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AN EMPIRICAL ANALYSIS OF PASSIVELY MANAGED EXCHANGE TRADED FUNDS AND MUTUAL FUNDS

The analysis of index replicating funds from North America, Europe and the world

Tapani Lehtonen

International Business

Bachelor's Thesis

Supervisor: David Volkman

Date of approval: 13 April 2017

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ABSTRACT OF
BACHELOR'S THESIS

Author:

Title of thesis: An Empirical Analysis of Passively Managed Exchange Traded Funds and Mutual Funds

Date: 13 April 2017

Degree: Bachelor of Science in Economics and Business Administration

Supervisor: David Volkman

Objectives:
The main objectives of this study were to discover, whether exchange traded funds differ from mutual funds for which both employ passive replication strategies and to examine if mutual funds have incurred a decrease in monthly cash flows due to the emergence of exchange traded funds.

Summary:
Exchange traded funds and mutual funds are similar investment vehicles. Due to the existence of passively managed funds of both types, the question arises, whether they provide similar returns with similar risk. The literature explains the differences of both fund types and finally the empirical analysis aims to discover whether there are significant differences in what they provide. Additionally, due to the proliferation of exchange traded funds all over the developed capital markets, one would think that due to their similarity with mutual funds, they would eventually replace them.

Conclusions:
No statistical evidence of any differences in exchange traded fund and mutual fund returns, risk, risk-adjusted returns or index tracking. Mutual funds have not incurred lower cash flows on a cumulative basis. Exchange traded funds and mutual funds can possibly coexist because both have their own users depending on the investment horizon, tax structure or the monetary situation of the investor among other factors

Key words: *ETF, mutual fund, index fund, regression, comparison, cash flows, S&P 500, FTSE 100, Russell 1000, Russell 3000, MSCI World*

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ABSTRACT

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1. INTRODUCTION

1.1 Background

The increasing interest accorded to exchange traded funds prompts for research in order to get a better understanding of their differences and similarities. Both exchange traded funds and mutual funds offer similar passive, index tracking instruments for the investors. Exchange traded funds have become one of the most appealing financial instruments due to their ease of purchase and low barriers of entry due to very affordable price ranges as compared to their mutual fund counterparts. Due to their increase in popularity and availability at the same time with mutual funds, it is worthy to discover, whether these two similar looking fund types provide identical returns, and if there are differences in index tracking. Simultaneously it is studied, whether the increase in exchange traded funds has had a negative effect on the mutual fund cash inflows.

1.2 Research Problem

This paper explores the returns on passively managed exchange traded funds compared to passively managed mutual funds, with the purpose of finding a difference in their returns and, whether the proliferation of the former has affected the cashflows of the latter.

1.3 Research Questions

Specifically, the following will be studied:

1) How much do the returns differ for exchange traded funds compared to mutual funds relative to their underlying benchmarks?
2) Are exchange traded funds more efficient than mutual funds in terms of returns, risk and tracking error?
3) Have the mutual fund cashflows been decreasing over the past decade?

1.4 Research Objectives

1) To compare the returns of an exchange traded funds to a mutual fund.

2) To measure the risk adjusted returns and the tracking error of exchange traded funds and mutual funds.
3) To measure the similarity of an exchange traded fund and a mutual fund.
4) To see, whether the mutual funds have experienced a decrease in monthly cash flows.

1.5 Definitions

Exchange traded fund: Comparable to conventional index funds. Usually it is comprised of several stocks or bonds that define the underlying index. The major difference, when compared to index funds, is the ability to trade it as stock during the conventional trading hours. The price, however, is formed not only by supply and demand, but from the exchange traded fund's underlying assets, that is, its net asset value. Exchange traded funds do not incur taxation because of the in-kind redemption process. The holdings are taxed when they are liquidated.

The term Index Fund and Mutual Fund are used to refer to the same entity. The term Index Fund is used in the data and findings section to refer that the fund is passively managed.

2. LITERATURE REVIEW

2.1. Introduction

This is a synthesis about the current state of the literature of exchange traded funds (ETFs) and mutual funds (MFs). It will try to support the ideas, trends and the methodology used by providing examples and critique for ETFs and MFs. This review will additionally critically analyze the ideas and the findings of earlier researches. The purpose of the review is to provide a deeper understanding of ETFs' and MFs' world and, to aid in interpreting the advantages and disadvantages in both investment vehicles.

The theoretical framework will be used to structure the literature review and the research, which will focus on analyzing trends and empirical studies which are then also synthesized to devise an objective and holistic result about ETFs and MFs. Additionally, the methodological approach will be incorporated in the paper.

Overall, the literature lacks in-depth reasoning for recommending ETFs over MFs or vice versa. The lack of objectivity also seems to be quite prominent. Often, the general tone of the authors in most of the literature, is in favor of the ETFs over MFs from the beginning. Due to somewhat biased opinions, this literature review aims to get more information about the true nature of these two investment vehicles to aid in forming a thesis which could give an objective view of the current situation concerning ETFs and MFs. The analysis of the current literature will prove as guidance in forming this thesis.

First some background of ETFs will be discussed. This is followed by critiquing perspectives on ETFs and MFs. Afterwards the views suggesting a possible coexistence of ETFs and MFs will be analyzed. In addition, different methodologies employed by various authors will be presented. Finally, the conclusion will give further explanation on the subject and possible areas for future research.

2.2 Background and Implications

Buetow and Henderson (2012) discuss ETF returns on a very general note. They argue that the tracking error regarding ETFs which mirror benchmarks composed of less liquid assets show a greater tracking error. Also, the ETFs which follow securities that are less liquid or outside of the United States (U.S.), would have a greater correlation with the U.S. equity index than those that do not display these traits. Additionally, the authors explain the detailed characteristics of the price formation of an ETF, the so called "creation/redemption" process and how it contributes towards balancing out between an ETFs current market price and its net asset value (NAV). The two hypotheses presented: an ETFs investment performance is supposedly impacted by the liquidity of underlying securities which implies that the more liquid they are, the worse the ETFs performance is and that the liquidity of the underlying securities and the liquidity of the ETFs themselves would play an important role in determining the tracking performance of an ETF. What they conclude from these findings is that diversification is less beneficial than stated by the benchmarks. Both these hypotheses are relevant to this thesis because one of the objectives is to determine why the ETFs might perform better or worse than MFs.

Another important implication is the phenomenon called "overreaction" to a specific market, in most cases, it is usually the U.S. market. This seems to exist also among ETFs, since they trade as stocks during intraday trading hours (Levy & Lieberman, 2013). The study concerns country-specific ETFs vis-à-vis U.S. market returns in general. The authors discover the possibility that the ETFs' prices are guided by their own NAVs during synchronized trading hours with the U.S. market. The opposite, that is, an "overreaction" to the U.S. market returns, namely the S&P 500 index, are found during non-synchronized trading hours (ibid.). This has lead the author to conclude that country ETFs would have more persistent and larger premium pricings. These finding could affect the whole study, since country ETF returns are directed by the U.S. market, it could be difficult to analyze country ETF and U.S. domiciled ETF data.

2.3. ETFs Might Be Better Than MFs

2.3.1 ETFs Offer Easy Diversification

Bansal et al. (2002) argue that ETFs provide interesting ways of diversifying a portfolio. They state that ETFs are a creative solution in the world of investing, compared to the other alternatives available (ibid.). This is relatively true, because ETFs offer a more accessible pathway to more exotic industries or regions. The authors aim to explain the reason why ETFs could be better investments today. Although, a reason why ETFs are growing at such an increased pace is partly also due to them still being relatively new investment vehicles. Rationally speaking, MFs can only be used in so many ways, because the individual investor is not capable of manipulating the trades, whereas when an ETF is bought, the investor can experiment with it in ways that are more different, for example, it can be shorted or hedged.

This discussion is further continued by Parthemer (2009) who criticizes the choice of investing into an MF instead of an ETF. He argues that most who overlook ETFs do so because they are unfamiliar with how they work or with what they generally do. The author explains various views on how ETFs can be used to manipulate risk and return when applying the basic principles of modern portfolio theory. For example, the author argues that ETFs can offer simpler asset class diversification or a very strong passive investment strategy. Additionally, he states that it should always be taken into consideration that a passive investment strategy might not be perfect for every investor but that it is always a relevant discussion when analyzing ETFs. The author concludes that ETFs are satisfying the needs, which MFs used to, that is, reducing the time needed to choose securities one by one for diversification purposes. Carrel (2009) also claims that ETFs provide a way to invest into easy to access areas, such as broad market indices. These views on ETFs and MFs seem unilateral to some degree.

