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Master Thesis Accounting, Auditing & Control

The effect of ETFs on the value relevance of earnings

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Abstract

The purpose of this thesis is to investigate whether the market reaction to accounting information changed due to the increase of ETF trading. More specifically, this master thesis investigates whether the value relevance of earnings is different due to ETF ownership. The value relevance of earnings is determined by using the ERC measure which focuses on a security's abnormal market return in response to the unexpected component of the firm's reported earnings. The results of the main regression analyses and the sensitivity tests combined lead to the rejection of the hypothesis suggesting a negative association between ETF trading and value relevance of earnings. The conclusion in this thesis states that ETF trading did not change the value relevance of earnings. This thesis focuses on a new potential determinant of the value relevance of earnings. Besides the results have implications for practice, because the way investors react to accounting numbers may influence the reporting of firms and new accounting standards. The implications for practice are limited since no change in value relevance of earnings is noted.

Key words*: Exchange Traded Fund (ETF), value relevance, earnings, Earnings Response Coefficient (ERC), market sensitivity.*

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Chapter 1: Introduction

In 1993, the S&P 500 Depository Receipt (SPDR), the first global Exchange Traded Fund (ETF), was launched on the American stock market by State Street Global Advisors (Lerman, 2002). An ETF is characterized as a 'portfolio in a single share' (Gastineau, 2001). An investor can buy a share in an ETF and follow the returns of several securities without having to buy all the underlying securities. ETF trading has been growing tremendously over the last years, especially in the United States (US). The trend of outflow of capital from actively managed mutual funds has been rising over 2016 and this equity is moved to the more passive investment option of ETFs (Wigglesworth, 2017). This trend can also be noticed from the fact that seven of the 10 most actively traded securities on the US stock market in 2016 were ETFs. In 2016 ETF trading was about 30% of the total daily traded value on the US stock market and this percentage will probably increase over the years. Therefore it can be concluded that ETFs have become an important new investment opportunity in the financial market. Currently there are almost 2,000 ETFs traded on the US stock markets and the amount of ETFs is expected to rise.

The purpose of this thesis is to examine the market reaction to accounting information in the context of ETFs. More specifically, this master thesis investigates whether the market reaction towards earnings information changed due to the more passive investment by ETF trading. The thesis focuses on the investors' perspective since prior research indicates that investors are the most important stakeholders of the company (Lev and Zarowin, 1999). The reaction of investors to accounting information is related to the field of value relevance research. Earnings information is value relevant for investors participating in a firm since this information can affect their welfare. Value relevance research attempts to operationalize the qualitative characteristic of relevance of financial information of the FASB framework. Value relevance is determined in research as the field of studies that examines the relation between accounting numbers and security market values (Barth et al., 2001; Holthausen and Watts, 2001; Francis and Schipper, 1999). The market reaction towards accounting information indicates whether investors perceive information as value relevant.

'Noise' investors participating in ETFs and the passive investment strategy of the ETF itself make it likely that the earnings-return association changes when equity of a firm is held by an ETF. Noise traders or passive investors trade not on information about fundamentals of firms but on market sentiment (Barkham & Ward, 2009). Therefore, this thesis answers the following research question:

RQ: *Does ETF trading change the value relevance of earnings for investors?*

ETF trading did grow due to the benefits of an ETF over other securities. ETFs make it possible to easily diversify a portfolio, to have low expense ratios, to participate in intraday trading and it is a transparent investment option. ETFs invest passively in the underlying securities, unlike active managed funds (Ke and Ramalingegowda, 2005). The fees for active mutual funds (0.8% of the value of the fund) are four times as high as the fees for ETFs (0.2% of the value of the fund) (Wigglesworth, 2017). ETFs do not change often from portfolio and focus on the long-term perspective. Besides, mutual funds have the disadvantage of a principle-agent problem (Golec, 1996). In mutual funds, fund managers make decisions on behalf of the investors participating in a fund regarding buy and sell decisions for specific securities. They receive a bonus when a fund is doing well and are therefore more risk seeking with the money of investors. Their behavior results in a more changing portfolio of securities of a mutual fund. In the ETF case, this problem is avoided due to the passive investment strategy. ETFs invest in broad sectors of the market and take the average return from the total of underlying securities while keeping the portfolio constant.

ETF trading has a negative influence on the security's informational efficiency due to the effect on the supply of the underlying securities available for trading (Israeli et al., 2016). As ETF ownership increases, more underlying securities are 'locked up' by the ETF issuer. These shares cannot be traded anymore on firm-specific information and this could result in a less sensitive market reaction to relevant information. The other negative effect on the informational efficiency of a stock comes from the fact that there is an increased amount of uninformed ('noise') traders participating in ETFs (Harper et al., 2006). Uninformed traders tend to migrate towards the ETF market because ETFs are an attractive type of investment because of their more

risk averse profile (Israeli et al., 2016). ETFs are profitable but less risky in comparison to an underlying security or mutual fund and therefore an attractive option for passive investors.

1.1 Methodology

Most of the value relevance literature focuses on value relevance of earnings and other flow measures (Beisland, 2009). In these studies, the metric of interest is the earnings reported by a firm. This thesis measures the value relevance of earnings by making use of an ERC model. This model measures the extent of a security's abnormal market return in response to the unexpected component of the firm's reported earnings. Three different proxies for ETF trading are used in the ERC model in this thesis: a dummy variable indicating whether a firm is part of an ETF (1) or not (0), the percentage of ETF holdings in a company and the difference in percentage of ETF holdings in a company between subsequent years. Besides, additional sensitivity tests are done to test the robustness of the obtained results. All these analyses make it possible to gather sufficient evidence in order to answer the research question.

1.2 Findings

First of all it is worth noticing that the research design of this thesis is based on an ERC model and that therefore the findings of this thesis state the investor's perception. The coefficients of the variables of interest in the main regression models suggest that there is a positive association between ETF trading and the market sensitivity to earnings. However, these coefficients are not significant and combined with the results of the sensitivity tests there cannot follow a conclusion regarding the sign of the association between ETF trading and the value relevance of earnings of the underlying firms. Therefore the conclusion in this thesis states that ETF trading did not change the value relevance of earnings.

1.3 Contribution and implications

Prior research regarding ETFs mainly focuses on price efficiency of ETFs. Other topics of research related to ETFs pay attention to: increased volatility caused by ETF trading, future earnings response coefficients and co-movement (Israeli et al., 2016; Glosten et al., 2016). From these studies it can be concluded that the existence of ETFs has an impact on the stock market. The impact of ETFs on the perceived relevance of accounting information is not determined yet. Prior

research already determines several determinants of the ERC. This thesis examines a new potential determinant of earnings relevance on the US stock market relating to ETF trading. The US stock market is chosen because of the high proportion of ETF trading in this market in comparison to other markets were ETFs are available.

Investigating the market reaction to earnings information in case of ETFs has also implications for practice, because the way investors react to accounting numbers may influence reporting of firms and new accounting standards (Holthausen and Watts, 2001). Passive investors are likely to participate in ETFs and focus less on firm-level information but buy an ETF because of its expected return and risk profile (Subrahmanyam 1991). Passive investors trade more on the basis of macro level information. Therefore, a large presence of these investors can possibly reduce the market sensitivity to accounting information. However, the findings of this thesis suggest that there is no difference in value relevance when ETF trading is present and therefore standard setters do not need to find ways to motivate these passive investors to pay attention to accounting information of firms that are part of an ETF.

This thesis aims to contribute to the existing value relevance literature by examining a new factor to explain differences in market response to earnings information. However, the results suggest that ETF trading is not changing the value relevance of earnings. Besides the results of this thesis provide information to standard setters regarding the relevance of accounting information.

1.4 Structure

The thesis is structured as follows: chapter 2 discusses the relevant concepts for this thesis and chapter 3 deliberates on prior research related to the field of earnings relevance, ETFs, the information environment and factors effecting the earnings response. At the end of chapter 3 the hypothesis is developed. In chapter 4 the research design is described, including the theoretical constructs, regression models and the sample. Next, in chapter 5 the results relating to the main regression models and the sensitivity tests are provided. Finally, in chapter 6 the conclusion is stated including the limitations related to this thesis.

Chapter 2: Theoretical background

2.1 Introduction

The purpose of this chapter is to explain the concepts that are useful for the conducted research in this thesis. The following concepts are explained after: Exchange Traded Fund (ETF), the Efficient Market Hypothesis (EMH) and the concept of value relevance.

2.2 General remarks

The framework of the FASB states: '*the objective or general purpose of financial reporting is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity*' (Barth et al., 2001). The FASB identified qualitative characteristics to which information should comply to be useful and informative. The fundamental qualities underlying the qualitative characteristics are relevance, reliability, comparability and consistency.

This thesis focuses on relevance, which is a fundamental quality. When financial information is relevant, it is able to make a difference in the decisions made by users of the financial information (Francis and Schipper, 1999). Financial information can make a difference in decisions of users when it has predictive value, confirmatory value or both. Predictive value means that financial information can be used as an input to predict future financials. The confirmatory value of financial information is needed to provide feedback about previous evaluations. The predictive value and confirmatory value are interrelated.

2.3 Exchange Traded Fund

An investor who buys a share in an ETF follows the returns of several securities, without having to buy all underlying shares. ETFs are traded on the stock exchange, but are based on a 'basket' of stocks, bonds or other type of investments. An issuer and Authorized Participant (e.g. market maker) establish this basket. The Authorized Participant is appointed by the issuer of an ETF to gather the underlying assets of the ETF. The ETF issuer exchanges ETF shares with the assets of the Authorized Participant. Investors do buy ETF shares from the issuer of an ETF.

Most ETFs have a mixed strategy, this means that an ETF invests in regular stocks, derivatives and commodities (Wiandt & McClatchy, 2011). It is possible to divide ETFs in multiple groups. The

most common way to categorize them is by underlying asset: shares, derivatives, bonds, commodities et cetera (Schizas, 2014). Since 2008 are there as well actively managed ETFs but these are not taken into account due to the complexity for the analyses of this thesis. The portfolio of active managed ETFs changes and therefore it's hard to analyze the effects of these ETFs on value relevance of earnings. Besides, the passive ETFs are the biggest group of EFTs and therefore a good proxy to be used in this thesis.

ETFs and mutual funds make it possible for investors to invest easily in a diversified portfolio. ETFs make use of intermediaries unlike a mutual fund when creating shares for investors (Gastineau, 2001). Because of these intermediaries is it possible to exchange intraday with ETF shares, while this is not possible for mutual funds. Furthermore, these intermediaries make it possible to trade ETFs on the market, the counterparty of an ETF is another investor, not a fund manager as with a mutual fund. The expense rates of ETFs in comparison to the ones of mutual funds are four times lower. Next, ETFs are transparent due to the fact that they are listed on the market, which forces them to comply with the exchange transparency (Kosev and Williams, 2011). Therefore ETFs are obliged to publish their own financial statements and disclose the components of their fund on a daily basis to inform the investors. Finally, the structure of ETFs is beneficial to minimize tax expenses (Kosev and Williams, 2011). This tax efficiency advantage is not available in all jurisdictions, but is in the United States. Investors are usually not exposed to capital gains of an ETF and therefore are the tax expenses lower than tax expensive related to mutual fund holdings. ETF trading increased tremendously because of the above-mentioned benefits (Pisani, 2015).

However, there are also disadvantages related to ETFs. First of all, due to the passive investment strategy of an ETF it can be that by participating in ETFs you do not benefit of all the positive information relating to a company (Kosev and Williams, 2011). An ETF does not expand holdings when positive news of a certain firm is expected, this is done for example by a mutual fund to anticipate on expected future news. Besides, there are also ETFs investing in low volume indexes. Investing in these indexes can lead to high bid/ask spreads. In these cases is it for investors more beneficial to invest in the underlying stocks or maybe even a managed fund, because this results to lower bid/ask spreads. The last significant disadvantage regarding ETFs is related to the

dividend payout. Some ETFs reinvest immediately the received dividends and therefore investors do not receive the dividends of companies. Not receiving the dividends can be more risky, since it is possible to lose more money when the underlying stocks are performing badly.

2.4 Efficient Market Hypothesis (EMH)

The EMH assumes that all available information is incorporated in the stock price of a firm (Malkiel, 2003A). The EMH states that when information becomes available, the information spreads quickly to all interested parties without delay. The ERC coefficient measures how the market responds to accounting information that becomes public (Dechow and Schrand, 2004). The ERC is used as a proxy to measure the value relevance of earnings. This measure needs an informationally efficient market to provide trustworthy outcomes (Roberts, 1967). Fama distinguished three forms of market efficiency: weak, semi-strong, and strong forms (Fama, 1970).

The weak form assumes that the stock price reflects all past information related to a firm and that the investor can outperform the market persistently by technical tools. Under the semi-strong form, the stock price reflects all publicly available information and fundamental analyses do not make it possible to earn excess profits. This semi-strong form of market efficiency is seen as an informational efficient market (Hasan and Wadud, 2015). Finally, the strong form of market efficiency indicates that the stock price reflects all available information including non-public information. Under the strong form, even insiders cannot outperform the market since all information is reflected by the stock price. Prior research shows that the market in the United States is in line with the semi-strong form of market efficiency (Hasan and Wadud, 2015). Therefore, it is possible to use the ERC as proxy for earnings relevance since the market is informational efficient.

