *et al*, 2017). An important maintenance factor for ETFs is that its trading price has to remain a close proxy on the NAV of the underlying securities. In other words, the intrinsic value of the underlying basket of securities is reflected in the ETF's market price. Intra-day the underlying stocks move up and down, changing the NAV. An ETF's share price cannot simply increase or decrease due to the level of supply and demand. A strong increase in demand for the ETF cannot result in a lasting increase in the ETF's share price while the underlying NAV does not change. The ETF is maintained close to the intra-day's NAV. This is maintained by large market participants such as market makers who create ETF shares by essentially depositing the underlying stock, which is e.g. the equivalent for 10,000 ETF shares. Vice versa market makers redeem 10,000 ETF shares for one underlying stock portfolio.

This way the ETF's share price is managed and maintained close to the NAV of the underlying assets (Gastineau, 2001). There is an ongoing debate whether it is best to invest in an actively managed mutual fund, or to invest in a more passively managed ETF. The next section will go more in depth on a comparison between funds.

2.2 A comparison between Funds

A similarity between an ETF and a mutual fund is that both types of funds have operating costs, which lower the return for the investor. The funds can differ in tracking error, taxation, realized returns, the relationship between the price and the underlying NAV, and the funds can differ significantly in the cost structure (Poterba and Shoven, 2002). According to Gastineau (2001), mutual funds are in nature more expensive because an investor has to pay ongoing fees for the fund's active management style. In active management, managers intend to achieve abnormal returns by actively researching investment opportunities in order to select the best securities. Furthermore, active managers intend to time the market by buying and selling securities at the right time (Rompotis, 2009). Apart from the fees associated with active management, there are additional costs for a mutual fund. Such costs can be marketing costs, transaction fees, capital gain taxes, costs for an agent to track the salesman's placement of fund positions and costs associated with the shareholder accounting (Gastineau, 2001). For the latter, the fund must for example record and maintain all transactions, income and capital gains for each shareholder and has to keep track on the ownership distribution of shares. The management fees, the accounting costs, the other additional costs and possibly even costs to allow you to invest in the fund, are passed along to the investor which increase the fund's total expense ratio.

According to Singh & Yadav (2014), in comparison to a mutual fund an ETF offers diversifying simplicity, higher liquidity, higher trading flexibility and moreover; lower transaction costs and lower management fees. Cost-efficiencies occur since an ETF tracks an index or other basket of securities and does not include active research into investment opportunities or market timing. Hence, an ETF is cheaper in nature with a more passive management style. Furthermore, the ETF managers are not responsible for the shareholder accounting. The paperwork involved in the accounting and the costs it entails are the responsibility for the shareholder's broker. No record keeping is necessary, which makes ETFs similar to stocks. This decreases the ETF's operating costs significantly (Gastineau, 2001). Another cost-efficiency is that ETFs are more tax efficient than mutual funds. The tax burden

on stock investments is lower than the tax burden on mutual funds. An investor will pay lower taxes when directly buying stocks, and higher taxes when holding these stocks through a mutual fund. As investing in ETFs is similar as investing in stocks, ETFs are more attractive than mutual funds for taxation reasons as there is a tax benefit (Poterba and Shoven, 2002). In the end, costs can differ significantly between the different types of funds. According to Cummans[1] (2015), the average annual expense ratio over an investor's managed wealth, is 1.4% and 0.58% for mutual funds and passively managed ETFs respectively.

Costs lower the return for the investor. Since mutual funds are associated to higher costs in comparison to ETFs, a mutual fund needs to achieve a higher gross return in order to achieve a similar net return for the investor. For this reason, there is an ongoing debate whether or not active management is worth the high costs, or that it is more likely to achieve an outperformance when investing in a cheaper and more passively managed instrument. The debate mainly discusses two elements which active managers claim to possess. These are (i) the security selection ability; where managers intend to pick securities which will outperform, and (ii) the market timing ability; where managers intend to time the market by increasing equity market exposure during bull markets, and decrease exposure during bear markets. The goal for active mutual fund managers is to beat the market, or the benchmark. However, multiple studies such as Malkiel (1995), Gruber (1996) and Fama and French (2010) find that active managers are not able to acquire abnormal returns and underperform relative to passive management, where most mutual funds do not have enough skill to acquire returns high enough to cover costs. Fama and French (2010) find that the top performing mutual funds have an alpha no better than passive funds. Furthermore, Carhart (1997) does not find any evidence regarding the security selection ability whereas Blake *et al* (2012) and Graham and Harvey (1996) found none to limited evidence regarding the market timing ability. On the other side of the debate, Wermers (1999) does find some evidence on managers with security selection skills whereas Bollen and Busse (2001) and Jiang *et al* (2007) do find that managers from a mutual fund can have significant timing skills. Jiang *et al* (2007) claim that active mutual fund managers are able to time the market by using macro-economic indicators and non-public information in order to increase or decrease equity market exposure. After all, if active managers do not possess the skills to outperform passive benchmarks, why would a rational return seeking investor invest in an actively managed mutual fund and reward managers with high fees? (Berk and Green, 2004).

[1] As of April 6, 2015. On behalf of "ETFdb"; an ETF database provider for real-time data on more than 1,900 U.S. listed ETFs.

In a more recent study, Berk and Binsbergen (2015) use "value added" to measure skill for active managers in mutual funds. The study finds that the average active manager does have skills and the average mutual fund generates an added value of $3.2 million per annum. Investors do recognize these skills and are able to identify these funds, resulting in more capital invested in the better performing funds. Berk and Binsbergen (2015) also find that these better performing funds earn higher fees, where a strong positive relationship is found between compensation and performance. These results would suggest the reason why investors choose to invest in an expensive mutual fund, as higher fees tend to result in higher performance. However, another striking finding by Berk and Binsbergen (2015) is that the net alpha for investors is zero, which indicates investors do not earn any abnormal returns. This is a comparable finding as mentioned earlier by Fama and French (2010), saying mutual funds are not able to achieve returns high enough to cover all costs and do not achieve an alpha better than passive funds. The active managers absorb all economic rents. In an earlier research of Berk (2005) is mentioned that return itself is not a proper measure for skill. According to Berk (2005), researchers use net returns to measure skill and conclude there is none or low skill involved. Berk (2005) argues if skill is measured properly, one will find the average manager does have skill and does add value. Berk (2005) measures managerial skill via returns before the occurrence of any costs and finds that 80% of active managers have an alpha higher than the management fee. The finding indicates that on average, an active manager does add value. However, in the beginning of the section is described the additional costs which are associated with mutual funds. Recall costs related to for example the shareholder accounting, marketing and taxes. The additional costs increase the total expense ratio for the investor and result in a net alpha of zero.

If there is no excess return for investors to be achieved via mutual funds, then why do mutual funds exist? Recall Berk and Binsbergen (2015) who discuss why investors invest in a mutual fund, where investors acknowledge managerial skill and associate higher costs with higher performance. Another reasoning for investing in mutual funds is mentioned by Poterba and Shoven (2002), who mention that different types of funds can be attractive for different kinds of investors. The reasoning here is that investing in a mutual fund is more attractive for investors who do not give high value to liquidity and prefer to buy or sell regularly in small lots. An ETF is more attractive for the investor who demands high liquidity and prefers large purchases or sales. Mentioned earlier, ETFs offer a high trading liquidity and can be purchased or sold throughout the day. The downside is that in order to do these transactions, an investor needs a broker. Using a brokerage firm implies there will be commission costs for every

transaction. Shares in a mutual fund on the other hand, do not trade throughout the day and can solely be bought or sold for the NAV at the end of a trading day. Furthermore, according to Poterba and Shoven (2002), buying or selling mutual fund shares usually does not entail commission costs, which makes transactions through a mutual fund more attractive for small lots. Because of such differences, Poterba and Shoven (2002) explain how ETFs and mutual funds can therefore be attractive for different types of investors. The mutual fund suits the investor who does not need high liquidity, and buys or sells in small lots, whereas the ETF may be more suitable for the high liquidity demanding investor who buys or sells in larger lots.