Korn (2013) discusses the increase in the favor of ETFs even among numerous MFs in his trade article. His discourse revolves largely around investor preference and the favoritism of ETFs over MFs. He argues that the trend is mainly due to the underperformance of many MF managers and the low expense ratios on ETFs in general. Additionally, the author indicates that the ETFs provide intriguing diversification and investment routes, such as, different regions in China or using inverse or leveraged

ETFs. Overall, the author lacks in-depth analysis and contradicts with some points of view, which discovered that, although, ETFs would have more transparency, smaller tracking error and expense ratios, there would be instances when they could fall short to MFs.

Finally, also Russell (2013) argues in favor of the ETFs. He provides several arguments, such as, the commonly known fact that ETFs have an average expense ratio of 0.44% p.a., as opposed to MFs whose total costs can account to as much as 2.5% p.a. Additionally he claims that ETFs are more transparent in terms of their holdings and that it is much easier for an investor to buy an ETF due to low costs per share. The common threshold to enter an MF is $10,000 (ibid.). All in all, the article lacks in-depth analysis about the rivalry between ETFs and MFs and the author has taken an ETF favoring stance.

2.3.2 ETFs Outperform MFs

Although a relatively old study regarding the ETFs and MFs, Delacoure (2001) concluded that ETFs do outperform MFs in the examined period (1993-2000). He also notes that ETFs might have additional diversification benefits, better price, and dividend tracking of the underlying securities. An important point, which the author elucidated, is that the study limits itself by the small sample size of ETF data at the time being and that the testing was conducted during high unprecedented economic growth in the U.S.

Narend & Thenmozhi (2016) discover that there is a seasonality in the tracking errors of the ETFs and that the tracking errors are amplified for ETFs that track emerging market indices. They also concluded that SPDRs are priced more efficiently than their closed-end MF counterparts are and that they would not be trading at economically significant discounts. After comparing different ETFs from Vanguard and Ishares to Vanguard MFs, they found no returns over the benchmark. It can be noted, though, that MF managers should lower their expense ratios if they do not perform well enough relative to their benchmarks.

Prather, Chu, Mazumder, and Topuz (2009) arrive at a similar conclusion as other authors (Zhou, 2004; Korn, 2013; Narend & Thenmozhi, 2016) that mutual fund managers fail to outperform their benchmarks consistently, which is a possible reason

for the emergence of passively managed funds with low expense ratios. Peters, Vale and McKay (2013) claim that ETFs have outperformed MFs over the past 20 years. Additionally, they state that MFs would tend to “erode” value relative to the market.

Another reason why MFs have been shunned by ETFs lately could be attributed to some of the scandals to which they, and more specifically, their managers have been a part of. Wolosky (2005) explains how investors were paying for fees without an awareness of the source. The author further argues, whether people will start moving more and more towards ETFs after these scandals and after the population in general, becomes more informed about the nature and performance of ETFs (ibid.). Although the article is quite dated, some of the ideas which it elaborates on are still relevant. Old scandals and bad reputation tends to persist for long periods even though those under bad reputation might have reconditioned themselves largely, as is the case with some MFs nowadays.

2.4. Disadvantages of ETFs

Huang (2001) explores some of the less eminent disadvantages of the ETFs. The author argues that diversification would be a factor, which affects, among other things, the transaction costs of ETFs by lowering them. The degree to which an ETF is diversified can have some influence on the bid-ask spreads. The results of the study indicate that most major costs in ETFs for the active traders would not only be the commissions but as well the bid-ask spreads. It is implied that they are less important for longer holding periods of the securities which is also called the “clientele effect” (ibid.). It is an important article, because it explains some of the less visible implications regarding ETFs and how their total expense ratios are formed. Thus, it is further implied that ETFs are not as perfect as was first thought.

2.4.1 ETFs Are Causing Problems

Schifrin (2016) analyzes some of the current trends in this trade article. Many people who invest in leveraged or inverse ETFs do not understand the way in which the so-called double or triple returns are calculated. The author states that while the investor should pay close attention to, among other things, the expense ratios, fees and the historical performance of an ETF, he/she should mainly worry about the tracking performance of his/her ETF relative to the benchmark. With the inception of actively

managed ETFs, the author speculates that tracking errors might increase and it might be harder to find an ETF, which does what it is designed to do.

A more skeptical and dreary picture is given by Huang (2016). He discovers that sometimes when an index that the ETF is tracking plummets, the ETF loses much more in value relative to how many basis points the index loses. He advises that a trade for an ETF should not be more than 1% of its daily volume. The author also states that investors should be skeptical when it comes to choosing their ETFs. This is the first article is skeptical towards choosing an ETF and it provokes the investor to question the strategies employed by ETFs to track indices.

The previous problem is supported by Carrel (2015) who wants investors to be more critical in choosing an ETF. The expense ratio should not be the only determining factor but only something to consider. More importance should be attributed to how the ETF is constructed, for example, the weightings assigned to the underlying securities (Carrel, 2015). The size of the ETF should also be considered according to Vandermarliere, Ryckebusch, Schoors, Cauwels, and Sornette (2017) who state that usually large ETFs perform better than small ones.

It is true that Investors should be more prudent with the choice of an ETF but while analyzing the anatomy of individual ETFs sounds plausible, it might appear to be very burdensome to the individual investor who does not necessarily have much time to choose each ETF carefully. Also, a noticeable trend in the literature seems to be that ETFs are converging towards an undesirable state, which could have the extent of reaching situations similar to previous crises.

2.4.2. “Toxic” ETF Classes

Meinhardt, Mueller and Schoene (2015) form a very interesting discussion regarding synthetic and physical ETFs. In short, the latter are comprised of highly liquid assets, which also allows for loaning assets. While the former are comprised of illiquid assets and are usually considered to have higher tracking errors compared to their physical counterparts. They conclude that synthetic ETFs are no more inferior to physical ones when fixed-income bearing ETFs are concerned. However, an alarming concern is raised, that is, the possibility that synthetic ETFs might undermine the whole financial

system due to increased systematic risk. This article has explained one of the potential problems regarding ETFs which is a relevant part for the discussion surrounding the subject.

A graver view, but close to the one by Meinhardt et al. (2015), is accorded by Newlands (2016), where he discusses how ETFs could, again, cause disruptions in the financial world due to huge and continuous net inflows year after year which have got even the Securities and Exchange Commission (SEC) worried. Newlands (2016) claims that the investors start using ETFs in ways, which deviate from their originally meant roles, that is, passive, buy and hold strategies. Instead, they are being used for short-term speculative trading in the form of, for example, inverse and leveraged ETFs, which are said to have already disrupted the markets on several occasions (ibid., 2016). Once again, concerns are raised on how ETFs might evolve to cause problems, which have been disregarded until now.

Most authors seem to be very positive regarding ETFs, however some of them provide interesting, perhaps, easily disregarded details about flaws or problematic practices taking place around ETFs (Carrel, 2015; Meinhardt et al., 2015; Newlands, 2016; Schifrin, 2016). Some implications concerning the effect of the bid-ask spreads on total ETF costs were uncovered at the start of the decade (Huang, 2001). Russell, Shekhar and Malhotra (2004) are concerned that only a relatively small proportion of ETFs, such as Standard and Poors Depositary Receipts (SPDRs) will continue growing, while the other more exotic ETF classes, such as commodity or leveraged ETFs, will be trading at smaller volumes, hence increasing their price volatility. On the other hand, it is generally considered that the more unorthodox ETFs deviate too much from their original mission; however, this is a question, which needs more time to develop. With the advent of actively managed ETFs, the whole competition among ETFs and MFs could take unprecedented turns.