2.5 Value relevance

As explained before, the objective of financial reporting is to provide useful information to the stakeholders of a company. Value relevance is determined in research as the field of studies that examines the relation between accounting numbers and security market values (Barth et al.,

2001; Holthausen and Watts, 2001; Francis and Schipper, 1999). This thesis focuses on the perceived value relevance of investors.

Value relevance studies determine by statistical models whether accounting information has an association with market values. Value relevance studies can be categorized into five areas: Ohlson model related studies, value relevance of earnings and other flow measures, value relevance of equity and other stock measures, value relevance over time and value relevance of alternative accounting methods (Beisland, 2009).

Empirical research related to value relevance has as theoretical foundation the valuation theory (Feltham et al., 1995). This theory states that the theoretical value of a firm's equity is determined by the present value of the future expected dividends or free cash flows to equity. The association between accounting numbers and the value of a firm is assumed by the valuation theory and needs to be present to determine the value relevance of accounting information.

2.5.1 Ohlson model studies

The residual income valuation model (RIV) of Ohlson (1995) can be indicated as the start of the value relevance research. The model of Ohlson predicts the market value of equity by the book value of equity, present value of abnormal earnings and other relevant information. This model focusses on both earnings and book values of equity. Assumed in this model is that the value of the company's equity is the present value of the future dividends. The model of Ohlson is as follows:

Market value of equity (P) = Book value of equity (BV) + Future abnormal earnings (E) + ε

The value relevance of accounting information is measured based on the statistical parameter R-squared. The higher the R-squared of the equitation stated above, the higher the value relevance of the underlying accounting numbers. The value relevance under the model of Ohlson is based on expected abnormal earnings and equity numbers.

However, there are difficulties in conducting analyses based on the Ohlson model. Firstly, the book value of equity is influenced by accounting methods (e.g. recording of intangibles) and can therefore bias the results obtained by the Ohlson model (Swartz et al., 2006). Secondly, the

Ohlson model uses estimates for future abnormal earnings. It is not possible to predict perfectly future abnormal earnings and therefore it can be that the value relevance of information is not estimated properly. The third concern related to the Ohlson model is regarding the other relevant information term in the equation. This term should include prospective changes to earnings and is sometimes ignored by other researches due to uncertainty issues (Aboody, 1996).

2.5.2. Value relevance of earnings and other flow measures

Most of the value relevance literature focuses on this group; value relevance of earnings and other flow measures (Beisland, 2009). In these studies, the metric of interest is the earnings or cash flows reported by a firm. These researches determine whether the metric is value relevant by regressing them on the stock return. Research shows that earnings are perceived more relevant than cash flows due to the fact that earnings have less matching and timing problems (Dechow, 1994). The most common used measure to examine the value relevance of earnings is the ERC which measures the extent of a security's abnormal market return in response to the unexpected component of the firm's reported earnings. The ERC captures whether investors find the earnings information value relevant. In general do give studies related to ERCs low R-squared, however many valid reasons for this phenomenon came up by prior research (Lev, 1989). By a low R-squared is meant that the model used to measure the ERCs with as dependent variable cumulative abnormal returns has a low R-squared. Explanations for the low R-squared are: conservative accounting, earnings management, aggregation of earnings items, inadequately short measurement intervals and low earnings persistence. To conclude, the ERC is nowadays a commonly used measure to estimate earnings relevance.

2.5.3. Value relevance of equity and other stock measures

There is also a lot of research that focuses on the value relevance of equity and other stock measures (Ohlson and Penman, 1992; Collins et al., 1997). The statistical association investigated between book equity and stock prices is stronger than the relation between stock prices and earnings. However, a big limitation of this area of researches is that balance sheet measures are really sensitive to the valuation principles used for the different accounting items and therefore a less precise measure than earnings (Khurana and Kim, 2003). For example, the recognition of intangibles can vary across firms and therefore decrease the explanatory power of the book

values (Barth et al., 1998). The before mentioned reasons make the equity measure a less adequate measure for value relevance.

2.5.4. Value relevance over time

The next area of research discussed here is related to the degree of value relevance over time. There has been a global shift from industrial economies to service orientated high tech economies. Research has been done to examine whether this change affected the value relevance of historical based accounting numbers. An often-cited study in this area is from Lev and Zarowin (1999). This research shows that the value relevance of book equity, earnings and cash flows has declined over the years. However, research contradicts each other related to the change in value relevance over time. The increased volatility of the market is likely to be an explanation for the significant relations observed, indicating a decrease over time of value relevance relating to accounting information (Dontoh et al., 2004; Francis and Schipper, 1999).

2.5.5. Value relevance of alternative accounting methods

The last category of value relevance research is related to alternative accounting methods. In general do different accounting methods have a different informational value for users of the statements. This area focuses whether certain accounting methods provide more value relevant information than others. Ayers (1998) examined for example whether the net deferred tax liabilities under the Statement of Financial Accounting Standards (SFAS) No. 109 provide more value relevant information than under the Accounting Principles Board (APB) Opinion No. 11 Accounting for Income Taxes (Ayers, 1998). He concludes that the former SFAS standard provides more value relevant information regarding net deferred tax liabilities than the new APB requirement.

2.5.6. Concluding remarks

To conclude, this thesis does not focus on the categories mentioned above relating to relevance over time and alternative accounting methods due to the different scope of the thesis. I focus on the category of value relevance of earnings and other flow measures due to the fact this category of research has less limitations than the equity measures and that this category of research is most widely used in the field of value relevance studies. The study is conducted using the ERC

since this is the most commonly used measure to capture the difference in market reaction towards earnings announcements.

Chapter 3 – Prior research and Hypothesis development

This chapter discusses relevant prior research relating to ETFs and passive and active funds in sections 3.1 and 3.2. Furthermore, prior research regarding the returns-earnings association and the ERC measure are explained in sections 3.3 and 3.4. Finally the information environment is brought to the attention in section 3.5 and the hypothesis of this thesis is developed in section 3.6. The main purpose of this chapter is to bring insight in the above-mentioned concepts to be able to conduct analyses after.

3.1 Exchange Traded Funds (ETFs)

Due to the relative youth of the ETF type of investment, research done on this topic is limited and mainly done in the US. First of all, most of the current research relating to ETFs focuses on the efficient pricing or valuation of ETFs. Ackert and Tan (2008) find that the prices of American ETFs are very close to the net asset value, which indicates that ETFs are nearly efficiently priced. ETFs are efficiently priced if there is no difference between the aggregate value of underlying securities and the value of an ETF. However, since the price of an ETF is not the same as the net asset value, premiums or discounts are asked for. These differences in price are especially noticed for non US ETFs (Engle and Sarkar, 2006). Engle and Sarkar focus on end of day value of securities and intraday data and measure the premiums' magnitude and the persistence of these premiums. Their sample consists of US and international funds. They conclude that the creation-redemption process for international funds is more complicated and costly and therefore premiums are asked.

The topic of efficiently pricing of American ETFs is developed by several studies. Elton et al. (2002) find that the most important reason for mispricing of American ETFs is due to management fees and dividends received but not paid out. Ackert and Tian (2008) find evidence that the mispricing of country funds is caused by illiquidity of the market. They find an inverted U-shaped relation between fund premium and market liquidity. This association suggests that more active trading ETFs have less mispricing but this result in only observed after a certain level of liquidity is reached. Lastly, Blitz et al. (2010) argue that taxes are another reason for causing the mispricing of ETFs. Especially dividend taxes cause price distortions.

Qin and Singal (2015) focus on the pricing of the underlying securities of funds. In their study they find that greater indexing, like more ETF trading, results in less efficient stock prices. They base their conclusions on the fact that firms participating in ETFs have bigger post-earnings announcement drifts and greater deviations of the stock prices from the random walk. They conjecture that one of the reasons for their findings is the passive trading caused by passive funds like ETFs which results in degradation in price efficiency.

Madura and Ngo (2008) conduct research to estimate the effect of ETFs on the component stocks in funds. They define component stocks as the ten largest stocks in an ETF. They find that positive and negative valuation effects caused by ETF ownership influence the underlying component stocks. The variation of the valuation effects is related to stock-specific characteristics like the level of liquidity and the size of the ETF. An increase in trading volume is pronounced for component stocks that are relatively small, have low liquidity and are part of relatively large ETFs.

Israeli et al. focus on ETF ownership in the US between 2000 and 2014 and find at first that a firm that is part of an ETF has higher trading costs, indicated by lower market liquidity (Israeli et al., 2016). Besides, they see that ETF ownership is associated with an increase in stock return synchronicity, which Israeli et al. (2016) define as "*the extent to which variation in firm-level stock returns is attributable to movements in market and related-industry returns"*. Besides they find that fewer analysts are following a firm that is part of an ETF. Finally, Israeli et al. conclude that there is a decline in future earnings response coefficients when a firm is part of an ETF.

The review study done by Wurgler (2010) shows furthermore that ETF trading leads to: increased volatility in the market, co-movement, higher systematic risk and affected real decisions by managers. There can be concluded from above mentioned researches that it is still unclear what the precise effect of ETF trading is for the underlying shares and the stock market in general because the results of research are sometimes contradicting. However, research shows that ETFs have an impact on the stock market and the underlying securities. These findings highlight the importance of further investigation in the area of ETF trading and possible effects on the stock market by looking at accounting information since prior research does not focus on that.

3.2 Passive and active managed funds

First of all, prior research indicates that institutional ownership (e.g. ETF ownership or active mutual fund holdings) leads to positive results for the underlying companies. Appel et al. (2016) do research outside the field of finance and are focused on corporate governance. They find that the increasing percentage of passive investors, like ETFs, results in a bigger influence on corporate governance choices. Firms with a significant percentage of passive owners had more independent directors, more equal voting rights and less takeovers defenses. Besides the positive effects on corporate governance due to institutional ownership does prior research find that operating performance of a firm improves by institutional monitoring (Demiralp et al., 2011). The results of Demiralp et al. (2011) hold after controlling for the fact that institutional investors have an informational advantage, which makes it possible for them to invest in well performing firms. A drawback of institutional ownership can be that institutions focus on short-term earnings over long-term value (Bushee, 2001).

Active managed funds have as aim to maximize short-term profits (Sharpe, 1991). They use fund managers or brokers to buy and sell securities trying to outperform the market. People engaging in these funds pay close attention to shifts in the economy, trends in the market or pay attention to other factors that may influence the value of a security. Research shows that their behavior has for example an impact on the post-earnings announcement drift. Ke and Ramalingegowda (2005) find that these institutional investors generate 22% of the annual abnormal returns of securities. They focus on actively managed mutual funds, which have skilled managers and analytical resources to identify actively profitable opportunities in the market. The results of Ke and Ramalingegowda give an indication that the behavior of institutions has an impact on the returns-earnings association. Active managed funds on one side and the investors on the other are dealing with a principle-agent problem as mentioned in the introduction.

This thesis focuses on ETFs, which are funds with a focus on long-term profits and having a passive buy-and-hold strategy of investing (Malkiel, 2003B). The focus of ETFs is not to outperform the market to the extreme, but create long-term value. The fees asked for these funds are most of the time lower than active managed funds, due to the fact that managers are not needed to continuously analyze the market. The additional analyses of Ke and Ramalingegowda (2005)

show that passive institutions do not exploit post-earnings announcement drifts. They did not include ETFs in their sample for passive institutions but other passive funds. Their results show that passive funds react less significant to earnings since the return-earnings association is weaker. Aghion et al. (2013) find in America that passive investment results in more innovation of the firms that are part of a passive fund. These studies indicate that passive ownership is associated with improvements in the long-term performance and less focus on short-term performance.

Malkiel (2003, A) supports in his research the passive management of funds. He states that there is no profitable investing strategy even when there is an inefficient market. The study compares the return of actively managed funds with the return of the S&P 500 index. His results show that in the period between 1970 and 2001 only a few actively managed funds performed better than the S&P 500 Index.

3.3 Returns-earnings association

Ball and Brown (1968) did the first research contributing to the stream of literature related to the importance of accounting information. They found that investors do give importance to the annual income number of a firm by examining the relation between unexpected accounting earnings and abnormal returns. They used an event study as research design and concluded that the income number captured more than half of the information that becomes available during the year. This was the start of accounting research, before earnings and other accounting related items were assumed to be useless.

Nichols and Wahlen (2004) conducted a widely cited study in 2004 relating to the value relevance of earnings. They provided a review and replication of three classical studies. The first replication was the study of Ball & Brown in 1968, which is mentioned above. Nichols and Wahlen (2004) found at first that the positive or negative earnings announcements are associated with positive or negative abnormal returns, as found by Ball and Brown. They extended the research of Ball & Brown by examining whether the magnitude of earnings surprises had an impact on stock returns. The extension of the event study shows that the extreme low and high deciles of earnings changes generate a significant different cumulative abnormal return, this means that the

magnitude of earnings changes results in different positive or negative market reactions. The last finding related to the first replication was that portfolios based on cash flows produce smaller return differences than earnings; this indicates that accruals are informative.

In the second replication study of Nichols and Wahlen (2004) is found that there is a significant return difference between high and low earnings persistence portfolios for the earnings increase sample. The firms in the earnings decrease sample had no significant different return difference due to the fact that negative earnings changes are less persistent in general. In the last part of the study of Nichols and Wahlen (2004) is focused on how efficiently the market reacts to earnings news. From this last part of their study can be concluded that the market reacts quickly and significantly to earnings surprises and value them as relevant. The market reaction to the earnings announcement is observed between day -4 and day +1.