Investors recognize skill and there is a reasoning for investors to invest through a mutual fund. Even though active managers may have skill, studies show that this may not result in excess returns for the investor. A recent trend within the ETF segment is the rise of actively managed ETFs. Active ETFs have a goal similar as mutual funds, which is to beat the market with abnormal returns. According to Rompotis (2009) the difference between an active and passive ETF is that an active ETF manager designs the ETF to track the manager's top picks, to track a mutual fund, to time the market or to achieve some other form of investment goal. A way for the manager to select top picks is by the use of factor investing. Within the underlying stocks of an index, a manager assigns additional weight to his/her top picks. An index is usually market capitalization weighted. This means the underlying stocks are weighted within the index using a single factor; market capitalization. In factor investing, the manager uses an alternative weighting strategy, where the manager intends to overweight the underlying stocks in the index which score high on several factors, and underweight stocks which score low. According to Bender *et al* (2013), common factors used for the security selection are (i) value; stocks showing excess returns for low prices, (ii) small caps showing excess returns, (iii) stocks with positive momentum, (iv) low volatility stocks, (v) high dividend yield stocks and (vi) quality stocks. By using such factors, the manager will underweight stocks which are considered more likely to show poor performance in the future, and to overweight stocks which are considered more likely to show strong performance. This way the index, or benchmark, may be outperformed. A manager can also intend to achieve excess returns by enhanced indexing, which is a more aggressive strategy. In enhanced indexing, the manager short-sells poor performing stocks underlying in the index and uses the proceeds of the sale to increase exposure to the stocks which are considered to be best by the manager (Thomaidis, 2013). Active management within ETFs comes with greater costs. These funds are on average more expensive than passively managed ETFs, but remain significantly cheaper than mutual funds. According to Cummans (2015), the average expense ratio for an active ETF is 0.89%. Recall the average expense ratios

for a mutual fund and a passively managed ETF, according to Cummans (2015), are 1.4% and 0.58% respectively. If possibly a more expensive ETF could be related to a more active management style, and active managers do have skills, one can wonder whether a relatively expensive ETF is still cheap enough not to absorb excess returns. Hence, an investor may be able to earn abnormal returns by investing in a more expensive ETF.

Cost levels vary between different management styles and different types of funds, where this study has its focus on the relationship between expenses and performance of ETFs. In the relationship there could be a role for market sentiment, indicating a different relationship between expenses and performance in bullish and bearish markets respectively. In a bullish market, one wants overexposure in outperforming securities where an active manager may or may not succeed in the successful security selection whereas a passive instrument has its exposure to such stocks. In a bearish market an active manager can rebalance its portfolio and e.g. decrease exposure to stocks, deleverage and increase exposure to bonds. Glode (2010) argues that studies regarding the active versus passive management debate do not reconcile the poor performance of active managers during a bullish economic period with good performance during a bearish economic period. Glode (2010) discusses why, in comparison to other mutual funds, the expensive and relatively poor performing funds can survive. Glode (2010) finds evidence showing these funds are related to countercyclical returns, indicating a relative good performance when the economy is in a bad state. Therefore, overall performance may seem poor while investing in such funds is rational. Kosowski (2006) researches equity funds and finds evidence for an average alpha which is higher when there is a recession than when there is not. Furthermore, Staal (2006) finds a negative relationship between a fund's risk-adjusted return and the CFNAI index, an index which measures the level of economic activity in the United States. A passively managed instrument on the other hand, does not have a monitoring active manager and cannot frequently rebalance, since the instrument is simply aimed to follow the benchmark. In a bearish market this will result in a negative return, comparable to its benchmark, and a similar positive return in a bullish market. Taking into account the findings of Glode (2010), Kosowski (2006) and Staal (2006), this research wonders whether or not there is a moderating role for market sentiment in the relationship between expenses and performance of ETFs. If the average manager performs significantly better in bearish periods than bullish periods, this indicates that in a bearish period there may be a positive relationship between expenses and performance, whereas it may be negative in a bullish period. Therefore the relationship may change due to the moderating effect of market sentiment.

2.3 Hypothesis Development

The literature review provides insights in the essentials of Exchange Traded Funds, a comparison between ETFs and mutual funds, and the ongoing debate between active and passive management. The debate argues whether active managers have skills and whether or not the high costs involved in active management result in excess returns for the investor. Studies (e.g. Berk and Binsbergen, 2015) find that managers do add value, but the excess returns are absorbed by the costs. Furthermore, the literature review discusses the active ETFs which are on average more expensive than the passive ETFs, but cheaper than mutual funds. Given there are passive and active ETFs, expense ratios within the ETF segment can significantly differ. Hence, this study wonders whether it can be worth it for an investor to invest in more expensive ETFs rather than cheaper ETFs. For this reason, this study researches the relationship between the expenses and performance of ETFs. If active managers do have skills and add value, this may indicate that more expensive ETFs may not absorb all excess returns and that it may be worth it to invest in relatively expensive ETFs. A key issue here remains whether the more expensive ETF is able to outperform a cheaper ETF. Studies (e.g. Fama and French, 2010) find there is a lack of skills for active managers, and are not able to outperform passive instruments. Furthermore, the literature review shows how market sentiment may have an effect on the relationship between expenses and performance. Hence, the main research question: *"Is there a difference during bull and bear markets in the effect of expenses on performance of Exchange Traded Funds?"*.

An active manager may try to beat the benchmark by for example selecting undervalued stocks, high dividend yield stocks, or to increase leverage for additional exposure to the stock markets when the market is bullish. The literature review suggests a manager may not be successful in security selection, or in timing the market. In a bearish market the manager may be able to deleverage and to decrease the portfolio's exposure to the stock market. Therefore, higher expenses may result in a relatively bad performance in a bullish market, and a better performance during bearish markets. In the light of this the following hypotheses have been generated:

H1: Expenses have a positive effect on performance in bearish markets.
H2: Expenses have a negative effect on performance in bullish markets.

3. Methodology

3.1 Approach

This study will investigate the moderating role of market sentiment in the relationship between the expenses and performance of Exchange Traded Funds. A cross-sectional study and a panel study will be conducted. The total sample yields 94,127 monthly observations for 1,465 U.S. listed ETFs during the period 2007-2017. An ETF's net excess return is used as a proxy for performance and the ETF's annual expense ratio is used as a proxy for expenses. First, the cross-sectional study will take into account the ETF's average monthly net excess return during the full period. Subsequently, the sentiment in the market will be determined for each monthly observation in order to make a distinction between ETF performance in bearish markets and ETF performance in bullish markets, using new net excess return averages for each sentiment. The bullish and bearish samples will be tested on whether or not there is a significant difference from the full sample where market sentiment is not taken into account. The regression results will provide the first indication if there is a moderating role for market sentiment in the effect of expenses on performance.

Secondly, a panel study will be conducted in order to improve the understanding in the role of market sentiment. In the panel study, time variance is taken into account and all monthly observations are included, where market sentiment will be incorporated in the models. The development in the net excess return of an ETF will be observed over time. The next section will go more in depth on the variables; the moderator, the dependent variable, the independent variables and control variables.