2.5. ETFs and MFs Could Coexist

2.5.1. Investing into ETFs and MFs

Whether ETFs and MFs would be perfect substitutes to one another has been researched extensively (Parthemer, 2009; Agapova, 2011; Li, Klein & Zhou, 2012; Charupat & Miu, 2013). Agapova (2011) focuses on comparing the performance of ETFs and MFs, which follow the same benchmarks. The results indicate that ETFs and MFs are very close substitutes because the cash flows of ETFs affect the cash flows of MFs negatively, but still, they can cater to niche markets, such as, tax-exempt or -deferred investors (Agapova, 2011). The cash flows to ETFs have also increased during the period under which the data was analyzed, although, the decrease in MF cash flows can also be contributed to the overall growth of the fund industry (ibid.). Moreover, Li et al. (2012) argue that the introduction of ETFs has had a negative effect on the trading of closed-end mutual funds. However, there is a likelihood that open-end mutual funds and ETFs could be complementary to each other, instead of being perfect substitutes (Li et al., 2012). The growth of the fund industry might be important to investigate, hence the growth of ETFs and MFs should be studied unilaterally.

Charupat and Miu (2013) introduced another interesting comparison. The authors argue that even though ETFs and MFs have conventionally been regarded as substitutes to one another they could be complementary instead. They discovered that the SPDRs, which are one of the oldest ETFs available, are underperforming the Vanguard 500 index fund on a pre-tax basis. When looking at the after-tax performance, the SPDR does outperform the Vanguard 500 index fund. On the other hand, some other findings suggest that the difference between the performance of an ETF and a corresponding MF would be statistically insignificant. These findings complicate the comparison performance of these two investment vehicles. This article has high relevance to the study due to the controversial findings it reports regarding the ETF and MF rivalry.

Romero-Perez (2010) findings support Charupat and Miu's (2013) research by claiming that ETFs and open-end MFs would be complementary in "side-by-side" management. Again, another view which suggest that perhaps it would be wise to invest in both vehicles simultaneously. Clements (2003) arrives at the same conclusion that it should

not be the case of choice between either an ETF or an MF but to split the investment sum across both. This is due to small sums requiring bigger commission fees relative to the amount invested when buying or selling stocks of ETFs, as opposed to investing into MFs when at the beginning stage of the investment life of an individual person and opting to transfer the money into ETFs when the amount has grown larger.

A comparison between the differences of ETF and MF expenses, tracking ability and tax implications was conducted by Dajczman (2008). The trading flexibility of ETFs is claimed to be superior, although, the commission fees and bid-ask spreads to the broker can mitigate the benefits of trading. The author finds out that many competitive domestic indices tracked by popular MFs can, in fact, have lower expense ratios than similar ETFs and that now many MFs have improved their tax structure to be more in term with prevailing investor sentiment, which has lowered the overall costs of modern MFs. A common realization is that MFs can appeal to investors with tax-deferred accounts, whereas ETFs would bring no additional benefits to those type of investors (ibid). Additionally, Dagher (2011) speculates that while not all ETFs are as tax efficient as proposed, tax managed MFs could become popular in the future, even though, they do not offer the same diversification innovations. A possible inference is that due to the nature of ETFs deferring capital gains payments to later dates, they are better for investors with a long-term investment horizon, as opposed to MFs, which could appeal to shorter-term investing.

Lastly, thorough performance analysis of MFs was conducted by Zhou (2004). The findings resulted in the conclusion that the more focused an MF is, that is, not over investing in too different securities or sectors, the better and bigger are the abnormal returns (ibid.). Even though the study barely relates to the scope of the thesis it is important to take into consideration because it can give the individual investors better understanding when gauging the performance of different MFs. The findings are also quite new: if it is true that the scope and overall investment objective of the MF manager depends on his/her performance, then there is a greater chance that MFs will coexist with ETFs because of them exhibiting essentially completely different strategies and results.

2.5.2 ETF and MF Cash Flows

ETF cash flows is an area in the ETF literature which has been studied less. Clifford, Fulkerson and Jordan (2014) explore the possibility that the cash flows diverted to ETFs would lend themselves to same reasons as cash flows of an MF. They also claim that ETF and MF investors resemble one another in the sense that a fund of a larger scale with a higher expense ratio would drive investors away. However, some flows cannot be explained due to the similarity of these two funds, because many investors choose to invest in an MF for “return chasing”, as opposed to an ETF investor which mainly seeks to achieve similar returns to benchmarks. The article states that new ETFs reduce the cash flows in most of the existing MFs and as well in some ETFs (Guedj & Huang cited in Clifford et al., 2014). Due to this phenomenon, it can be even more difficult to understand the cash flows of MFs and ETFs. The article provides a new perspective to how the fund flows operate over these two very similar investment vehicles.

2.5.3 Contradicting Opinions

Strauss (2006) states in his trade article different views on whether ETFs will replace MFs in the future. He acknowledges that ETFs would never replace MFs because 401(k) platform pension investors do not gain any advantage from them, on the contrary, they reduce value due to brokerage commissions. On the other hand, some top executives state that ETFs will soon replace MFs. It is interest to note the opinionated views of different stakeholders, and to realize that MFs and ETFs are very different both as a type of investment strategy and as to what audiences they cater.

A more neutral point of view to the ETF and MF rivalry is provided by Fabian (2014). He starts with indicating that ETFs are commonly less expensive in terms of their fees and more transparent than MFs, as has been concluded many times before. However, he argues that ETFs would be hard to distinguish from one another and that the ability to get in and out of the market, via buying and selling the ETFs on the exchanges could have negative effects on some investors. On the other hand, there are currently certain strategies employed by the MFs, which the ETFs have not replicated. It is why the author concludes that the individual investors should recognize the possibility of

investing into both at the same time or at least being cognizant when an ETF or an MF would be a better variant for the given circumstances.

There seem to be mixed opinions among most of the scholars, whether ETFs would be replacing MFs or if a possible coexistence would be plausible. A large part of the researchers state that ETFs usually outperform their MF counterparts because of, for example, intraday trading which appeals to a larger audience, transparency regarding assets under management, lower expense ratios and deferred capital gains taxing. However, ETFs have their limitations and disadvantages and it could prove difficult to produce definitive answers regarding their coexistence. Next different methodologies employed by various researchers will be compared and analyzed.

2.6. Different Analysis Methods

Sharifzadeh and Hojat (2011) take a more critical stance regarding the previous researches in the ETF literature. They criticize some of the older research as being, perhaps, overly parametric. They apply a Wilcoxon signed rank test to examine, whether, ETFs had better results than similar MFs during 2002-2010. They found that there is no statistical evidence of ETFs outperforming MFs. The sample period was during the financial crisis; therefore, it should be noted that it could influence the results.

A very systematic way of choosing between ETFs and MFs was proposed by Prather et al. (2009) who claims to have devised a model which could make comparisons between them easier and to choose the investment path more suitable to the individual investor. Additionally, they discovered that through different models, such as the single index model, the expense ratios for ETFs and MFs differ substantially to the point where one alternative is more appealing than another. Their article provides insight into critically evaluating the expense ratio figures reported by funds. The choice between an ETF and MFs is not as transparent as it may seem.