Easton, Harris and Ohlson (1992) examined the relation between data aggregation and the return-earnings association. They hypothesized that the earning-return association has problems with timeliness in the short run; this association improves if you increase the time span of the study. They find significant results for a stronger association between returns and earnings over the long run. Later research shows that this increased association over the long run is due to the fact that losses are almost absent because of aggregated the performance of a firm (Hayn, 1995).

Prior research discusses a lot about the statistical models that are used to investigate the returns-earnings association. Researchers agree on the fact that multiple regression models are significantly better than simple regression models to estimate the returns-earnings association. This has to do with the fact that the examined relation has endogeneity issues; controlling for several factors can reduce these issues. Factors for example are: forecast information or industry proxies (Liu and Thomas, 2000).

3.4 Earnings Response Coefficient (ERC)

As explained before, the most common measure for investigating the relation between returns and earnings is the ERC. The sensitivity of the stock returns is depending on many factors, which are determinants of the ERC. This section explains the most common and important factors for

this thesis influencing the ERC. There is done a lot of research on the market response to earnings by examining factors not relevant for this thesis, but these are not discussed here.

First of all, the market reaction towards earnings announcements is different among different sized firms. Some studies find evidence that firm size is positively associated with the magnitude of the ERC (Chaney and Jeter, 1992). However, other studies argue that information of large firms is available prior to the announcement of earnings and that this results in a smaller market reaction (Potter, 1992). Therefore, the effect of firm size is ambiguous since it can have the above-mentioned contradicting effects.

Three other widely cited determinant of the ERC are the growth potential, earnings persistence and the sign of the reported earnings. If a firm has a bigger growth potential investors are more likely to invest in a certain firm (Ghosh et al., 2005). The earnings persistence gives a good indication of the future firm performance. The permanent component of the net income is likely to persist over the upcoming years. These two determinants are positively associated with the return-earnings association (Ghosh et al., 2005). If reported earnings are negative, research shows that a bigger market reaction is expected in comparison with the same amount of profit (Francis and Ke, 2006).

There are also several determinants that are negatively associated with the ERC. A reason for a differential market response is for example the level of default risk (Manganaris et al., 2015). If the risk associated with a company is higher, it is likely that fewer investors react to the earnings announcement. Investors perceive a company as more risky when for example the bond rating for the company is worse. Default risk is also related to the capital structure of a company. Higher levels of debt increase financial risks like dividend cuts or discontinuation of operations (Ofek, 1993).

Conservatism is another factor that has an impact on the ERC (DeFond and Zhang, 2014). Some companies reflect bad news earlier than others due to their conservatism. Conservatism has an impact on the timeliness and persistence of earnings and therefore results in different investor behavior.

Finally, ERCs are examined as a function of fundamental firm characteristics. This results in investors reacting differently towards earnings announcements of firms participating in different industries (Dechow et al., 2010). Investors react more positively or negatively according to the industry of a company and therefore the ERC should be controlled for industry characteristics. ERCs are for example larger for nondurable goods firms than for durable goods firms (Kwon and Yin, 2015). Similarity in the expectations of investors results in more abnormal returns.

All the above-mentioned factors have to be taken into account when conducting analyses concerning ERCs. Not controlling for other factors than the variable of interest can result in biased results. When tests are done, is there controlled for the most common determinants of the ERC to create more validity for the results in this thesis.

3.5 Information environment

Whether information is value relevant depends not only on the quality of accounting rules or regulation, but also on the process of production, communication and utilization of accounting information. These factors contribute to the information environment of a firm (Jones and Smith, 2011). The information environment determines the utility of accounting information for decisions made by investors. Therefore, the information environment has a significant effect on value relevance of earnings information of a firm. Research by Glosten et al. (2016) examines whether ETF trading has an effect on the informational efficiency of underlying securities. Their sample consists of American firms that are listed on the NYSE, AMEX or NASDAQ and are part of an ETF. The analyses done in this research show that greater ETF trading is associated with an improvement in the information environment of the underlying securities. The improvement of the informational environment is caused by the incorporation of incrementally more systematic fundamental information, instead of firm-specific information. The results are driven by small stocks and stocks that participate in imperfectly competitive equity markets. The increase of the informational efficiency is caused by the timely incorporation of earnings information. They do not find these results when investigating big stocks that participate in a perfectly competitive equity market. They find that this last group of ETFs creates synchronicity and co-movement.

Israeli et al. (2016) find in their study that the information environment of firms participating in ETFs declines due to ETF trading. Their proxies for analyzing the effect of ETFs on the information environment are based on: the transaction costs of market participants and the extent to which security prices include firm-specific information. Bigger transaction costs deter investors to obtain firm specific information and this results in a worse information environment. There can be concluded from the studies discussed in this section that the precise effect of ETF trading on the informational environment of a firm is ambiguous and needs to be analyzed in future research.

3.6 Conclusion

This chapter explains prior literature relevant for this thesis. The first literature section is related to ETFs. Prior research in this field is focusing on price efficiency of ETFs. Reasons why ETFs are not perfectly efficiently priced are: management fees, dividend paid out but not received, illiquidity of the market and tax distortions. Other research notices other effects to the capital market due to ETF trading like: synchronicity, less analysts following, increased volatility and affected management decisions. The most important difference between active managed funds and ETFs is related to the strategy. ETFs are focused on creating long-term shareholder value, while active managed funds prefer short-term profits. Prior research shows that the market reacts towards earnings information of a firm. The most common measure to capture this reaction is the ERC. Prior research finds several factors to explain the magnitude of the market reactions, for example: size of the firm, growth potential of a firm, earnings persistence, the sign of the reported earnings and the industry of operation of a firm. Finally, prior research relating to the information environment is discussed in the last section of the literature review. The research of Glosten et al. (2016) and Israeli et al. (2016) discuss the impact of ETF trading on the information environment. However, the conclusions reached by these studies are contradicting and therefore it is not possible to estimate the effect of ETF trading on the information environment.

3.7 Hypothesis development

Research shows that passive investors are likely to invest in ETFs because of the expected return and smaller risk in comparison to underlying shares or actively managed funds. Other reasons to participate in ETFs are the easy way to diversify the portfolio and the low expense ratios. Passive investors are not following intensively the firm level information of the underlying firms in an ETF. This can be indicated from the fact that passive managed funds do not exploit post-earnings announcement drifts (Ke and Ramalingegowda, 2005).

Prior research already found many different factors to explain abnormal returns related to abnormal earnings. Nowadays the US stock market has a big percentage of ETF trading and prior research indicates effects on the capital market due to ETFs. Besides, the informational environment is influenced by ETF trading. However, the results in this area are contradicting and therefore the effect on the perceived value relevance of earnings unknown. The big amount of passive investors participating on the stock market can have an impact on the earnings relevance of firms. Several parties worry that passive investors do not have the resources and motives to monitor their portfolios (Appel et al., 2016). The objective of ETFs is to deliver the performance of the benchmark, and unlike actively managed funds, focus on the long-term and do not change their strategy often. The portfolio of investors participating in ETFs is big in general. Assumed is that the increase of 'noise investors' weakens the relation between accounting information and the market reaction (Harper et al., 2006). The main conjecture of this thesis is that people participating in an ETF react less sensitive towards the earnings announcements of underlying firms and therefore the market reaction towards earnings is smaller. Based on the before mentioned arguments, is the following hypothesis presented:

H1: *Companies participating in ETFs perceive less market sensitivity to earnings announcements.*

Chapter 4 – Research design

This thesis uses an event study methodology in order to answer the hypothesis developed before and consequently answer the research question stated in the introduction. An event study makes it possible to investigate the impact of a particular event on a variable of interest. As mentioned before, the event study used in this thesis analyses the market response to earnings announcements. This chapter discusses first a short section related to the ERC measure. Afterwards are the regression models explained to answer the hypothesis.

4.1 Earnings Response Coefficient (ERC)

In the chapter related to the theoretical background is already explained that the ERC is the best measure to capture the value relevance of earnings. The ERC makes it possible to assess the impact of the earnings announcement on the value relevance of earnings based on a short-window approach. This measure is based on the idea that investors respond fast to the released earnings because this information has value implications for a firm (Dechow et al., 2010). The idea behind the ERC is that investors revalue a firm when the actual earnings differ from the expected earnings. This revaluation is an indication that earnings are perceived value relevant. A higher reaction by investors to the earnings information implies that this information is perceived more value relevant. The ERC captures the reaction of the market towards one unit of earnings surprise change.

The ERC is chosen because of its accurate measurement and because of the limited applicability of other measures. The advantage of the ERC comes from the fact that it directly measures the value relevance of earnings by examining the market reaction to earnings announcements (Beisland, 2009). The second reason for choosing the ERC is because there are limited other measures to capture the value relevance of earnings. Most current research related to value relevance of accounting information is based on the ERC measure.

4.2 Regression model

To investigate the association between ETF trading and value relevance of earnings is a cross-sectional regression model including earnings announcements composed. The model used in this thesis is based on the model of Francis and Ke (2006) but adapted for the variable of interest of

this thesis, ETF trading. This thesis develops three different models to make it possible to answer the hypothesis and the research question afterwards. The regression model stated below has as variable of interest ETF ownership. The regression variable ETF is estimated three times to see whether results differ relating to the value relevance of earnings. First, the effect of ETFs is examined by using a dummy variable indicating whether a firm is part of an ETF (1) or not (0). Second, the ETF variable is calculated as the percentage ETF holdings in a stock at the end of the fiscal year. This percentage can be calculated by aggregating the number of shares in a firm held by an ETF and divide this by the total number of shares outstanding of that firm in a year (Israeli et al., 2016). Finally, the ETF variable is estimated as the difference in ETF holdings between subsequent fiscal years. The ETF holdings are estimated the same way as the second approach. The regression used in this thesis is as follows:

$$CAR3_{it} = \alpha + \beta_1 UE + \beta_2 UE * ETF + \beta_3 UE * SIZE + \beta_4 UE * MTBV + UE * \beta_5 DE + \beta_6 UE * LOSS + \varepsilon_{it} \quad (1)$$

The variables in the regression can be explained as:

- **CAR3** = Cumulative Abnormal Return (CAR) over a 3-day window. The estimated period is from one day before the earnings announcement to one day after the earnings announcement. The model estimates for fiscal year *t* and firm *i*.
- **UE** = Unexpected earnings ('earnings surprises') in fiscal year *t* and firm *i*. This is measured as the difference between the consensus analyst forecast and the actual earnings per share (EPS). The end of the year stock price of a firm scales this variable.
- **ETF** = ETF variable which is estimated in three different ways. The first regression has a dummy variable indicating whether a firm is part of an ETF (1) or not (0). The second regression has the percentage ETF holdings in a firm. The last regression has the difference in percentage ETF holdings in a firm for subsequent fiscal years.
- **SIZE** = Scaled market capitalization (natural logarithm) for fiscal year *t* and firm *i*.
- **MTBV** = Market to book value for fiscal year *t* and firm *i*.
- **DE** = Debt to equity ratio, used as a proxy for risk for fiscal year *t* and firm *i*.
- **LOSS** = A dummy variable indicating whether the EPS of a firm are negative (1) or not (0).

- $\boldsymbol{\varepsilon_{it}}$ = Error term

The several components of this model need to be explained to understand the theoretical relation between ETF trading and value relevance of earnings. This explanation contributes to the interpretation of the coefficients obtained after and makes it possible to explain the sign of the variables of interest.

The dependent variable of the regression model stated above is the three-day window CAR. This variable is calculated based on the market model. Instead of the market model (MM), other measures could also be used such as: the Capital Asset Pricing Model (CAPM), the Index Model (IM) and the Mean Adjusted Returns Model (MAR). This thesis uses the Market Model because it has higher validity compared to the other models (Cable and Holland, 1999). The Market Model is composed as follows:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (2)$$

The variables in het formula are explained by:

- R_{it} = The rate of return of the common stock of firm *i* on earnings announcement day *t*
- R_{mt} = The rate of return of the market index on the earnings announcement day *t*
- β_i = Measure of how much return of a stock can be explained by the market index
- α_i = Constant
- ε_{it} = Error term

The Market Model is used to estimate the abnormal return of a stock. The abnormal returns can be calculated after rearranging formula 2 (Fama, 1998):

$$Abnormal\ Return\ (AR_{it}) = R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (3)$$

Fama (1998) shows that the abnormal return of a stock (AR_{it}) can be calculated by the difference between the actual return of a stock and the expected return of this stock. The dependent variable of regression 1 is the cumulative abnormal return over a three-day window. Therefore the following equation needs to be estimated:

$$CAR3_{it} = \sum_{t-1}^{t+1} R_{it} - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}) \quad (4)$$

The thesis uses a three-day window, since prior research argues that an event study with as window three days captures the impact of an earnings announcement (Francis and Ke, 2006). Using this size of event window leads probably to the less biased results due to external events and captures the complete reaction towards the earnings announcement.