3.2 Variables

3.2.1 The Moderator

If there is a moderating role for market sentiment, a change in market sentiment will change the relationship between expenses and performance. Market sentiment is captured using a monthly benchmark's gross return including dividends. A positive benchmark return is used as a proxy for a bullish sentiment, whereas a negative return is used as a proxy for a bearish sentiment. Each ETF is allocated to a corresponding asset class and region where each combination of class and region has its own benchmark and therefore its own sentiment. The specific allocations are discussed in more depth in section 3.2.4. For each allocation, an appropriate benchmark is measured on a monthly basis by calculating the average gross return

including dividends among all ETFs in the specific asset class, region and specific month. Subsequently, a positive benchmark return will be marked as “bullish”, whereas a negative benchmark return is marked as “bearish”. A “neutral” sentiment is not considered as necessary since ~97% of observations in the return of the benchmark falls outside bandwidths of [-0.1%] and [+0.1%], which is considered wide enough in order to be seen as a negative or positive return. Other tested bandwidths are [-0.2%; +0.2%] and [-0.3%; +0.3%], where the benchmark return falls outside the bandwidths for ~94% and ~91% of observations respectively. Hence, the total sample yields 58,780 and 35,347 monthly observations for a bullish and bearish sentiment respectively.

3.2.2 The Dependent Variable

The performance of an ETF is measured using the net excess return (EXRET). The net excess return is measured as the ETF’s monthly gross return including dividends, minus the benchmark return and the monthly expense ratio for the ETF. This research considers the net excess return to be the best indicator for the performance of an ETF and return for the investor.

3.2.3 The Independent Variables

The independent variable of interest is the total annual expense ratio (TER). For TER, rather than a monthly ratio, the annual expense ratio is used for ease of interpretability. The annual expense ratio is of interest in the cross-sectional study and the panel study. For the panel study there will be a second independent variable of interest. This variable will contain interaction between the annual expense ratio and market sentiment (SENT). Recall market sentiment is defined in section 3.2.1; the sentiment in the market is bullish when the benchmark return is positive and bearish when the benchmark return is negative.

3.2.4 Control Variables

The control variables used in the regressions are those which are expected to have an effect on the excess return of an ETF. Since an ETF is a tracker of the underlying securities, the performance of an ETF is directly related to the performance of these underlying securities. ETF performance is determined by the basket of securities it follows. The appropriate control variables are those which are related to the underlying securities, which in this study are best reflected by the use of controls for asset class and region and individual fixed effects. Each

unique ETF is allocated to one of the following asset classes; (i) equities, (ii) bonds, (iii), real estate, (iv) commodities and (v) currencies. Secondly, the ETFs are allocated to one out of five regions; (i) global, (ii) Northern America, (iii) Europe, (iv) Asia-Pacific and (v) emerging markets. The combinations of asset classes and regional classes are represented by dummy variables where an ETF cannot have multiple allocations. An ETF is allocated to one asset class, and one region. The dummies are used in the cross-sectional study and are used as fixed effects in the panel study.

Furthermore, the monthly growth in outstanding ETF shares (SHA) and trading volume (VOL) are used as control variables. Increasing outstanding shares may be related to an increasing demand for an ETF, which could indicate an increasing interest in the underlying securities. Similar as for shares outstanding, an increasing trading volume may be related to an increasing demand for the ETF, which also may indicate an increasing interest towards the underlying securities. Furthermore, a variable is used to control for ETFs which are currency hedged. These ETFs control for currency fluctuation risk which can have an influence on performance and therefore on excess returns.

3.2.5 Samples and Data Collection

Monthly data is retrieved on the whole ETF universe available at the Center for Research in Security Prices (CRSP) for the period 2007 - 2017. CRSP[2] provides data from the NYSE, NASDAQ and NYSE Arca[3] exchanges. Within CRSP, two databases have been consulted. Within the *fund summary* files, data on expense ratios, asset classes and regions are retrieved. ETFs can be identified using an ETF indicator variable. A Lipper classification, the fund's name and additional manual work allows this study to allocate each ETF to the corresponding asset class, region and to determine if an ETF is currency hedged. Information on an ETF's share price, shares outstanding and trading volume is retrieved from CRSP's *security files*.

Missing and inconsistent data such as negative share prices and negative expense ratios is removed from the sample. Outliers in the expense ratio, returns including dividends, trading volume and market capitalization of the fund are dropped, since outliers may produce statistical errors. For example, two unique ETFs in the sample which incurred expense ratios of 3.32% and 3.36% respectively are dropped. All other unique ETFs incur an expense ratio lower than 2%. Hence, 2% is used as the limit where observations incurring a higher ratio are dropped.

[2] Coverage CRSP U.S. Stock Data as retrieved via *Wharton Research Data Services.*
[3] NYSE Arca is the world's largest ETF exchange according to *Investopedia (2018).*

The boundaries for returns including dividends are set at [-50%; +75%] and observations with a monthly trading volume of more than 90 million shares are dropped. The market capitalization of a fund is calculated as the ETF's share price multiplied by the shares outstanding. Market capitalization is used to determine the size of the fund, of which the ETF's monthly growth in shares outstanding is used as a control variable. Funds with a market capitalization lower than $5 million and higher than $1.2 billion are dropped from the sample. Furthermore, this study uses ETF averages for the cross-sectional study and observes ETFs over time in the panel study. Hence, ETFs with a low number of monthly observations are removed from the sample. Funds with less than 12 observations (<1 year) are dropped. Also, funds allocated to an asset class and region where the combination yields less than 12 unique ETFs are dropped from the sample. This is because a benchmark is not considered a good benchmark when it is based on a small number of funds. 973 observations for 20 unique ETFs are dropped from the sample. The initial asset class and regional allocations are to be found in appendix A. The allocations will be discussed in more depth in section 4.1.

The data consists of two datasets retrieved from CRSP's *fund summary* and *security files* which are merged using the ETF's ticker symbol and date. The panel data yields 94,127 monthly observations for 1,465 unique ETFs. There are 58,780 and 35,347 monthly observations for a bull and bear market sentiment respectively. Appendix B provides a summarizing overview on the variables used in this study. The next paragraph will discuss the models.

3.3 Models

3.3.1 Cross-Sectional Study

This research will start with a cross-sectional study where the unique ETFs are taken into account once during the period 2007-2017. Averages for an individual ETF_i for the period are calculated for the time-variant variables; net excess return (EXRET), trading volume (VOL), annual expense ratio (TER) and shares outstanding (SHA). The expense ratio and shares outstanding are frequently time-invariant but are subject to change occasionally. The hedging variable (HED) and the dummy variables for asset class and region (DUM) are time-invariant. The ordinary least squares regression equation for model [1] is as follows:

[1]

$$EXRET_i = \beta_1 TER_i + \beta_2 SHA_i + \beta_3 VOL_i + \beta_4 HED_i + \beta_5 DUM_i$$

The equation does not show an intercept term. This is because the intercept will be captured by the dummy variables for asset class and region. The first series of regressions which are conducted will not take into account market sentiment. In order to get insights in the moderating role of market sentiment, the second series of regressions will take into account variable averages during a bearish sentiment, whereas the third series of regressions will take into account variable averages during a bullish sentiment. The study researches if the bullish and bearish sample are significantly different from the sample where market sentiment is not taken into account. If there is a moderating role to be found for market sentiment, the effect of the annual expense ratio on net excess return will be different when there is a different sentiment.