Most researchers, though, used traditional OLS or SUR regression analyses (Agapova, 2011; Romero-Perez, 2010; Levy & Lieberman, 2013; Charupat & Miu, 2013; Buetow & Henderson, 2013; Delcoure, 2001; Clifford et al., 2014). These regressions are relatively easy to conduct and the results tend to be straightforward. Less commonly utilized

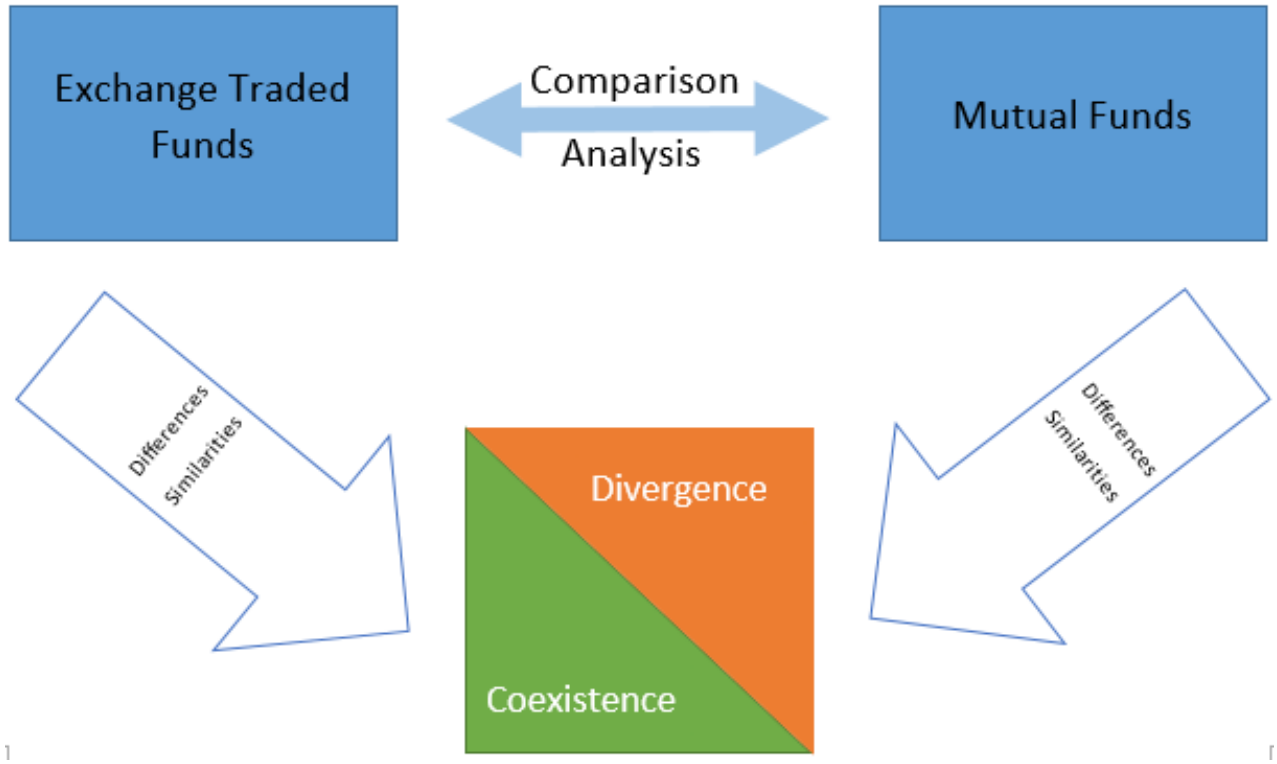
methodologies comprise of CRSP and N-SAR sampling, single factor model, time-series cross-section regression, panel regression analysis, sub periods, MacBeth, Four Factor Alpha and multivariate regressions (Zhou, 2004; Narend & Thenmozhi, 2016; Huang, 2001; Clifford et al., 2014; Delcoure, 2001). Regardless of the methodologies, the results are usually either in favor of ETFs outperforming MFs or that there is no statistical evidences regarding an outperformance of ETFs. This is due to different ETFs and MFs and the differing periods which were analyzed.

2.7. Ending Thoughts

It is important to realize that, perhaps, MFs and ETFs can coexist due to differences mentioned by various authors (Parthemer, 2009; Romero-Perez, 2010; Agapova, 2011; Li et al., 2012; Charupat & Miu, 2013). The choice of investing into an ETF as opposed to an MF should perhaps be based on the objective of the individual investor. Some investors are return chasers, that is, they hope that they could get abnormal returns relative to the market. On the other hand, passive investors might choose a regular index tracking ETF or an Index MF with small expense ratios and, therefore, minimal tracking errors. What has been happening lately, is the transformation of the MF into an ETF. MFs have started to lower their expense ratios. Consequently, MF managers are trading less frequently the underlying securities to minimize the costs incurred by the investor.

Further research should be considered on whether MFs should stay to incur abnormal returns at a higher cost, or if, to mold into entity resembling an ETF. The prevailing trend is the comparison of ETFs and MFs as if they would be substitutes. However, the real situation could be more different: the MFs mostly compete in “beating the market” sector and ETFs have originally been in the “mirror the market” segment. That is why, perhaps, the comparison of these two investment vehicles is not suitable. What is uncertain, though, is that the financial community is unaware of the evolution of ETFs and MFs. The possibility of a “bubble” with the ETFs should not be disregarded either. Since ETFs are still a new class of assets, the world is still relatively inexperienced with what implications they might posit. It would not be unfounded to speculate whether there is a new crisis appearing soon and if ETFs will play a major role in it.

2.8 Theoretical Framework



3. DATA

The data was extracted from the survivorship bias free DataStream database and the returns are total return indices. All the data was collected as daily observations. The data consists of observations from three different geographical regions:

I) funds from the United States which follow the S&P 500 index and the total stock market indices Russell 3000 and Russell 1000

II) funds from the United Kingdom which follow the FTSE 100 index, and

III) world funds which follow the MSCI World Index.

All funds are passively managed and there should theoretically be no differences with in their returns, neither should they have significant alphas relative to their benchmark, however the scientific curiosity prompts to analyse for possible differences.

Additionally, the monthly MF data for the three different Finnish MFs over the past five years was collected from Bloomberg.com. The MF data can be found in the Appendix section. MF in Appendix A is the Seligson-Finland index class A fund which invests in the Finnish equity markets. MF in Appendix B is the Seligson-NA index class A fund which invests in the North American equity markets. MF in Appendix C is the OP-Pienyhtiöt class A fund which invests in small cap companies located in Finland. The funds should have theoretically incurred lower cash flows if the ETFs would be more attractive competitors. Additional reasons are not excluded.

Table 1. Summarizes the ten ETFs and the ten Index Funds, providing the symbol, the inception date and the expense ratio, which have been collected from Morningstar.com. The funds which belong in the same family, that is following the same benchmark, have similar sample lengths. The observation of all the samples ends on December 31, 2016.

Table 1: Summary of North American, European and World ETFs and Index Funds

Name	*Symbol*	*Benchmark*	*Inception Date*	*Expense Ratios*
Exchange traded funds				
North American-equity indices				

S&P 500	SPY	S&P 500 Index	22.1.1993	0,10 %
S&P 500	IVV	S&P 500 Index	15.5.2000	0,04 %
S&P 500	VOO	S&P 500 Index	7.9.2010	0,05 %
North American-total market indices				
Russell 3000	IWV	Russell 3000 Index	26.5.2000	0,20 %
Russell 3000	VTHR	Russell 3000 Index	22.9.2010	0,15 %
Russell 1000	IWB	Russell 1000 Index	19.5.2000	0,15 %
Russell 1000	VONE	Russell 1000 Index	22.9.2010	0,12 %
European-equity indices				
FTSE 100	ISF	FTSE 100 Index	27.4.2000	0,07 %
FTSE 100	XDUK	FTSE 100 Index	28.11.2012	0,09 %
World-equity indices				
World Index	ACWI	MSCI WORLD Index	26.3.2008	0,33 %
World Index	VT	MSCI WORLD Index	24.6.2008	0,11 %
		ETFs' average expense ratio: 0.13%		

Index funds				
North American-equity indices				
S&P 500	VFINX	S&P 500 Index	31.8.1976	0,16 %
S&P 500	VFIAX	S&P 500 Index	13.11.2000	0,05 %
S&P 500	SWPPX	S&P 500 Index	19.5.1997	0,09 %
S&P 500	FUSEX	S&P 500 Index	17.2.1988	0,10 %
North American-total market indices				
Russell 3000	VRTTX	Russell 3000 Index	1.11.2010	0,08 %
Russell 1000	VRNIX	Russell 1000 Index	15.10.2010	0,08 %
Russell 1000	SNXFX	Russell 1000 Index	2.4.1991	0,05 %
European-equity indices				
FTSE 100	GB0000412477.L	FTSE 100 Index	30.9.1994	0,25 %
FTSE 100	IIFPX	FTSE 100 Index	17.8.2009	0,42 %

World-equity indices				
World Index	VHGEX	MSCI WORLD Index	14.8.1995	0,51 %
		Index funds' average expense ratio: 0.18%		

Index funds do not exhibit surmountable expense ratios compared to ETFs. The average ETF expense ratio is 0.13% while the Index Funds have 0.18%.