Another component of the equation that needs additional explanation is the unexpected earnings variable. The unexpected earnings are calculated by the following formula:

$$UE_{it} = \frac{EPS_{actual} - EPS_{expected}}{P_{it}} \quad (5)$$

The difference between the actual EPS and expected EPS are estimated for every firm in every fiscal year and is called the 'earnings surprise' or analysts' forecast error. The expected EPS is based on the most recent median consensus analyst forecast before the earnings announcement. This method of unexpected earnings calculation is based on Francis and Ke (2006). The end of the year fiscal stock price scales the unexpected earnings. It is expected that the cumulative abnormal returns differ when the market perceives good or bad earnings surprises.

The cumulative abnormal returns and unexpected earnings are the fundamental parts of an ERC research design. After explaining these components it is possible to understand how the hypothesis in this thesis is operationalized. By adding more variables to the fundamental components is it possible to see how the market reaction differs in a variety of circumstances.

Intuitively, it is possible to state expectations towards the cumulative abnormal returns when earnings surprises appear in the case of ETF ownership. ETFs itself have a passive buy and hold strategy and combined with the passive investors participating in ETFs is it expected that abnormal returns are smaller when ETF holdings are present and that therefore the earnings relevance declines. The expected sign of β_3 is negative in all the three regressions based on the main conjecture of this thesis stated before.

As explained before in the literature review chapter, prior research shows that there are several determinants of the ERC that need to be controlled for. This thesis controls for the most common used controls when an ERC research design is used: firm size, earnings persistence, risk and growth potential (Francis and Ke, 2006; Easton and Zmijewski, 1989). Although other research

sometimes controls for more determinants, these control variables are the ones that are used consistently when the ERC measure is used. Therefore, these controls are applied in this thesis to isolate the effect of ETF ownership on the value relevance of earnings. The controls used in this thesis make it more likely that the interpretation of the ERCs is reliable.

This study controls for all the above-mentioned concepts by unique proxies. The proxy used to control for the firm size is in line with the method of Francis and Ke (2006). They use as proxy the natural logarithm of the market value of common equity of a firm. For growth is controlled by the proxy of the market to book value of common equity (Frankel et al., 2002). The proxy to control for firm risk follows as well the methodology of Francis and Ke (2006). The debt-equity ratio is used to control for firm risk. The debt-equity ratio is calculated as the total value of debt divided by the total value of equity. There is controlled for earnings persistence by adding a dummy variable indicating one when the firm makes a loss during a year and otherwise zero (Francis and Ke, 2006). As explained before, the control variables mentioned here are all determinants of the ERC, and need to be included as in interaction term with the 'earnings surprise' in the regression model stated in the beginning of this section. All the variables need to be multiplied by the unexpected earnings to make it possible to interpret the earnings response coefficients.

Before I already explained the expected signs of the variables of interest. However, the control variables are also expected to have a specific sign. These specific signs can be derived from prior research. The control variable for growth is expected to have a positive sign. A bigger growth potential of a firm results in more investment in the underlying securities and this results in a positive ERC (Ghosh et al., 2005). The signs for earnings persistence and risk are expected to be negative (Francis and Ke, 2006). Both factors are indications of (future) bad performance and therefore it's likely that investors respond negatively to those. There are no expectations regarding the sign of firm size since the effect of firm size on the ERC is ambiguous as mentioned in section 3.4.

In this chapter the research design to answer the hypothesis is explained and therefore is it now possible to present the operationalization of the conceptual association between ETF ownership

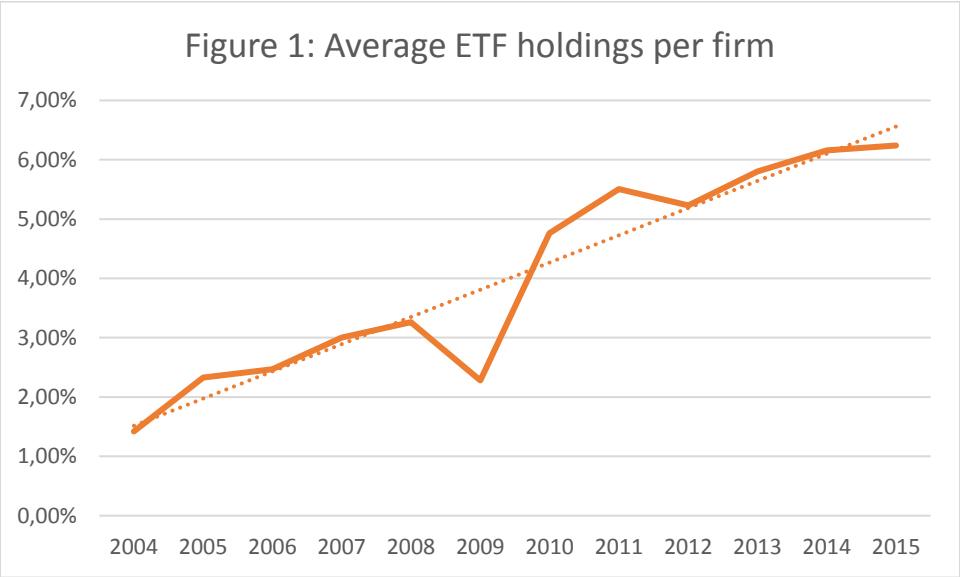
and value relevance of earnings. This conceptual association is visualized in the Libby boxes presented in appendix A. In research there is referred to the Libby boxes as the Predictive Validity Framework, which is introduced by Libby in 1981 (Libby, 1981).

4.3 Sample selection and data

The sample selection process conducted in this thesis is based on the selection process of Israeli et al. (2016). The first step of the sample selection process entails obtaining all the available security information in the United States. ETFs are identified as securities with a share code of "73" in the CRSP database. These ETFs are only participating in stocks and no other investment options. After identifying all the ETFs traded between 2004 and 2015 are they merged with their CRSP fund number. The sample period starts in 2004 due to the fact that before this year there are not enough ETFs to do analyses on. Besides, the sample period ends in 2015 due to data availability constraints for 2016. Next, the MFLINK tables are used to convert the CRSP fund numbers into FUNDNO for the S12 Thomson Reuters database (Glosten et al., 2016). By using the FUNDNO identifier are the equity holdings for each ETF obtained. The final sample consists of 538 unique ETFs. The Thomson Reuters database provides 928.749 observations of equity holdings in firms by ETFs over the sample period. From this can be concluded that many ETFs are participating in the same companies. These observations are all end of the year equity holdings by ETFs as done by Israeli et al. (2016). Therefore, the sample of this thesis is similar to the ones of Israeli et al. (2016) and Glosten et al. (2016). The total of 538 ETFs are participating in 11.089 unique firms over the sample period. The sample selection process is visualized in table 1 shown in the end of this section.

The percentage of ETF ownership in a firm is calculated based on the annual panel of holdings of the Thomson Reuters S12 database. Obtaining the ETF holdings from the Thomson Reuters S12 database results in 67.165 matching observations. The number of shares held by all ETFs is divided by the total number of shares outstanding in that year. Figure 1 shows the average ETF ownership for each firm for each year of the sample period. The figure shows that the ETF holdings in the sample significantly increased over the sample period from roughly 1% in 2004 to more than 6% in 2015. The trend shown in the figure is in line with the increase of the dollar value traded in ETFs as percentage of the total exchange dollar value traded. From all this

information can be concluded that ETFs are becoming an important investment opportunity for traders in the equity market.



Subsequently, the I/B/E/S database is used to calculate the unexpected earnings. First, the actual EPS per firm per fiscal year are obtained. These are compared with the EPS median analysts' forecast closest to the earnings announcement. Afterwards these earnings surprises are scaled by the stock price of the firm, which is obtained from the CRSP database. The merging procedure between I/B/E/S and the master file with CUSIP/Fdate combinations results in 21.578 missing observations.

The next database used in this thesis is the Eventus database. Within this database the 'Cross-Sectional Analysis – Daily event study' section is used. This database makes it possible to collect the Cumulative Abnormal Returns around an earnings announcement of a firm. This database needs as input the CUSIP identifiers of the firms in the sample and the earnings announcements of these firms, which is obtained from the I/B/E/S database. This thesis requires as output the Cumulative Abnormal Returns around the announcement date, calculated based on the Market Model. Merging the cumulative abnormal returns in the master file with *CUSIP-Fdate* combinations results in 425 missing observations.

The input for the control variables comes from the Compustat database. In this database annual information is found relating to the firm size, market to book ratio, risk and earnings persistence.

Firms with negative total assets or assets smaller than 10 million dollar are excluded from the sample. This procedure is in line with the sample selection of Francis and Ke (2006). The observations with all missing control variables are excluded from the sample (29.473 observations).

The sample selection procedure described so far is related to the firms that are part of an ETF and therefore the 'primary sample'. The selection process is shown below in table 1. Afterwards, an additional sensitivity analysis is done to see whether firms that are not part of an ETF perceive a different level of earnings relevance. This control sample consists of all companies in the United States that are not part of an ETF and have available data. Prior to the analyses all the variables are winsorized at the 1 percent and 99 percent level.

Table 1: Sample selection

Total ETFs avaible in CRSP	538
Total firms part of an ETF	11.089
Total firm year observations (11.089 firms * 12 years of sample period)	133.068
No complete data available:	
Equity holdings for firm over whole sample period	-65.903
Earnings surprises data	-21.578
Cumulative abnormal returns data	-425
All control variables missing	-29.473
Total observations	15.689

Chapter 5 - Results

This chapter discusses the statistical analyses done in this thesis. These analyses consist of the estimation of the three regression models explained in chapter 4 and additional analyses to create more validity for answering the research question. This chapter discusses the following: first the descriptive statistics, followed by the discussing of the assumptions of the Ordinary Least Squares (OLS) regression. Next, the interpretation of the results of the regression models and the implication of these results for the hypothesis are discussed. Thereafter some additional sensitivity tests are done to verify the robustness of the results. The chapter ends with a summary of the results and an answer to the hypothesis.

5.1 Descriptive analysis

Table 2 shows the descriptive statistics of the data used in this thesis. The table displays the number of observations, mean, median and standard deviation for the variables used in the research. The sample is split in the ETF sample and the control sample. The statistics show that all variables used in the thesis are significantly different for the two groups. These differences are due to the fact that all firms that are part of a big index are represented in the ETF sample. The ETF sample therefore consists of big and popular for trading firms. This is either way no problem since the control sample is used to control for market effects by a sensitivity test in section 5.5. I can conclude from the data that most American firms are part of an ETF, due to many index ETFs, and this results in a smaller and less comparable control sample. Therefore is chosen to not use a difference in difference design but an additional test to check for the robustness of the regressions. The sample period is 12 year and includes most of the firms in the United States and therefore makes it possible to generalize the findings with the additional sensitivity tests even with a smaller control sample.

From the descriptive statistics related to the abnormal returns can be concluded that the average abnormal return is positive in this sample. The mean of unexpected earnings has a negative value. However, the median is positive which shows that the mean is driven by more negative values. Next, the control variable of the market-to-book ratio shows a positive sign (1.6569), which is an indication that there is growth potential for the firms in the sample. The size of the firms is relatively stable across the sample as the standard deviation of size indicates (1,5723). The

average and the median of the debt to equity ratio is under 1. This shows that most of the firms are financed with more equity than debt, this is a positive sign for the risk profile of the firms. Noticeable is the fact that the control sample includes firms with on average more debt than equity holdings (1,0788), this indicates a more risky profile for these firms. The last control variable, which is a common determinant of the ERC, is the *LOSS* dummy. This is a proxy for earnings persistence. Table 2 shows that on average 87,50% of the firms make a profit over the sample period.

The first variable of interest tested for in the thesis is the *POST* variable. This variable indicates whether firms are part of an ETF or not. All firms in the ETF sample are or have been part of an ETF. Therefore this variable indicates whether the change in being part of an ETF has an impact on the value relevance of earnings. In total there are 15.689 observations for the *POST* variable. These observations are split in one part of firms that are part of an ETF (1) 12.504 observations and 3.185 observations when a firm is not part of an ETF (0). The average equity holdings (PerETF) by ETFs over the sample period in the underlying firms is 4.2%. The median equity holdings by ETFs is 3.7%. This indicates that firms that have bigger ETF holdings in their firm positively influence the average. Currently, the equity holdings by ETFs are higher than the mean and median values in table 2, due to the growth of ETF holdings over the sample period as indicated in the previous chapter. Finally, from the variable Per_DETF can be concluded that the average change in percentage ETF holdings between subsequent years is 0,53%. The median (0.33%) is quite smaller than the average change in ETF holdings this indicates that the differences between years are varying among firms.

The correlation coefficients among the dependent variable (*CAR3*) and the independent variables are shown in table 3 below. The first coefficient of interest (POST) is positively correlated with the dependent variable. However, this coefficient is only significant at a 12% level. The next variable of interest, *Per_ETF*, is significantly associated with the dependent variable. The correlation has a sign of -0.0148 and indicates lower abnormal returns when the percentage of ETF ownership is increasing. The last coefficient of interest (*Per_DETF*) is also negative but not significant. The variables of interest have contradicting signs in comparison to the dependent variable. However, ERC models use interaction terms to analyze the markets' reactions and

therefore no conclusion can be stated from these correlations. The variable *UE* is significantly associated with the independent variables, which indicate that earnings surprises result in abnormal returns. This association is needed to conduct research in the field of ERCs. The other variables are added to control for the effect of ETF ownership and multiplied by the variable *UE* to obtain the ERCs. Therefore, they do not need extra explanation regarding their correlation coefficients.

