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Risk-adjusted performances of small-cap mutual funds: Evidence from Emerging Markets

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ABSTRACT:
This thesis studies actively managed mutual funds globally that invest in small-cap equities in emerging markets. Rapidly growing demand for passive investment vehicles such as ETFs or index funds, and their increasing AUMs make the role of actively managed mutual funds more important. In addition, the capital flows toward passively managed instruments create opportunities for active portfolio management.

Since academic studies have focused on larger companies and funds with a focus on developed markets, there is room for additional studies in the niche of small-cap equities in emerging countries. This thesis exploits widely used metrics regarding risk-adjusted performance, such as Sharpe and Treynor’s ratio and Jensen’s alpha. Moreover, the Fama and French five-factor model is used in order to assess the performances of mutual funds. Moreover, regarding examining the activity levels of the funds, tracking error and active share metrics are used in order to evaluate if the portfolio managers have been active or not. The data of the research includes historical data of 28 mutual funds in addition to the benchmark during the period 3/2019-3/2024.

The result of the thesis indicates that net of fees, the mutual funds, on average, tend to underperform the dedicated benchmark on absolute terms. In addition, on a risk-adjusted basis, the funds underperform the benchmark on average regardless lower levels of risk. The results also indicate that the funds, on average, are highly active in relation to the benchmark, measured by tracking error and active share metrics. Even though the data is limited due to the research period of five years, the results provide a very interesting platform for further research since many of the sample funds in the dataset did not have a longer track record than the research period. In addition, the result of the study offers insightful and useful information for both private and institutional investors who are seeking opportunities to enhance their portfolio performance on risk-adjusted terms.

KEYWORDS: Portfolio management, mutual fund, small-cap, emerging markets, investments

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TIIVISTELMÄ:

Tämä tutkielma tarkastelee aktiivisesti hoidettuja osakerahastoja globaalisti, jotka sijoittavat pääasiallisesti pienyhtiöiden osakkeisiin kehittyvillä markkinoilla. Passiivisten sijoitustuotteiden kysynnän kasvun sekä kasvavat pääomat tekevät aktiivisten rahastojen roolista entistä tärkeämmän. Lisäksi pääomien siirtyminen indeksirahastoihin tarjoaa myös samalla mahdollisuuksia aktiiviselle salkunhoidolle.

Koska aiemmat tutkimukset keskittyvät lähinnä suuryhtiörahastoihin sekä kehittyneisiin markkinoihin, on akateemisessa maailmassa tilaa tutkimuksille pienyhtiörahastoista sekä kehittyvistä markkinoista. Tässä tutkielmassa hyödynnetään yleisesti käytettyjä riskikorjatun tuoton kuvastavia malleja kuten Sharpen ja Treynorin luku sekä Jensenin alpha. Lisäksi tutkielmassa käytetään Faman ja Frenchin viiden faktorin mallia tuottojen tarkasteluun. Rahastojen aktiivisuutta mitataan tracking error- sekä active share -lukuja hyödyntämällä. Aineisto koostuu 28 osakerahaston ja vertailuindeksin historiallisesta datasta ajanjaksolta 3/2019–3/2024.

Tutkimuksen tulokset osoittavat, että kulujen jälkeen aktiivisesti hallinnoidut rahastot häviävät vertailuindeksille, sekä rahastojen riskikorjatut tuotot ovat matalampia pienemmästä riskistä huolimatta. Tutkimukset myös paljastavat, että kehittyvien markkinoiden pienyhtiörahastot ovat keskimäärin erittäin aktiivisia niin tracking error- sekä active share -metodilla mitattuna. Vaikka tutkielman aineisto onkin rajoitteinen viiden vuoden tarkastelujakson takia, antaa tutkielma erittäin mielenkiintoisen aiheen jatkotutkimuksille, sillä monella aineiston rahastoista, ei ollut pidempää historiaa. Tulokset myös tarjoavat hyödyllistä informaatiota niin instituutio- kuin yksityissijoittajille parantaakseen salkkutason suorituskykyä riskikorjatusti.

AVAINSANAT: Salkunhoito, sijoitusrahasto, pienyhtiöt, kehittyvät markkinat, sijoitukset

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1 Introduction

1.1 Background

The main purpose of an investment is a monetary return from the financial market. Investors seek continuous sources of alpha in order to outperform markets. Investors must differentiate from broad market or benchmark indexes to gain excessive returns. The primary objective of actively managing mutual funds is to outperform their given benchmark and popular financial vehicle to try to outperform the given market. Due to the lack of trading services, purchasing individual securities within emerging markets is relatively difficult. Thus, the only vehicle to invest in such a specific market might be hiring a portfolio manager through mutual funds.

Mutual funds are a well-established concept in developed financial markets, such as Europe and the U.S. They are widely researched both at the theoretical and technical level, which indicates how far they have matured in developed markets. However, emerging markets are not the case since they are relatively recent phenomena (Ramasamy and Yeung, 2003). Nevertheless, the growth of the mutual fund industry in emerging markets has been impressive. For example, it has been estimated that, since 1989, the industry has been growing on average 14,4 % annually.

Mutual funds offer investors a convenient option for outsourcing day-to-day decision-making regarding portfolio allocation and instrument selections to qualified and professional portfolio managers. Convenience is one key factor in the emerging popularity of mutual funds.

Mutual funds also provide opportunities to individual and institutional investors, which they could not facilitate alone. For example, emerging market equities are an asset class. Not every brokerage firm offers every stock exchange in the world. However, through mutual funds, the investor can allocate funds to emerging markets. Emerging markets appear to be tempting for investors since, according to World Economics (2023), emerging economies account for 50 % of global GDP and 66 % of global GDP growth in the past 10 years (2012-2022).

However, portfolio managers' competence and ability to generate excessive returns have been a popular debate during past decades. Jensen (1968), Carhart (1997), Cremers and Petajisto (2009), and Petajisto (2013), among other articles, question portfolio managers and their ability to add value to shareholders through abnormal returns.

While passive investing strategies have become more popular during the past decade with low-cost index funds and exchange-traded funds (ETFs), there is still room and demand for active asset management. According to a survey from Morgan Stanley (2023), 57 % of high-net-worth investors in the U.S. currently work with financial professionals.

The debate between the two schools has been around for decades. Supporters of passive investing suggest that active investing and deviating from benchmark indices are not worth the time and resources. On the other hand, supporters of active investing seek abnormal, outperforming returns over given benchmarks. They are not satisfied with market returns but want higher rates.

This thesis examines mutual funds, with a focus on emerging markets and small capitalization companies. According to theories introduced later in the thesis, such efficient markets hypothesis should be the most favorable market environment for active investing strategies and portfolio management to generate abnormal returns.

1.2 Research questions

The thesis aims to test existing theories in emerging markets that are mutually agreed to be less efficient than developed markets, such as the USA and Europe. In order to do so, mutual funds are actively managed, and their performances are compared to their benchmark index. As emerging markets are considered weak in terms of information efficiency, there should be better opportunities to generate excessive returns than a benchmark index. Another motivation is the small-cap anomaly from Fama and French (1970), who proposed that small-cap stocks outperform the broad market. In addition, a paper from Allen (2005) found that even in the US markets, it is possible to generate excessive returns within smaller companies over a longer period. These two phenomena in financial markets form an interesting topic for further research. Additionally, sample funds' activity levels are studied in the research to determine if the funds are truly actively seeking excessive returns.

Regarding portfolio management, one objective of the study is to determine if the mutual funds are active and make active over and under weightings or if they are just claiming to be active but, in reality, tend to be rather passive, "closet index funds." Closet indexing is discussed later in this paper. The first research question is:

RQ_1: Are portfolio managers active within their mutual funds?

Another motivation for the study is that even though fund performances are studied widely by academics, the research regarding broad emerging market small-cap funds is limited due to limited funds and therefore data. Also, a major proportion of emerging market small-cap funds are relatively young. Thus, conducting reliable examinations during the past decade has not been possible. The second research question is:

RQ_2: Can portfolio managers generate excessive returns on an absolute basis?

Different investments have different returns and risk levels. It is important to determine if one investment has a higher rate of return. Is the higher rate due to the portfolio manager's skill or higher risk associated? When considering different investments, it is vital to determine the risk/reward ratio. The final research question is:

RQ_3: Are portfolio managers able to outperform their benchmark risk-adjusted?

Ultimately, through the three questions mentioned, the thesis aims to analyze and answer whether portfolio managers can provide value in the form of excessive returns after their fees.

1.3 Limitations

The main limitation of the study is the lack of research. Emerging markets small-cap equities are not the most popular sub-asset class in equity investments. Thus, the number of mutual funds is rather low. Moreover, most mutual funds have a relatively short history, and the research period is limited to five years. In addition, the amount of research in this field is limited, for example, compared to studies regarding large-cap US equities. In this thesis, there are 28 mutual funds with a history of five years or more. The selection criteria are introduced in the methodology chapter.

1.4 Structure of the study

After the general introduction of the topic, the literature review is followed. It covers other studies and introduces further information on portfolio management and investments in small-caps and emerging markets. The chapter provides a great background for the thesis and introduces previous studies with results over the past decades. The chapter is divided into two subchapters. The first subchapter includes research related to emerging market investments and fund studies, and the second subchapter contains studies regarding small-cap mutual funds. The literature section exploits peer-reviewed academic articles conducted in the past regarding mutual fund analysis, both supporting and objecting to the relevance of active portfolio management to offer a comprehensive background on the topic.

After the literature review, theoretical concepts, such as the Efficient market hypothesis (EMH) and Portfolio theory, are introduced in detail. The chapter offers an appropriate foundation for the empirical stage of the study. Furthermore, various performance measurements are introduced and used in the empirical part of the study. The chapter provides a theoretical understanding of how equity capital markets and portfolio constructions are designed in the modern financial world and how theories could be applied in practice.

After the theoretical stage of the thesis, the empirical section begins with an introduction to data and methodology. The chapter reveals the data type used in the research and how it is gathered. Moreover, the methodology of the fund evaluation is introduced in addition to revealing the benchmark used in the thesis. Also, assessment methods and criteria are provided in detail. The chapter introduces the tools and how the research is conducted to clarify the methodology and research section of the thesis.

Finally, the research results are provided in detail, in addition to reflections. The chapter begins with descriptive statistics of the data and funds' activity evaluation and provides return calculations on an absolute basis. After that, risk-adjusted performance figures are provided. Finally, the results of the Fama & French factor model are discussed. The chapter comprehensively analyses the study's results, followed by a conclusion on the most important findings, answers, and insights for the research questions. Also, a discussion and suggestions for further research and studies are provided.

2 Literature review

Selecting a mutual fund that provides high returns with an acceptable level of risk is not a simple task. Academic literature reveals that few factors could be used when evaluating mutual funds.

Mutual fund analysis is not a new field of financial science. Sharpe (1966) set a guideline for studying mutual fund performances within three closely related areas: portfolio selection, the capital asset pricing model (CAPM), and the general behavior of stock markets.

Portfolio selection theory defines the three market participants and their roles: a security analyst, a portfolio analyst, and an investor. Papers from Markowitz (1952), Sharpe (1963), and Fama (1965) highlight market taxonomy. The security analyst's role is to predict the performance of individual assets, such as a stock, within the underlying portfolio and its relationship with other instruments. On the other hand, the portfolio analyst estimates anticipated results through the expected performance and risk of the portfolio and constructs the most efficient entity under given assumptions. The third participant, the investor, selects the optimal portfolio in relation to his risk profile and return expectations out of the options presented. Sharpe highlights that the performance of mutual funds can vary due to risk or market volatility.

The literature regarding mutual fund analysis tends to present criticism towards active portfolio management and lean toward the efficient market hypothesis. However, Lehman and Modest (1987) argued that mutual fund performance analysis and their results might vary widely with the benchmark and performance metric selection. For instance, CAPM performance evaluation is highly sensitive to the corresponding benchmark. In addition, they found statistically significant excessive returns over various benchmarks when analyzing 130 mutual funds. They also questioned how the "normal" performance should be classified, i.e., how benchmark indices should be formed.

The literature review section of the thesis is divided into two sections. The first section covers academic literature regarding investing in emerging markets and mutual funds' performances in the market. The second section covers literature on small-cap mutual fund investing. The two subjects sufficiently combine the topic of the thesis; thus, they are appropriate topics to cover in the literature review chapter. Another reason to divide the literature review into two chapters is the lack of research regarding small-cap investments in emerging markets.

2.1 Literature on emerging markets investments

In general, emerging markets are considered riskier than developed markets. However, investors also have higher expectations for returns in emerging markets as well. In this literature review, the focus is more on the rewards or benefits of investing in emerging countries. Moreover, this part of the literature review considers diversified portfolios, such as mutual funds and indices, rather than individual securities. The reasoning behind this is that, in this thesis, diversified portfolios are under consideration instead of single stocks.

Although investors tend to look to emerging markets as a source for higher expected returns, diversifying to emerging countries has another benefit: risk reduction. For instance, Li et al. (2013) discovered that increasing returns depended on short sale availability from 1976 to 1999. They conclude that if Markowitz's (1952) model is used, estimation of moments can result in large and levered positions. The article uses a dataset that includes eight stock indices, seven from emerging markets and one from G7 countries. They exploit the mean-variance approach where "delta" demonstrates the increased expected return when a portfolio differs from its given benchmark towards an efficient portfolio. Moreover, they use the same procedure to measure the change in the portfolio's variance. They conclude, after using the Monte Carlo simulation, in addition to Bayesian inference, that the majority of diversification benefits are collected when an investor can leverage developed markets to benefit from emerging markets. In addition, their minimum variance portfolio demonstrates that emerging markets provide a great diversification benefit for investors who are not allowed for short selling. Another study by Driessen and Laeven (2007) makes the same conclusion. This study looks at the topic from the point of view of local investors. However, they find that diversification benefits are highest for investors in developed markets who are seeking exposure and diversification from emerging markets. Moreover, they also found that the diversification benefits between developed and emerging markets decreased between 1985 and 2002. The authors claim the reason behind the decreased benefit of diversification is the higher country risks. Bouslama and Ouda (2014) provide another insight as they find in their paper that the increase in correlation between developed and emerging markets can be explained by technological development and integration of financial markets. In their research, they compared stock indices from both developed and emerging countries. During the period of 1988-2009, they find a consistent increase in correlation between the two. Additionally, the authors conclude that emerging markets should be included in the framework of international equity portfolios, given that the allocation is not too remarkable.

In addition, Kristofferson et al. (2012) found that the correlation between developed and emerging markets decreased from 1989 to 2009. The research includes three datasets regarding different stock indices. The first includes thirteen weekly returns, and the second includes seventeen emerging market stock indices. The third dataset consists of weekly returns of sixteen stock indices from developed markets. Authors find that although equity market crises occur more frequently in emerging markets than developed ones, they are usually country specific. For instance, the MSCI Russia index (RUB) crashed in 2022, which was followed by Russia’s invasion of Ukraine and resulted in a crash and removal from global indices (Zangari, 2022). Additionally, they discovered that the diversification benefits tend to increase during market downturns.

Moreover, Bekaert and Harvey (2023) examine the integration of emerging markets into developed markets in their paper. Also, they question whether emerging markets should be seen as a separate sub-asset class or included in global equity indices. The paper focuses on emerging market indices' characteristics, such as correlation to developed market indices or price-to-earnings ratios. Furthermore, they find that emerging markets are rather segmented than integrated regarding trade openness, financial openness, and investable equity. They also claim that one of the reasons behind the segmentation of emerging markets is the higher probability of political risks, which leads to institutional investors' avoidance of emerging market investments in addition to mandate restrictions. Therefore, investors tend to require higher returns from emerging countries. Nevertheless, they claim that emerging markets should be seen as a separate asset class from global equities due to differences in financial structures and diversification benefits, even though the correlation has increased between emerging and developed markets during past decades.