3.3.2 Panel Study

A panel study is conducted in order to gain a deeper understanding in the moderating role of market sentiment. A moderator changes the effect of a predictor on the outcome variable. In other words, a moderator *interacts* with the predictor. Hence, model [2], [3] and [4] are interaction models. The monthly time period$_t$ for an individual ETF$_i$ is taken into account. Time variance is incorporated for the net excess return, annual expense ratio, shares outstanding and trading volume. Furthermore, a dummy variable for market sentiment (SENT) is added to the model. The independent variables of interest are the annual expense ratio (TER) and an interaction variable, where there will be interaction between market sentiment and the annual expense ratio. Model [2] is a pooled panel regression excluding the asset class and region dummy variables. In model [3] the dummy variables are included which are then fixed effects for asset class and region. The dummies capture the intercept, hence the intercept itself can be omitted. Model [4] is an individual fixed effects (IFE) panel regression. In this model, the data analysis program (STATA) automatically controls for time-invariant factors for each individual ETF. Hence, the dummy variables for currency hedging (HED) and asset class and region (DUM) are omitted in model [4]. The regression equations are as follows:

[2]

$$EXRET_{t,i} = \beta_0 + \beta_1 TER_{t,i} + \beta_2 SENT_{t,i} * TER_{t,i} + \beta_3 SHA_{t,i} + \beta_4 VOL_{t,i} + \beta_5 HED_i$$

[3]

$$EXRET_{t,i} = \beta_1 TER_{t,i} + \beta_2 SENT_{t,i} * TER_{t,i} + \beta_3 SHA_{t,i} + \beta_4 VOL_{t,i} + \beta_5 HED_i + \beta_6 DUM_i$$

[4]

$$EXRET_{t,i} = \beta_0 + \beta_1 TER_{t,i} + \beta_2 SENT_{t,i} * TER_{t,i} + \beta_3 SHA_{t,i} + \beta_4 VOL_{t,i} + IFE_i$$

4. Results

4.1 Descriptive Information

In table 1 the descriptive statistics are shown for the non-dummy variables which are the net excess return (EXRET), the total annual expense ratio (TER), the ETF's number of shares outstanding (SHA) and the ETF's trading volume (VOL). The first two rows; (1), show descriptive information for the net excess return and the annual expense ratio for the full sample cross-sectional regression. Rows (2) and (3) show information on the bearish and bullish sample respectively. Notable is that net excess return in the bearish sample is higher than in the bullish sample. The average net excess return in the bearish sample is -0.01%, whereas it is -0.1% in the bullish sample. At first sight this seems to be in line with Glode (2010), Kosowski (2006) and Staal (2006), indicating better performance in a bearish period. The net excess return and annual expense ratio in row (4) describe the sample in the panel. The monthly mean net excess return is -0.03%. The average annual expense ratio is 0.53% and is comparable in all samples. The expense ratio is lower than according to Cummans (2015) mentioning average expense ratios of 0.58% and 0.89% for passive and active ETFs respectively. Possible reasons can be that Cummans' averages are a snapshot as of April 6, 2015, for 1,900 U.S. listed ETFs. My study on the other hand reflects an average expense ratio for all monthly observations during the period 2007 – 2017, for 1465 U.S. listed ETFs. The final row shows descriptive information on the number of monthly observations per unique ETF. On average, a unique ETF is observed for 64 months.

Table 1 Descriptive Statistics

Variable	Obs	Mean	St. Dev.	Min	25%	Median	75%	Max
EXRET (1)	1,465	-.0005	.0112	-.3131	-.0032	-.0001	.0019	.0737
TER (1)	1,465	.0052	.0027	.0001	.0031	.0050	.0070	.0185
EXRET (2)	1,447	-.0001	.0241	-.2481	-.0053	.0022	.0093	.1712
TER (2)	1,447	.0053	.0027	.0001	.0032	.0050	.0070	.0185
EXRET (3)	1,465	-.0010	.0206	-.3829	-.0073	-.0015	.0034	.1129
TER (3)	1,465	.0052	.0027	.0001	.0030	.005	.0069	.0185
EXRET (4)	94,127	-.0003	.0426	-.5748	-.0154	-.0003	.0143	.7386
TER (4)	94,127	.0053	.0025	.0001	.0035	.0050	.0070	.0190
SHA	94,127	5,860	8,589	50	950	2,700	7,000	119,200
VOL	94,127	2,523	7,548	.3	168	536	1,748	89,980
Months	1,465	64	37	12	31	55	92	132

Recall that for shares outstanding (SHA) and trading volume (VOL), monthly growth is used in the regressions. In descriptive table 1 the absolute numbers are shown, in thousands. It is notable that the mean values are considerably larger than the corresponding median values. This indicates a skewed distribution for these variables, which could make it more difficult to find significant results for shares outstanding and trading volume.

Table 2 shows the distribution of the sample with a distinction between unique ETF observations, and monthly observations. Column (1) shows the specific market sentiment, whether it is currency hedged, the asset class and region. Column (2) shows the number of observations for each unique ETF. Column (3) provides the number of monthly observations. Noteworthy is that the sample mainly consists of ETFs with a focus on equities, and ETFs which have a global exposure.

Table 2 Sample distribution

(1)	(2)	(3)
Sentiment/Hedged/Asset Class/Region	Unique ETFs	Monthly Observations
Bull Sentiment	-	58,780
Bear Sentiment	-	35,347
Total	-	**94,127**
Hedged	36	1,346
Equities	1,089	69,245
Bonds	239	14,169
Real Estate	28	1,956
Commodities	97	7,578
Currencies	12	1,179
Total	**1,465**	**94,127**
Global	983	60,123
Northern America	239	18,862
Europe	56	3,381
Asia-Pacific	35	1,969
Emerging Markets	152	9,792
Total	**1,465**	**94,127**

In table 3 the asset class and regional allocation is described in more detail. Since table 2 shows a high number of observations in equity ETFs and in global ETFs, it is not surprising that table 3 shows global equity ETFs are observed the most. Noteworthy is not all regions are available for each asset class. The currencies asset class is the category with the lowest number of unique firms. Multiple asset class/region combinations have been dropped since there were zero to a low number of unique ETFs allocated to a specific category. A low number of ETFs is not considered representative to reflect a good benchmark. For additional information on the allocations before dropping multiple categories can be found in the table in appendix A.

Table 3 Asset Class and Regional Allocation

(1)	(2)	(3)	(4)
Asset class	Region	Unique ETFs	Monthly observations
Equities	Global	681	40,721
	Northern America	182	14,304
	Europe	56	3,381
	Asia-Pacific	35	1,969
	Emerging Markets	135	8,870
Bonds	Global	183	10,424
	Northern America	39	2,823
	Emerging Markets	17	922
Real Estate	Global	28	1,956
Commodities	Global	79	5,843
	Northern America	18	1,735
Currencies	Global	12	1,179
Total		**1,465**	**94,127**

Table 4 shows the correlation matrix for the variables used in this study, excluding the fixed effects. The variables for net excess return (EXRET), the annual expense ratio (TER), shares outstanding (SHA) and trading volume (VOL) show significant correlations. The matrix shows a negative correlation between the annual expense ratio and net excess return of -0.014, which can be an indication that the net excess return may decrease for an increasing expense ratio. For the binary variables, most correlations are significant. There is an insignificant correlation between market sentiment (SENT) and net excess return, while the correlations between market sentiment and the expense ratio, shares outstanding and trading volume are significant. Therefore, market sentiment is considered important in the model as a whole. Furthermore, the highest correlation in the matrix is found for trading volume and shares outstanding, with a significant positive correlation of 0.313.