Table 2: Descriptive statistics

	Full sample				ETF sample				Control sample				Difference in means	
Variable	Number Obs	Mean	Median	Std. Deviation	Number Obs	Mean	Median	Std. Deviation	Number Obs	Mean	Median	Std. Deviation	P-value	
Continuous:														
CAR3	16051	0,0019	0,0006	0,0719	15689	0,0017	0,0005	0,0703	362	0,0104	0,0032	0,1216	0.0116	**
UE	16052	-0,0070	0,0003	0,0995	15689	-0,0065	0,0003	0,0914	363	-0,0291	0,0005	0,2764	0.0000	***
Per_ETF	12504	0,0418	0,0370	0,0317	12504	0,0418	0,0370	0,0317	-	-	-	-	-	
Per_DETF	8957	0,0053	0,0033	0,0152	8957	0,0053	0,0033	0,0152	-	-	-	-	-	
MTBV	9206	1,6569	1,2447	1,5427	8956	1,6622	1,2486	1,5414	250	1,4688	1,0856	1,5807	0.0395	**
SIZE	13249	7,8342	7,7917	1,5723	12945	7,8389	7,7961	1,5712	304	7,6305	7,6179	1,6099	0.0112	**
DE	11069	0,5888	0,3533	0,8618	10773	0,5753	0,3478	0,7892	296	1,0788	0,6560	2,2076	0,0000	***
Dummy:														
POST	15689	0,7970	1,0000	0,4023	15689	0,7970	1,0000	0,4023	-	-	-	-	-	
LOSS	16053	0,1251	0,0000	0,3308	15689	0,1228	0,0000	0,3282	364	0,2225	0,0000	0,4165	0,0000	***

Note: The difference of the means is calculated by a t-test. This is done by subtracting the means of the control sample from the means of the ETF sample. The t-test is done to identify whether the difference in means is significant. Table 2 shows the statistics of the several variables. CAR3 is the cumulative abnormal return over a 3 day window, UE shows the unexpected earnings, Per_ETF shows the percentage of ETF holdings in a firm, Per_DETF states the difference in percentage ETF holdings in a firm between subsequent years, POST indicates whether a firm is part of an ETF (1) or not (0), MTBV states the market-to-book ratio which is an proxy for growth, SIZE indicates the log of the market capitalization of a firm, DE is the debt to equity ratio which is an indicator of risk and LOSS shows the earnings persistence of a firm by indicating 1 when a firm makes a loss in a year

* Difference significant at 10%, two-tailed
** Difference significant at 5%, two-tailed
*** Difference significant at 1%, two-tailed

Table 3: Correlation matrix

	CAR3		UE		POST		Per_ETF		Per_DETF		SIZE		MTBV		DE		LOSS
CAR3	1.000																
UE	0.0829		1.000														
	(0.000)	***															
POST	0.0124		0.0168		1.000												
	(0.122)		(0.036)	**													
Per_ETF	-0.0148		0.0402		-		1.000										
	(0.099)	*	(0.000)	***	-												
Per_DETF	-0.0090		0.0232		-		0.3011		1.000								
	(0.393)		(0.028)	**	-		(0.000)	***									
SIZE	-0.0295		0.1442		0.2469		0.0527		0.0220		1.000						
	(0.001)	*	(0.000)	***	(0.000)	***	(0.000)	***	(0.049)	**							
MTBV	-0.0223		0.0494		0.0126		0.0249		0.0308		0.3741		1.000				
	(0.032)	**	(0.000)	***	(0.233)		(0.020)	**	(0.011)	**	(0.000)	***					
DE	-0.0093		-0.1021		-0.0385		0.0243		0.0005		-0.2190		0.2194		1.000		
	(0.327)		(0.000)	***	(0.000)	***	(0.013)	**	(0.966)		(0.000)	***	(0.000)	***			
LOSS	-0.0221		-0.1418		0.1507		-0.0310		-0.0331		-0.1558		-0.1338		0.1650		1.000
	(0.005)	***	(0.000)	***	(0.000)	***	(0.001)	***	(0.002)	***	(0.000)	***	(0.000)	***	(0.000)	***	

This correlation table indicates the associations between the variables used in the regressions in this thesis. *, **, *** Indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

5.2 Ordinary Least Squares (OLS) assumptions

There are several assumptions related to the OLS regression that need to be tested for in this research. These assumption need to be considered before interpreting the findings of this thesis. By examining the assumptions, value can be added to the credibility of the study. In this section is tested for the following assumptions: multicollinearity, homoscedasticity, normal distribution of errors and serial correlation of the errors.

Multicollinearity exists when two or more independent variables have a linear association with each other (Mason & Perreault, 1991). To be able to interpret the results of an OLS with more certainty, multicollinearity should not exist in a regression analysis. In this thesis there is tested for multicollinearity by the variance inflation factor (vif). The rule of thumb regarding the vif is that the vif should be below 10 (O'Brien, 2007). The problem of multicollinearity in case of ERC models is common, since all the independent variables are multiplied by the unexpected earnings. In appendix C are the vif output tables given for the three regressions. From these tables can be concluded that there is a high level of multicollinearity. By deleting the independent variable *EU_SIZE* in the first regression, is the level of multicollinearity declined to a level to interpret the findings. In the second regression the variable *UE_LOSS* needs to be excluded to have a good level of multicollinearity.

The second assumption discussed is the assumption of homoscedasticity. Homoscedasticity means that the variance of the residuals should be constant. This is the case when the residuals of the independent variables have the same variance (Jarque & Bera, 1980). When heteroscedasticity exists it means that the residuals have a pattern that follows the fitted values. The most common way to test for homoscedasticity in research is the Breusch-Pagan test. The outcomes of this test are presented in appendix D. The results of the tests suggest that heteroscedasticity exists in all three regressions and therefore are the regressions estimated with robust standard errors. By using robust standard errors there can be corrected for the violation of the assumption of homoscedasticity of the residuals.

The next assumption tested is the normal distribution of errors in relation to the regression models. A normal distribution of errors means that the residuals of the regression models are

randomly distributed and have as mean zero (Joanes & Gill, 1998). This last assumption can be tested by the Skewness/Kurtosis test. The results of this test are stated in appendix E. The results of the Skewness/Kurtosis test for the three regressions show that the null hypothesis that the errors are normally distributed is rejected. This means that the error terms are not normally distributed, this is probably due to the large sample (Field, 2009). Small deviations from the normal distribution with a big sample size result under the Skwenss/Kurtosis test in a fast rejection of the null hypothesis. There is tried to correct for this not normal distribution by winsorizing the variables of the regression.

The last assumption tested is the assumption of no serial correlation in the errors. When error terms from different years are correlated, serial correlation exists. When serial correlation is present, OLS estimators are be biased, and is there a tendency to reject the null hypothesis when it should not be rejected. There can be tested for first order serial correlation with the Durbin – Watson test. For all the three regression models is the null hypothesis of no autocorrelation accepted. Therefore, can be concluded that there is no autocorrelation in the error terms and no corrections need to be made. The output table can be found in appendix F.

5.3 Regression analyses

This part of chapter 5 discusses the results from the three regression models. This makes it possible to answer the hypothesis in the end of this chapter. The hypothesis predicts the following: “Companies participating in ETFs perceive less market sensitivity to earnings announcements.” This means that the ERCs in the different regressions for the ETF variable should be negative. A negative earnings response coefficient indicates that the value relevance of earnings declines due to ETF trading. All the variables used in this thesis are defined in appendix B with their respective measurement. The regressions are done based on the ETF sample as discussed before. In section 5.5 is there a sensitivity test done to compare the ETF and control sample, other regressions before are only estimated based on the ETF sample.

The first regression model discussed is the model including a dummy variable for ETF holdings in a firm. The dummy indicates 0 before a company is part of an ETF or when it left an ETF and otherwise 1 when it is part of an ETF. By including a dummy is it possible to see whether the market sensitivity changes due to ETF ownership. As mentioned before, the variable *UE_SIZE* is excluded from the model due to multicollinearity issues. The results of the first regression can be found below in table 4. The F-value of the model is 4.02 and therefore is the model significant at a 1% level. Besides, the model has a R-squared of 0.32%. The earnings response coefficient of the variable of interest *(UE_POST)* shows a positive sign of 0,0160. This means that being part of an ETF results in more abnormal returns. The control variables in this model have all the expected signs in comparison with prior research, except for the variable *UE_DE*, which has a positive coefficient. However, the control for risk is not significant and the size of the ERC is small, therefore is it consistent with prior research. To conclude, the earnings response coefficient of *UE_POST* is not significant and therefore no inferences can be made from the sign of this coefficient.

Table 4: Regression 1 Dummy variable indicating whether part ETF

Number of obs	8.956
F(5, 8950)	4.02
Prob > F	0.0012
R-squared	0.0032

CAR3	Coefficient		Robust Std. Err.	t-stat	p-value
UE	0,0367		0,0350	1.05	0.294
UE_POST	0,0160		0,0164	0.98	0.330
UE_MTBV	0,0109		0,0097	1.12	0.264
UE_DE	0,0002		0,0005	0.35	0.726
UE_LOSS	-0,0144		0,0172	-0.84	0.402
_cons	0,0041	***	0,0008	5.20	0.000

Regression is performed with CAR3 as dependent variable, UE_POST as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_POST indicates whether a firm is part of an ETF. *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

The second regression estimated in this thesis has as variable of interest the percentage of ETF holdings in a company. Worth mentioning is the fact that the variable *UE_LOSS* is excluded from the model due to multicollinearity issues, mentioned in the previous section. The shares held by ETFs are divided on company level by the total shares outstanding for every firm per fiscal year. The output of this regression can be found in table 5. First of all, we see that the F-statistic of the regression is highly significant at a 1% level. This means that the model estimated provides a better fit than the intercept only model. Furthermore, the model has a R-squared of 0.0032. This means that 0,32% of the variance of the independent variable is explained by the dependent variables in the model. The low R-squared is in line with other studies done using earnings response coefficients as explained before in chapter 2. The coefficient of interest in this model (*UE_PerETF)* has a positive sign (0,0525). The first regression model shows as well a positive sign. However, in this model the coefficient is even less significant and therefore it does not provide evidence for a positive relation between ETF trading and value relevance of earnings.

Table 5: Regression 2 Percentage ETF holdings per company

Number of obs	8.690
F(5, 8684)	5.10
Prob > F	0.0001
R-squared	0.0032

CAR3	Coefficient		Robust Std. Err.	t-stat	p-value
UE	0,0305		0,0434	0.70	0.482
UE_PerETF	0,0525		0,3077	0.17	0.864
UE_SIZE	0,0010		0,0011	0.89	0.373
UE_MTBV	0,0122		0,0111	1.10	0.271
UE_DE	-0,0001		0,0007	-0.08	0.940
_cons	0,0042	***	0,0008	5.15	0,000

Regression is performed with CAR3 as dependent variable, UE_PerETF as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_PerETF the percentage of ETF holdings in a firm. *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

The third regression done in this thesis has as variable of interest the difference in percentage ETF holdings ($\Delta\%ETF$) on firm level between subsequent years. This model uses all the control variables, because no multicollinearity issues are noticed while conducting the vif test. The output of regression 3 can be found in table 6. The F value of the regression model is 2.93, which indicates that the model is significant at a 1% level. Besides, the R-squared shows that 1.19% of the variance of *CAR3* is explained by the independent variables of regression 3. It is worth mentioning that the R-squared of this model is the best compared to the other models stated before. As mentioned before, the low R-squared is in line with other studies done using the same model.

The unexpected earnings variable (*UE*) is significant and shows that an earnings surprise results in more cumulative abnormal returns, as explained by prior research. The variable of interest (*UE_PerDETF*) of this model shows a positive coefficient (0,3075), like the two models stated before. However, this time the variable is close to the 10% significance level and therefore it is more likely that an increase in ETF holdings in a company results in more cumulative abnormal returns. More abnormal returns are an indication for the fact that an increase in ETF holdings in a firm results in more investors' sensitivity towards earnings announcements.

The debt equity ratio shows an opposite sign than expected, but this control variable is far from being significant so there is no need to find justifications. The control variable for loss is significant and shows that when a firm is making a loss in a year, this results in a negative market reaction. This is in line with prior literature relating to ERC studies. Prior research shows that there are no certainties related to the effect of firm size on the cumulative abnormal returns. Finally can be noted that a positive market to book ratio results in more abnormal returns. The market perceives growth potential as something positive and the market trades more stocks with growth potential.

Table 6: Regression 3 Difference between years in percentage ETF holdings per company

Number of obs	6.828
F(6, 6821)	2.93
Prob > F	0,0074
R-squared	0.0119

CAR3	Coefficient		Standard error	t-stat	p-value
UE	0,1505	**	0,0586	2.57	0.010
UE_PerDETF	0,3075		0,2099	1.47	0.143
UE_SIZE	0,0051		0,0051	0.99	0.320
UE_MTBV	0,0114		0,0142	0.80	0.424
UE_DE	0,0002		0,0019	0.09	0.925
UE_LOSS	-0,0543	**	0,0226	-2.40	0.016
_cons	0,0041	***	0,0009	4.50	0.000

Regression is performed with CAR3 as dependent variable, UE_PerDETF as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_PerDETF indicates the difference in percentage of ETF holdings in subsequent years in a firm. *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

The output of the three main regressions stated in this section all have a positive earnings response coefficient for the variable of interest relating to ETF holdings. However, none of these ERCs is significant and therefore cannot be assumed that ETF holdings have a positive effect on the value relevance of earnings. More analyses are done in the next sections to see how robust the obtained results are.