These papers studied precisely the correlation between developed and emerging markets. The conclusion is the same with each paper: the diversification benefit exists, and emerging markets have their role in efficient portfolios, yet the impact has decreased over the years. The main reason behind the phenomenon is emerging markets' integration into developed markets, which decreases the correlation between the two. However, even though emerging countries have become more integrated, their segmentation in relation to trade openness and financial structures forces emerging markets equities to be seen as a separate sub-asset class. Nevertheless, under certain circumstances, due to trading restrictions, individual investors have difficulties gaining diversification benefits from emerging markets. Mutual funds solve this problem and are accessible to most investors. There are various mutual funds that provide exposure to emerging markets, thus opening the possibility to invest in countries to which individual investors do not have access. In other words, mutual funds, among other advantages, allow investors to allocate funds to emerging countries and construct well-diversified portfolios.

After covering studies regarding diversification between emerging and developed markets, the next papers focus more on the value creation of mutual funds in emerging countries and how they tend to perform.

Chang et al. (1995) researched the potential for performance improvement in the US. They focus on country-specific global mutual funds. Additionally, funds are globally located since most investors cannot access foreign capital markets. Moreover, to demonstrate the benefits of international diversification, they examine whether the performance results from excessive returns of mutual funds in the research. As a methodology, they calculate Jensen’s alphas for each mutual fund. Out of emerging markets mutual funds, only the investment portfolio in Mexico equities offered risk-adjusted excessive returns during the research period. Thus, the possibility of generating excessive returns from emerging countries is relatively low when considering mutual funds instead of individual securities during the research period.

Moreover, the research from Singh (2014) examines Canadian-based mutual funds and their performance during 1987-2011. Mutual funds used in the paper invest in fixed-income and equity securities in emerging markets. The paper uses factor models on unconditional, partial, and full condition levels to estimate abnormal returns. In addition, the paper examined three different time periods (1989-2000, 2001-2011, and 1989-2011) to gain more reliable and stable results. The paper assesses if mutual funds can generate excessive returns compared to the benchmark. Additionally, to evaluate the timing skills, the research uses bootstrapped samples, which the author uses to demonstrate whether performance is due to timing or sample variation. Firstly, he focused on equity funds’ gross returns using two- and five-factor models. The research found that neither value nor equal-weight portfolios generated major excessive returns. Using the same method with net returns, he found negative alphas for each time and significant negative alpha for the most recent time period. When estimating individual mutual funds, most failed to generate excessive returns after fees. The author concluded that mutual funds cannot generate enough alpha to cover their fees. Moreover, he stated that, on average, the mutual funds of the sample did not represent any level of timing skills.

The paper from Dyck et al. (2013) found reverse findings. Their results indicated that active portfolio management in emerging markets excluding East Asia and the Far East (EAFE) generated risk-adjusted excessive returns. The authors claimed that institutional investors could execute active strategy cost-efficiently compared to other active trading strategies. Their paper focused on institutional investors and their passive and active strategies in non-US markets. The authors used panel data to analyze 492 US and 226 Canadian mutual funds and their performances from 1993 to 2008. Their approach used various versions of factor models based on the famous Fama-French framework to test if the performances were obtained by skill or a higher level of risk. The authors declared that risk-adjusted performances resulted from skillful portfolio management and that the advantages of investing in emerging markets occur from market inefficiencies.

Another paper from Huij and Post (2011) researched the efficiency of emerging markets from a momentum perspective. They used 137 mutual funds with exposure to emerging markets from 1993 to 2006. The paper is considered important since it provides evidence of behavioral factors of investment strategies of individual investors. Authors ranked mutual funds by their past quarter's performances monthly. The data set included nine quantiles, the first being the best-performing one. During the period, the top quantile showed clear persistence in terms of performance. However, the difference between top and bottom quantiles was relatively high, being 7,26 % annually. Regarding excessive returns over the benchmark, the paper found that only the top quantile of mutual funds could generate significant alpha. Moreover, the authors examined, using factor models, if the persistence of the mutual funds was a result of exposures to the market, firm value, firm size, or momentum. The results indicated that none of the nine quantiles generated alpha due to given attributes. However, the paper indicates that the momentum effect was significant with the top five of the funds, which implies that the performance was not a product of skillful portfolio management. Nevertheless, the authors stated that the momentum factor had a role in alpha generation in emerging markets and was more successful in relation to developed markets, concluding that the reason behind the result is the inefficiency of emerging markets.

Another paper from Eling and Faust (2010) focuses on risk-adjusted performances in emerging markets. In addition to mutual funds, the article used hedge funds to examine market efficiency. They used the same theoretical framework as in the previous paper to determine the fund’s returns, but they extended models to determine the dynamics of the funds’ returns. Variables used in the article included various emerging market indices from MSCI, the spread between Russell 2000 and S&P 500, two bond-oriented factors, and three different trend and momentum factors. The authors used 243 hedge funds and 629 mutual funds with exposure to emerging markets during 1995-2008. They deployed the factor model to evaluate the excessive return of an equal-weight portfolio of all mutual funds used in the research. With the equal-weight portfolio, the estimated alpha was negative and statistically significant. The results by the authors concluded that, on average, mutual fund managers do not generate excessive returns over their benchmark. When the same research was conducted with all the hedge funds included in the research, the estimated alpha was close to zero, yet a bit positive. Nevertheless, from the group of hedge funds, approximately 12 % outperformed their benchmark, 0,95 % being the number for mutual funds used in the research. To check the robustness of the results, the author made estimations for alphas and factor premiums in various time periods. The test gave results that implied insignificant alphas for each time period on the confidence level of 95 % for both hedge and mutual funds. Additionally, the authors tested the impacts of region exposures compared to the market MSCI EM benchmark index. They conducted a scenario analysis examining the worst and the best moths compared to the benchmark. Results concluded that hedge funds delivered their promise, hedge, during the worst periods compared to mutual funds. Otherwise, mutual funds and hedge funds tend to have similar performance during other periods. The reason behind the results is, according to the authors, that hedge funds have higher flexibility in allocations and usage of derivatives.

The results of past research tend to have reverse results and implications. However, the consensus implies that regarding diversification, emerging markets indeed provide diversification benefits in terms of portfolios' allocation constructions. Also, most of the papers found inefficiencies in emerging markets that provide opportunities for sophisticated investors. Moreover, trading restrictions are believed to be one of the main drivers of market inefficiencies. Nevertheless, results also indicate that despite inefficiencies, portfolio managers generate alphas with gross returns, trading, and management fees that tend to be higher than excessive returns generated by active portfolio management. Results of the past research provide an interesting platform for this thesis since it is evident that market inefficiencies already exist with large capitalization companies in emerging markets; they must also exist with smaller companies in such markets.

2.2 Literature on small-cap equities

As the previous chapter covered emerging market investments, this chapter focuses on small-capitalization companies and mutual funds. First, the size factor is discussed in detail, followed by papers covering small-cap mutual funds. As with the previous chapter, studies that used well-diversified portfolios are only considered. The reasoning is the same, as this thesis also covers diversified portfolios.

There is non-denial evidence that, over the long term, small-cap stocks generate higher rates of return. Banz (1981) was one of the first researchers to study the correlation between portfolio returns and market capitalizations of companies within underlying portfolios. He claimed that the CAPM might not be correctly formed. He argued that small-cap equities had returned higher rates that are too high with respect to their underlying betas, while the opposite occurs with large-cap equities. Moreover, he claimed that the effectiveness of the size factor varies over time and is not a linear function of portfolio returns. The reasoning was that the returns of mid-cap equities do not differ from large caps, only deviation occurring with higher returns of small-cap companies.

Another academic evidence claimed small-cap companies yield higher rates than larger companies due to a lack of disclosed information by the small-cap companies themselves (Chan et al. 1985). Investors might reject such a company from their investable universe when much of the information is unavailable. Therefore, small-cap companies' stock prices might differ greatly from their intrinsic value and be mispriced by market participants since they require additional risk premia for the absent information. Furthermore, academic evidence also implies that the size factor is connected to the company's default risk. Chan et al. discovered that the explanatory power weakens when the corporation's default spread is included. However, Vassalou and Xing (2004) revealed that the size factor is statistically significant only with portfolios that are constructed based on firms with the highest default risk in the investable universe.

Moreover, Fama and French (1993) contributed to the size factor and its relevance. Their article discovered a significant so-called size effect when studying companies in the US stock exchange from 1963 to 1990. Moreover, Heston et al. (1999) found in their research that the size effect had a significant explanatory power of small-cap equities' outperformance compared to large-caps from 1980-1995. The research covered 12 European countries. Furthermore, van Dijk (2011) had similar results in his research as he studied the explanatory power of the size factor. He concluded that small caps returned higher rates on risk-adjusted terms than large companies. He also noticed that the size factor's risk premium had a large, positive coefficient in explaining the portfolio returns in the U.S. market. In addition, Xiao (2016) made the same conclusion about the French stock market in his paper. He discovered a clear sign of size premium in the French market. However, he argued that the conditional beta cannot justify the differences between the average returns of small and large companies. Another paper

(Amel-Zadeh, 2011) concerning the small company effect in the German stock market had the same conclusion.

Otten and Bams (2002) conducted a study regarding small-cap funds in European markets with an interesting conclusion. They exploited Carhart's 4-factor model in their research to evaluate mutual funds in five countries. The results of the study revealed that small-cap funds outperformed their designated benchmark. Four of the five countries generated excessive returns after fees (the UK, Italy, Netherlands, and France). Small-cap funds' performances were below their benchmark in Germany, even before management fees.

Karrupasamy and Vanaja (2013) researched both large and small-cap mutual funds, focusing on Indian markers in their research during 2007-2012. They analyzed performances on absolute and risk-adjusted in comparison with respected benchmarks. The study involved open-ended funds from 30 different asset managers. Funds included both large and small-cap mutual funds. They selected Sharpe and Treynor's ratio and Jensen's alpha for risk-adjusted returns to demonstrate the funds' performance. The results indicated that both large and small-cap funds outperformed their respective benchmarks. However, small-cap funds outperformed their large-cap counterparts on absolute and risk-relative terms.

Another study focused on Indian small and mid-cap equity funds was conducted by Kandi, Harshitha, and Dhyan (2022). They analyzed 20 Indian small and mid-cap funds during two different time periods, the first being 2013-2021 and the second 204-2022. They used various statistical methods, such as beta, standard deviation or volatility, Sharpe ratio, Treynor's ratio, and Jensen's alpha, and data analysis. They discovered that active management indeed offered excessive returns with lower risk compared to benchmarks in both small and mid-cap fund categories. They also highlighted the importance of diversification when investors allocate funds towards small-cap equities since the volatility is higher with small caps than with larger companies.

In another study, Sharma (2023) analyzed large, mid, and small-cap mutual funds operating in emerging markets. The study was conducted based on NAV data of 44 mutual funds in total. The study used five different time periods, 1, 2, 3, 5, and 10-year returns, to comprehensively analyze different time periods. The study used risk-relative figures, such as Treynor’s and Sharpe's ratios, to compare different fund classes’ returns. The study concluded that small-cap funds generated more stable returns across different time periods compared to middle and large-cap funds. Moreover, small-caps generated higher risk-adjusted returns than other sub-asset classes. Regarding absolute returns, small-caps consistently outperformed large and middle-cap equities.

Contrary evidence of the factor has also been identified in the past. Berk (1996) discovered a statistically insignificant coefficient for the size factor in his research. His conclusion originates from the mutual understanding that the correlation between firm size and portfolio returns is deteriorated by the statistical “noise” in the company's market capitalization due to varying firm size over the years. However, if the company's market value is controlled by size variables that are not market-based, a positive correlation exists between factor portfolio returns and portfolio companies’ sizes. The same phenomenon applies when using the book-to-market ratio as an explanatory factor for the portfolio returns. Since the size is controlled by a variable that is not market-dependent, it decreases the “noisiness” of the market value factor. In addition, Berk (1995) saw the size effect purely empirically since he claimed that the size anomaly should only be considered “an empirical anomaly.” He underlined that the size factor’s explanatory power concerning portfolio returns should not surprise anyone. The reasoning behind the claim was that the size factor itself is not a proxy for missing factors but rather depends on an asset pricing model in question and its setup. If different asset pricing models disregard vital explanatory factors, the size effect will be a proxy for the excluded factors. Therefore, he did not discover a relationship between portfolio companies’ size and portfolio return from 1963 to 1981.

Another paper (Horowitz et al., 2000) discovered that even the size anomaly and its effectiveness persisted for 20 years from its discovery in 1982 until 1997; the performance has reversed since then. In terms of average returns, the returns of large-capitalization stocks have exceeded small-cap equities. Another interesting finding was discovered by Blitz (2021), as he noted that not a single portfolio constructed on the basis of small-cap stocks between June 2018 and August 2019 outperformed the global developed market.

Previous literature agrees that the size effect exists and provides a premium on market return. However, the effectiveness of the factor has been decreasing over the years, yet it still exists. Another important aspect when evaluating mutual funds is the risk associated with the instrument. Most articles found that volatility levels tend to be lower than the corresponding benchmark index. These findings are useful, especially for institutional investors who must assess their portfolios' risks and volatility levels. In addition, the academic evidence suggests in most of the covered articles that active portfolio management can generate excessive returns in small and mid-cap markets. These findings are insightful and provide an encouraging sentiment for further research in broader emerging markets.

3 Theory

In the theory chapter, various theories related to portfolio management and investments are covered, such as the Efficient market hypothesis (EMH), Portfolio theory, tracking error, and Capital asset pricing model (CAPM), few to be mentioned. These theories are relevant in understanding fund performance analysis. Even though this study focuses on the performance comparison of emerging markets' small-cap equity funds over their benchmark index, it is appropriate to introduce and define relevant theories to portfolio management and the mutual fund industry.

At first, mutual funds on the general level are discussed, and their characteristics and different types of mutual funds are introduced. In addition, both passive and active portfolio management in practice are discussed. After mutual funds and portfolio management, the focus shifts towards the modern portfolio theory (MPT), which could be considered a baseline for investing, especially in the asset management industry. MPT is followed by largely debated and a concept that divides opinions, the Efficient market hypothesis (EMH). The concept is relevant not only for asset pricing but also for financial markets in general.

After a rather general introduction, the more technical section of the chapter is revealed. First, CAPM and its successors, the three- and five-factor models applied in this thesis, are introduced. After asset pricing methods, portfolio performance metrics and concepts such as tracking error, Sharpe ratio, Treynor’s ratio, or Jensen’s alpha are discussed.

3.1 Mutual funds

What is a mutual fund? It is a portfolio of securities from various asset classes. Investments included in mutual funds could be equities, bonds, alternative assets, real estate, commodities, or other funds. The fund is owned by investors, retail or institutional, and provides an opportunity to benefit from large or institutional asset managers' knowledge and cost-efficiency (Puttonen & Repo, 2011).

The business model of mutual funds is simple. The fund gathers funds from investors, and when it has collected a sufficient amount, it invests the capital into equity, fixed income, money market, or alternative securities according to its investment strategy and policy, as well as target allocation. Funds' strategy and investment policies must be declared in official documents, such as key information documents and prospectuses. There are various investment strategies, and any fund manager can label their fund's strategy as a new one. However, successful funds tend to keep their strategy for a long period of time, while unsuccessful ones close or merge with other funds. Funds active during the whole research period are included in this thesis, and others are excluded.

In this paper, mutual funds, specifically equity funds, are under consideration. Nowadays, there are many different financial instruments for various purposes; thus, it is appropriate to cover basic terms and concepts regarding fund investing.

Fund classes

Since there are different asset classes, such as equities, bonds, commodities, real estate, etc., there are also different funds for each asset class. On a wider level, funds can be divided into equity, bond, balanced, alternative, and hedge funds. Moreover, Exchange-Traded Funds (ETFs) could be added to the list.

As mentioned in the thesis, equity funds are considered in the research. Simply put, equity funds allocate their capital to stocks that are suitable for their strategy. Generally, equity funds can be divided into subcategories by geographical or sector allocation or factor styles. They can also be divided into passive and active funds.