Table 4 Correlations including p-values within brackets. (*) indicates the correlation is significant at minimally the 10% level.

Variable	EXRET	TER	SENT	SHA	VOL	HED
EXRET	1.000					
TER	-.014* (.000)	1.000				
SENT	-.002 (.550)	-.008* (.014)	1.000			
SHA	-.026* (.000)	-.014* (.000)	.013* (.000)	1.000		
VOL	-.009* (.004)	-.012* (.000)	-.013* (.000)	.313* (.000)	1.000	
HED	-.020* (.000)	.003 (.339)	-.003 (.446)	.025* (.000)	.047* (.000)	1.000

4.2 Cross-Sectional Regressions

Table 5 shows the cross-sectional regressions including all unique ETFs without taking into account market sentiment. The levels for the adjusted R^2 are low which is understandable since excess returns are subject to a high level of randomness. Theoretically, the value of the intercept is the value of the net excess return (EXRET) when all other independent variables are zero. Regression (1) regresses the net excess return on the total annual expense ratio (TER), excluding control variables. In regression (2) to (5) additional control variables are added to the model. In regression (5) the intercept is omitted since all scenarios are captured in the asset class and region dummies, for which the output can be observed in appendix C. The results show a significant negative relationship between the annual expense ratio and net excess return at the 1% level throughout the regressions.

Table 5 Regressions (1)-(5) include cross-sectional regressions including all unique ETFs with net excess return (EXRET) as the dependent variable. Shares outstanding (SHA) and trading volume (VOL) are based on monthly growth. Regression (5) is run without an intercept since all scenarios are captured in the dummy variables for asset class and region. The standard errors are shown within the brackets. Values are rounded to three decimal places and the associated significance levels are 1%(***), 5%(**) and 10%(*).

Variable	(1)	(2)	(3)	(4)	(5)
Intercept	.002**	.002***	.002***	.002***	-
	(.001)	(.001)	(.001)	(.001)	
TER	-.389***	-.397***	-.395***	-.395***	-.462***
	(.109)	(.108)	(.108)	(.108)	(.116)
SHA		-.010***	-.010***	-.010***	-.010***
		(.001)	(.001)	(.001)	(.002)
VOL			.000	.000	.000
			(.000)	(.000)	(.000)
HED				.000	.000
				(.002)	(.002)
DUM	No	No	No	No	Yes
Adj. R^2	.79%	3.65%	3.75%	3.69%	3.47%
Obs.	1,465	1,465	1,465	1,465	1,465

Table 5 shows that the net excess return decreases for an increasing expense ratio. This can be related to the passive versus active debate in which ETFs are compared to mutual funds. Recall e.g. Fama and French (2010) who find that top performing mutual funds are not able to achieve an alpha better than passive funds, and Berk and Binsbergen (2015) who find the net alpha for investors is zero due to the high costs involved in mutual funds. Hence, the result indicating that an increasing expense ratio will result in a lower net excess return to the investor is in line with these studies.

Outstanding shares (SHA) is added in regression (2). Notable is the adjusted R^2 which increases from 0.79% to 3.65%, indicating that shares outstanding is an important contributor in explaining the model's variance. Shares outstanding is negatively significant at the 1% level throughout the regressions. At first sight, the coefficient for shares outstanding seems low. Taking into account the variable is based on the average monthly growth, it is understandable. When the variable for shares outstanding increases with 0.1, the net excess return decreases with 0.001, ceteris paribus.

Moreover, regression (4) and (5) show a declining trend in the adjusted R^2, indicating that the currency hedging variable (HED) and the asset class and region dummy variables (DUM) do not add additional value in explaining the variance within the net excess return. The adjusted R^2 penalizes for the idea that a significant result could be because of chance. Since the adjusted R^2 decreases in regression (4) and (5), it indicates that the asset class and region allocations and currency hedging contribute less to the variance within net excess returns than the model would expect by chance. Hence, the optimal regression for this model may be regression (3).

The next step in the process is to include market sentiment. A bearish market sentiment will first be taken into account. The cross-sectional regressions regarding a bearish market sentiment are shown in table 6. The output shows whether the coefficients are significantly different in comparison to the full sample in table 5. Noteworthy is that the number of observations counts 1,447 unique ETFs, rather than 1,465 ETFs which are present in the full sample. This indicates 18 unique ETFs which are not observed during bearish markets, and are only observed during bullish markets.

Table 6 Regressions (1)-(5) include cross-sectional regressions including all unique ETFs with the average net excess return (EXRET) during bearish markets as the dependent variable. The results are in comparison to the full sample in table 5 where market sentiment is not taken into account. Shares outstanding (SHA) and trading volume (VOL) are based on growth. Regression (5) is run without an intercept since all scenarios are captured in the dummy variables for asset class and region. The standard errors are shown within the brackets. Values are rounded to three decimal places and the associated significance levels are 1%(***), 5%(**) and 10%(*).

Variable	(1)	(2)	(3)	(4)	(5)
Intercept	.008*** (.001)	.008*** (.001)	.008*** (.001)	.008*** (.001)	-
TER	-1.457*** (.233)	-1.445*** (.232)	-1.467*** (.232)	-1.459*** (.231)	-1.794*** (.248)
SHA		.002 (.003)	.001 (.003)	.000 (.003)	.001 (.003)
VOL			.001 (.000)	.001 (.000)	.001 (.000)
HED				.011*** (.004)	.011*** (.004)
DUM	No	No	No	No	Yes
Adj. R^2	4.10%	4.58%	5.16%	5.60%	6.40%
Obs.	1,447	1,447	1,447	1,447	1,447

The results in regressions (1) to (5) show strong significant results at the 1% level for the annual expense ratio. The strong negative relationship between the expense ratio and net excess return indicates that in a bearish market, the relationship is significantly more negative in comparison with the full sample in table 5. If expensive ETFs may be related to active ETFs, the results show that these funds are likely to underperform cheaper funds in bearish markets. This would imply that costs associated with the fund absorb the excess returns when there is a bearish sentiment. This is comparable to the study of Berk and Binsbergen (2015) saying costs

associated with mutual funds absorb the investor's excess return. Another reason can be that during bearish markets active managers do lack skills, which is a comparable finding as studies by e.g. Fama and French (2010) and Blake *et al* (2012).

The results in table 6 for shares outstanding and trading volume are insignificant. This indicates that the results for shares outstanding and trading volume in a bearish market do not significantly differ from the full sample. The hedging variable shows a significant positive relationship with net excess return at the 1% level, whereas the result for the full sample is insignificant. Hence, in a bearish market, currency hedging is more positively related to net excess return in comparison to the full sample.

The intercept coefficient in a bearish market is significantly more positive in comparison to the full sample. In theory, the initial value of an ETF's net excess return when all else is zero is higher in a bearish market in comparison to the full sample. This may be related to studies such as Glode (2010), Kosowski (2006) and Staal (2006) who find a higher performance for mutual funds in recessions, in comparison to when there is not. For ETFs, the reason for a more positive intercept in a bearish market could be that actively managed ETFs successfully apply factor investing or enhanced indexing, which is described by Bender *et al* (2013) and Thomaidis (2013) respectively. Recall these strategies increase exposure to stocks within an index which are considered best, and decrease exposure to stocks which are considered worst. This way, the benchmark may be outperformed. Hence, such strategies could be the reason for the positive intercept found in a bearish market. However, one should be aware that the relationship between the expense ratio and net excess return is significantly more negative in a bearish market relative to the full sample.