5.4 Sensitivity test: Omitting effect crisis

Figure 1 which is presented before, shows that in 2008 and 2009 the average ETF holdings declined rapidly while there was a growing trend in the years before and the years after. The earnings response coefficient measures the market reaction towards earnings news. However, external events can also have an impact on the earnings response coefficients. The three-day window to calculate abnormal returns is used to minimalize the effect of external events on the earnings response coefficients. Besides the three-day window for the dependent variable, is there also corrected for the most common determinants of earnings response coefficients. However, it is impossible to control for all external events. Especially the start of the crisis in 2008 and 2009 had a big impact on the behavior of the participants on the capital market (Markham, 2015).

Therefore, a sensitivity analysis is conducted to see whether the years 2008 and 2009 had an impact on the before obtained results in this thesis. The years 2008 and 2009 had the biggest impact on the financial market and are therefore excluded from the original regression models stated before. The same regressions as estimated in the previous section are used and discussed in this section when the major years of crisis are taken from the sample period.

The first regression is estimated with the variable of interest *UE_POST*. The output is shown in table 7 below. Worth mentioning is the fact that both the F value of the model (original model: 4.02) and the R squared (original model 0.0032) are significantly better when the years of the crisis are excluded. These facts indicate that the model is predicting the cumulative abnormal returns better when the years of crisis are taken from the sample period. The variable of interest (*UE_POST*) has the same sign as the original model. However, the significance level of the variable is much lower, which makes it impossible to state conclusions regarding the difference in value relevance due to ETF holdings in a firm.

Table 7: Sensitivity analysis Regression 1, years 2008 and 2009 excluded

Number of obs	7.643
F(5, 7637)	17.86
Prob > F	0.0000
R-squared	0.0131

CAR3	Coefficient		Robust Std. Err.	t	P>t
UE	0,4277	***	0,0854	5.01	0.000
UE_POST	0,0035		0,0118	0.30	0.764
UE_MTBV	0,0034		0,0068	0.51	0.613
UE_DE	-0,0002		0,0002	-0.78	0.434
UE_LOSS	-0,0009		0,0119	-0.07	0.943
_cons	0,0047	***	0,0008	5.93	0.000

Regression is performed with CAR3 as dependent variable, UE_POST as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_POST indicates whether a firm is part of an ETF. *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

The next sensitivity test has as variable of interest the percentage of ETF holdings in a firm. The results of this regression are not comparable to the ones of the original model and shown in table 8. The F-value and R-squared are significantly better than the ones of the model estimated before. This indicates that the crisis has an effect on the output of this regression. The unexpected earnings (*UE*) variable is highly significant in this regression (p=0.000). This indicates that investors react to earnings announcements and this results in significant changes in the cumulative abnormal returns. The sign of the earnings response coefficient of the variable of interest is in the opposite direction (-1.0369) compared to the sign in the original model (0.0525). In this sensitivity test is the variable significant at a 5% level and the variable is not significant in the original model. Therefore, it looks like the percentage of ETF holdings has a negative impact on the cumulative abnormal returns as expected by the hypothesis when the years 2008 and 2009 are excluded. The fact that the variable of interest in this regression is significant needs to be taken into account when conclusions are formulated, since this finding can have an effect on the external validity of the research.

Table 8: Sensitivity analysis Regression 2, years 2008 and 2009 excluded

Number of obs	7.399
F(5, 7393)	52.36
Prob > F	0.0000
R-squared	0.0152

CAR3	Coefficient		Robust Std. Err.	t	P>t
UE	0,5224	***	0,0892	5.86	0.000
UE_PerETF	-1,0369	**	0,5263	-1.97	0.049
UE_SIZE	0,0008	**	0,0004	2.03	0.043
UE_MTBV	-0,0085		0,0089	-0.95	0.341
UE_DE	0,0019	*	0,0011	1.72	0.085
_cons	0,0048	***	0,0008	5.95	0.000

Regression is performed with CAR3 as dependent variable, UE_PerETF as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_PerETF indicates the percentage of ETF holdings in a firm. *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

The last sensitivity test relating to this section is done by regression number three with as variable of interest the difference in ETF holdings between subsequent years. From the output shown in table 8 can be concluded that this regression is better than the one estimated before. This can be concluded from the fact that the F value (8.51) and R squared (0.0201) of the model are better than the original model (2.93; 0.0119) discussed in section 5.3. The variable of interest (*UE_PerDETF)* in this sensitivity test is significant at a 5% level. The sign of the coefficient (1.1522) is the same as the sign of the original model, indicating that when the difference in ETF holdings is positive between subsequent years, this results in higher abnormal returns. The signs of the control variables are all in line with the expectations, except for the *UE_DE*. However, the debt equity variable is not significant and therefore needs no extra justification. This model shows different results compared to the second regression estimated in this sensitivity analysis section. These differences need to be taken into account when answering the hypothesis.

Table 9: Sensitivity analysis Regression 3, years 2008 and 2009 excluded

Number of obs	5.728
F(6, 5721)	8.51
Prob > F	0.0000
R-squared	0.0201

CAR3	Coefficient		Std. Err.	t	P>t
UE	0,6617	***	0,1695	3.90	0.000
UE_PerDETF	1,1522	**	0,4996	2.31	0.021
UE_SIZE	0,0127		0,0120	1.05	0.292
UE_MTBV	0,0020		0,0156	0.13	0.898
UE_DE	0,0025		0,0026	0.96	0.338
UE_LOSS	-0,3007	***	0,0911	-3.30	0.001
_cons	0,0046	***	0,0009	5.00	0.000

Regression is performed with CAR3 as dependent variable, UE_PerDETF as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_PerDETF indicates the difference in percentage of ETF holdings in subsequent years in a firm. *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

The sensitivity analyses relating to regression models 1 and 3 give similar outputs as the original models stated before. Both show a positive effect on the abnormal accruals due to ETF holdings. However, these findings are only significant for the sensitivity analysis of regression 3. The sensitivity analysis done for regression 2 shows significantly different results in comparison to the original model. The coefficient of interest *UE_PerETF* changes from a positive insignificant coefficient to a negative significant coefficient. The findings in this section provide additional evidence to answer the hypothesis after.

5.5 Sensitivity test: Sample comparison

This section compares the ETF and the control sample with each other to see whether the firms that are part of an ETF behave differently to earnings announcements than the firms in the control sample. By comparing these two groups there can be controlled for market effects. As mentioned before, the control firms are not included before in the analyses due to the fact that the control firms are significantly different when compared by the control variables (see table 2).

The variable *UE_NONETF* is constructed as an interaction effect between the earnings surprises and an indicator *NONETF*. *NONETF* is a dummy variable indicating 1 when a firm is not part of an ETF and otherwise 0. To compare the two samples with each other a normal ERC regression is estimated without additional ETF variables, but including the *UE_NONETF* variable. Due to multicollinearity issues is variable *UE_LOSS* excluded from the regression model (appendix G).

The output of the regression estimated in this section is stated in table 10 below. The model is significant at a 1% level and has a R-squared of 0.45%. The variable of interest in this regression (*UE_NONETF*) has a coefficient of 0,0221. This coefficient indicates that a firm that is not part of an ETF has bigger cumulative abnormal returns than a firm that is part of an ETF. The positive sign of the ERC indicates that the market perceives earnings information of firms that are not part of an ETF as more value relevant. The market reacts less to earnings announcements of firms that are part of an ETF. However, the variable (*UE_NONETF*) is not significant (p-value: 0.629) and therefore can be concluded that the cumulative abnormal returns do not significantly differ between the ETF sample and control sample. Besides, the control sample is significantly different from the ETF sample and therefore more analyses are done in the following sections to make it possible to answer the hypothesis after. All other variables in this model are not significant and therefore it is not possible to state what the effect is of the variables on the cumulative abnormal returns. This outcome provides additional evidence to answer the hypothesis later.

Table 10: Sensitity analysis comparison ETF vs Control sample

Number of obs	9.204
F(5, 9198)	7.28
Prob > F	0.0000
R-squared	0.0045

CAR3	Coefficient		Robust Std. Err.	t	P>t
UE	0,0311		0,0352	0.88	0.376
UE_SIZE	0,0014		0,0010	1.45	0.147
UE_MTBV	0,0081		0,0086	0.94	0.347
UE_DE	-0,0001		0,0003	-0.17	0.866
UE_NONETF	0,0221		0,0458	0.48	0.629
_cons	0,0042	***	0,0008	5.31	0.000

Regression is performed with CAR3 as dependent variable, UE_NONETF as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_NONETF indicates whether a firm is/has been part of an ETF(0) or not (1). *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

5.6 Sensitivity test: Fixed effect models

Fixed effect models are estimated to check for the robustness of the original models estimated before. Fixed effect models are estimated when ERC regression models are used (Ghosh et al., 2009). By doing this additional sensitivity check there can be tested for correlated omitted variables, which can have an effect on the association tested for and give endogeneity issues. Correlated omitted variables have an impact on the coefficients of a regression model. Hence, in order to tackle this problem, all regressions are estimated with fixed effects for industry and year. The sic2 code is used as a group variable in this analysis. The output related to this sensitivity test is shown in appendix H.

The first fixed effect model done is related to regression model 1 and can be found in table 1 of appendix H. The findings of this model are in line with the results obtained by the original model. The implementation of the fixed effects did not change the coefficient of interest significantly. The original model has a coefficient of 0,0160 for the variable *UE_POST* and the fixed effect model has a coefficient of 0,0164. Besides, the p-value (0.316) of *UE_POST* is similar to the original model (0.330). This shows the robustness of the obtained results before and indicates that ETF holdings in a firm result in more market sensitivity.

The second fixed effect model focusses on the percentage of ETF holdings in a firm. This model has as variable of interest the *UE_PerETF* variable. The coefficient of this variable in the original model was 0,0525 with a p-value of 0.864. The ERC of the variable of interest did increase after controlling the original regression for industry and year effects. The coefficient in the second fixed effect model is 0,0878 with a p-value of 0.770. The sensitivity test shows that the coefficient is bigger after controlling for the year and industry effects. However, the coefficient is still not significant and therefore is it still difficult to state conclusions based on this model.

The last sensitivity test estimated in this section is based on the third regression model. This regression model has as variable of interest the difference between subsequent years in percentage ETF holdings in a firm. The fixed effect model relating to regression 3 shows significantly different results related to the variable of interest (*UE_PerDETF)*. In the original model is the coefficient of this variable 0,3075 with a p-value of 0.143. The fixed effect model

shows a similar coefficient (0,3021), but has a much better p-value of 0.017. The coefficient under this model is significant at a 5% level. The result of this sensitivity analysis indicates that an increase in ETF holdings in a firms result in more value relevance of earnings indicated by the significant positive ERC.

From the fixed effect models can be concluded that the results of regression 1 and 2 are in line with the findings of the original model. However, the fixed effect model related to regression 3 gives a different significance level related to the variable of interest (*UE_PerDETF)*. This significant outcome provides additional evidence regarding the association between ETF holdings and the value relevance of earnings and can help with answering the hypothesis later.

5.7 Sensitivity test: Big versus Small ETFs

The next sensitivity test focusses on the difference in size between ETFs and what the effect is of the size of an ETF on the value relevance of earnings of the underlying firm. The impact of the ETF size on the value relevance of earnings is not determined yet and can give additional evidence for answering the hypothesis. It is possible that the size of an ETF matters in relation to the effect on the value relevance of earnings. Bigger ETFs have more assets under management and therefore have probably a bigger impact on the underlying firms and maybe on the value relevance of earnings.

The assets under management are determined for every firm in the sample by calculating the average assets held per ETF over the whole sample period (Israeli et al., 2016). The assets held are calculated by multiplying the stock price of a firm with the amount of shares held by an ETF. After, the smallest 80 ETFs and the 20 biggest ETFs are determined to create a sample with different sized ETFs. There are more smaller ETFs in this sample due to their limited holdings. Not including more smaller ETFs would lead to biased results, because smaller ETFs would almost not be present in the regression in case of a sample with the same amount of ETFs in both samples.

This sensitivity test includes an ERC model including the variable *UE_bETF*. This variable is an interaction variable composed from the variables *UE* and *bETF*. The variable *UE* indicates the earnings surprise related to the earnings announcement of a firm and the variable *bETF* indicates whether a firm is part of a small ETF (0) or a big ETF (1). The UE_*bETF* variable gives an indication of the effect of ETF size on the value relevance of earnings.

The output of this regression is stated in table 10 below. The F-value of the model is 9.66 and therefore significant at a 1% level. The ERC model explains 0.37% of the variance of the dependent variable, this percentage is in line with the models estimated before. The variable of interest (*UE_bETF*) has an ERC of -0,7540, this indicates that being part of a big ETF (1) results in less cumulative abnormal returns. The coefficient has a p-value of 0.141, which is close to the 10% significance level. From this sensitivity test can be concluded that there is no significant difference between firms that are part of different sized ETFs regarding the market reaction towards earnings announcements. However, the p-value is not far from the 10% significance level

and therefore is the finding in this section relevant for the conclusion related to the hypothesis of this thesis.