Bond funds, on the other hand, invest in fixed-income or other debt securities. Historically, the returns and volatilities of bonds are lower than equities (Carlson, 2023);

thus, comparing equity and bond funds is not meaningful. According to Kallunki, Martikainen, and Niemelä (2011), bond funds are divided into sub-categories by the maturities of bonds included in the funds. Categories are short, intermediate, or long maturity. Bond funds are useful instruments, especially for smaller investors, since, unlike stocks, direct bond investments have high minimum investment amounts and transaction fees. Moreover, since the minimum investment is high, it is difficult to construct a diversified portfolio with smaller amounts of capital (Hayes, 2024). Bond funds are a valid option due to better accessibility and diversification.

Another major fund class is balanced or allocation funds. These instruments tend to invest in equity and fixed-income asset classes according to the given target allocation, for example, 50-50, where funds invest 50 % into each asset class (Puttonen & Repo, 2011).

Hedge funds are a slightly rarer fund class than traditional equity or bond funds. These funds might not have a strict investment strategy or policy and might change heavily over time. Moreover, they can use riskier derivative strategies, such as different futures and options (Gad, 2023).

Unlike mutual funds, hedge funds usually do not declare a specific benchmark they try to outperform, yet they focus on absolute returns. Moreover, hedge funds can have both long and short positions. In other words, they try to generate positive absolute returns in any market conditions. This leads to a situation where hedge funds are exposed to risk factors that are impossible with traditional long-only mutual funds (Agarwal & Naik, 2004).

Another fund class, Exchange Traded funds (ETF), is a relatively new innovation in the financial industry. However, the growth of ETFs' popularity has been rapid during the past decade, and they have emerged as real competitors for mutual funds. They are considered important investment vehicles for retail and institutional investors (Wallace

& McIver, 2019). ETFs are a prime example of the efficiency and adaptability of the financial industry (Puttonen & Repo, 2011)

Even though the innovation of ETFs has been revolutionary and welcomed warmly by investors, studies have been conducted regarding related difficulties. For instance, Engle and Sarkar (2006) have questioned the effectiveness of ETF market prices. In addition, a study from Petajisto (2017) found clear arbitrage opportunities between different ETFs.

Investment strategy

As mentioned earlier, there are two types of investors: One believes in passive index-tracking at low cost and earning the market return net of fees. On the other hand, there are supporters of active investment strategies. Especially in developed markets, investors can combine the two and include both styles in their portfolios. Index funds, or ETFs, are a very simple vehicle for passive investing. If investors are eager to have active portfolio management and investing, they should hire a portfolio manager to invest in actively managed mutual funds. Investors can combine the two portfolio management styles with different instruments or funds according to their policies.

3.2 Modern portfolio theory

Modern portfolio theory provides a main framework for constructing an optimal investment portfolio. It was invented by Harry Markowitz (1952) and earned a Nobel prize in 1990. The theory's objective is to maximize expected return at a given level of volatility or risk.

In the context of investing, risks can be divided into two categories: systematic and unsystematic risk. Systematic risk is related to the underlying market, and it impacts every security. In addition, systematic risk is a risk that cannot be avoided by diversification when considering long-only equity funds (LI, Zu, Li & Li, 2013). On the other hand, unsystematic risk is in relation to individual companies or securities.

Fortunately, unsystematic risk can be minimized through diversification. Modern portfolio theory focuses on this aspect.

Modern portfolio theory provides a foundation for appropriate and efficient diversification and eases unsystematic or diversifiable risk. The theory allows investors to select securities with the greatest diversification advantage.

According to the theory, the main objective is to create a portfolio with the highest expected rate of return at a certain level of risk or the lowest level of risk with a certain target return Brown & Reilly, 2009). Constructed portfolios with these parameters could be called optimal or efficient portfolios. Efficient portfolios construct capital allocation lines, where expected returns are on the highest level with certain risk levels. The risk is measured by the variance of returns in Markowitz's model.

Modern portfolio theory argues that a broadly diversified portfolio is always preferred over a non-diversified portfolio. The theory assumes that a rational investor always chooses the lowest risk out of available portfolios with the same expected return. Additionally, the theory claims that instead of selecting individual securities based on their individual characteristics, a well-diversified portfolio should be constructed by combining well-diversified securities.

3.3 Efficient market hypothesis

Investors, by nature, are seeking and competing for higher returns. This competition has emerged as a situation where many financial institutions search for even a small source of excessive returns. Moreover, the historical returns are widely researched, as mentioned earlier, and results are relatively unambiguous, especially in the long term. Okusanya's (2018) paper is one example since it found out that stocks have had the highest rate of return over the past hundred years. This might be one of the reasons why financial analysts and institutions research the stock market endlessly.

According to the Efficient market hypothesis (EMH), the prices of financial instruments in the security market line (SML) reflect the available information completely (Fama, 1970). The EMH suggests that it is nearly impossible to outperform market return constantly since the security prices adjust to the information when released to the public. Therefore, under the assumptions of EMH, investors cannot generate excessive return or alpha from mispricing of securities since there is no such concept as mispricing in capital markets, according to the theory. It also suggests that investors can only generate higher returns than the market by taking a higher level of risk. In other words, risk-adjusted, it is impossible to generate under assumptions of EMH.

Eugene Fama, the inventor of EMH (1970), divided markets into three categories by the level of information efficiency: weak, semi-strong, and strong. The weak level of information efficiency indicates that asset prices reflect all past public data and information, such as trading volumes. However, with past and outdated information, it is impossible to predict future stock prices. The rationale behind the claim is that asset prices do not have memory; thus, the prices move randomly. On the other hand, in weak markets, such as emerging markets, there might be a possibility of generating excessive returns since asset prices do not necessarily reflect present or future news or information.

The semi-strong level of information efficiency refers to that in addition to the past and present data and information reflected stock prices. Under these assumptions, public information, such as earnings forecasts or quarterly financial reports, is "priced in" asset prices beforehand. Under these conditions, fundamental analyses are unnecessary, and the possibility of generating excessive returns is lower than in weak-level markets.

The strong level of information efficiency refers to market circumstances, where all past, present, and future public and nonpublic information and data reflect asset prices. According to EMH, it is impossible to generate alpha in strong efficiency markets, even with insider information, since it is already included in stock prices. EMH claims that generating excessive returns in strong markets is fundamentally impossible, and active portfolio management categorically wastes time and resources.

Efficient market hypothesis assumptions encourage rational investors to select passive portfolio management and support index investing. EMH rejects active fund management since it cannot constantly generate excessive returns under its conditions. Hence, active portfolio management underperforms in relation to benchmarking by the cost of its own expenses and fees. Therefore, active portfolio management is investors' and portfolio managers' resources. According to EMH and its assumptions, investing in index funds or ETFs is a rational choice. However, EMH has received a lot of criticism due to its unrealistic assumptions, even though the theory is relevant theory and has a wide reach in financial literature.

As with any theory, there are supporters and objectors, and EMH is no exception. For instance, Dreman and Berry (1999) and Lo and MacKinlay (2011) argued in their articles that capital markets could not be entirely efficient regarding information reflection in asset prices. Moreover, they claimed that producing abnormal returns with active investing strategies is realistic. Unsurprisingly, most asset management companies and fund managers strongly object to the theory and claim the market to be inefficient.

Another criticism of EMH is related to one of the theory's assumptions, the rationality of investors and other market participants. Obviously, in capital markets, there will always be several irrational market participants (Malkiel, 1973). These participants enable mispricing events in the market and, therefore, opportunities for excessive returns for other investors. In history, there are many examples of irrational events; for instance, tulip mania in the Netherlands in 1634-1637 is one of the most famous. Price bubbles are considered the most extreme irrational events in capital markets. Fromlet (2001) argues that such events are prime examples of capital markets not acting as efficiently as theories suggest since investors' irrational behavior and psychology have a significant role in capital markets.

3.4 Passive portfolio management

Passive portfolio management or investing strategies are outlined as a portfolio management style with the main objective of replicating the benchmark's holdings and allocations. The strategy's result is market return deducted by index-tracking instrument fees (Garcia, Guijarro & Moya, 2013). The objective of index-tracking investing or indexing is not to beat the market but to follow its return.

Passive portfolio management is closely tied to EMH (Fama, 1970), introduced earlier in this paper. Since EMH expects capital markets to be efficient and securities to be correctly priced, active stock picking or portfolio management could not be profitable in the long run. According to EMH, investing in index-tracking mutual funds, or ETFs, is a rational decision instead of actively managed mutual funds.

Generally, passive strategies are more cost-efficient than active ones (Sharpe, 1991). The cost of passive strategies is lower because active managers tend to trade more often, which incurs trading fees. Additionally, active managers need to invest in research to beat the market and generate sources of overperformance, which also have costs. Meanwhile, passive managers only need to monitor the weights of index components and reallocate their portfolios to align with the benchmark holdings. The fee aspect is also aligned with EMH since it claims that active managers tend to lose their benchmarks by a margin equal to their fees.

Passive strategies can be either full or partial index tracking. In full tracking, the fund's holdings are equal to its corresponding benchmark index, and the weight of each security is aligned with the benchmark (Garcia et al., 2013). Therefore, the tracking is partial if the fund consists of some benchmark proportion and deviates slightly from the given index.

Garcia et al. (2013) exposed difficulties related to full tracking in their paper. They addressed the issue that arises when comparing full tracking to partial tracking. Full tracking tends to be more expensive due to more frequent trading, which is required when holding every security in the index. That occurs at higher trading costs. Vice versa, partial tracking index funds save trading costs since they do not trade with every security. Nevertheless, the partial tracking fund needs to concentrate more on the security selection since it does not include all the stocks in the benchmark. Stock selection involves additional recourses, which causes additional expenses as well.

3.5 Active portfolio management

As mentioned, ETFs and passive investing, in general, have gained more popularity during the past decade. In addition, Morningstar's (2023) fund report confirms the claim. Passive funds receive more inflow than actively managed mutual funds. Nevertheless, there is still room for an active portfolio management. Passive instruments, like ETFs and index funds, provide market returns reduced by the investment product's total expense ratio (TER). These products are relatively cost-efficient and require minimal effort from investors and portfolio managers. However, passive products' return potential is capped to the benchmark's return and cannot generate excessive returns.

Actively managed funds' portfolio managers search sources of alpha and try to generate abnormal returns by active investment decisions, in other words, deviating from the benchmark. Stock selection and factor timing are two general strategies for performing an active investment decision (Fama, 1972). The portfolio manager can differ from the benchmark index by allocating funds to stocks not included in the benchmark or over/underweight stocks included in the index. Additionally, by factor timing, it is possible to deviate. Factor timing means placing bets on any systematic risk that is in relation to the underlying index, for instance, the entire index industry.

Actively managed funds tend to have higher expenses than their passive counterparts. Higher expenses are justified by the trading fees and research conducted to generate excessive returns. However, this is a challenge for active funds as they must generate alpha at least equal amounts to their own expenses to create value and justify their existence.

The costs of active investing are widely researched. French (2008) claims that other investor's gain is another's loss before adding transaction costs. Thus, active investors are playing a negative sum game after transaction costs. However, French do not see active portfolio management as harmful on a wider level. He states that active investors enhance the liquidity and efficiency of the stock market. However, he argues that active portfolio management and investment strategies are not as profitable as passive counterparts, mainly due to the higher costs of active portfolio management. Active portfolio management can be measured using various key figures, such as tracking error and active share.

3.6 Tracking error

When evaluating and selecting a mutual fund, it is important to determine how much the fund manager deviates from its benchmark index. As a figure, a commonly used tracking error figure indicates how accurately the returns of a mutual fund follow the benchmark index's returns. It is a standard deviation of the difference between portfolio and benchmark returns. Usually, a high-value tracking error refers to a fund that deviates greatly from its benchmark; in other words, it is an actively managed mutual fund. Vice versa, a fund with low tracking error denotes a passive index fund or so-called closet-index fund.

Mathematically, tracking error is calculated:

$$Tracking\ error = \sqrt{\frac{\sum_{i=n}^{n}\left(r_p - r_b\right)^2}{n-1}}, \tag{1}$$

where

r_p is the return of the portfolio

r_b is the return of the benchmark

n is the number of return periods

Regarding tracking error, the fund manager aims to generate a higher return rate than the given benchmark while keeping the tracking error figure low. High volatility and high tracking error, especially with equity funds, expose the portfolio to a high risk of underperformance. A high tracking error value is usually a sign of a higher level of risk, which the portfolio manager takes to outperform the benchmark index.

In his paper, Roll (1992) argues that fund investors do not notice the average performance of the fund they invest in, but it takes time to recognize if the fund performs compared to peer funds and benchmarks. This is also a reason why investors look at tracking error figures when they analyze funds since it is a useful number to evaluate if the fund can add value to investors' capital. Low tracking error is important in the selection process and fund manager's skill evaluation. The low figure implies that the fund's returns are similar to the benchmark's counterparts since the portfolio does not deviate from the benchmark portfolio. Thus, the performances tend to follow each other rather strictly and accurately.

Furthermore, Roll (1992) introduced two reasons why low tracking error is meaningful and important for investors and portfolio managers. The first was that, in an ideal case, the money manager generates abnormal monthly returns equal to the fund fees and expenses. That is a clear case where the portfolio manager is able to add value to investors and requires zero tracking error. In such cases, investors who decided to invest in a low-cost index fund would have lost to the market by the expenses of an index fund to investors who decided to allocate their funds to an actively managed mutual fund. Another reason Roll (1992) was that when evaluating mutual funds' performances, the period is usually inappropriate in terms of the length of the period. A short period does not give a reliable enough overview of the fund manager's skill. In addition, the manager might be replaced with a new one due to lacking performance in the short run. By reviewing tracking error figures, investors and fund management companies can better understand whether the performance is mainly driven by the market and make better-informed decisions.

Cremers and Petajisto (2009) used an example of two mutual funds in their writing. One fund was a rather concentrated stock-picking portfolio whose objective was to gain excessive returns by active company bets within different business sectors. The second fund had the same objective, yet the method was different. The second mutual fund was the so-called sector-rotation fund, which did not pick individual companies or stocks, but by over and under-weighting sectors, the fund tried to generate alpha over the benchmark. In the second fund, the positions of individual companies were rather passive since the manager made active bets by sectors. However, with active sector bets, the portfolio deviates from the benchmark. In the example, the first fund had a lower tracking error than the second fund, which means that when looking at the activity through the lens of tracking error, the sector rotation fund appears to be more active than the stock-picking fund. On the grounds of the example, an alpha-seeking investor should select a sector rotation fund to gain excessive returns. However, on its own, tracking errors might provide slightly misleading results on the fund's activity, as it does in the example. The tracking error is lower in the first fund because picking individual stocks allows a wider sectorial diversification compared to putting an active bet on the entire sector. In addition, the first fund’s holdings differ more than the second fund’s counterparts from the benchmark, even though it has a lower tracking error. Due to the weaknesses in tracking errors, Cremers and Petajisto (2009) developed another ratio to analyze mutual funds’ activity, active share. This theorem is discussed in the next chapter in more detail.

3.7 Active share

As a method of assessing the activity of a mutual fund, active sharing is rather a new methodology. It was invented by Cremers and Petajisto (2009). Active share demonstrates the difference between portfolios and benchmark holdings, which cannot be obtained using tracking error alone. The ratio indicates the difference as a percentage from 0 to 100, where 0 indicates totally identical portfolios. 100, on the other hand, represents a completely diverse portfolio compared to the underlying benchmark. Theoretically, the percentage could exceed 100 % since it may obtain a higher value due to possible short positions. However, mutual funds are usually long-only portfolios; thus, they do not take short positions. The active share is calculated as follows:

$$Active\ Share = \frac{1}{2}\sum_{i=1}^{N}\left(w_{p,i} - w_{i,i}\right), \tag{2}$$

where

N	is the number of assets in the portfolio
wp,i	is the weight of an asset i in the portfolio
wi,i	is the weight of an asset i in the benchmark

Formula 2 demonstrates the calculation for obtaining an active share is rather simple. The absolute value of the difference in the weight of a stock in the portfolio and the corresponding weight in the benchmark is divided by two. The absolute value is halved in order to ensure that the active share value will be set between 0 % and 100 % (Cremers & Petajisto, 2009). To illustrate how the figure is calculated further, table 1 demonstrates a simplified example of a calculation of active share for an example portfolio.