4. METHODOLOGY

The analysis methods are: Regression, Sharpe Ratio and Tracking Error. Additionally, the fund returns, risk (standard deviation) and risk over return (coefficient of variation) will be tested. The central methodology being the Regression, which will be explained shortly.

4.1. Data Statistics

The average daily returns are calculated as logarithmic returns using the equation:

$$r_1 = log(p_1 / p_0)$$

where r_1 is the average daily return of day 1, p_1 is the price at day 1 and p_0 is the price at day 0. The returns on the indices are calculated using daily adjusted closing prices. The risk is the standard deviation of the returns of the ETFs and the Index Funds. The risk over return is calculated by dividing the mean standard deviation of the returns by the average return.

4.2. Regression Analysis

The Regression analysis is implemented as used by Rompotis (2009) that will be used to examine the beta, alpha and the R-squared of the different fund returns. R-squared measures the extent to which fund returns are driven by the market, that is, the underlying index of the fund. The regression analysis is used as a tool to examine the fund returns vis-à-vis the index returns and to observe, whether there are statistical evidences of congruence regarding the returns. The regression analysis aims to explain the two variables: the independent variable, the index return and the

dependent variable, the fund return. The regression model is employed using equation:

$$R_{pt} = \alpha + \beta_i R_{bt} + \varepsilon_{pt}$$

Where R_{pt} is the return of the ETF or the Index Fund, R_{bt} is the return of the benchmark and ε_{pt} is the error factor (ibid.). The alpha, intercept coefficient (α) is the abnormal excess return that a fund could achieve above the benchmark's return. Alpha should theoretically be statistically insignificant due to the passive management strategy of both the ETFs and the Index funds. Finally, the beta (β) coefficient measures the systematic, also called market risk, to which the ETF or the index fund is exposed. It also indicates the strategy employed by the fund. If the beta is less than 1, the fund engages in more conservative investment techniques. Conversely, the beta above 1 indicates that the funds have an aggressive approach. A beta of 1 indicates that the fund returns move in concordance with the underlying market index. 1% change in the market translates to a 1% change in the funds returns. Consecutively a beta of -1% would reflect an inverse relationship with the underlying market index. However, that should not be the case with the funds analysed in this paper. The beta will give further information about the replication strategy of the fund, which is assumed to be a full replication strategy for the funds in this case.

4.3. Sharpe Ratio

The Sharpe ratio measures excess returns relative to risk. The ratio seeks to discover whether any of the examined funds would have significant differences in their risk adjusted returns. The higher the Sharpe ratio is, the better is the adjusted risk per return. The Sharpe ratio is defined as:

$$\frac{E[R_d - R_f]}{\sigma_d}$$

Where $E[R_d - R_f]$ is the expected return of R_d (return on fund) less the R_f (average return on 10-year US Treasury Bill) and σ_d is the standard deviation of the fund.

4.4. Tracking Error

The Tracking error shows the portion of an indices returns that deviate from the return of the benchmark. The Tracking error is defined as the Simple Tracking Error:

$$\mu_i - \mu_d$$

where μ_i is the average return for the index and μ_d is the average return for the fund. If the result is positive, it indicates that the funds was unable to beat the underlying index. Conversely, if the result is negative, it represents a return over the benchmark for the given fund.

5. FINDINGS

5.1. Empirical Results

5.1.1. Return Data

Table 2. shows the return, risk and risk to return ratio of the funds. According to the results the average daily return of the ETFs is a positive 4 basis points (bps). The average return of the index is also 4 bps. The t-test which was exercised on the difference between ETF and index returns is -1.00 and is insignificant given any confidence level. The maximum return is 5 bps and is attributed to the S&P 500 ETFs and the Russell total stock market ETFs. The minimum return is 1bp and it belongs to the ACWI ETF.

Concerning risk, the average for ETFs is 0.97 bps and 0.95 bps for the index. The t-test is 0.60 and is insignificant at all confidence levels. The maximum risk is 1.41 bps and is exhibited by ACWI. The minimum risk is 0.90 bps and attributable to ISF. The oddity is that the highest risk figure belongs to ACWI which has the lowest return. This is in contradiction with the common knowledge that, in order for an investor to achieve greater returns, the greater the risk one must bear. The risk to return ratio is 33.09 bps on average. Even though the average risk to return ratio of the index is 24.88 bps, it is not statistically significant at any confidence level given a t-test of 0.98. The best risk to reward, that is, the smallest ratio, is found on all the S&P 500 ETFs and on VTHR, the value being 18.40. The poorest risk to reward ratio is attributed to ACWI.

Index funds have identical returns compared to ETFs. Table 2 shows the average returns are congruent at 0.04 bps with no statistical significance regarding the index. The average risk of the Index Funds is 2 bps higher than the one on ETFs. On the contrary, the index funds have better risk to reward ratios on average. The risk to reward ratio of Index Funds is 25.34 whereas ETFs have 33.09. However, that is still not statistically significant. Furthermore, Index risk to reward ratio is closer to the average index risk to reward ratio, 24.88. The findings are in agreement with Rompotis (2009) who did not find significant differences in the returns between ETFs and Index Funds.

Table 2: Return and risk

ETF symbol	*Benchmark*	*Return*		*Risk*		*Risk/return*		Obs.
		ETF	*Index*	*ETF*	*Index*	*ETF*	*Index*	
Exchange traded funds								
SPY	S&P 500 index	0,05	0,05	0,92	0,93	18,40	18,60	1649
VOO	S&P 500 index	0,05	0,05	0,92	0,93	18,40	18,60	1649
IVV	S&P 500 index	0,05	0,05	0,92	0,93	18,40	18,60	1649
ISF	FTSE 100 index	0,03	0,03	0,90	0,90	30,00	30,00	1055
XDUK	FTSE 100 index	0,03	0,03	0,91	0,90	30,33	30,00	1055
IWV	Russell 3000 index	0,05	0,05	0,94	0,96	18,80	19,20	1637
VTHR	Russell 3000 index	0,05	0,05	0,92	0,96	18,40	19,20	1637
IWB	Russell 1000 index	0,05	0,05	0,93	0,94	18,60	18,80	1637
VONE	Russell 1000 index	0,05	0,05	0,93	0,94	18,60	18,80	1637
ACWI	MSCI WORLD index	0,01	0,02	1,41	1,14	141,00	57,00	2285
Average	-	0,04	0,04	0,97	0,95	33,09	24,88	-
Max	-	0,05	0,05	1,41	1,14	141,00	57,00	-
Min	-	0,01	0,02	0,90	0,90	18,40	18,60	-
T-test	-	-1,00		0,60		0,98		

Table 2. (cont'd)

Fund symbol	*Benchmark*	*Return*		*Risk*		*Risk/return*		Obs.
		Fund	*Index*	*Fund*	*Index*	*Fund*	*Index*	
Index funds								
VFINX	S&P 500 index	0,05	0,05	0,93	0,93	18,6	18,6	1649
VFIAX	S&P 500 index	0,05	0,05	0,93	0,93	18,6	18,6	1649
SWPPX	S&P 500 index	0,05	0,05	0,92	0,93	18,4	18,6	1649
FUSEX	S&P 500 index	0,05	0,05	0,93	0,93	18,6	18,6	1055
GB0000412477.L	FTSE 100 index	0,03	0,03	0,90	0,90	30	30	1055
IIFPX	FTSE 100 index	0,00	0,03	1,06	0,90	-	30	1637
VRRTX	Russell 3000 index	0,05	0,05	0,96	0,96	19,2	19,2	1637
VRNIX	Russell 1000 index	0,05	0,05	0,96	0,94	19,2	18,8	1637
SNXFX	Russell 1000 index	0,05	0,05	0,95	0,94	19	18,8	1637
VHGEX	MSCI WORLD index	0,02	0,02	1,33	1,14	66,5	57	2285
Average		0,04	0,04	0,99	0,95	25,34	24,82	-
Max		0,05	0,05	1,33	1,14	66,50	57,00	-
Min		0,00	0,02	0,90	0,90	18,40	18,60	-
T-test		-1,00		1,59		-		

To conclude, an investor should be relatively unconstrained in choosing the investment vehicle. The choice can be readdressed to other specifications such as their preferences, investment horizon, tax structure or time allocation. However, these funds cannot account for the whole amount of Index Funds and ETFs, which are available to the investors. An implication to this procedure is also the use of daily

data instead of monthly and the all the funds were studied in a post-crisis period of 2010-2016 where the economic climate has been driven, at times, heavily by corporate buybacks and cash outflows from funds, mutual and exchange traded. Bonds have become gradually more attractive to individual investors and along with the growing interest rates, there will possibly be a surge in country specific bonds.