Table 11: Sensitivity test Big versus Small ETFs

Number of obs	7.471
F(6, 7464)	9.66
Prob > F	0.0000
R-squared	0.0037

CAR3	Coefficient		Std. Err.	t	P>t
UE	0,7886		0,5131	1.54	0.124
UE_bETF	-0,7540		0,5119	-1.47	0.141
UE_SIZE	0,0014		0,0021	0.65	0.514
UE_MTBV	0,0059		0,0082	0.71	0.477
UE_DE	0,0000		0,0003	-0.15	0.881
UE_LOSS	-0,0001		0,0092	-0.01	0.995
_cons	0,0055	***	0,0009	6.24	0.000

Regression is performed with CAR3 as dependent variable, UE_bETF as variable of interest, UE_SIZE, UE_MTBV, UE_DE and UE_LOSS as control variables. UE_bETF indicates whether a firm is part of a bigger ETF (1) or smaller ETF (0). *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

5.8 Sensitivity test: Effect of big ETFs

The last sensitivity test is related to the impact of big ETFs on the value relevance of earnings of the underlying firms. The size of the ETFs is determined by the average assets under management over the sample period, which is the same way as the sensitivity test in the section (5.7) before. The sample used in this additional test consists of the 40 biggest ETFs traded on the American stock market. This sample size is used due to the fact that a smaller sample of ETFs did not give enough data to do a before after analysis related to big ETFs. Quite some firms were already part of big ETFs before 2004, however the total assets managed in these ETFs were really small.

The variable of interest in this last regression is *UE_AFTER*. This variable is an interaction variable that consists of the *UE* and *AFTER* variable. The *UE* variable shows the unexpected earnings related to a firms' earnings announcement in a specific year. *UE_AFTER* indicates whether a firm is already part of a big ETF (1) or not yet (0). Therefore, this variable shows whether being part of a big ETF results in a different level of earnings relevance.

The output related to this sensitivity analysis is presented in table 12. The regression model has a R-squared of 0,47% and a F-value, which is significant at 1% level. The variable of interest shows a positive sign for the ERC (0,0205) in the table below. This outcome means that when a firm becomes part of a big ETF, this results in more cumulative abnormal returns. However, the variable has a p-value of 0.817 and is therefore not significant at all. This means that the results of this section do not provide evidence for the hypothesis answered after.

Table 12: Sensitivity test Big versus Small ETFs

Number of obs	8.436
F(6, 8429)	3.12
Prob > F	0.0047
R-squared	0.0031

CAR3	Coefficient		Robust Std. Err.	t	P>t
UE	0,0185		0,0813	0.23	0.820
UE_AFTER	0,0205		0,0886	0.23	0.817
UE_SIZE	0,0037		0,0034	1.10	0.271
UE_MTBV	0,0021		0,0092	0.22	0.823
UE_DE	0,0004		0,0006	0.69	0.492
UE_LOSS	-0,0131		0,0153	-0.86	0.389
_cons	0,0043	***	0,0008	5.16	0.000

Regression is performed with CAR3 as dependent variable, UE_AFTER as variable of interest, UE_SIZE, UE_MTBV, UE_DE and UE_LOSS as control variables. UE_AFTER indicates whether a firm is already part of a big ETF (1) or not (0). *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

5.9 Conclusion results

This thesis attempts to provide insights into the effect of ETF trading on the value relevance of earnings. The hypothesis developed before is as follows: *"Companies participating in ETFs perceive less market sensitivity to earnings announcements"*. This chapter discusses the results related to this topic and started with discussing the descriptive statistics of the variables used in the regressions. Thereafter, is tested for the OLS assumptions related to the ERC regression models, whereby is examined for: multicollinearity, homoscedasticity, normality and autocorrelation of the errors. Subsequently, the findings of the three main regression models and the sensitivity tests are discussed. The results of all these analyses relating to the impact of ETF trading on the market sensitivity to earnings announcements are sometimes contracting. The results of these analyses are visualized in table 12 below.

Table 12: Overall results thesis

		Variable of interest					
		UE_POST	*UE_PerETF*	*UE_PerDETF*	*UE_NONETF*	*UE_bETF*	*UE_AFTER*
Different analyses							
Main regression model	Coefficient	0,0160	0,0525	0,3075	-	-	-
	P-value	0.330	0.864	0.143	-	-	-
Sensitivity test: Omitting effect crisis	Coefficient	0,0035	-1,0369	1,1522	-	-	-
	P-value	0.764	0.049 **	0.021 **	-	-	-
Sensitivity test: Sample comparison	Coefficient	-	-	-	0,0221	-	-
	P-value	-	-	-	0.629	-	-
Sensitivity test: Fixed effect models	Coefficient	0,0164	0,0878	0,3021	-	-	-
	P-value	0.316	0.770	0.017 **	-	-	-
Sensitivity test: Big versus Small ETFs	Coefficient	-	-	-	-	-0,7540	-
	P-value	-	-	-	-	0.141	-
Sensitivity test: Effect of big ETFs	Coefficient	-	-	-	-	-	0,0205
	P-value	-	-	-	-	-	0.817
This table gives an overview of the results of the several analyses discussed before. *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.							

The coefficients of the variables of interest in the main regression models suggest that there is a positive association between ETF trading and the market sensitivity to earnings. However, these coefficients are not significant and combined with the results of the sensitivity tests there cannot follow a conclusion regarding the sign of the association between ETF trading and the market

sensitivity towards earnings announcements. The sensitivity test to control for the crisis with as variable of interest *UE_PerETF* and the sensitivity test to see the difference between big and small ETFs show negative signs. Besides, many ERCs obtained from the several models are not significant and therefore it is unsure whether the market reaction towards earnings announcements changed due to ETF trading. All these results together lead to the rejection of the hypothesis suggesting a negative association between ETF trading and value relevance of earnings. The findings stated in this chapter form the basis for answering the research question in the next chapter.

6. Conclusion

The purpose of this thesis is to examine the market reaction to accounting information in the context of ETFs. ETF trading did grow, due to the benefits of and ETF over others securities. This thesis focusses specifically on the market reaction towards earnings information and the question whether this reaction changed due to the impact of ETFs on the stock market. Prior research regarding ETFs focuses mainly on non-accounting related topics. In this thesis earnings response coefficients are used to measure the market reaction and determine the value relevance of earnings. The sample of this study consists of American firms over the period 2004-2015. The research question that is answered in this thesis is:

Does ETF trading change the value relevance of earnings information for investors?

Two main concepts are explained in the theoretical background chapter of this thesis. These topics are value relevance and the investment type ETF. Value relevance studies examine the relation between accounting numbers and security market values. The value relevance studies can be categorized in different areas, but in this thesis there is a focus on one area: value relevance of earnings and other flow measures. In this area of value relevance studies the ERC measure is used most commonly. This measure captures the reaction of investors to unexpected earnings and can therefore show how the market perceives the earnings announcement. The other concept explained in the theoretical chapter is the ETF, which is a type of investment that makes it possible to follow the returns of several securities. ETFs make it therefore possible for investors to invest easily in a diversified portfolio. Besides the easy way to diversify the portfolio are there other benefits of ETFs: low expense ratios, intraday trading, minimal tax expenses and transparency of ETFs. There are also disadvantages related to ETF trading, for example ETF trading with the passive investment strategy cannot benefit optimally from positive news. Besides, sometimes dividends are reinvested immediately and not paid out.

Five streams of literature are discussed before formulating the hypothesis. The hypothesis states that companies participating in ETFs perceive less market sensitivity to earnings announcements. This hypothesis is based on the main conjecture that the passive strategy of investing by ETFs results in less value relevance of earnings. The conceptual relation between ETF trading and value

relevance of earnings is operationalized by making use of ERC regression models. Three different proxies for ETF trading are used in the ERC model: a dummy variable indicating whether a firm is part of an ETF (1) or not (0), the percentage of ETF holdings in a company and the difference in percentage ETF holdings in a company between subsequent years. This ERC model makes it possible to measure immediately the link between ETF trading and value relevance of earnings, unlike other models. Another proxy, such as earnings quality, could also be used to evaluate the impact of ETF trading on the perceived usefulness of earnings of a firm. The earnings quality proxies (such as an accruals model) are not as straightforward to capture the relation between earnings relevance and ETF trading. Therefore, the earnings response coefficient is used to investigate the conceptual relation in this thesis.

The findings in this thesis are contradicting and therefore no evidence is found that ETF trading results in less market sensitivity towards earnings announcements. Therefore, the hypothesis was rejected in the previous chapter. These findings are based on the main regression models with the three different proxies and the sensitivity analyses conducted afterwards to check for the robustness of the results. These findings form the basis to answer the research question and conclude that there is no change in value relevance of earnings due to ETF trading.

This conclusion leads to several consequences. First, the conclusion of this thesis is important for the purpose of this thesis, to examine the market reaction to earnings information in the context of ETFs. The key finding of this thesis, that there is no change in value relevance of earnings due to ETF trading, contributes to prior research relating to value relevance of earnings. This thesis is the first study that examines the association between ETF trading and value relevance of earnings directly. Many studies determined several determinants of earnings relevance and from this thesis it can be concluded that ETF trading is not a determinant that changes the value relevance of earnings significantly. Besides, the findings of this thesis contribute to the knowledge of the users of the financial statements of a firm. Investors base their decisions upon the information provided by firms. These users of the financial statements (investors, institutions or other market participants) should not base their opinions on whether firms are part of an ETF and the impact of this participation on the value relevance of earnings. The findings have as well implications for decision making of standard setters. The findings provide evidence that even while the

percentage of passive investment by ETFs increased significantly over the last years, the value relevance of earnings did not change. This conclusion can provide input on the discussion whether to change specific accounting rules due to new investment options.

The conclusion and the results obtained are not free of limitations. The limitations related to this thesis can be categorized in two groups: limitations related to the ERC research design in general and limitations related to this thesis specifically. The first limitation is related to the fact that the ERC model in general assumes market efficiency as explained before in chapter two. Prior research shows that the market in the United States is in line with the semi-strong form of market efficiency (Hasan and Wadud, 2015) and therefore not fully efficient as under the strong form of market efficiency. This finding raises doubt regarding the ERC measure, however prior research uses these measures as well in the United States and provide valid results. Another commonly discussed limitation of ERC studies is the fact that there can be correlated omitted variables. The ERC models include not many control variables and the R-squared are low so correlated omitted variables can be present and this reduces the internal validity. The internal validity refers to how well a study captures a causal effect after eliminating the alternative hypothesis. The presence of correlated omitted variables can result in biased and inconsistent parameter estimates. Regarding the construct validity of the different measures used to capture ETF trading can be stated that these measurements capture the underlying theoretical construct, which it is supposed to measure. Construct validity is created by using several different proxies to measure ETF holdings. This makes it probable that ETF holdings are measured accurately. Besides there are some limitations that are specifically related to this thesis. First of all, there is no proper control group in the thesis because almost all firms with available data are included in the ETF sample. Therefore, it was not possible to have a comparable control sample to see differences with the ETF sample, which makes it impossible to use a difference in difference design. This problem is tackled by doing additional sensitivity tests such as: controlling for the effect of the crisis, fixed effects, a comparison with a NONETF sample, examined whether being part of a big or small ETF results in different outcomes and the effect on value relevance of earnings of a firm when it becomes part of a big ETF. Another limitation is the fact that several violations of OLS assumptions are noticed. There has been corrected for these problems, however no guarantees

are given that these issues are eliminated completely. The last limitation related to this study has to do with the external validity of the findings. This thesis focusses only on the US, which does not make it possible to generalize the findings on a broader scale. Taking into account the limitations stated before, it is possible to interpret the conclusion that the value relevance of earnings did not change due to ETF trading.

Future research can construct a different research design to examine the association between ETF trading and value relevance of earnings. By using another research design, is it possible to test for the robustness of the results obtained in this thesis. Besides, the generalization of the findings can be improved by future research when a bigger sample is used. Research for example can focus on a specific accounting standard (e.g. IFRS) and include all firms that are part of an ETF. This makes it also possible to find similarities and differences with the US setting.