	Weight in portfolio	Weight in index	Absolute difference	Active share
Asset 1	30 %	25 %	5 %	2,5 %
Asset 2	0 %	25 %	25 %	12,5 %
Asset 3	35 %	25 %	10 %	5 %
Asset 4	45 %	25 %	20 %	10 %
Total	100 %	100 %	60 %	30 %

Table 1. An example of active share calculation

Table 1 is entirely for illustrative purposes and is based on a figurative portfolio and benchmark. The example above includes five stocks and their weights in the example portfolio and benchmark. The absolute value of the differences is calculated on the second last column as in the formula. The last column in the table demonstrates the contribution of each stock to the total active share percentage by dividing the absolute value of the difference by two. The portfolio's active share is visible on the bottom cell of the last column, 30 %.

Table 1, the example portfolio and benchmark index, includes four stocks. The portfolio does not include any of stock 2, while it accumulates 25 % in the benchmark. Vice versa, the portfolio has a weight of 45 % in stock 4, which has a weight of 25 % in the benchmark. In the example, one can clearly see that the portfolio manager has taken substantial active positions in relation to the benchmark, which also results in a high degree of active share.

Cremers and Petajisto (2009) argue that the active share has the ability to predict the future performance of a mutual fund. They also claim that funds with the highest active share tend to generate excessive returns over benchmarks with rather significant differences and can perform constantly. Vice versa, non-index funds with low active shares tend to lose to the corresponding benchmark constantly. Index funds are not to be considered in the theory by Cremers and Petajisto (2009).

In addition, Cremers and Petajisto (2009) suggest that funds with higher than 60 % active shares are considered truly active, while funds with lower active shares are considered "closet-index," which is discussed in the next chapter. Also, funds with active shares close to zero are not considered in the framework since index funds' objective is not to generate excessive returns but to follow or replicate the underlying index's return. This thesis uses the same limits when assessing whether the sample funds are active.

One of the most important features of the active share figure is that it exposes so-called "closet-index" funds, unlike tracking error figures (Cremers & Petajisto, 2009; Petajisto, 2013). A closet-index fund is a mutual fund that claims to be active, yet, it replicates its benchmark with significant overlapping in holdings while charging fees for an active fund. It is important for investors to know the activity of the fund since actively managed funds tend to charge a lot higher fees than passively managed index funds or ETFs. One should not pay higher fees for active management if the fund is inactive. As mentioned, Cremers and Petajisto (2009) set a limit of 60 %, and if the fund's active share is below that, the fund is considered a closet-indexer. On the contrary, the problem with the tracking error is that it does not necessarily uncover closet indexers. For example, in the example discussed in the tracking error chapter, the concentrated stock picker fund had a lower tracking error than the sector rotator fund, even though it certainly had higher active shares.

3.8 Capital Asset Pricing model

The concept of the Capital asset pricing model (CAPM) is one of the essential theories in modern finance (Del Vigna, 2014) and is based on the Modern portfolio theory by Markowitz (1952), which was introduced earlier. CAPM demonstrates either the relationship between expected returns and market or systematic risk (Apap & Masson, 2005). The theory is widely used in cases of analyzing and forecasting mutual fund performances, making CAPM a relevant theory to be introduced in the thesis. Additionally, the following risk-adjusted performance-related measurements, such as the Sharpe ratio, Treynor's ratio, and Jensen's alpha, are closely related to CAPM, which is widely used in portfolio and mutual fund analysis. Moreover, these models provide reliable comparisons of mutual funds' performance during a given time period.

The original inventor of the CAPM is William Sharpe (1964), alongside Jack Treynor. However, after the initial invention, various economists modified the model multiple times (Black, Jensen & Scholes, 1972). Building on the Modern portfolio theory, Sharpe (1964), Lintner (1965), and Mossin (1966) constructed a baseline for the equilibrium model, which defines the relationship between the expected return and risk of any risky asset. CAPM provides a theoretically expected rate of return concerning the underlying systematic risk of the security or portfolio. As mentioned, systematic risk cannot be avoided by diversification. However, the unsystematic proportion of the risk is assumed to be non-existent in the model because CAPM supposes that the security in question would be added to a diversified portfolio. Therefore, the sensitivity of the security to the variability of the market is relevant when determining security risk (Sharpe, 1964).

The equation of the CAPM is called the security market line (SML). In contrast to CML, introduced earlier in the thesis, which demonstrates risk premiums for optimal portfolios as a function of volatility, SML graphs risk premiums of individual assets as a function of beta. Therefore, SML illustrates expected returns regarding every asset or portfolio, regardless of whether they are efficient or not (Bodie et al., 2009).

Mathematically, the CAPM could be calculated as follows:

$$Er_p = r_f + \beta_i\left(Er_m - r_f\right), \tag{3}$$

where

Er_p	is the expected return of the portfolio
r_f	is the risk-free rate
β_p	is beta of the portfolio

$(Er_m - r_f)$ is expected market risk premium

Even though the CAPM is widely accepted and used both in academic and professional work in finance, the model has its critics. For instance, (Rossi, 2016) argues that since the market is so huge, it is nearly impossible to measure specifically the market portfolio's premium over the risk-free rate. In addition, Roll (1977) claims that market portfolio is impossible to determine, not because of the size but the number of securities in the world. Determining a market portfolio would require monitoring every single asset in the world with some value of owning, which is rather unrealistic.

3.9 Fama & French three-factor model

Criticism regarding CAPM and its ability to capture future returns arose in discussions on whether different factors, such as price momentum, company size, or valuation metrics, included in the CAPM could enhance the models for predicting returns (Fama and French, 1992). This led to the development of factor models. Since then, these factors seemed to have better power of predictability than the market risk factor, beta. As mentioned, Banz (1981) discovered the small company effect since smaller companies seemed to provide higher average returns. Both absolutely and in relation to risk or volatility. Jegadeesh and Titman (1993) noticed the momentum effect since stock prices had a tendency to move in the same direction as in the most recent history of up to 6-12 months. Moreover, Fama and French (1993) studied and discovered factors consistent with Banz's (1981) contribution and would rationalize asset prices and provide explanatory power to the extent. At first, they discovered that several reports found systematic cross-sectional patterns in mean returns depending on companies' market capitalization, various valuation metrics, such as price/earnings, price/free cash flow, and book-to-market multiples, revenue growth, and momentum factors like price return of the past twelve months. They claimed that such patterns could not be explained by traditional CAPM. Therefore, additional risk factors should be included in the equation. In addition to the size factor, they analyzed the value effect and discovered that stocks with low book-to-market ratios tend to outperform the market. Therefore, they even questioned the validity of the "original" CAPM since the results were economically significant. As a result of the academic evidence, they formed an extension based on CAPM, a three-factor model. The model includes firm size and book-to-market ratio, new risk factors besides the initial risk factor, company beta. By including these factors, the model can adjust for the tendency of equities to outperform. Mathematically, the equation is calculated as follows (Fama & French, 1996):

$$E(r_p) - r_f = \beta_i\left[E(r_m) - r_f\right] + s_p E(SMB) + h_p E(HML), \quad (4)$$

where $E(Ri) - Rf$ refers to the expected excess return of portfolio i, $E(Rm) - Rf$, $E(SMB)$, and $E(HML)$ are the factors' expected investment premiums, and βi,si, and hi, are the slopes in the model's time-series regression, i.e. factor sensitivities.

3.10 Fama & French five-factor model

Fama and French (2006) introduced a five-factor model with additional factors, continuing from the three-factor model. Studies have shown that the initial three-factor model fails to explain the profitability and investment-related variance in mean stock returns. For instance, Novy-Marx (2013) discovered that the profitability proxied by gross profit to assets strongly correlates with average returns. In addition, including the profitability factor improves the predictability of average returns.

Fama and French (2015), motivated by academic findings, invented the updated model with additional factors. The added factors were investment (CMA) and profitability (RMW). The CMA factor demonstrates the difference between the portfolio returns of low and high-investment companies. The RMW factor reflects the differences between portfolios of robust profitability and weak profitability companies. The formula is calculated as follows:

$$E(R_i) - R_f = B_i\left[E(R_m) - R_f\right] + s_i E(SMB) + h_i E(HML) + r_i E(RMW) + c_i E(CMA), \quad (5)$$

where $E(Ri) - Rf$ refers to expected excess return on portfolio i, $E(Rm) - Rf$, $E(SMB)$, $E(HML)$, $E(RMW)$, and $E(CMA)$ are the factors' expected investment premiums, and β, s, h, r, and c are the slopes in the model's time-series regression, i.e. factor sensitivities.

3.11 Sharpe ratio

Sharpe ratio is a widely used risk measurement figure in the mutual fund industry and portfolio analysis in general. Sharpe ratio is also referred to as the reward-to-variability ratio since it describes that the optimal portfolio is the one that generates the largest risk premium over its corresponding standard deviation. As equation 6 demonstrates, the ratio measures the relationship between the mean excess return of the portfolio and its standard deviation (Sharpe, 1966). In this context, the excess return is defined as the risk premium of the portfolio over the risk-free rate. The Sharpe ratio is derived from the capital market line (CML) since it labels a portfolio's excess return in relation to the total risk of the underlying portfolio. Regarding performance comparisons, the corresponding benchmark is based on the slope of the capital market line, which demonstrates excess return over the market, divided by the portfolio's standard deviation or volatility. Simply, if the Sharpe ratio is higher than the slope of CML, the portfolio outperforms its benchmark. The concept of the Sharpe ratio is based on the mean-variance theory; thus a useful measure of risk-adjusted performance metric, which allows portfolios' risk to be evaluated by standard deviation and their returns are normally distributed (Ornelas et. al., 2012)

Mathematically, the Sharpe ratio is calculated as follows:

$$Sharpe\ ratio = \frac{r_p - r_f}{\sigma_p}, \tag{6}$$

where

r_p is the return of the portfolio

r_f is the risk-free rate

σ_p is the standard deviation of the portfolio

The formula for the Sharpe ratio is simple: it is a security's excessive return over a risk-free rate divided by the asset's volatility. Investors tend to chase securities with high Sharpe ratios to generate alpha in the future. A security can obtain a high Sharpe with a high return or a low level of risk.

3.12 Treynor's ratio

Another risk-adjusted metric for security analysis is Treynor's ratio (Treynor, 1965). Treynor's ratio is similar to the Sharpe ratio as they measure excess return divided by risk. The difference between the two is the form of risk. While the Sharpe ratio uses the portfolio's standard deviation as a denominator, Treynor's ratio uses the portfolio's beta as a denominator. In other words, Treynor's ratio indicates alpha per unit of market or systematic risk (Kidd, 2011).

Mathematically, the Treynor's ratio is calculated as follows:

$$Treynor's\ ratio = \frac{r_p - r_f}{\beta_p}, \tag{7}$$

where

r_p is the return of the portfolio

r_f is the risk-free rate

β_p is the beta of the portfolio

Treynor's ratio is a useful tool in addition to the Sharpe ratio since it focuses on systemic risk and not on diversifiable risk as the Sharpe ratio. Roll (1978) argues that there are two important topics to consider when selecting a mutual fund. Firstly, the correlation between alpha and market risk might be underrated if the fund with low beta and high risk due to a low level of diversification outperforms a fund with high beta and broad diversification risk-adjusted. The second aspect is the benchmark's suitability. A suitable index is crucial when conducting security selection. Roll (1978) states in his research that funds with low beta and volatile benchmarks might have higher Treynor ratios artificially than funds with high beta and less volatile benchmarks. This could potentially cause a problem where investors allocate their capital into funds with unfitting risk profiles due to a lack of knowledge.

3.13 Jensen's alpha

The model of Jensen's Alpha is strongly related to the Capital Asset Pricing Model (CAPM), which was previously introduced (Jensen, 1968). Jensen's alpha could be defined as an excessive return of the portfolio, measured as the difference between the actual mean return of the portfolio and the expected return, estimated using CAPM and given market conditions and the level of risk. For a mutual fund, Jensen's alpha is its deviation from the security market line (SML) as it visually represents the CAPM. A positive deviation implies excessive returns, and a negative deviation demonstrates the fund's underperformance. A positive alpha indicates the fund is above the SML and demonstrates outperformance compared to the benchmark (Brown et al. 2009).

Mathematically, the Treynor's ratio is calculated as follows:

$$Jensen's\ alpha = r_p - [r_f + \beta_p * (r_m - r_f)], \tag{8}$$

where

r_p	is the return of the portfolio
r_m	is the market return
r_f	is the risk-free rate
β_p	is the beta of the portfolio

Jensen’s alpha is explicit to measure, demonstrating the portfolio manager's stock selection ability. The figure is essential to investors as they need to assess the investment's associated risk. If two securities yield the same return but the level of risk is different, the one with lower risk is logically preferred.

Jensen’s alpha has its limitations as well. The major notable negative factor of the model is using beta as the risk meter. Since it requires an estimation of the beta, which can fluctuate greatly depending upon the source, the model may lead to mismeasurement of risk-adjusted performances. Moreover, in his report, Jensen (1968) claimed that positive alpha, especially from a short period, could be a sign of distortion or luck in portfolio managers' predictions.

3.14 Information ratio

As a figure, the information ratio demonstrates the portfolio performance and how active the fund is compared to the benchmark. The figure represents the money manager’s ability to generate abnormal returns in relation to the benchmark index and indicates if the outperformance is due to additional risk taken by the portfolio manager or due to skill and effective security selection (Clarke, 2020). Mathematically, the information ratio is calculated as follows:

$$Information\ ratio = \frac{(r_p - r_m)}{\sigma_{rm}}, \tag{9}$$

where

r_p	is the return of the portfolio
r_m	is the market return
σ_{rm}	is the standard deviation of the excess return with respect to the market return

The information ratio can be considered a performance metric rather than an activity measure since the denominator, tracking error, is considered a portfolio risk measure. Nevertheless, tracking error figures could be considered a level of activity when calculating information ratio. Thus, the information ratio could also be seen as a ratio for the portfolio management activity. However, activity and excessive return are usually connected with each other; therefore, they should be considered together as well (Goodwin, 1998). Regarding the absolute value of the information ratio, a higher value demonstrates a successful portfolio management strategy since a higher numerator value indicates higher excessive returns over the benchmark index, and a lower denominator number refers to a lower level of risk of the portfolio in relation to the benchmark portfolio.

4 Data and research methodology

This chapter reveals data and research methodology in detail. The data used in the empirical research is also introduced and explained, along with how it is gathered and the reasoning behind the final research group, in other words, what requirements the funds included needed to meet to be selected.

4.1 Research participants

The data used in the thesis is historical price data derived from the Bloomberg database. In order to calculate both absolute and risk-adjusted returns, historical net asset values (NAV) of funds are collected for further calculation and research. Taxation is ignored in the research due to its global scope since the motivation is to provide academic research for asset managers and investors around the globe. In addition, some of the funds generated dividend income during the sample period, which were also considered when calculating total returns since they have a major impact on return figures. Also, all fund and benchmark returns are calculated in USD.

Regarding fees, performance calculations are net of fees since NAV figures are used, which means that management and performance fees are included in the research. However, trading fees are ignored due to limited data regarding funds' redemption and subscription fees. The risk-free rate of return also needs to be clarified for risk-adjusted performance calculations. In this thesis, the risk-free rate is equivalent to the US government's 3-month treasury bill. The risk-free rate is introduced in more detail later.