5.1.2 Regression

Table 3. presents the results of the regression. For ETFs, the average intercept coefficient, alpha, is zero and is insignificant given any confidence level. In addition, the alphas are insignificant for any ETFs as well. These findings are in concordance with the fact that the indices do not generate any returns above the benchmark. In this research, the returns were not significantly below the benchmark. Previous research had found that fund returns differed by on average a negative 2bps from the index returns. This can be attributed to the very small expense ratios.

The average beta value of the ETFs is also not significantly different from unity; thus, they react to market conditions identically to how their benchmarks react. However, the average R-squared differs from unity by 5 bps and it is statistically significant given a 95% confidence level. This can potentially indicate that the ETF returns are not fully driven by the underlying index. The deviation might be caused by selling or buying of the underlying assets for the less liquid (less liquid compared to the ones studied) ETFs which follow the World Index, thus it is not a conclusion for all funds. Overall, the full replication strategy is best employed by the S&P 500 tracker ETFs.

Table 3: Regression analysis results

ETF symbol	*Benchmark*	*Alpha*	*T-test*	*Beta*	*T-test*	R-squared	Obs.
Exchange traded funds							
SPY	S&P 500 Index	0.00	0.08	1.00	811.11	1.00	1649
IVV	S&P 500 Index	0.00	0.08	0.99	610.23	1.00	1649
VOO	S&P 500 Index	0.00	0.25	0.99	626.23	1.00	1649
IWV	Russell 3000 Index	0.00	-0.16	0.99	698.18	1.00	1637
VTHR	Russell 3000 Index	0.01	0.55	0.88	92.08	0.84	1637
IWB	Russell 1000 Index	0.00	0.19	0.98	630.59	1.00	1637
VONE	Russell 1000 Index	0.00	0.19	0.97	189.27	0.96	1637
ISF	FTSE 100 Index	0.00	-0.43	0.99	279.24	0.99	1055
XDUK	FTSE 100 Index	0.00	-0.35	0.99	159.17	0.96	1055
ACWI	MSCI WORLD Index	0.00	-0.63	1.15	119.97	0.87	2285
VT	MSCI WORLD Index	0.00	-0.48	1.16	109.66	0.84	2285
Average	-	0.00	-0.07	1.01	393.25	0.95	-
T-test	-	1.00	-	0.34	-	-2.43	-

Fund symbol	*Benchmark*	*Alpha*	*T-test*	*Beta*	*T-test*	R-squared	Obs.
Index funds							
VFINX	S&P 500 Index	0.00	-0.89	0.99	12846.02	1.00	1649
VFIAX	S&P 500 Index	0.00	-1.02	0.99	9609.36	1.00	1649
SWPPX	S&P 500 Index	0.00	-0.10	0.99	885.92	1.00	1649
FUSEX	S&P 500 Index	0.00	-2.37	1.00	1558.03	1.00	1649
VRTTX	Russell 3000 Index	0.00	-2.16	1.00	7970.03	1.00	1637
VRNIX	Russell 1000 Index	0.00	-1.43	1.02	981.85	1.00	1637

Table 3 (cont'd)

SNXFX	Russell 1000 Index	0.00	-0.62	1.01	659.39	1.00	1637
GB0000412477.L	FTSE 100 Index	0.01	0.39	0.69	31.52	0.49	1055
IIFPX	FTSE 100 Index	0.00	-1.04	0.85	34.23	0.53	1055
VHGEX	MSCI WORLD Index	-0.01	-0.61	1.10	133.41	0.89	2285
Average	-	-0.01	-0.61	1.10	133.41	0.89	-
T-test	-	-0.67	-	-1.00	-	-1.69	-

For Index Funds, the alpha value is not statistically significant on average. The Index Funds have no abnormal returns relative to the market. Furthermore, they have similar alphas as their ETF counterparts. None of the beta values are neither significantly different from unity on average. Finally, the R-squared of the Index Funds is not significantly different from 1, thus their returns can be explained 100% by the market returns. It is interesting to note that the Index Funds did not exhibit statistically significant R values, such as the ETFs. The lowest R-squared values were found on the FTSE 100 tracking funds and the highest were attributed to the S&P 500 and Russell index trackers.

The results would indicate that the replication strategies are mainly similar regardless of the investment vehicle. ETFs and Index Funds both offer similar returns as their underlying indices according to these results. The regression components: beta and alpha, were identical for both funds.

5.1.3 Sharpe Ratio and Tracking Error

The results of the Sharpe ratio and Tracking error analysis are summarized in Table 4. The highest Sharpe ratio, 0.6144 is achieved by the ETF VOO, which replicates the S&P 500 index. The lowest being 0.0754%, belonging to XDUK, which follows the FTSE 100. On average, the ETF Sharpe ratio is 0.4363. The average Sharpe Ratios have statistical significance in their mean differences given a 95% confidence level, thus not all ETFs provide the same risk adjusted returns. The largest tracking error is achieved by the ETF ACWI with a value of 0.94%, which tracks the MSCI World Index. While the lowest is achieved by the ETF VOO with 0.04%. On average, the tracking error is 0.30% and is statistically significant at the 95% confidence level. It can be noted that due to that, ETFs do deviate in their index replicating when compared to each other. Not all ETFs exhibit the same amount of tracking error.

Table 4: Summary of Sharpe Ratio and Tracking Error

ETF symbol	*Benchmark*	*Sharpe*	*TE*	*Obs.*
Exchange traded funds				
SPY	S&P 500 Index	0.6107	0.11	1649
IVV	S&P 500 Index	0.6107	0.07	1649
VOO	S&P 500 Index	0.6144	0.04	1649
IWV	Russell 3000 Index	0.5649	0.17	1637
VTHR	Russell 3000 Index	0.5757	0.26	1637
IWB	Russell 1000 Index	0.5950	0.12	1637
VONE	Russell 1000 Index	0.5922	0.13	1637
ISF	FTSE 100 Index	0.0892	0.28	1055
XDUK	FTSE 100 Index	0.0754	0.48	1055

ACWI	MSCI WORLD Index	0.2338	0.94	2285
VT	MSCI WORLD Index	0.2368	0.71	2285
Max	-	0.6144	0.94	-
Min	-	0.0754	0.04	-
Average	-	0.4363	0.30	-
T-stat	-	6.41	3.40	-

Fund Symbol	*Benchmark*	*Sharpe*	*TE*	*Obs.*
Index fund				
VFINX	S&P 500 Index	0.6033	0.15	1649
VFIAX	S&P 500 Index	0.6110	0.04	1649
SWPPX	S&P 500 Index	0.6095	0.09	1649
FUSEX	S&P 500 Index	0.5846	0.43	1649
VRTTX	Russell 3000 Index	0.5710	0.02	1637
VRNIX	Russell 1000 Index	0.5637	0.31	1637
SNXFX	Russell 1000 Index	0.5700	0.24	1637
GB0000412477.L	FTSE 100 Index	0.0866	0.34	1055
VHGEX	FTSE 100 Index	0.2921	-0.09	2285
Max	MSCI WORLD Index	0.6110	0.43	-
Min	-	0.0866	-0.09	-
Average	-	0.4364	0.17	-
T-stat	-	5.38	3.00	-

IIFPX *was excluded because the results of the Sharpe ratio and Tracking error* were outliers compared to funds following similar indices.