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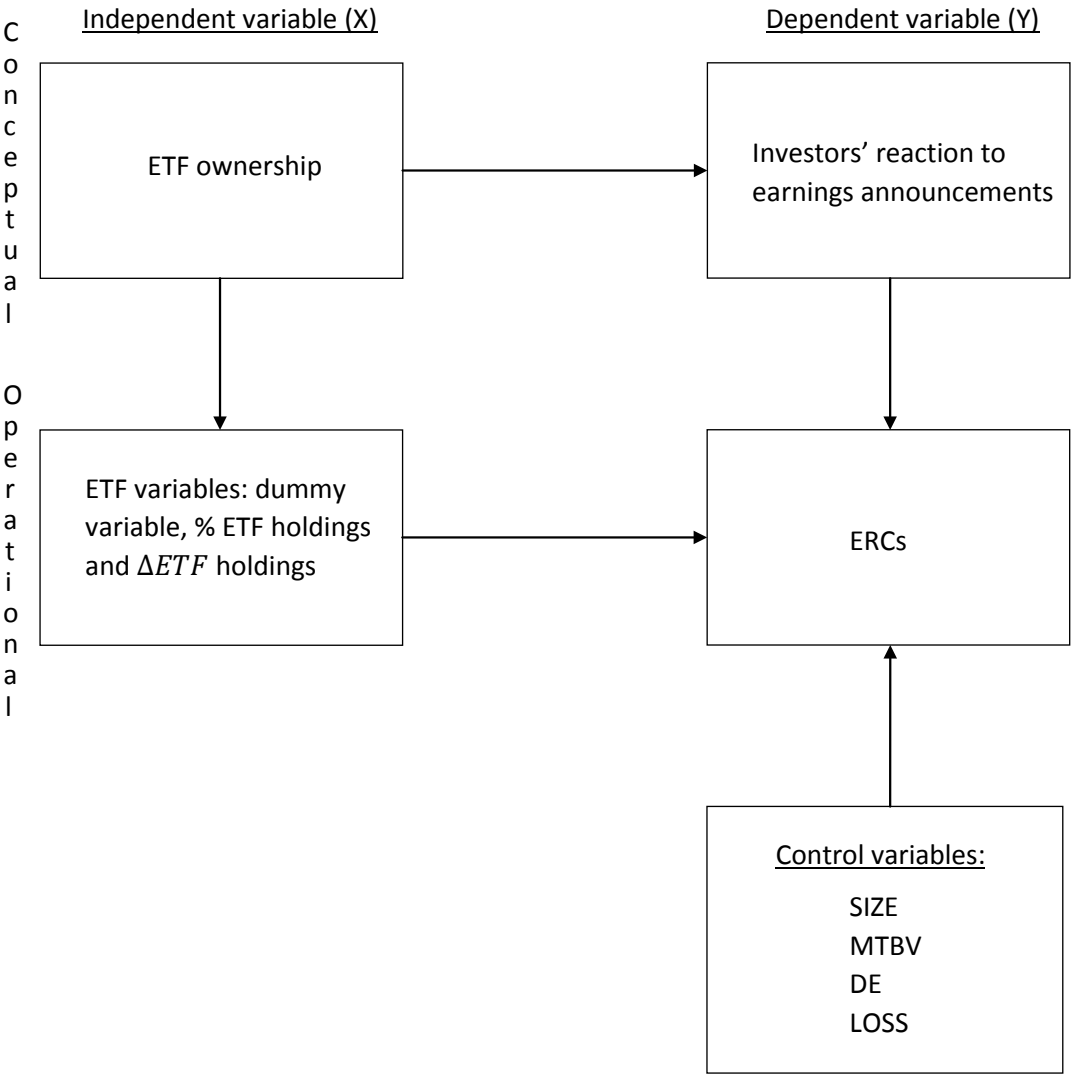
Appendix

Appendix A: Libby Boxes



Appendix B: Variable definitions

Variable	Definition	Measured as
CAR3	Cumulative Abnormal Returns measured on a 3 day window	Cumulative Abnormal Returns based on the Market Model.
UE	Unexpected Earnings	Difference between the actual EPS and median analyst forecast EPS scaled by the stock price of a firm.
UE_POST	Interaction term: UE * PERIOD	Interaction term between UE and the period indicating whether firm is part of an ETF (1) or not (0).
UE_PerETF	Interaction term: UE * PerETF	Interaction term between UE and the percentage ETF holdings in a company. ETF holdings calculated as the aggregated amount of shares held by ETFs divided by the total shares outstanding of a firm.
UE_PerDETF	Interaction term: UE*PerDETF	Interaction term between UE and the difference in percentage ETF holdings between subsequent years. ETF holdings calculated based on the variable PerETF.
UE_SIZE	Interaction term: UE*SIZE	Interaction term between UE and firm size. Firm size calculated by the natural logarithm of the market value of a firm.
UE_MTBV	Interaction term: UE*MTBV	Interaction term between UE and the market to book ratio. Market to book ratio calculated by dividing the market value of a firm by the book value of equity.
UE_DE	Interaction term: UE*DE	Interaction term between UE and the debt to equity ratio. Debt to equity ratio is calculated by the total level of debt divided by the total level of equity.
UE_LOSS	Interaction term: UE*LOSS	Interaction term between UE and a dummy variable indicating (1) if a company made a loss or otherwise (0). The LOSS indicator is based on the EPS of a firm.

Appendix C: Tests for multicollinearity

Regression 1

Variable	VIF	1/VIF
UE_POST	62.80	0.015925
UE_SIZE	30.27	0.033031
UE_LOSS	25.88	0.038644
UE_DE	3.13	0.319986
UE_MTBV	1.65	0.604238
UE	1.52	0.659963
Mean VIF	20.87	

The variance inflation factor is used as measure to detect multicollinearity. The rule of thumb mentioned before is exceeded, therefore the *UE_SIZE* variable is excluded to obtain a lower level of multicollinearity

Regression 2

Variable	VIF	1/VIF
UE_LOSS	14.49	0.069017
UE_SIZE	12.18	0.082068
UE_DE	4.07	0.245767
UE_PerETF	3.84	0.260230
UE	2.00	0.500529
UE_MTBV	1.58	0.632105
Mean VIF	6.36	

The variance inflation factor is used as measure to detect multicollinearity. The rule of thumb mentioned before is exceeded, therefore the *UE_LOSS* variable is excluded to obtain a lower level of multicollinearity

Regression 3

Variable	VIF	1/VIF
UE_SIZE	7.20	0.138871
UE_LOSS	7.10	0.140914
UE_DE	3.57	0.279926
UE_MTBV	3.48	0.287089
UE	3.27	0.306043
UE_PerDETF	1.87	0.535149
Mean VIF	4.41	

The variance inflation factor is used as measure to detect multicollinearity. The rule of thumb mentioned before is not exceeded, therefore no adjustments need to be done.

Appendix D: Tests for homoscedasticity (Breusch Pagan test)

Regression 1

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

Ho: Constant variance (Homoscedasticity)

Chi-squared	407.86
Prob > Chi-squared	0.000

The table regarding regression 1 shows that the null hypothesis of homoscedasticity is rejected. This means that the variance of the residuals is heteroscedastic. In order to comply with the assumption of homoscedasticity for OLS, robust standard errors are used in the regression.

Regression 2

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

Ho: Constant variance (Homoscedasticity)

Chi-squared	383.01
Prob > Chi-squared	0.000

The table regarding regression 2 shows that the null hypothesis of homoscedasticity is rejected. This means that the variance of the residuals is heteroscedastic. In order to comply with the assumption of homoscedasticity for OLS, robust standard errors are used in the regression.

Regression 3

Breusch-Pagan / Cook-Weisberg test for heteroscedasticity

Ho: Constant variance

Chi-squared	198.76
Prob > Chi-squared	0.00

The table regarding regression 3 shows that the null hypothesis of homoscedasticity is rejected. This means that the variance of the residuals is heteroscedastic. In order to comply with the assumption of homoscedasticity for OLS, robust standard errors are used in the regression.

Appendix E: Test for normality of errors (Skewness/Kurtosis test)

Regression 1

Skewness/Kurtosis tests for Normality

H_0: Normal distribution of errors

Variable	Observations	Pr (Skewness)	Pr (Kurtosis)	Adj chi2 (2)	Prob> chi2
e	8.956	0.0000	0.0000	-	0.000

The table above shows the results of the Skewness/Kurtosis test. The results indicate that the residuals of the regression are not normally distributed since the H_0 is rejected. These findings are probably due to the big sample size.

Regression 2

Skewness/Kurtosis tests for Normality

H_0: Normal distribution of errors

Variable	Observations	Pr (Skewness)	Pr (Kurtosis)	Adj chi2 (2)	Prob> chi2
e	8.690	0.0000	0.0000	-	0.000

The table above shows the results of the Skewness Kurtosis test. The results indicate that the residuals of the regression are not normally distributed since the H_0 is rejected. These findings are probably due to the big sample size.

Regression 3

Skewness/Kurtosis tests for Normality

H_0: Normal distribution of errors

Variable	Observations	Pr (Skewness)	Pr (Kurtosis)	Adj chi2 (2)	Prob> chi2
e	6.828	0.0000	0.0000	-	0.000

The table above shows the results of the Skewness/Kurtosis test. The results indicate that the residuals of the regression are not normally distributed since the H_0 is rejected. These findings are probably due to the big sample size.

Appendix F: Durbin-Watson d-statistic

Regression 1: Durbin-Watson d-statistic(6, 8956) = 1.8017

Regression 2: Durbin-Watson d-statistic(6, 8690) = 1.7708

Regression 3: Durbin-Watson d-statistic(7, 6828) = 1.7149

From the output of the Durbin-Watson test can be concluded that there is not serial correlation in the error terms. The d-statistic is close to 2 which means that error terms have no serial correlation (Joanes & Gill, 1998).

Appendix G: VIF test for control sample

Variable	**VIF**	**1/VIF**
UE_LOSS	14.28	0.070031
UE_SIZE	11.89	0.084129
UE_DE	2.79	0.358101
UE	2.07	0.484247
UE_MTBV	1.52	0.655767
UE_NONETF	1.46	0.683828
Mean VIF	5.67	

The variance inflation factor is used as measure to detect multicollinearity. The rule of thumb mentioned before is exceeded, therefore the *UE_LOSS* variable is excluded to obtain a lower level of multicollinearity.

Appendix H: Fixed effect models

Table 1: Fixed effect model Regression 1

Number of obs	8.956
F(16, 62)	4.78
Prob > F	0.0000
R-squared	0.0066

CAR3	Coefficient		Robust Std. Err.	t	P>t
UE	0,0302		0,0331	0.91	0.365
UE_POST	0,0164		0,0162	1.01	0.316
UE_MTBV	0,0107		0,0105	1.02	0.310
UE_DE	0,0002		0,0005	0.30	0.764
UE_LOSS	-0,0142		0,0189	-0.75	0.454
_cons	0,0043	*	0,0026	1.68	0.098
2005	-0,0042		0,0042	-1.00	0.322
2006	0,0006		0,0039	0.16	0.872
2007	0,0087	*	0,0049	1.77	0.082
2008	-0,0080		0,0067	-1.19	0.239
2009	0,0023		0,0048	0.48	0.634
2010	0,0039		0,0029	1.35	0.183
2011	-0,0047		0,0033	-1.42	0.161
2012	-0,0032		0,0035	-0.91	0.369
2013	-0,0018		0,0034	-0.54	0.591
2014	-0,0020		0,0039	-0.52	0.605
2015	0,0055		0,0034	1.61	0.113

Regression is performed with CAR3 as dependent variable, UE_POST as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_POST indicates whether a firm is part of an ETF. The model is estimated with fixed effects for group variable sic2 (two digit sic code). *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

Table 2: Fixed effect model Regression 2

Number of obs	8.690
F(16, 62)	3.06
Prob > F	0.0008
R-squared	0.0069

CAR3	Coefficient		Robust Std. Err.	t	P>t
UE	0,0227		0,0425	0.53	0.595
UE_PerETF	0,0878		0,2994	0.29	0.770
UE_SIZE	0,0010		0,0011	0.92	0.363
UE_MTBV	0,0123		0,0112	1.10	0.277
UE_DE	0,0001		0,0007	-0.18	0.856
_cons	0,0053	**	0,0026	2.03	0.047
2005	-0,0048		0,0043	-1.11	0.271
2006	-0,0004		0,0040	-0.10	0.921
2007	0,0078		0,0050	1.56	0.123
2008	-0,0091		0,0067	-1.35	0.182
2009	0,0015		0,0048	0.31	0.756
2010	0,0032		0,0031	1.04	0.303
2011	-0,0059	*	0,0032	-1.84	0.070
2012	-0,0048		0,0038	-1.25	0.215
2013	-0,0028		0,0035	-0.79	0.434
2014	-0,0037		0,0040	-0.92	0.360
2015	0,0049		0,0034	1.43	0.158

Regression is performed with CAR3 as dependent variable, UE_PerETF as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_PerETF indicates the percentage ETF holdings in a firm. The model is estimated with fixed effects for the group variable sic2 (two digit sic code)*, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.

Table 3: Fixed effect model Regression 3

Number of obs	6.828
F(16, 60)	5.20
Prob > F	0.0000
R-squared	0.0174

CAR3	Coefficient		Robust Std. Err.	t	P>t
UE	0,1418	**	0,0657	2.16	0.035
UE_PerDETF	0,3021	**	0,1228	2.46	0.017
UE_SIZE	0,0052		0,0044	1.19	0.238
UE_MTBV	0,0141		0,0119	1.19	0.239
UE_DE	-0,0004		0,0016	-0.25	0.804
UE_LOSS	-0,0521		0,0316	-1.65	0.105
_cons	-0,0002		0,0030	-0.06	0.949
2005	-		-	-	-
2006	0,0038		0,0038	1.00	0.321
2007	0,0142	***	0,0040	3.52	0.001
2008	-0,0059		0,0069	-0.86	0.396
2009	0,0066		0,0045	1.47	0.147
2010	0,0079		0,0047	1.69	0.097
2011	-0,0009		0,0037	-0.24	0.808
2012	-0,0005		0,0045	-0.10	0.919
2013	0,0022		0,0048	0.46	0.647
2014	0,0038		0,0032	1.20	0.236
2015	0,0135	***	0,0053	2.57	0.013

Regression is performed with CAR3 as dependent variable, UE_PerDETF as variable of interest, UE_SIZE, UE_MTBV and UE_DE as control variables. UE_PerDETF indicates the difference in percentage ETF holdings for subsequent years in a firm. The model is estimated with fixed effects for the group variable sic2 (two digit sic code). *, **, *** indicate significance of the coefficients at 10%, 5%, and 1%, respectively.