Mutual funds

Regarding selection criteria, the following criteria were exploited out of 1,28 million investment funds in the Bloomberg database to narrow the research scope. At first, inactive funds were excluded since the objective is to provide relevant information for investors and asset managers. Closed mutual funds are not possible instruments for investors to allocate; thus, they will not add value for existing market participants. Secondly, only primary institutional share classes are considered in this thesis. Mutual funds often have different share classes for different investor types. However, to make the research meaningful, share classes meant for the same investor type is the most reasonable way to construct the research since the total expense ratios (TER) tend to vary across different investor types. For example, retail investors pay higher fees than institutions. The third criterion was the asset class of the fund. In this thesis, only long equity funds are considered. Balanced funds, which allocate assets across asset classes, are excluded from the study. The fourth criterion was the geographical focus. With the Bloomberg database, a screen called “emerging markets” was used to filter funds that invest primarily in Emerging markets globally. The last filter was regarding market capitalization levels of the fund’s holdings. Bloomberg filter “market capitalization” was used, and only mutual funds with small-cap companies were selected as research participants. The last criterion for funds was that the fund must have been active throughout the research period; if the NAV values could not be calculated for the period, the fund was excluded from the study.

Out of 1.28 million mutual funds globally listed in Bloomberg database, the target group was narrowed down to 28 emerging markets small-cap mutual funds. The final list of the selected funds is provided with Bloomberg tickers in table 2.

Bloomberg ticker	**Fund name**
AEMINIA LX Equity	abrdn SICAV I - Emerging Markets Smaller Companies
TQEZX US Equity	AMG TimesSquare Emerging Markets Small Cap
AECLX US Equity	American Century Emerging Markets Small Cap
AEMGSCI LX Equity	Ashmore SICAV Emerging Markets Global Small-Cap
DANGEMI LX Equity	Danske Invest SICAV - Global Emerging Markets Small Cap
DEMSX US Equity	DFA Emerging Markets Small Cap Portfolio
DFESX US Equity	DFA Emerging Markets Social Core Equity
DEMKTVA ID Equity	Dimensional Funds II PLC - Emerging Markets Targeted Value
DRESX US Equity	Driehaus Emerging Markets Small Cap Growth

EPASX US Equity	EP Emerging Markets
EQMSC2K FH Equity	eQ Kehittyvät Markkinat Pienyhtiö
EVEMFIB FH Equity	Evli Emerging Frontier
FPS0009 AU Equity	Fiducian Global Smaller Companies and Emerging Markets
GPEIX US Equity	Grandeur Peak Emerging Markets Opportunities
JOMMX US Equity	JOHCM Emerging Markets Discovery
JPMEMSU LX Equity	JPMorgan Funds - Emerging Markets Small Cap
LPVEMSI GR Equity	L&P Value EM Small Cap
MSMLX US Equity	Matthews Emerging Markets Small Companies
OIEMX US Equity	Oberweis Emerging Markets
POLSMLC LX Equity	Polunin Funds - Emerging Markets Small Cap
PGIOGEI ID Equity	Principal Global Investors Funds - Origin Global Emerging Markets
RBCEMSO LX Equity	RBC Funds - Emerging Markets Small Cap Equity
SIGEMSI LX Equity	Schroder International Global Emerging Markets Smaller Companies
SSEMSIU LX Equity	SSGA Luxembourg SICAV - Emerging Markets Small Cap ESG
TSCIAUS LX Equity	Templeton Emerging Markets Smaller Companies
VAESX US Equity	Virtus KAR Emerging Markets Small-Cap
WAEMX US Equity	Wasatch Emerging Markets Small Cap
WESNX US Equity	William Blair SICAV - Emerging Markets Small Cap Growth

Table 2. List of funds

Benchmark

In order to have a meaningful and reasonable comparison, it is essential to declare a proper benchmark to be compared against active funds. The MSCI Emerging Markets Small Cap Net Total Return USD Index is the selected benchmark in this study. The index covers small-cap representation globally across 24 Emerging countries. The benchmark includes 2052 individual companies, covering approximately 14 % of the market cap in each country. Compared to larger companies in such countries, the small-cap indexes tend to cover more local economic and sector characteristics (MSCI, 2024).

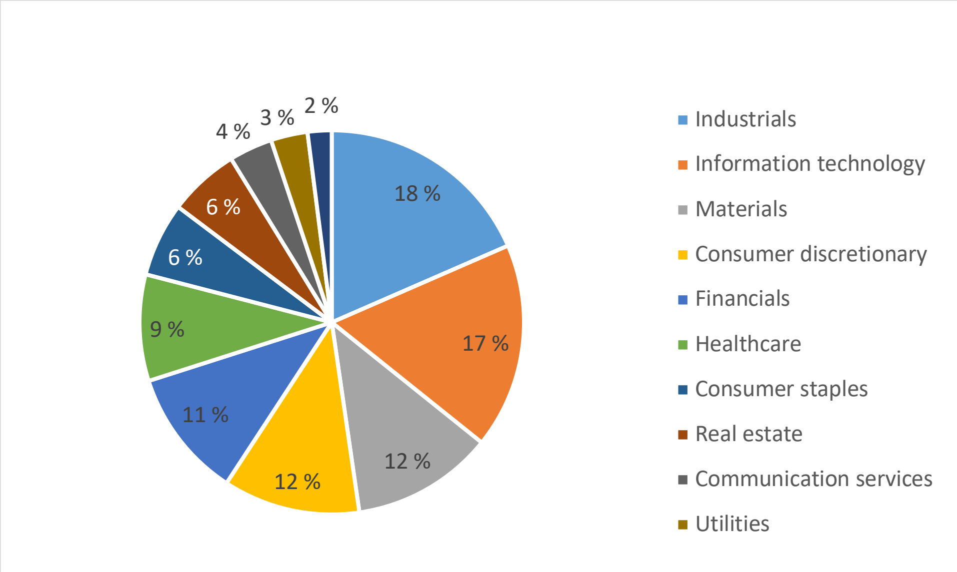

Figure 1. Sector allocation of the benchmark

As Figure 1 demonstrates, the largest sector in the benchmark is industrial companies, with a total of 18%, followed by IT, with a weight of 17 %. Regarding the smallest sector of the benchmark, utilities account for 2 %, followed by the second smallest sector, communication services.

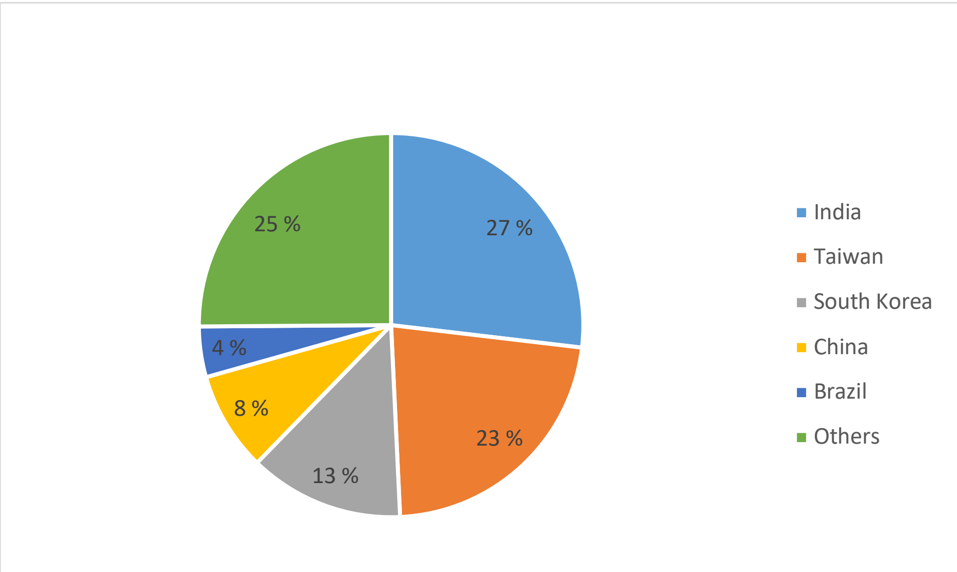

Figure 2. Geographical allocation of the benchmark

Regarding country or geographical allocation, figure 2 indicates that the benchmark is concentrated on two countries, India and Taiwan. The two largest countries cover approximately 50 % of the benchmark, which is a major country risk for the market portfolio or investor who would like to invest in Emerging markets small cap equities with a passive strategy by index fund or ETF. The benchmark selection is a natural choice since the mutual funds included in the thesis invest in small-cap equities. Thus, the index should be a small-cap index to gain relevant and meaningful results.

4.2 Data

Mutual funds

As mentioned, raw data regarding funds' Net asset values (NAV) are used in the research. The data frequency is every month. Thus, the last NAV of the month is considered for each fund. The data is derived from Bloomberg, which is widely trusted by investment banks around the globe and is considered a reliable data source for quantitative research.

The study's five-year period is mainly due to the limited data. Specifically, most emerging market small-cap funds are relatively young; thus, conducting research for longer periods is impossible. As mentioned, to exclude currency risks and fluctuations, all the return calculations for each fund and the benchmark figures are calculated in USD.

Fund	Size (mUSD)	N of holdings	TER (%)	Inception date
AEMINIA LX Equity	182,4	57	1,34 %	12.3.2007
TQEZX US Equity	1,9	86	1,37 %	12.4.2016
AECLX US Equity	17,2	96	1,65 %	7.4.2016
AEMGSCI LX Equity	28,5	48	1,81 %	10.10.2011
DANGEMI LX Equity	29,6	56	1,16 %	1.6.2007
DEMSX US Equity	4477,1	4813	0,59 %	4.3.1998
DFESX US Equity	1611,4	5698	0,44 %	31.8.2006
DEMKTVA ID Equity	464,7	3785	0,73 %	23.4.2007

DRESX US Equity	113,1	91	1,25 %	1.12.2008
EPASX US Equity	88,7	74	1,77 %	1.12.2010
EQMSC2K FH Equity	71,4	44	1,50 %	31.5.2017
EVEMFIB FH Equity	234,0	34	0,95 %	7.10.2016
FPS0009 AU Equity	1407,9	105	1,33 %	1.1.1999
GPEIX US Equity	416,7	111	1,50 %	16.12.2013
JOMMX US Equity	59,9	122	1,49 %	17.12.2014
JPMEMSU LX Equity	1149,1	82	0,91 %	9.3.2011
LPVEMSI GR Equity	4,8	97	1,58 %	3.12.2018
MSMLX US Equity	684,2	75	1,34 %	15.9.2008
OIEMX US Equity	17,4	70	1,50 %	1.5.2018
POLSMLC LX Equity	30,9	180	2,98 %	10.12.2007
PGIOGEI ID Equity	77,8	107	0,99 %	11.4.2013
RBCEMSO LX Equity	2,9	60	1,30 %	28.4.2015
SIGEMSI LX Equity	168,5	72	1,33 %	29.1.2014
SSEMSIU LX Equity	285,2	451	1,30 %	21.12.2016
TSCIAUS LX Equity	397,3	89	1,41 %	18.10.2007
VAESX US Equity	284,8	40	1,79 %	17.12.2013
WAEMX US Equity	351,1	52	1,96 %	1.10.2007
WESNX US Equity	408,2	128	1,40 %	1.3.2013
Average	466,7	597,3	1,38 %	
Median	175,5	87,5	1,36 %	
Min	1,9	34	0,44 %	
Max	4477,1	5698	2,98 %	
Count	28	28	28	28

Table 3. Descriptive statistics of the mutual funds

The descriptive statistics table contains four different features of each fund: assets under management (AUM), number of holdings, TER, and the date of inception. The AUM figures vary a lot since the smallest fund is only 1,9 million USD, and the largest fund of the study is 4 477,1 million USD. In general, the mutual funds of the study are not very large given that the median size is USD 175,5 million, which is not surprising since the market is not as large as that of larger companies. Thus, mutual funds' AUMs cannot be as large as large-cap funds' counterparts.

The range is also wide regarding the number of holdings in portfolios. The most concentrated portfolio includes only 34 companies, while the widest diversification is 5698, which is more than the benchmark. On average, portfolios are more concentrated than the benchmark since the average number of holdings is 597,3, while the benchmark includes 2052 companies, as mentioned earlier.

The figures regarding mutual fund fees vary heavily as well. The highest ongoing fee is 2,98 %, while the most inexpensive fund is 0,44 %. In other words, the most expensive fund is over six times more expensive than the cheapest. However, on average, the mutual fund's management fee is 1,38 % annually, which could be considered relatively low, especially when considering actively managed equity funds.

Benchmark

As mentioned, the benchmark index in this thesis is the MSCI Emerging Markets Small Cap Index. The given index is a total return index, so the performance includes dividends. The index is calculated in USD, as are mutual funds' NAVs in the research. Figure 2 demonstrates that the benchmark's total return is 50,47 % and 10,09 % annually for 5 years.

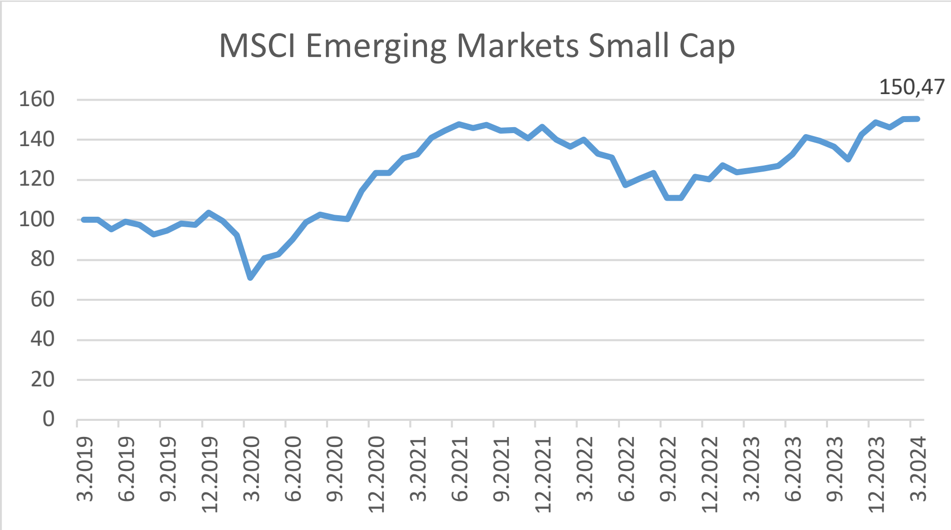

Figure 3. Benchmark returns over the period

Risk-free rate

A risk-free rate is an essential component for risk-adjusted performance analysis and vital when calculating risk-adjusted returns. As mentioned earlier, the US 3-month treasury bill is selected as a risk-free rate. The main justification is that both mutual funds and the study's benchmark are noted in dollars. Thus, selecting the risk-free rate of the corresponding currency is a rational decision. Also, the rate in question is widely used in the academic and professional world of finance as a reference for the risk-free rate.

Figure 4. The development of a risk-free rate 2019-2024

As shown in Figure 4, the interest rate environment has been volatile during the research period. After the quantitative easing followed by the pandemic of Covid 19, the short-term interest rates were at zero level from March 2020 until the end of 2021. However, due to the rapid increase in inflation due to quantitative easing and Russia's invasion of Ukraine, which even bolstered the rapid inflation, central banks were forced to raise interest rate levels fast up to 5 %. At the end of the research period, 29.3.2024, the US 3-month treasury bill rate is 5,4 %, averaging 2,2 % during the period monthly.

4.3 Portfolio performance measures

Absolute returns

For absolute returns calculations using funds, monthly NAV figures are conducted. In this study, total and annualized returns for five years are introduced. As mentioned earlier, the data for each fund is in USD and gathered from the Bloomberg database. For annualized returns, geometric average returns are calculated by dividing the total return by the number of years, thus by five, in this thesis.