For Index Funds, the highest Sharpe ratio, 0.6110 is achieved by VFIAX, the admiral class Index Fund from Vanguard, which follows the S&P 500. The lowest Sharpe ratio is attributed to GB0000412477.L, HSBC's FTSE 100 tracker, with 0.0866. The

average Sharpe ratio is 0.4364. The mean of the ratios is statistically significant at the 95% confidence level, thus there are relevant differences in choosing an Index Fund over another. The tracking error was highest for FUSEX, Fidelity's S&P 500 tracker, with 0.43%. The lowest tracking error, -0.09%, was exhibited by VHGEX, Vanguards MSCI World index tracker. In other words, it was the only fund that was could beat the index. It could be attributed to the fact that its beta was 1.10 relative to the index and the R-squared was 0.89, therefore it does not employ a full replication strategy as is stated in the fund description. Finally, the average tracking error is 0.17% and it is statistically significant given a 95% confidence level. Given that, the Index Funds also exhibit tracking errors even though their returns were identical to their underlying.

5.2 Mutual Fund Cash Flows

Appendix A. shows the cumulative cash flows for Seligson-Finland class A fund. The cumulative cash flows have increased 26 times from March 2012 until January 2017. The same trend can be seen with the Seligson-NA class A and OP-Pienyhtiöt class A funds as well increasing 84 and 120 times respectively by cash inflows since February 2012. The mutual funds have not incurred a decrease in cash flows in Finland, even though, exchange traded fund investing and knowledge has grown significantly during the same period.

The literature suggested that mutual funds will eventually cease to exist due to mutual funds usually having higher expense ratios and more visible and invisible fees associated with them. The Finnish mutual funds seem to contradict this thought. The mutual fund industry seems to live separately of the exchange traded fund industry, which is a sign that it could coexist alongside ETFs. Perhaps when the information will be more widespread and the differences of ETFs more apparent, will mutual funds start to experience an increase in cash outflows. Although, that might not be the case since many factors determine, whether an investor will purchase a mutual fund or an ETF.

6. DISCUSSION AND ANALYSIS

Firstly, Index Funds and ETFs have no statistically significant differences in average, daily, fund returns. Also, the risk exhibited by both vehicles was overall uniform. Thus, the creation process explained by Buetow and Henderson (2012) does not

change the composition of exchange traded funds fundamentally that it would deviate from its underlying assets. However, the funds analyzed were all using physical replication, that is they own all their underlying.

Secondly, both fund types did not show statistically significant alphas. A finding which proves that the funds do not seek to outperform their underlying. The betas and the R-squared values were significantly close to unity in most cases, thus the remaining few are outliers. The funds do implement a full replication strategy and the returns are driven by the markets. The findings suggest that the returns are identical to the underlying benchmark. It is noteworthy because the fund returns are congruent to the index returns, however, the funds do also simultaneously exhibit tracking errors. This would require more in-depth research in the fund returns.

Thirdly, Sharpe ratios and Tracking errors exhibited strong deviations for both funds. Most notably, the Sharpe ratios were very different for index funds in the FTSE 100 family when compared with each other. The Tracking error was on average 0.13% higher for exchange traded funds, but it has to be taken into consideration that it was a simple tracking error calculation, which does not necessarily provide enough conclusive information. Finally, the average expense ratios were 13 bps for ETFs and 18 bps for Index Funds. According to this sample of funds, ETFs would be less expensive than Index Funds. One reason for the recent ETF proliferation are also the lower ETF expense ratios.

The findings suggest that the funds do have tracking errors, even though the returns seemed to be identical with the underlying benchmarks. The tracking errors were calculated using the simple method, thus they cannot be interpreted as conclusive results. The Sharpe ratios were the highest for indices following the S&P 500, which means that they have the most optimal risk and return combination of all the examined funds.

According to the results, ETFs and Index Funds following the same indices would be interchangeable. The investors incur the same returns, risks and tracking errors regardless of the vehicle. The differences are more notable when compared with funds following different indices. Furthermore, it must be considered that exchange traded funds offer a more accessible and affordable solution. Tax-wise, ETFs are taxed when the owner decides to liquidate them, as opposed to index funds where

investors can incur tax payments and trading fees when the fund managers need to sell the worst performing stocks. Personal investor preferences will contribute to choosing an investment vehicle.

7. CONCLUSIONS

7.1 Main Findings

I) ETFs and Index Funds provide similar returns, both risk adjusted and unadjusted. They exhibit almost identical standard deviations, thus one option is not risker than the other. They also follow the underlying indices congruently. A visible trend is that the less popular the indices are the higher their deviation in tracking and returns, compared to major and widely traded indices such as the S&P 500 or the Russell 3000 according to the results. However, when comparing the results of ETFs and Index funds from same index classes, the results were identical.

II) Mutual fund cash inflows have grown exponentially over the period of five years with surges in the inflows monthly. This may suggest that ETFs do not have an immediate effect on the popularity of conventional mutual funds.

III) ETFs and mutual funds can coexist as was argued by Agapova (2009). Their relationship is an independent one. Even though they would superficially seem as if accomplishing the same purpose, it does not indicate that they compete directly. This means that mutual funds will possibly not be replaced by ETFs, as was indicated by many scholarly discourses. Different tax implications and investment horizons due contribute even further for the existence of both investment vehicles.

7.2 Implications for International Business

From the perspective of investors seeking diversified portfolios and due to the similarity in overall performance of ETFs and Index Funds, the investors can possibly freely choose exchange traded funds over mutual funds or vice versa. For example, residents outside the United States are usually not allowed to invest in mutual funds. ETFs offer a simple and very similar alternative for investors who wish to acquire foreign stock market indices or penetration into difficult to invest sectors, such as the Chinese housing market. Also, because ETFs and Index Funds are both identical according to the study, corporate investors could potentially save money, time and effort, for example in contributing monthly pension savings for their employees.

7.3. Research Problem Specifications and Limitations

The research problem addresses the current situation where two investment vehicles exist for the same purpose, to passively follow an index. Due to the existence of similar instruments, the research wanted to discover whether there is a difference in their tangible results, such as the returns or the risk. The research problem is limited to passively managed funds only and theoretically there should be no differences between them. However, previous research and scholarly discourse addresses critical insight regarding the superiority of one fund type over another, and that ETFs would have provided slightly better returns. The research problem is also limited to quantitative analysis. To better understand this topic and their inherent differences, a qualitative approach should be developed in future research.

7.4 Suggestions for Further Research

Further research is required for analyzing the fund returns. The Regression model utilized has sometimes been criticized by many scholars, thus, other models such as the capital asset pricing model or the Fama and French model could be used to analyze the return series. In addition, the tracking error is limited to its simplicity in this paper and could be further analyzed with more complex tracking error models in order to get a more sophisticated picture. Furthermore, the whole process is excessively parametric and, thus, research using non-parametric models, such as the Wilcoxon signed rank test should be applied. Finally, the exchange traded funds and the index funds were limited to majorly traded indices which are highly liquid. Because of the efficient market hypothesis, funds tracking illiquid and more obscure indices and regions should also be tested.

Regarding the mutual fund cash flows, they were limited to three Finnish funds, hence fund cash flows from different countries could be also analyzed and three mutual funds cannot express the state of all the mutual funds of a country. The analysis systemic risk of exchange traded funds could also provide more insight in suggesting exchange traded funds over mutual funds through qualitative analysis methods. Finally, another untested research could be the difference in real bonds vis-à-vis exchange traded fund bonds in a similar research setting.

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APPENDICES

Appendix A.