Table 7 shows the cross-sectional regressions where the average net excess return during bullish markets is taken into account. Similar as for the bearish market sample, the output shows whether the coefficients are significantly different in comparison to the full sample in table 5. In contrast to the bearish sample regressions in table 6, the output shows a significant positive relationship throughout the regressions between the annual expense ratio and net excess return at the 1% level. Hence, in comparison to the full sample excluding market sentiment, in a bullish market the relationship between the expense ratio and net excess return is more positive. These results may give an indication that in bullish markets, more expensive ETFs are likely to outperform cheaper ETFs. An expensive ETF may be more likely to be categorized as an active ETF, implying that the relatively expensive funds may be actively managed. This would imply that active managers within the ETF segment may be able to outperform the cheaper passive ETFs in bullish markets. Managers may be able to add value, increase exposure to

outperforming stocks and to generate abnormal returns for the investor. This is in line with Berk (2005) and Berk and Binsbergen (2015) finding that active managers do have skills and add value.

Table 7 Regressions (1)-(5) include cross-sectional regressions including all unique ETFs with the average net excess return (EXRET) during bullish markets as the dependent variable. The results are in comparison to the full sample in table 5 where market sentiment is not taken into account. Shares outstanding (SHA) and trading volume (VOL) are based on growth. Regression (5) is run without an intercept since all scenarios are captured in the dummy variables for asset class and region. The standard errors are shown within the brackets. Values are rounded to three decimal places and the associated significance levels are 1%(***), 5%(**) and 10%(*).

Variable	(1)	(2)	(3)	(4)	(5)
Intercept	-.004*** (.001)	-.004*** (.001)	-.004*** (.001)	-.004*** (.001)	-
TER	.715*** (.202)	.706*** (.201)	.698*** (.201)	.695*** (.201)	.848*** (.217)
SHA		.000 (.002)	.001 (.002)	.001 (.002)	.001 (.002)
VOL			-.001 (.001)	-.001 (.001)	-.001 (.001)
HED				-.005 (.003)	-.006 (.004)
DUM	No	No	No	No	Yes
Adj. R^2	.11%	1.37%	1.34%	1.41%	1.20%
Obs.	1,465	1,465	1,465	1,465	1,465

The results in table 7 for shares outstanding, trading volume and hedging are insignificant, indicating there is no significant difference relative to the full sample. The associated levels of the adjusted R^2 throughout the regressions indicate that trading volume and the asset class and region allocations do not add value in explaining the model's variance. Moreover, the intercept is significantly more negative at the 1% level in comparison to the full sample. This may again be related to Glode (2010), Kosowski (2006) and Staal (2006) who find a lower performance for mutual funds when there is not a recession, in comparison to when there is a recession. For ETFs, a possible explanation could be that strategies used in actively managed ETFs are unsuccessful during bullish markets. This can be related to Malkiel (1995), Gruber (1996) and Fama and French (2010) who claim active managers do not have enough skill, do not acquire abnormal returns, and underperform relative to passive management. Since

there is a negative intercept in bullish markets, and a positive intercept in bearish markets, this may indicate ETFs mitigate market fluctuations. Since passive ETFs track a basket of securities or an index and thus tend to follow the market, it could be the strategies of the actively managed ETFs why the results indicate ETFs are less subject to market movements.

The results for the cross-sectional regressions indicate how the effect of the annual expense ratio on the net excess return differs in a bearish and bullish market in comparison to the full sample where market sentiment is not taken into account. In a bullish market the relationship for the expense ratio and net excess return is significantly more positive in comparison to the full sample, whereas the relationship is significantly more negative in a bearish market. At first sight, these findings indicate the opposite as hypothesized, since H1 states: *"Expenses have a positive effect on performance in bearish markets."*, and H2 states: *"Expenses have a negative effect on performance in bullish markets."*. Although the cross-section may indicate the opposite, this study investigates if there is a difference in a bull and bear market in the effect of expenses on performance of ETFs. The cross-section results provide reason to investigate the moderating role for market sentiment further in a panel study.

4.3 Panel Regressions

To improve the understanding on the moderating effect of market sentiment on the relationship between the annual expense ratio and net excess return, panel regressions are conducted where time variance is taken into account. The 1,465 unique ETFs are observed over time on a monthly basis during the period 2007-2017, yielding 94,127 observations. First, pooled panel regressions are conducted using the second model for this study:

[2]

$$EXRET_{t,i} = \beta_0 + \beta_1 TER_{t,i} + \beta_2 SENT_{t,i} * TER_{t,i} + \beta_3 SHA_{t,i} + \beta_4 VOL_{t,i} + \beta_5 HED_i$$

The model excludes the dummy variables for asset class and region. Two regressions are conducted. Regression (1) is excluding the interaction variable (SENT*TER), where market sentiment interacts with the annual expense ratio. Regression (2) includes the interaction variable. The results for the second model in regression (1) and (2) are shown in table 8. Regression (1) shows an insignificant result for the annual expense ratio. This is in contrast to the full sample cross-sectional regression in table 5, where the relationship between the expense ratio and net excess return is negatively significant. When adding the interaction variable to the model in regression (2) and thus taking into account market sentiment, the expense ratio

becomes positively significant at the 1% level. The interaction variable is negatively significant at the 1% level. Market sentiment (SENT) has a value of 0 when the sentiment is bullish, and 1 when the sentiment is bearish. Hence, in interpreting the results, the effect of the expense ratio on net excess return in a bullish market is the result for the variable TER. In a bearish market, the interaction variable becomes of interest and the effect of the expense ratio on net excess return is then the sum of the variable TER and the interaction variable SENT*TER. The results in regression (2) indicate there is a positive effect of the annual expense ratio on net excess return in bullish markets and a negative effect of the annual expense ratio on net excess return in bearish markets.

Table 8 The dependent variable throughout the regressions is net excess return (EXRET). Regressions (1) and (2) include pooled panel regressions. Regressions (3) and (4) include panel regressions including dummy variables for asset class and region, hence the intercept is omitted. Regressions (5) and (6) include individual fixed effects panel regressions. Regressions (1), (3) and (5) do not take into account market sentiment, whereas interaction between the annual expense ratio and market sentiment (SENT*TER) is included in regression (2), (4) and (6). The output for the asset class and region dummies for regression (3) and (4) can be consulted in appendix C. Shares outstanding and trading volume are based on growth. For model [2] and [3] the adjusted R^2 is reported. For model [4] the within R^2 is reported. The standard errors are shown within the brackets and the associated significance levels are 1%(***), 5%(**) and 10%(*).