Tracking error and Active share

One of the objectives is to analyze if the funds selected in the study are truly active, and tracking error and active share figures are calculated. The tracking error is calculated by exploiting absolute monthly return figures of mutual funds and the benchmark. The difference between the two is calculated, and then the standard deviation of the differences is calculated. The final step is annualizing the monthly tracking error, which is done by multiplying the monthly tracking error number by a square root of 12. The minimum figure for being considered an active fund is 5 %, as Vardharaj et al. (2004) and Alford et al. (2003) suggest.

Active share figures were calculated on an annual basis. The methodology was introduced earlier in the theory section. As the figure represents the differences in holdings at a certain time, it is reasonable to calculate the active share throughout the research period to demonstrate how active the mutual funds have been. The development of active shares is introduced in the next chapter. As Cremers and Petajisto (2009), the minimum percentage for being considered as an active fund is 60 %. Active shares are calculated from mutual funds' holdings data from Bloomberg database.

Risk-adjusted performances

Different investments have different risk profiles. When calculating returns on an absolute basis, results and conclusions might be misleading. Risk-adjusted returns must also be calculated when conducting security analysis and selection. For that purpose, Sharpe, Treynor's, and Information ratios are calculated in addition to Jensen's alpha. For these figures, mutual funds' volatilities and betas must be calculated. For volatilities, standard deviations of monthly returns are taken and multiplied by the square root of 12. As for betas, the values are derived from regression for each fund in relation to the benchmark. As a risk-free rate, a US 3-month treasury bill is used. These figures will provide a better understanding of how the portfolio managers performed in relation to the risks they have taken during the period. Sharpe and Treynor's ratios are compared to those of their benchmark counterparts on an absolute basis. For both figures, a positive number indicates outperformance in relation to risk. As for Jensen's alpha, a positive figure indicates that the fund has generated a higher return than CAPM excepted. The information ratio is also compared to the benchmark; a positive value indicates excessive returns.

Regarding the Fama & French factor models, this study considers only the five-factor model since it is more recent and comprehensive and considers more factors when explaining portfolios' out- or underperformances. The alphas of the regressions with P-values are provided in the next chapter. The coefficients of the time-series regression demonstrate the alphas of the portfolios, with negative values indicating underperformance and positive values denoting outperformance.

5 Empirical findings

This chapter introduces the study's empirical results with illustrative charts and tables. First, mutual funds' activity is demonstrated and discussed further. In the second subchapter, absolute returns and different risk metrics are introduced. The final subchapter introduces and analyzes risk-adjusted performance figures and results from the Fama and French five-factor model.

5.1 Funds' activity

This chapter evaluates mutual funds' portfolio management and activity. As mentioned earlier, it is important for investors to evaluate whether an actively managed mutual fund is indeed active if they are considering investing in it. If the fund is a so-called closet index, investors should not pay higher fees but allocate their capital to passive index funds or ETFs, which charge lower fees.

Table 4 includes the figures for tracking errors for the whole research period and annual active share numbers. As the results demonstrate, sample funds were extremely active compared to the benchmark during the research period. The average tracking error for the funds was 7,4 %, considered high, indicating a clear sign of active portfolio management. The median number was even higher, accounting for 7,5 %. However, there was a wide variance among sample funds since the lowest number was 3,8 % and the highest was 12,0 %. Nevertheless, sample funds deviated a lot from the benchmark regarding tracking errors.

Fund	TE 5y	AS 2019	AS 2020	AS 2021	AS 2022	AS 2023	AS 2024	AS Average
AEMINIA LX Equity	5,5 %	97,8	97,4	97,2	96,3	95,6	97,1	96,9
TQEZX US Equity	6,6 %	98,5	95,4	96,7	96,6	96,5	96,5	96,7

AECLX US Equity	6,1 %	94,3	96,0	95,4	95,2	95,9	94,7	95,2
AEMGSCI LX Equity	9,4 %	96,8	96,2	96,9	97,7	97,2	97,8	97,1
DANGEMI LX Equity	5,5 %	97,1	97,4	97,1	96,3	95,8	97,0	96,8
DEMSX US Equity	4,3 %	52,5	51,7	65,7	54,9	55,8	49,8	55,1
DFESX US Equity	7,4 %	83,2	85,8	84,0	81,6	80,0	77,3	82,0
DEMKTVA ID Equity	4,8 %	69,9	72,0	71,0	69,2	69,2	66,6	69,6
DRESX US Equity	8,0 %	94,8	96,0	93,8	94,8	95,5	95,7	95,1
EPASX US Equity	7,8 %	96,5	96,0	97,1	97,8	97,7	98,6	97,3
EQMSC2K FH Equity	7,8 %	99,2	99,3	99,4	99,5	99,3	99,4	99,3
EVEMFIB FH Equity	12,0 %	99,4	99,7	99,5	98,8	99,1	99,9	99,4
FPS0009 AU Equity	9,1 %	94,9	95,3	95,4	95,0	95,4	97,1	95,5
GPEIX US Equity	7,0 %	96,8	96,3	97,1	97,4	97,0	97,6	97,1
JOMMX US Equity	5,9 %	93,3	93,2	92,8	94,0	95,2	94,1	93,8
JPMEMSU LX Equity	6,8 %	96,2	96,3	96,3	97,6	97,0	97,5	96,8
LPVEMSI GR Equity	7,9 %	99,5	98,1	97,3	96,0	95,3	97,1	97,2
MSMLX US Equity	10,7 %	98,2	97,2	97,8	97,9	97,8	97,6	97,8
OIEMX US Equity	7,9 %	96,5	96,9	97,7	98,6	96,3	97,1	97,2
POLSMLC LX Equity	7,7 %	96,6	96,2	96,2	96,0	96,7	97,1	96,4
PGIOGEI ID Equity	10,0 %	98,6	97,2	97,6	98,3	98,1	98,6	98,0
RBCEMSO LX Equity	6,1 %	95,7	95,9	96,8	96,9	96,4	96,2	96,3
SIGEMSI LX Equity	5,3 %	95,7	96,2	96,9	97,2	97,6	97,3	96,8
SSEMSIU LX Equity	3,8 %	72,0	72,2	71,3	73,5	74,0	76,1	73,2
TSCIAUS LX Equity	7,3 %	96,9	96,9	96,6	96,9	96,5	96,1	96,7
VAESX US Equity	9,3 %	98,7	99,2	99,2	99,3	98,7	99,3	99,0
WAEMX US Equity	9,5 %	96,1	96,7	97,2	97,9	96,7	98,1	97,1
WESNX US Equity	8,5 %	92,8	92,2	91,9	92,0	93,8	93,7	92,7
Average	**7,4 %**	**92,8**	**92,8**	**93,3**	**93,0**	**92,8**	**92,9**	**92,9**
Median	**7,5 %**	**96,5**	**96,2**	**96,8**	**96,7**	**96,5**	**97,1**	**96,8**
Min	**3,8 %**	**52,5**	**51,7**	**65,7**	**54,9**	**55,8**	**49,8**	**55,1**
Max	**12,0 %**	**99,5**	**99,7**	**99,5**	**99,5**	**99,3**	**99,9**	**99,4**
Count	**28**	**28**	**28**	**28**	**28**	**28**	**28**	**28**

Table 4. Tracking error and Active share figures 2019-2024

Regarding active share, the average annual active share during the whole period was 92,9, which can be considered highly active. The median was higher, totaling 96,8. The variance among mutual funds was relatively wide with active share figures as well since the lowest number was only 55,1, which indicates the fund is a closet-index fund according to Cremers and Petajisto (2009), while the highest number was 99,4. The portfolio with such a high active share could be considered extremely active, which almost entirely deviates from the benchmark portfolio. The results of the active shares have been on the same level throughout the research period as well, with the lowest average number being 92,8 in 2019 and 2020 and the highest 93,3 in 2021; thus, the activity of the sample funds has been constant. The numbers in table 4 suggest the same result as tracking error figures; the sample funds are indeed active in relation to the benchmark, and on that topic, they fulfill their value proposition regarding active portfolio management. The next chapter evaluates whether the activity of the portfolio managers has been rewarding or not in terms of risk-adjusted performances.

5.2 Absolute returns

First, the absolute returns of each fund, in addition to the benchmark, are provided. Additionally, annualized volatility and beta values for the research period are revealed. The table's results will answer whether the fund outperformed the benchmark on an absolute basis.

Bloomberg	**Total return 5y**	**Absolute return 5y p.a.**	**Volatility 5y**	**Beta 5y**
AEMINIA LX Equity	44,1 %	8,8 %	20,7 %	0,98
TQEZX US Equity	43,1 %	8,6 %	16,8 %	0,79
AECLX US Equity	38,8 %	7,8 %	18,0 %	0,85
AEMGSCI LX Equity	33,5 %	6,7 %	22,8 %	1,02

DANGEMI LX Equity	43,0 %	8,6 %	20,8 %	0,98
DEMSX US Equity	33,5 %	6,7 %	18,9 %	0,91
DFESX US Equity	19,1 %	3,8 %	19,0 %	0,87
DEMKTVA ID Equity	32,5 %	6,5 %	20,4 %	0,97
DRESX US Equity	69,3 %	13,9 %	18,0 %	0,81
EPASX US Equity	19,7 %	3,9 %	18,2 %	0,83
EQMSC2K FH Equity	25,0 %	5,0 %	19,8 %	0,90
EVEMFIB FH Equity	115,5 %	23,1 %	22,0 %	0,91
FPS0009 AU Equity	15,4 %	3,1 %	17,3 %	0,76
GPEIX US Equity	32,3 %	6,5 %	17,9 %	0,83
JOMMX US Equity	65,0 %	13,0 %	17,7 %	0,83
JPMEMSU LX Equity	22,9 %	4,6 %	18,9 %	0,87
LPVEMSI GR Equity	49,1 %	9,8 %	20,8 %	0,94
MSMLX US Equity	85,0 %	17,0 %	19,1 %	0,80
OIEMX US Equity	55,2 %	11,0 %	17,9 %	0,81
POLSMLC LX Equity	56,6 %	11,3 %	22,3 %	1,03
PGIOGEI ID Equity	9,4 %	1,9 %	18,6 %	0,80
RBCEMSO LX Equity	10,7 %	2,1 %	18,6 %	0,87
SIGEMSI LX Equity	52,4 %	10,5 %	20,0 %	0,95
SSEMSIU LX Equity	70,4 %	14,1 %	20,2 %	0,97
TSCIAUS LX Equity	31,5 %	6,3 %	20,8 %	0,95
VAESX US Equity	37,5 %	7,5 %	16,7 %	0,73
WAEMX US Equity	44,5 %	8,9 %	19,3 %	0,84
WESNX US Equity	53,7 %	10,7 %	17,6 %	0,78
Average	**43,2 %**	**8,6 %**	**19,2 %**	**0,88**
Median	**40,9 %**	**8,2 %**	**18,9 %**	**0,87**
Min	**9,4 %**	**1,9 %**	**16,7 %**	**0,73**
Max	**115,5 %**	**23,1 %**	**22,8 %**	**1,03**
M1EFSC Index	50,5 %	10,1 %	20,4 %	1,00

Table 5. Absolute returns, betas and volatilities 2019-2024

Table 5 indicates that the mutual funds have underperformed the dedicated benchmark over the research period. The average total return was 43,2 %, while the benchmark generated 50,5 %. However, the variance among the funds was extremely wide since the worst fund provided a return of only 9,4 % while the best fund generated 115,5 %. The median return was lower than the average return, totaling 40,9 %. Even though mutual funds tend to underperform the benchmark, thus failing to fulfill their value proposition, their risk metrics seemed to be lower than the market portfolio, indicating that the risks of mutual funds were lower. As for the volatility, the average was 19,2 % among the mutual funds, while the benchmark had a volatility of 20,4 %. The median volatility was even lower, 18,9 %. Regarding beta values, the average figure was 0,88, and the median beta was 0,87. The figures demonstrate that the NAVs of the funds did not move as strongly as the benchmark, indicating a lower level of risk in the portfolios. The figures in the table clearly indicate that, on average, portfolio managers did provide lower absolute returns for investors. Nevertheless, the results also indicated that mutual funds had lower risks on average when using both volatility and beta figures as an assessment method. This leads to the question of whether the performances of portfolio managers could outperform the market in relation to risks taken. However, the results of risk-adjusted performances are revealed and discussed later in this chapter.

5.3 Risk relative returns

This study mainly examines the risk-adjusted performance of different strategies and portfolios. The figures mentioned are used to measure the performances of the long-only portfolios. Table 6 will include Sharpe and Treynor’s and Jensen’s alpha and Information ratios.

Bloomberg	Sharpe 5y	Treynor 5y	Jensen's Alpha 5y	Information ratio 5y

AEMINIA LX Equity	0,32	0,07	-1,1 %	-0,23
TQEZX US Equity	0,38	0,08	0,2 %	-0,22
AECLX US Equity	0,31	0,07	-1,1 %	-0,38
AEMGSCI LX Equity	0,20	0,04	-3,6 %	-0,36
DANGEMI LX Equity	0,31	0,07	-1,4 %	-0,27
DEMSX US Equity	0,24	0,05	-2,7 %	-0,79
DFESX US Equity	0,09	0,02	-5,2 %	-0,86
DEMKTVA ID Equity	0,21	0,04	-3,4 %	-0,75
DRESX US Equity	0,65	0,14	5,2 %	0,47
EPASX US Equity	0,10	0,02	-4,8 %	-0,79
EQMSC2K FH Equity	0,14	0,03	-4,3 %	-0,66
EVEMFIB FH Equity	0,95	0,23	13,7 %	1,09
FPS0009 AU Equity	0,05	0,01	-5,1 %	-0,77
GPEIX US Equity	0,24	0,05	-2,2 %	-0,52
JOMMX US Equity	0,61	0,13	4,2 %	0,49
JPMEMSU LX Equity	0,13	0,03	-4,5 %	-0,82
LPVEMSI GR Equity	0,37	0,08	0,2 %	-0,03
MSMLX US Equity	0,77	0,18	8,5 %	0,64
OIEMX US Equity	0,50	0,11	2,5 %	0,12
POLSMLC LX Equity	0,41	0,09	1,0 %	0,16
PGIOGEI ID Equity	-0,01	0,00	-6,6 %	-0,82
RBCEMSO LX Equity	0,00	0,00	-6,9 %	-1,31
SIGEMSI LX Equity	0,42	0,09	0,8 %	0,07
SSEMSIU LX Equity	0,59	0,12	4,2 %	1,05
TSCIAUS LX Equity	0,20	0,04	-3,4 %	-0,52
VAESX US Equity	0,32	0,07	-0,5 %	-0,28
WAEMX US Equity	0,35	0,08	0,1 %	-0,13
WESNX US Equity	0,49	0,11	2,4 %	0,08
Average	0,33	0,07	-0,5 %	-0,23
Median	0,32	0,07	-1,1 %	-0,28

Min	-0,01	0,00	-6,9 %	-1,31
Max	0,95	0,23	13,7 %	1,09
M1EFSC Index	0,39	0,08		

Table 6. Risk-adjusted performances 2019-2024

The results of the risk-adjusted performances are mixed, depending on the methodology. Table 6 demonstrates that regarding the Sharpe ratio, on average, mutual funds' performance is positive concerning risk, with the average and median numbers being 0,33 and 0,32. However, the Sharpe ratio of the benchmark is 0,39, indicating that, on average, sample funds lose to the benchmark risk-adjusted, even though the benchmark volatility was higher than the mutual funds' average.

Treynor's ratio indicated the same conclusion as Sharpe's. However, the difference is smaller with Treynor's ratio. The average number among mutual funds was 0,07, the same median, while the benchmark's counterpart was 0,08, implying slightly better performance.

Jensen's alpha average and median figure also suggest mutual funds' underperformance in relation to CAPM. The average alpha was -0,5 % and median -1,1 %, respectively. What is interesting regarding the numbers is that since the average TER was 1,38 %, mutual funds did outperform the benchmark before fees in theory. However, since management fees are a reality, it would not be reasonable to assess funds' performance without fees, as investing in mutual funds without fees is impossible in the real world.