Year	Months	Interim CF	Principal CF	Total CF	Cumulative CF
	Total	10,257,479	0	10,257,479	10,257,479
2012	February	0	0	0	0
2012	March	375,551	0	375,551	375,551
2012	April	1,215,628	0	1,215,628	1,591,179
2012	May	353,060	0	353,060	1,944,239
2012	June	0	0	0	1,944,239
2012	July	0	0	0	1,944,239
2012	August	0	0	0	1,944,239
2012	September	24,953	0	24,953	1,969,192
2012	October	46,097	0	46,097	2,015,289
2012	November	73,192	0	73,192	2,088,481
2012	December	0	0	0	2,088,481
2013	January	0	0	0	2,088,481
2013	February	0	0	0	2,088,481
2013	March	364,401	0	364,401	2,452,881
2013	April	1,247,035	0	1,247,035	3,699,917
2013	May	169,609	0	169,609	3,869,526
2013	June	0	0	0	3,869,526
2013	July	0	0	0	3,869,526
2013	August	12,792	0	12,792	3,882,318
2013	September	0	0	0	3,882,318
2013	October	0	0	0	3,882,318
2013	November	12,479	0	12,479	3,894,796
2013	December	63,433	0	63,433	3,958,229
2014	January	0	0	0	3,958,229
2014	February	0	0	0	3,958,229
2014	March	387,148	0	387,148	4,345,377
2014	April	1,107,552	0	1,107,552	5,452,930
2014	May	170,332	0	170,332	5,623,262
2014	June	0	0	0	5,623,262
2014	July	352,759	0	352,759	5,976,021
2014	August	0	0	0	5,976,021
2014	September	0	0	0	5,976,021
2014	October	0	0	0	5,976,021
2014	November	0	0	0	5,976,021
2014	December	86,505	0	86,505	6,062,526
2015	January	0	0	0	6,062,526
2015	February	0	0	0	6,062,526
2015	March	410,524	0	410,524	6,473,050
2015	April	1,257,601	0	1,257,601	7,730,650
2015	May	276,635	0	276,635	8,007,285

2015	June	0	0	0	8,007,285
2015	July	0	0	0	8,007,285
2015	August	36,878	0	36,878	8,044,162
2015	September	0	0	0	8,044,162
2015	October	0	0	0	8,044,162
2015	November	0	0	0	8,044,162
2015	December	0	0	0	8,044,162
2016	January	0	0	0	8,044,162
2016	February	0	0	0	8,044,162
2016	March	418,665	0	418,665	8,462,828
2016	April	1,322,247	0	1,322,247	9,785,075
2016	May	189,751	0	189,751	9,974,827
2016	June	7,045	0	7,045	9,981,872
2016	July	247,885	0	247,885	10,229,756
2016	August	10,339	0	10,339	10,240,095
2016	September	7,045	0	7,045	10,247,140
2016	October	0	0	0	10,247,140
2016	November	0	0	0	10,247,140
2016	December	10,339	0	10,339	10,257,479
2017	January	0	0	0	10,257,479
2017	February	0	0	0	10,257,479
2017	March	0	0	0	10,257,479

Appendix B.

Year	Months	Interim CF	Principal CF	Total CF	Cumulative CF
	Total	4,721,497	0	4,721,497	4,721,497
2012	February	55,274	0	55,274	55,274
2012	March	92,637	0	92,637	147,911
2012	April	52,945	0	52,945	200,857
2012	May	63,012	0	63,012	263,869
2012	June	95,957	0	95,957	359,826
2012	July	53,192	0	53,192	413,017
2012	August	58,091	0	58,091	471,108
2012	September	99,848	0	99,848	570,957
2012	October	54,891	0	54,891	625,848
2012	November	62,934	0	62,934	688,782
2012	December	122,979	0	122,979	811,761
2013	January	51,081	0	51,081	862,842
2013	February	53,939	0	53,939	916,781
2013	March	104,111	0	104,111	1,020,892
2013	April	58,228	0	58,228	1,079,120
2013	May	65,501	0	65,501	1,144,622
2013	June	104,146	0	104,146	1,248,768
2013	July	68,003	0	68,003	1,316,771

2013	August	59,250	0	59,250	1,376,022
2013	September	107,787	0	107,787	1,483,808
2013	October	60,298	0	60,298	1,544,106
2013	November	64,766	0	64,766	1,608,873
2013	December	102,362	0	102,362	1,711,235
2014	January	78,092	0	78,092	1,789,327
2014	February	60,606	0	60,606	1,849,932
2014	March	112,400	0	112,400	1,962,332
2014	April	64,997	0	64,997	2,027,329
2014	May	67,924	0	67,924	2,095,253
2014	June	113,813	0	113,813	2,209,066
2014	July	66,883	0	66,883	2,275,949
2014	August	64,247	0	64,247	2,340,196
2014	September	116,311	0	116,311	2,456,508
2014	October	65,906	0	65,906	2,522,414
2014	November	69,578	0	69,578	2,591,992
2014	December	111,681	0	111,681	2,703,673
2015	January	83,501	0	83,501	2,787,174
2015	February	67,155	0	67,155	2,854,329
2015	March	120,716	0	120,716	2,975,045
2015	April	70,150	0	70,150	3,045,195
2015	May	69,230	0	69,230	3114425.00
2015	June	124,936	0	124,936	3,239,361
2015	July	79,714	0	79,714	3,319,075
2015	August	64,517	0	64,517	3,383,592
2015	September	124,575	0	124,575	3,508,167
2015	October	69,292	0	69,292	3,577,460
2015	November	72,036	0	72,036	3,649,496
2015	December	118,782	0	118,782	3,768,277
2016	January	83,267	0	83,267	3,851,545
2016	February	65,879	0	65,879	3,917,423
2016	March	147,861	0	147,861	4,065,284
2016	April	67,224	0	67,224	4,132,508
2016	May	73,279	0	73,279	4,205,787
2016	June	127,824	0	127,824	4,333,612
2016	July	74,612	0	74,612	4,408,223
2016	August	75,075	0	75,075	4,483,299
2016	September	124,307	0	124,307	4,607,606
2016	October	34,722	0	34,722	4,642,329
2016	November	8,645	0	8,645	4,650,974
2016	December	589	0	589	4,651,563
2017	January	8,189	0	8,189	4,659,752
2017	February	40,436	0	40,436	4,700,188
2017	March	21,310	0	21,310	4,721,497

Appendix C.

Year	Months	Interim CF	Principal CF	Total CF	Cumulative CF
	Total	16,093,251	0	16,093,251	16,093,251
2012	February	133,250	0	133,250	133,250
2012	March	630,941	0	630,941	764,191
2012	April	2,006,442	0	2,006,442	2,770,633
2012	May	378,614	0	378,614	3,149,247
2012	June	0	0	0	3,149,247
2012	July	0	0	0	3,149,247
2012	August	0	0	0	3,149,247
2012	September	0	0	0	3,149,247
2012	October	0	0	0	3,149,247
2012	November	0	0	0	3,149,247
2012	December	0	0	0	3,149,247
2013	January	0	0	0	3,149,247
2013	February	74,750	0	74,750	3,223,997
2013	March	141,750	0	141,750	3,365,747
2013	April	2,552,898	0	2,552,898	5,918,645
2013	May	256,658	0	256,658	6,175,303
2013	June	0	0	0	6,175,303
2013	July	0	0	0	6,175,303
2013	August	0	0	0	6,175,303
2013	September	0	0	0	6,175,303
2013	October	0	0	0	6,175,303
2013	November	65,000	0	65,000	6,240,303
2013	December	270,000	0	270,000	6,510,303
2014	January	0	0	0	6,510,303
2014	February	74,750	0	74,750	6,585,053
2014	March	198,076	0	198,076	6,783,129
2014	April	2,288,749	0	2,288,749	9,071,878
2014	May	233,700	0	233,700	9,305,578
2014	June	0	0	0	9,305,578
2014	July	0	0	0	9,305,578
2014	August	0	0	0	9,305,578
2014	September	0	0	0	9,305,578
2014	October	0	0	0	9,305,578
2014	November	0	0	0	9,305,578
2014	December	0	0	0	9,305,578
2015	January	0	0	0	9,305,578
2015	February	32,500	0	32,500	9,338,078
2015	March	187,744	0	187,744	9,525,822
2015	May	15,300	0	15,300	12,546,887
2015	June	0	0	0	12,546,887
2015	July	0	0	0	12,546,887

2015	August	0	0	0	12,546,887
2015	September	0	0	0	12,546,887
2015	October	0	0	0	12,546,887
2015	November	0	0	0	12,546,887
2015	December	0	0	0	12,546,887
2016	January	0	0	0	12,546,887
2016	February	0	0	0	12,546,887
2016	March	684,554	0	684,554	13,231,440
2016	April	2,585,586	0	2,585,586	15,817,026
2016	May	270,600	0	270,600	16,087,626
2016	June	2,813	0	2,813	16,090,439
2016	July	0	0	0	16,090,439
2016	August	0	0	0	16,090,439
2016	September	2,813	0	2,813	16,093,251
2016	October	0	0	0	16,093,251
2016	November	0	0	0	16,093,251
2016	December	0	0	0	16,093,251
2017	January	0	0	0	16,093,251
2017	February	0	0	0	16,093,251
2017	March	0	0	0	16,093,251