	Model [2]		**Model [3]**		**Model [4]**	
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-.000 (.000)	-.000 (.000)	-	-	.002 (.002)	.002 (.002)
TER	-.047 (.055)	.152*** (.059)	-.062 (.060)	.141** (.064)	-.479 (.374)	-.154 .375
SENT *TER	-	-.468*** (.047)	-	-.470*** (.048)	-	-.475*** .047
SHA	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)	-.001*** (.000)
VOL	.001*** (.000)	.001*** (.000)	.001*** (.000)	.001*** (.000)	.001*** (.000)	.001*** (.000)
HED	-.001 (.001)	-.001 (.001)	-.001 (.001)	-.001 (.001)	-	-
DUM	No	No	**Yes**	**Yes**	No	No
Fixed Effects	No	No	No	No	**Yes**	**Yes**
R^2	.04%	.14%	.03%	.13%	.04%	.15%
Obs.	94,127	94,127	94,127	94,127	94,127	94,127

Secondly, pooled panel regressions are run without an intercept and are including the dummy variables for asset class and region. Hence, the intercept is captured in the dummies. Recall the third model for this study:

[3]

$$EXRET_{t,i} = \beta_1 TER_{t,i} + \beta_2 SENT_{t,i} * TER_{t,i} + \beta_3 SHA_{t,i} + \beta_4 VOL_{t,i} + \beta_5 HED_i + \beta_6 DUM_i$$

Regression (3) and (4) in table 8 represent the third model. The output for the dummy variables can be consulted in appendix C. Regression (3) is run without the interaction variable and therefore excludes market sentiment. Regression (3) shows an insignificant result for the annual expense ratio. The interaction variable is added in regression (4) and yields a significant positive result for the expense ratio at the 5% level and a significant negative result at the 1% level for the interaction variable. The results indicate a positive effect of the annual expense ratio on net excess return in bullish markets and a negative effect of the annual expense ratio on net excess return in bearish markets, which is a similar finding as in regression (2). In comparison to regression (2), the significance level for the expense ratio weakens from 1% to 5%.

Finally, individual fixed effects (IFE) panel regressions are conducted. The hedging variable and the asset class and region dummies are omitted since the model controls for time-invariant factors. Recall the fourth model:

[4]

$$EXRET_{t,i} = \beta_0 + \beta_1 TER_{t,i} + \beta_2 SENT_{t,i} * TER_{t,i} + \beta_3 SHA_{t,i} + \beta_4 VOL_{t,i} + IFE_i$$

Regression (5) and (6) in table 8 show the output for the fourth model. Regression (5) which excludes the interaction variable shows an insignificant result for the annual expense ratio. When adding the interaction variable in regression (6), the result for the annual expense ratio remains insignificant. The interaction term shows a significant negative relationship with net excess return at the 1% level. The results indicate no significant effect of the annual expense ratio on net excess return in a bullish market. For a bearish market, one cannot simply interpret the sum of the coefficients of the expense ratio and the interaction variable, since the expense ratio shows an insignificant result. Therefore, an additional test ("lincom") is conducted using the data analysis program (STATA) where a combination of the two variables is tested for significance. The result is negatively significant at the 10%. Hence, in a bearish market there is significant negative relationship between the annual expense ratio and net excess return. However, significance is weak.

Furthermore, table 8 shows a significant negative result at the 1% level for shares outstanding throughout regressions (1) to (6). Trading volume shows a significant positive result at the 1% level throughout regressions (1) tot (6). The hedging variable is insignificant throughout regressions (1) to (4) for the second and third model. The overall low level of the R^2 is understandable, since excess returns are subject to high randomness and furthermore because time periods are taken into account. The model's variance can therefore not be explained by variables which are time invariant. The jump in the R^2 in regression (2), (4) and (6) is likely to stem from the fact that the expense ratio and the interaction variable both contain TER. The expense ratio variable and the interaction variable are therefore correlated, resulting in a jump in the R^2.

Out of interest, additionally the panel regressions are run adding market sentiment individually. In the panel regressions excluding the interaction variable, market sentiment shows an insignificant result. At first sight it may therefore seem market sentiment is irrelevant. When adding the interaction variable for model [2], [3] and [4], the individual market sentiment variable is positively significant at the 1% level. The other variables show similar results as before as shown in table 8. Hence, the annual expense ratio is positively significant in model [2] and [3] and insignificant in model [4]. The interaction variable is negatively significant throughout the models.

4.4 Sensitivity Tests

To check for the sensitivity of the results, multiple additional tests have been conducted. First, robustness checks have been performed on the panel regressions. The same regressions are conducted using robust standard errors in order to control for heteroscedasticity among the error terms within all observations in the sample. The regressions yield similar results, while significance levels do slightly weaken in the pooled panel regressions. Shares outstanding and trading volume are significant at the 5% level, whereas the annual expense ratio is significant at the 5% level in the pooled regressions where the interaction variable is included.

Secondly, similar regressions are conducted using a monthly expense ratio rather than an annual expense ratio. The regressions yield the same results, with coefficients for the annual expense ratio and the interaction variable roughly 12 times larger than before.

5. Discussion of Findings

The cross-sectional regressions in table 5, 6 and 7 show regressions for the full sample, and regressions using a bearish and bullish sample relative to the full sample. The results in the full sample initially indicate a negative relationship between the annual expense ratio and net excess return. Relative to the full sample, the bearish sample indicates a more negative effect of the expense ratio on net excess return whereas the bullish sample indicates a more positive effect. This study aims to investigate whether in a bull and bear market there is a different effect for expenses on performance of ETFs. The cross-section results indicate a different effect when the sentiment in the market changes, providing the reason to investigate the moderating role of sentiment further. This is moreover important, since intercept values differ significantly in the cross-sectional regressions for the full, bearish and bullish sample respectively. Hence, it can be difficult to interpret results and may be subject to bias. In comparison to the full sample the intercept is significantly more positive in the bearish sample, and significantly more negative in the bullish sample. This is important to take into account since the average net excess return, for example within the full sample cross-section, is -0.0003. Furthermore, the annual expense ratios for unique ETFs in this sample vary between 0.0001 and 0.0190, with an average ratio of 0.0053. An expense ratio may increase with an amount such as 0.001, but is considered unlikely to increase with for example 0.2 or 0.02. Subsequently, one can wonder what this means throughout the cross-sectional regressions with different intercept coefficients.

When comparing the pooled panel regressions excluding market sentiment with the full sample cross-sectional regressions where market sentiment is not taken into account, the results are different. In the pooled panel regressions the result for the annual expense ratio is insignificant, whereas a significant negative result is found in the cross-section. When including market sentiment, the pooled panel regressions indicate a similar result as in the bearish and bullish cross-sectional regressions. A negative relationship between the expense ratio and net excess return is found for a bearish sentiment, whereas the relationship is positive for a bullish sentiment. The significance does slightly weaken for the expense ratio in the pooled panel regression where dummy variables for asset class and region are included. In the individual fixed effects panel regression including market sentiment, the result insignificant relationship between the expense ratio and the net excess return in a bullish market, whereas there is a weak significant negative relationship in a bearish market.

Hence, the results confirm a moderating role for market sentiment, although the result is weak in the individual fixed effects panel model which includes the most controls. There is

a moderating effect, while the opposite is found as in the hypotheses. H1 states: *"Expenses have a positive effect on performance in bearish markets".* The results indicate a negative effect of expenses on performance in bearish markets. Hence, H1 is rejected. H2 states: *"Expenses have a negative effect on performance in bullish markets"*. The regressions indicate a positive relationship, whereas in the individual fixed effects panel regression the relationship between expenses and performance is insignificant. Hence, H2 is rejected.

6. Conclusion

This study investigates the moderating role of market sentiment in the effect of expenses on performance of ETFs and is focussed on answering the following main research question: *"Is there a difference during bull and bear markets in the effect of expenses on performance of Exchange Traded Funds?"*. Previous research such as Berk and Binsbergen (2015) show how expenses relate to performance when taking into account mutual funds, whereas this research is relevant to conduct as it will provide insights with respect to the ETF segment.

In the cross-sectional regressions 1,465 unique ETF are taken into account where a distinction is made between average net excess returns in bearish markets and average net excess returns in bullish markets. The regressions indicate that the relationship between expenses and ETF performance in bearish markets is significantly more negative in comparison to the full sample, whereas the relationship is significantly more positive in bullish markets.