Finally, the information ratio yields results identical to those of previous methods. The average figure was -0,23, and the median was -0,28, respectively. The negative results suggest that, on average, mutual funds underperformed in relation to benchmarks and risks taken. These results imply that portfolio managers did not benefit from taking additional risks.

Even though all four ratios suggest that, on average, sample funds tend to lose to the benchmark, the variation of the funds is extremely wide. For instance, with Sharpe, the lowest number was -0,01, indicating a negative risk-adjusted return, yet the highest number was 0,95, denoting a great outperformance in relation to the benchmark. As for Treynor's ratio, respective numbers were 0,00 and 0,23, giving the same indication that some of the active mutual funds do offer high excessive returns. Jensen's alpha is not different since the lowest and highest values were -6,9 % and 13,7 %. The same applies to the information ratio since the counterparts were -1,31 and 1,09. The results of table 6 are unanimous: after management fees and, on average, sample funds tend to underperform on a risk-adjusted basis. However, there is a clear sign that active portfolio management can offer extremely high excessive returns over benchmark on an absolute and risk-adjusted basis.

5.4 Results from Fama & French five-factor model

This chapter reveals and discusses the results of the Fama & French five-factor model and its regressions. The coefficients and P-values are derived from a time-series regression framework. The results suggest from the previous chapters that on absolute terms, mutual funds, on average, tend not to provide abnormal returns. The following results in table 7 provide additional analysis and further insight into whether the portfolio managers have been able to generate excessive returns after controlling for the Fama and French five-factor model. The results of the regression also improve the robustness of this thesis and clarify whether the results are statistically significant regarding abnormal returns.

All funds

First, results from the factor model regression are provided in table 7. The table includes the intercept values, which indicate the portfolio's alpha or the rate of excessive returns. A positive value indicates positive alpha, while a negative value demonstrates negative alpha.

This table reports the five-factor regressions for the mutual funds. Reported values are regression intercepts from time-series regression, where the portfolio returns are regressed on factor returns. P-values are in parentheses. Alpha is in monthly terms, not annualized. The three statistically significant results are in bold.

Fund	Intercept	P-value
abrdn SICAV I - Emerging Markets Smaller Companies	0,188	(0,517)
AMG TimesSquare Emerging Markets Small Cap	0,263	(0,158)
American Century Emerging Markets Small Cap	0,092	(0,687)
Ashmore SICAV Emerging Markets Global Small-Cap	0,362	(0,332)
Danske Invest SICAV - Global Emerging Markets Small Cap	0,187	(0,523)
DFA Emerging Markets Small Cap Portfolio	-0,046	(0,663)
DFA Emerging Markets Social Core Equity Portfolio	-0,182	(0,100)
Dimensional Funds II PLC - Emerging Markets Targeted Value	-0,163	(0,202)
Driehaus Emerging Markets Small Cap Growth Fund	**0,654**	**(0,017)****
EP Emerging Markets Fund	0,132	(0,593)
eQ Kehittyvät Markkinat Pienyhtiö 2 K	0,028	(0,914)
Evli Emerging Frontier IB	0,941	(0,066)**
Fiducian Global Smaller Companies and Emerging Markets	-0,093	(0,749)
Grandeur Peak Emerging Markets Opportunities Fund	0,341	(0,089)**
JOHCM Emerging Markets Discovery Fund	0,398	(0,085)**
JPMorgan Funds - Emerging Markets Small Cap Fund	0,042	(0,848)
L&P Value EM Small Cap	0,042	(0,886)
Matthews Emerging Markets Small Companies	**1,009**	**(0,006)*****
Oberweis Emerging Markets Fund	**0,567**	**(0,023)****
Polunin Funds - Emerging Markets Small Cap Fund A	0,375	(0,252)
Principal Global Investors Funds - Origin Global Emerging Markets	-0,058	(0,764)
RBC Funds - Emerging Markets Small Cap Equity	-0,323	(0,178)
Schroder Global Emerging Markets Smaller Companies	0,294	(0,215)
SSGA Luxembourg SICAV - Emerging Markets Small Cap ESG Screened Equity	0,170	(0,392)
Templeton Emerging Markets Smaller Companies	0,047	(0,851)
Virtus KAR Emerging Markets Small-Cap Fund	0,403	(0,194)
Wasatch Emerging Markets Small Cap Fund	0,424	(0,253)

William Blair SICAV - Emerging Markets Small Cap Growth	0,469	(0,156)
Average	0,235	0,383
Median	0,188	0,253
Min	-0,324	0,006
Max	1,010	0,915
Note:		**p<0,1; **p<0,05; ***p<0,01*

Table 7. Results of the Fama and French regression

Table 7 demonstrates, on average, the alphas of the mutual funds are positive, being 0,235 and median 0,188. The results imply that according to the five-factor model, the sample funds are able to generate excessive returns. However, the P-value of the regression is 0,383 on average, and the median is 0,253. The P-values suggest that the results are not statistically significant enough, on the confidence level of 5 %. However, three mutual funds had statistically significant results: Driehaus Emerging Markets Small Cap, Matthews Emerging Markets Small Companies, and Oberweis Emerging Markets. Each of these funds generated a positive intercept value on a confidence level of 5 %. The results are discussed in more detail in the next chapter.

Statistically significant results from the five-factor model

This table reports three significant results from the previous five-factor regression table. Reported values are regression intercepts from time-series regression, where the portfolio returns are regressed on factor returns. P-values are in parentheses. Alpha is in monthly terms, not annualized.

	Driehaus Emerging Markets Small Cap	**Matthews Emerging Markets Small Companies**	**Oberweis Emerging Markets**
Intercept	0,654	1,010	0,567
	(0,018)**	(0,006)***	(0,024)**
Mkt-RF	0,956	0,957	0,936
	(5,27E-25)***	(1,36E-19)***	(2,04E-26)***
SMB	0,738	0,720	0,821
	(0,000)***	(0,004)***	(9,34E-06)***

HML	-0,248	-0,429	-0,226
	(0,105)	(0,036)**	(0,106)
RMW	-0,178	-0,435	-0,249
	(0,389)	(0,114)	(0,189)
CMA	0,221	0,178	-0,030
	(0,253)	(0,484)	(0,866)
Note:			*p<0,1; **p<0,05; ***p<0,01

Table 8. Regression results for three statistically significant performances

Table 8 demonstrates that the funds' intercepts were positive, with the lowest being 0,567 and the highest 1,010, indicating a clear sign of outperformance. The P-values of each intercept or alpha were statistically significant, with the highest value being 0,024, denoting statistical significance on a confidence level of 5 %.

In addition, all three funds had highly significant factor loadings for the market premium and SMB factors. This is intuitive since the sample funds are full equity portfolios investing in small-cap stocks.

Regarding the remaining factors of the model, the HML factor gave interesting findings, as negative HML factors indicate that these funds might focus more on small growth instead of value stocks. However, the factor loading is statistically significant only for the Matthews Emerging Markets Small Companies -fund. Even though the results of the RMW factor were not statistically significant, they offered consistent results with other regression results. Negative RMW factor loadings are in line with HML since small growth companies usually do not have a high level of operating profitability in their growth stage. CMA did not provide interesting results, and the coefficients were not statistically insignificant.

6 Conclusion

In this chapter, the results of the empirical research are concluded with answers to the research questions. First, the results regarding fund activity are discussed in detail. The second sub-chapter answers whether portfolio managers can add value by benchmark-beating absolute returns. The third sub-chapter includes answers regarding risk-adjusted performances and the overall conclusion in addition to suggestions for further research.

1. *Are mutual funds truly active?*

After analyzing funds' activity using two different assessment methods, tracking error and active share, we can conclude that the sample group of the funds used in this thesis is indeed remarkably active. Both active share and tracking error figures illustrate that most of the sample group deviates heavily from the corresponding benchmark.

Regarding tracking error, the average value of the sample groups was 7.4%, which can be considered a high figure for active portfolio management. The median of 7.5% supports the conclusion as well. However, within the sample group, the activity measured by tracking error varied from 3.8% to 12.0%, indicating a wide variance in portfolio managers' activity levels.

As for the active share, with an average value of 92,9 and median of 96,8, it can be claimed that the sample funds could be classified as highly actively managed mutual funds. The values imply that the research funds manage portfolios that deviate heavily from the benchmark's holdings. However, as with the tracking error, the variance was wide since the figures ranged from 55,1 to 99,4. The bottom of the range suggests that some proportions of the sample funds were so-called closet-index funds. At the same time, the highest value denotes a portfolio that is almost entirely deviated from the market portfolio.

Tracking error and active share figures support the conclusion that the sample funds were highly actively managed throughout the research period. Therefore, the fund's portfolio managers align and fulfill their active portfolio management value proposition and justify their higher management fees than passively managed ETFs or index funds. Nevertheless, since the ranges of both metrics were relatively wide, indicating high variance, investors should carefully conduct their due diligence on the fund's activity level when selecting their portfolio manager.

However, when considering small-cap mutual funds, the investable universe might be a key factor when explaining such high figures of active share and tracking error. In reality, when small-cap mutual funds grow their AUM large enough, they might need to reallocate some proportion of their capital towards mid-cap companies, resulting in higher active share and tracking error in comparison to small-cap benchmark. For instance, the smallest fund of the sample group was only 1,9 million USD, while the largest one had an AUM worth 4 477 million USD.

2. *Are portfolio managers able to provide excessive returns after fees?*

Analyzing the sample funds' performances on an absolute basis throughout the research period gives complicated and mixed results. Regarding total returns, the average portfolio manager generated a return of 43,2 %, below the benchmark's counterpart of 50,5 %. In addition, the median return was even lower among the mutual funds, 40,9 %. The rate of returns supports the previous literature and claims that most funds could not beat the broad market. These results also put portfolio managers' ability and trading strategies' effectiveness under criticism. Moreover, the discussion on higher fees might arise, and investors should consider whether paying for active portfolio management will bring additional value.

However, as discussed earlier in this thesis, active portfolio management is not only for achieving higher returns but also for gaining the same level of results with lower risk. As for the sample funds, the average annual volatility was 19,2 % and the median 18,9 %, while the benchmark had a volatility of 20,4 %. These numbers clearly demonstrate that even though the absolute returns of the sample funds were lower, portfolio managers did achieve their returns with slightly lower risks compared to the index. Moreover, the beta values of the funds support the same conclusion. During the research period, the average beta was 0,88 and the media of 0,87, indicating that the sample funds were less sensitive to the broad market and its movements, which ultimately is a sign of a lower level of risk.

As for the investors, the results regarding absolute returns and risks present a classic risk and return trade-off. The mutual funds did underperform the benchmark on an absolute basis, yet they performed with lower risk. The results could be useful for investors with lower risk profiles, such as insurance institutions that need to keep the volatility of their portfolios at a lower level. Less risk-averse investors can seek to outperform the market by investing in these funds. Still, it should be remembered that the relatively high absolute returns are accompanied by high variances, ranging from 9,4 % up to 115,5 %. The highest rate of return is over double the return compared to the benchmark, which supports the claim that with active portfolio management, it is possible to gain excessive returns, yet it is difficult to accomplish, even for professionals.

The findings regarding absolute returns and risk levels underline that investors must conduct versatile assessments when considering investing in a mutual fund. Both risk and return metrics need to be considered in the due diligence process and evaluate which security has the best risk-reward ratio or risk-adjusted return. Risk-adjusted performances are discussed in the next chapter.

However, even though the results are not too convincing for investors who are deciding whether to choose active or passive strategy when considering allocation decisions towards emerging markets small-cap equities, the research period is rather short due to the limited availability of data. As the time goes and emerging markets small-cap mutual funds have longer track records, it could be interesting to conduct similar research with longer time period.

Also, questions regarding fees could be raised. According to the data for Bloomberg, the average expense ratio was 1,38 %. As the average annual return of the funds was 8,6 % and the benchmark's counterpart 10,1 %, before fees, the portfolio manager's average return was close to the benchmark, being 9,98 %. The figure is close to the theoretical benchmark return which does not incur any fees. In reality, passive alternatives, for example, ETF, also incur expenses. iShares MSCI EM Small Cap UCITS ETF (BlackRock, 2024) has a TER of 0,74 %, for instance. When comparing real-world and practical options for EM small-cap investments, the difference between net total returns of active and passive strategies is not as wide as it seems in this study.

3. *Are portfolio managers able to generate excessive returns risk-adjusted?*

The evaluation of risk-adjusted returns of the sample funds gives further analysis and insights into their performance in relation to the benchmark. The results were derived using various widely used metrics, including Sharpe and Treynor's ratio, Jensen's alpha, and the Information ratio. Based on these theories, on average, the study's mutual funds tend to underperform the market risk-adjusted. Even though they did incur lower risk, their compensation in relation to risk was lower than the market's equivalent.

Regarding Sharpe and Treynor's ratio, the average Sharpe of the funds was 0,33, while the benchmark generated 0,39. As for the Treynor's ratio, the mutual funds' average was 0,07, whereas the benchmark provided 0,08. Both methodologies suggest that portfolio managers were not compensated enough for the risk compared with the market.

The figures for Jensen's alpha and Information ratio also supported the suggestion. The average Jensen's alpha of the mutual funds was -0,5 %, denoting a lower return than CAPM predicted. The Information ratio also supports the trend since the average figure was -0,23, indicating that portfolio managers could not generate returns from additional risks taken.

Even though the four assessment methods give the same conclusion, some funds generated significant risk-adjusted alpha. For instance, the highest Sharpe among the funds was 0.95. In addition, Jensen's alpha was the highest, at 13.7%. These figures can be considered significant risk-adjusted abnormal returns. The wide range also supports the claim that generating massive alpha in relation to risk is possible, yet it is difficult. However, on average, portfolio managers do not generate value by market-beating returns.

The extension of CAPM, the five-factor model, provides further analysis on the topic. On average, the intercepts of the regressions indicate positive alpha, which is a sign of outperformance and money managers' ability to generate abnormal returns. However, evaluated by the P-values of the regression model at a 5 % confidence level, the results are not statistically significant on average. However, few funds did generate statistically significant alphas as well. These funds were Driehaus Emerging Markets Small Cap, Matthews Emerging Markets Small Companies, and Oberweis Emerging Markets. All three funds provided a positive intercept on a confidence level of 1 %, demonstrating statistically significant alphas. The returns were driven mainly by market and size premiums with all three funds, which is not necessarily surprising since all the sample funds were Small-cap funds. Nevertheless, these findings also suggest that with an appropriate investment assessment and due diligence process in security selection analysis, it is possible to generate superior returns on an absolute and risk-adjusted basis.

To conclude, while the average portfolio manager of the study underperforms the market when considering risk-adjusted returns, there is a significant variance among performances. The results underline that in Emerging markets, especially small-cap markets, there is a considerable opportunity to generate significant returns and achieve superior outperformance. The findings imply that even though the average investor is most likely beaten by the benchmark, a more sophisticated investor could achieve benchmark-beating returns risk-adjusted with careful portfolio analysis and fund selection.

With answers to the three questions earlier, we can conclude the thesis, stating that, on average, the sample funds are extremely active; therefore, they fulfill their value proposition from one aspect. Also, they do provide returns with lower risk. Thus, they might be the correct option for a certain type of investor with restrictions towards portfolio risks. However, regarding absolute returns, on average, portfolio managers tend to lose to the broad market, yet some portfolio managers can provide alpha on absolute terms as well. Therefore, portfolio managers do not fulfill their value proposition by market-beating returns. Finally, when considering risk-return trade-offs, portfolio managers fail to fulfill their purpose on average since their risk-adjusted returns are lower than the benchmark's equivalent and, therefore, fail to add value. Nevertheless, results also indicate that active portfolio management could result in significant excessive returns on both absolute and risk-adjusted basis. Therefore, investors should conduct their research when considering allocating funds towards Emerging markets' small-cap equities and construct their analysis on whether paying higher fees for active portfolio management is worth it instead of choosing passively managed options as the results suggest when considering rates of return of the mutual funds.