The cross-sectional results can be hard to interpret and may be subject to interpretational bias. Hence, panel regressions are conducted using an interaction model in order to gain an improved and more valid understanding in the moderating role of market sentiment in the effect of expenses on performance. The 1,465 unique ETFs yield 94,127 monthly observations. The panel regression results provide evidence which confirm the moderating role of market sentiment. Although the direction in the effect of expenses on performance is different than anticipated in the hypotheses, the effect of expenses on ETF performance changes when the sentiment in the market changes. In bearish markets there is a negative relationship between expenses and performance. For a bullish market the relationship is positive, where the evidence is considered weak since the result in the final individual fixed effects panel regression is insignificant. Since there is a difference in bull and bear markets, I conclude there is a difference during bull and bear markets in the effect of expenses on performance of Exchange Traded Funds.

In a bullish market, an expensive ETF tends to outperform a cheap ETF. In a bearish market, an expensive ETF tends to underperform a cheap ETF. Mentioned is that if an expensive ETF is more likely to be actively managed, an underperformance may indicate lack of skill. This study however did not investigate the relationship between expenses and management style of an ETF, which could be interesting for future research.

The results in this study can provide investors with complementary knowledge within the field of ETFs. The study provides an insight in the moderating role of market sentiment and how costs relate to ETF performance. Although this study does not identify which ETFs perform best, this study does emphasize factors such as market sentiment and expenses to critically take into account before deciding on an investment.

Finally, the limitations of this study. An ETF's performance is directly related to the performance of the underlying. Hence, the limitedness and difficulty in determining suitable controls. Furthermore, the limited supply in control variables pairs with another limitation where a variable which may be considered as useful, may not have been available. Solely the number of ETF shares outstanding and trading volume was available next to manually computed controls. Another limitation for this study is the unavailability of external benchmark returns which would fit as a benchmark in each combination of asset class and region. Hence, this study is limited to the data sample itself in order to compute benchmark returns. Furthermore, one should be aware that the results in this study do not take into account costs other than the annual total expense ratio of a fund, such as transaction costs, brokerage costs and taxes.

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Appendices

Appendix A

Table Appendix A. Asset Class and Regional allocations before dropping categories with few observations in order to calculate a representative benchmark.

(1) Asset class	(2) Region	(3) Unique ETFs	(4) Monthly observations
Equities	Global	681	40,721
	Northern America	182	14,304
	Europe	56	3,381
	Asia-Pacific	35	1,969
	Emerging Markets	135	8,870
Bonds	Global	183	10,424
	Northern America	39	2,823
	Europe	1	28
	Asia-Pacific	2	88
	Emerging Markets	17	922
Real Estate	Global	28	1,956
	Northern America	4	315
	Europe	1	97
	Asia-Pacific	1	83
	Emerging Markets	0	n.a.
Commodities	Global	79	5,843
	Northern America	18	1,735
	Europe	0	n.a.
	Asia-Pacific	0	n.a.
	Emerging Markets	3	94
Currencies	Global	12	1,179
	Northern America	0	n.a.
	Europe	4	95
	Asia-Pacific	0	n.a.
	Emerging Markets	4	173
Total		**1,485**	**95,100**

Appendix B

Table Appendix B Variable Description

Variable	Description
EXRET	The ETF's monthly excess return.
TER	The ETF's annual expense ratio.
SENT	Dummy for market sentiment; 0 = bullish; 1 = bearish.
SHA	Growth in an ETF's shares outstanding. Measured as SHA_t / SHA_{t-1} - 1
VOL	Growth in an ETF's trading volume. Measured as VOL_t / VOL_{t-1} - 1
HED	Dummy for currency hedging; 0 = not hedged; 1 = hedged.
DUM	**Asset Class and Region dummy variables. Breakdown below.**
EQ / GL	**Global Equities**, with the value of 1 when allocated to this category.
EQ / NA	**North American Equities**, with the value of 1 when allocated to this category.
EQ / EU	**European Equities**, with the value of 1 when allocated to this category.
EQ / PA	**Asia-Pacific Equities**, with the value of 1 when allocated to this category.
EQ / EM	**Emerging Market Equities**, with the value of 1 when allocated to this category.
BO / GL	**Global Bonds**, with the value of 1 when allocated to this category.
BO / NA	**North American Bonds**, with the value of 1 when allocated to this category.
BO / EM	**Emerging Market Bonds**, with the value of 1 when allocated to this region.
RE / GL	**Global Real Estate**, with the value of 1 when allocated to this category.
CO / GL	**Global Commodities**, with the value of 1 when allocated to this category.
CO / NA	**North American Commodities**, with the value of 1 when allocated to this region.
CU / GL	**Global Currencies**, with the value of 1 when allocated to this region.

Appendix C

Table Appendix C The table provides a more detailed breakdown on the full regressions from table 5, 6, 7 and 8. The dependent variable is net excess return. The asset class/region dummies are shown individually. The full variable description can be consulted in appendix B. Column (1) shows the full cross-sectional regression without taking into account market sentiment. Column (2) and (3) show the full cross-sectional regressions for bearish and bullish markets respectively. Column (4) and (5) show the results on panel regressions (3) and (4) from table 8. The standard errors are shown within the brackets and the associated significance levels are 1%(***), 5%(**) and 10%(*).

Variable	(1)	(2)	(3)	(4)	(5)
TER	-.462***	-1.794***	.848***	-.062	.141**
	(.116)	(.248)	(.217)	(.060)	(.064)
SENT *TER	-	-	-	-	-.470***
					(.048)
SHA	-.001***	.001	.001	-.001***	-.001***
	(.002)	(.003)	(.002)	(.000)	(.000)
VOL	.000	.001	-.001	.001***	.001***
	(.000)	(.000)	(.001)	(.000)	(.000)
HED	.000	.011***	-.006	-.001	-.001
	(.002)	(.004)	(.004)	(.001)	(.001)
EQ / GL	.002***	.011***	-.005***	.000	.000
	(.001)	(.002)	(.001)	(.000)	(.000)
EQ / US	.002*	.004*	-.002	-.000	-.000
	(.001)	(.002)	(.002)	(.000)	(.000)
EQ / EU	.003	.008**	-.003	-.000	-.000
	(.002)	(.003)	(.003)	(.001)	(.001)
EQ / PA	.002	.010**	-.004	-.000	-.000
	(.002)	(.004)	(.004)	(.001)	(.001)
EQ / EM	.004***	.012***	-.006**	-.000	-.000
	(.001)	(.003)	(.002)	(.001)	(.001)
BO / GL	.002**	.006***	-.003	-.000	.000
	(.001)	(.002)	(.002)	(.000)	(.000)
BO / US	.001	.007*	-.004	-.000	-.000
	(.002)	(.004)	(.003)	(.001)	(.001)
BO / EM	.003	.009	-.004	-.000	.000
	(.003)	(.006)	(.005)	(.001)	(.001)
RE / GL	.002	.009**	-.004	-.000	-.000
	(.002)	(.005)	(.004)	(.001)	(.001)
CO / GL	.004***	.010***	-.006**	.000	.001
	(.001)	(.003)	(.003)	(.001)	(.001)
CO / US	.002	.009	-.005	-.000	-.000
	(.003)	(.006)	(.005)	(.001)	(.001)
CU / GL	.004	.003	-.001	.000	.000
	(.003)	(.007)	(.006)	(.001)	(.001)
Adj. R^2	3.47%	6.40%	1.20%	.03%	.13%
Obs.	1,465	1,447	1,465	94,127	94,127