Finally, future research could evaluate mid-cap mutual funds in Emerging markets. Analyzing mid-cap equities in such a market could also provide more reliable results since there are more mutual funds that focus on mid-cap equities in Emerging markets than smaller companies. Alternatively, hedge funds that focus on EM equities could be examined as they have more flexibility when it comes to portfolio construction as they do not have limits for diversification, for example. Also, as time passes, a longer research period could be investigated as the number of funds with longer histories should be higher in the future. In addition, further research could be conducted regarding AUM developments of the sample funds and their returns to see if an increase in AUMs undermined or boosted future returns. Also, it could be interesting to examine what factors explain the performances, negative or positive, and AUM growth of different funds and how they differ from each other. These findings could help investors to make better-informed decisions. Another interesting topic would be investigating if there is a connection between the AUM growth rate of mutual funds and their performances. As mentioned before, the larger the fund is in the small-cap region, the more difficult it is to invest in only pure small-cap companies, and they need to screen opportunities from mid-cap companies as well.

References

Agarwal, V., & Naik, N. Y. (2004). Risks and portfolio decisions involving hedge funds. *The Review of Financial Studies,* 17(1), 63-98.

Alford, A., Jones, R., & Winkelmann, K. (2003). A spectrum approach to active risk budgeting. *Journal of Portfolio Management*, 30(1), 49.

Allen, G. C. (2005). The active management premium in small-cap US equities. *Journal of Portfolio Management*, *31*(3), 10.

Amel-Zadeh, A. (2011). The return of the size anomaly: Evidence from the German stock market. *European Financial Management*, *17*(1), 145-182.

Apap, A., & Masson, D. J. (2005). NO-LOAD EQUITY MUTUAL FUNDS VERSUS THE S&P 500 INDEX FUNDS DURING BULL AND BEAR MARKETS. *Journal of Accounting & Finance Research*, 13(3).

Banz, R. W. (1981). The relationship between return and market value of common stocks*. Journal of financial economics*, 9(1), 3-18. https://doi.org/10.1016/0304-405X(81)90018-0

Bekaert, G., Harvey, C. R., & Mondino, T. (2023). Emerging equity markets in a globalized world. *Emerging markets review, 56*, 101034. https://doi.org/10.1016/j.ememar.2023.101034

Berk, J. (1995). A critique of size-related anomalies. *The review of financial studies*, *8*(2), 275-286.

Berk, J. (1996). An empirical re-examination of the relation between firm size and return. *Unpublished manuscript, University of British Columbia*.

Black, F. Jensen, M. and Scholes, M. (1972). The Capital Asset Pricing Model: Some Empirical Tests. *Studies in the Theory of Capital Markets*, pp. 79-121.

BlackRock. (2024). *iShares MSCI EM Small Cap UCITS ETF*. BlackRock. Retrieved 2024-09-27 from https://www.blackrock.com/fi/individual/products/251859/ishares-msci-emerging-markets-smallcap-ucits-etf.

Blitz, D. (2021). The Quant Crisis of 2018-2020: Cornered by Big Growth. *Journal of portfolio management, 47*(6), 8-21. https://doi.org/10.3905/jpm.2021.1.232

Bodie, Z., Kane, A. & Marcus, A. (2009). *Investments (8. ed.)*. McGraw-Hill.

Bouslama, O., & Ouda, O. B. (2014). International portfolio diversification benefits: The relevance of emerging markets. *International Journal of Economics and Finance*, *6*(3), 200-215

Brown, K. and Reilly, F. (2009). Analysis of Investments and Management of Portfolios. *South-Western Cengage Learning*, 9th Edition: Book.

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of finance*, *52*(1), 57-82.

Carlson, B. (2023, 29. January). *Stock, Bond & Cash Returns Over the Past 95 Years.* A Wealth of Common Sense. Reviewed 2023-10-12 from https://awealthofcommonsense.com/2023/01/stock-bond-cash-returns-over-the-past-95-years/

Chan, K. C., Chen, N. F., & Hsieh, D. A. (1985). An exploratory investigation of the firm size effect. *Journal of Financial Economics*, *14*(3), 451-471.

Chang, E., Eun, C. S., & Kolodny, R. (1995). International diversification through closed-end country funds. *Journal of banking & finance, 19*(7), 1237-1263. https://doi.org/10.1016/0378-4266(94)00122-J

Christoffersen, P., Errunza, V., Jacobs, K., & Langlois, H. (2012). Is the potential for international diversification disappearing? A dynamic copula approach. *The Review of financial studies*, *25*(12), 3711-3751.

Clarke, R. G. (2020). Analysis of active portfolio management. Portfolio Management in Practice, *Volume 3: Equity Portfolio Management*, 3, 141.

Cremers, M. & Petajisto A. (2009). How Active Is Your Fund Manager? A New Measure That Predicts Performance. *The Review of Financial Studies*, 22(9), 3329-3365. https://doi.org/10.1093/rfs/hhp057

Del Vigna, M. (2014). A note on the existence of CAPM equilibria with homogeneous cumulative prospect theory preferences. *Decisions in Economics and Finance*, 37, 341-348.

Dreman, D. N., & Berry, M. A. (1995). Overreaction, underreaction, and the low-P/E effect. *Financial Analysts Journal*, 51(4), 21-30.

Driessen, J., & Laeven, L. (2007). International portfolio diversification benefits: Cross-country evidence from a local perspective. *Journal of Banking & Finance*, *31*(6), 1693-1712.

Dyck, A., Lins, K. V., & Pomorski, L. (2013). Does active management pay? New international evidence. *Review of Asset Pricing Studies*, *3*(2), 200-228.

Eling, M., & Faust, R. (2010). The performance of hedge funds and mutual funds in emerging markets. *Journal of Banking & Finance*, *34*(8), 1993-2009.

Engle, R., & Sarkar, D. (2006). Premiums-discounts and exchange traded funds. *Journal of Derivatives*, 13(4), 27.

Fama, E. F. (1965). The behavior of stock-market prices. *The Journal of Business*, *38*(1), 34-105.

Fama, E. (1970). Efficient Capital Markets: A Review of Theory and Empirical Work. *Journal of Finance*, 25(2), 383-417. https://doi.org/10.1111/j.1540-6261.1970.tb00518.x

Fama, E. (1972). Components of Investment Performance. *Journal of Finance*, 27(3), 551-568. https://doi.org/10.1111/j.1540-6261.1972.tb00984.x

Fama, E. F. & French, K. R. (1992). The Cross-Section of Expected Stock Returns. *The Journal of Finance*, 47(2), pp. 427-465. doi:10.2307/2329112

Fama, E. F. & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, 33(1), pp. 3-56. doi:10.1016/0304-405X(93)90023-5

Fama, E. F., & French, K. R. (1996). Multifactor explanations of asset pricing anomalies. *The journal of finance*, 51(1), 55-84.

Fama, E. F. & French, K. R. (2006). Profitability, investment and average returns. *Journal of financial economics*, 82(3), pp. 491- 518 doi:10.1016/j.jfineco.2005.09.009

Fama, E. F. & French, K. R. (2015). A five-factor asset pricing model. *Journal of financial economics*, 116(1), pp. 1-22. doi:10.1016/j.jfineco.2014.10.010

French, K. R. (2008). Presidential address: The cost of active investing. *The Journal of Finance*, 63(4), 1537-1573.

Fromlet, H. (2001). Behavioral finance-theory and practical application: Systematic analysis of departures from the homo oeconomicus paradigm are essential for realistic financial research and analysis. *Business economics*, 63-69.

Gad, S. 2023. *What are hedge funds?*. Investopedia. Reviewed 2023-10-12 from https://www.investopedia.com/articles/investing/102113/what-are-hedge-funds.asp

García, F., Guijarro, F., & Moya, I. (2013). A multiobjective model for passive portfolio management: An application on the S&P 100 index. *Journal of Business Economics and Management*, 14(4), 758-775.

Goodwin, T. H. (1998). The information ratio. *Financial Analysts Journal*, 54(4), 34-43.

Hayes. 2024. What Is a Bond Fund? How It Works, Benefits, Taxes, and Types. *Investopedia*. https://www.investopedia.com/terms/b/bondfund.asp

Heston, S. L., Rouwenhorst, K. G., & Wessels, R. E. (1999). The role of beta and size in the cross-section of European stock returns. *European Financial Management*, *5*(1), 9-27.

Horowitz, J. L., Loughran, T., & Savin, N. E. (2000). Three analyses of the firm size premium. *Journal of Empirical Finance*, *7*(2), 143-153.

Huij, J., & Post, T. (2011). On the performance of emerging market equity mutual funds. *Emerging Markets Review*, *12*(3), 238-249.

Jegadeesh, N., & Titman, S. (1993). Returns to buying winners and selling losers: Implications for stock market efficiency. *The Journal of finance*, 48(1), 65-91.

Jensen, M. C. (1968). The Performance of Mutual Funds in the Period 1945-1964. *The Journal of Finance*, 23, 389-416. https://doi.org/10.1111/j.1540-6261.1968.tb00815.x

Kallunki, J., Martikainen, M., Niemelä, J. E., & Niemelä, J. (2011). *Ammattimainen sijoittaminen* (7. P.). Talentum.

Kandi V.S., Harshitha, K., & Dhyan, A. (2022). *Performance of mutual funds in india: Comparative analysis of small-cap and mid-cap mutual funds.* Academy of Marketing Studies Journal, 26(4)

Karrupasamy, R., & Vanaja, V. (2014). Performance evaluation of selected category of public sector mutual fund schemes in India. *International research journal of business and management*, *1*, 1-9.

Kidd, D. (2011). Measures of Risk-Adjusted Return: Let's Not Forget Treynor and Jensen. *Investment Risk and Performance Newsletter*, 1-3.

Lehmann, B. N., & Modest, D. M. (1987). Mutual Fund Performance Evaluation: A Comparison of Benchmarks and Benchmark Comparisons. *The Journal of finance (New York), 42*(2), 233-265. https://doi.org/10.1111/j.1540-6261.1987.tb02566.x

Li, Y., Zhu, S., Li, D., & Li, D. (2013). Active allocation of systematic risk and control of risk sensitivity in portfolio optimization. European journal of operational research, 228(3), 556-570. https://doi.org/10.1016/j.ejor.2013.02.016

Lintner, J. (1965). Security prices, risk, and maximal gains from diversification. *The journal of finance*, 20(4), 587-615.

Lo, A. W., & MacKinlay, A. C. (2011). A non-random walk down Wall Street. *Princeton University Press.*

Malkiel, B. G. (1999). A random walk down Wall Street: including a life-cycle guide to personal investing. *WW Norton & Company*.

Markowitz, H. (1952). Portfolio Selection. *Journal of Finance, 7*(1), 77-91. https://doi.org/10.1111/j.1540-6261.1952.tb01525.x

Morgan Stanley. (2023). *Morgan Stanley Investors Poll 2023.* Morgan Stanley. https://www.morganstanley.com/articles/advice-matters

Morningstar. (2023, October). Morningstar U.S. Fund Flows. *Morningstar research*. Reviewed 2023-10-28 https://www.morningstar.com/lp/fund-flows-direct [Restricted access]

Mossin, J. (1966). Equilibrium in a capital asset market. *Econometrica: Journal of the econometric society*, 768-783.

MSCI. 2024. Emerging Markets Small Cap Index. *Factsheet.* https://www.msci.com/documents/10199/4a397ecf-5cd5-4c49-a611-61db92de980c

MSCI. 2024. Russia Index. *Factsheet*. https://www.msci.com/documents/10199/1b68aecc-6aae-4451-8b7d-23630edb9844

Novy-Marx, R. (2013). The other side of value: The gross profitability premium. *Journal of financial economics*, 108(1), pp. 1-28. doi:10.1016/j.jfineco.2013.01.003

Okusanya, A. (2018). Lessons from 118 years of asset class return data. *Finalytiq*. https://finalytiq.co.uk/lessons-118-years-capital-market-return-data/.

Ornelas, J. R. H., Silva Júnior, A. F., & Fernandes, J. L. B. (2012). Yes, the choice of performance measure does matter for ranking of us mutual funds. International *Journal of Finance & Economics*, 17(1), 61-72.

Otten, R., & Bams, D. (2002). European Mutual Fund Performance. *European financial management : the journal of the European Financial Management Association, 8*(1), 75-101. https://doi.org/10.1111/1468-036X.00177

Petajisto, A. (2013). Active Share and Mutual Fund Performance. *Financial Analysts Journal*, 69(4), 73-93. https://doi.org/10.2469/faj.v69.n4.7

Petajisto, A. (2017). Inefficiencies in the pricing of exchange-traded funds. *Financial Analysts Journal*, 73(1), 24-54.

Puttonen, V., Repo, E., & Viitala, L. (2011). *Miten sijoitan rahastoihin* (5.). WSOYpro.

Ramasamy, B., & Yeung, M. C. (2003). Evaluating mutual funds in an emerging market: Factors that matter to financial advisors. *International journal of bank marketing, 21*(3), 122-136. https://doi.org/10.1108/02652320310469502

Roll, R. (1992). A Mean/Variance Analysis of Tracking Error. *Journal of Portfolio Management, 18*(4), 13-22. https://doi.org/10.3905/jpm.1992.701922

Roll, R. (1977). A critique of the asset pricing theory's tests Part I: On past and potential testability of the theory. *Journal of financial economics*, 4(2), 129-176.

Roll, R. (1978). Ambiguity when performance is measured by the securities market line. *The Journal of finance*, 33(4), 1051-1069.

Rossi, M. (2016). The capital asset pricing model: a critical literature review. *Global Business and Economics Review*, 18(5), 604-617.

Sharma, A. K. (2023). An Empirical Analysis of Performance and Evaluation of Mutual Funds in India. *Management Journal for Advanced Research*, *3*(4), 30-35.

Sharpe, W. F. (1963). A simplified model for portfolio analysis. *Management science*, *9*(2), 277-293.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *The journal of finance*, 19(3), 425-442.

Sharpe, W. F. (1966). Mutual Fund Performance. *The Journal of Business, 39*(1), 119-138. https://doi.org/10.1086/294846

Sharpe, W. F. (1991). The arithmetic of active management. *Financial Analysts Journal*, 47(1), 7-9.

Singh, S. P. (2014). Stock Market Anomalies: Evidence from Emerging BRIC Markets. *Vision (New Delhi, India), 18*(1), 23-28. https://doi.org/10.1177/0972262913517329

Treynor, J. L. (1965). How to Rate Management of Investment Funds. *Harvard Business Review*, 4(3), 63-75. https://doi.org/10.1002/9781119196679.ch10

van Dijk, M. A. (2011). Is size dead? A review of the size effect in equity returns. *Journal of banking & finance, 35*(12), 3263-3274. https://doi.org/10.1016/j.jbankfin.2011.05.009

Vardharaj, R., Fabozzi, F. J., & Jones, F. J. (2004). Determinants of tracking error for equity portfolios. *The Journal of Investing*, 13(2), 37-47.

Vassalou, M., & Xing, Y. (2004). Default risk in equity returns. *The journal of finance*, *59*(2), 831-868.

Wallace, D., & McIver, R. (2019). The effects of environmental announcements on exchange traded funds. Emerging Markets Finance and Trade, 55(2), 289-307.

World Economics. (2023). *GDP size dataset.* World Economics. https://www.worldeconomics.com/Regions/Emerging-Markets/

Xiao, B. (2016). Beta and Size Revisited: Evidence from the French Stock Market. *International Journal of Financial Research*, *7*(5), 42-50.

Zangari, P. 2022. From Crisis to Crisis: Russia's Diminished Role in Emerging Markets. *MSCI.* https://www.msci.com/research-and-insights/russia-ukraine-war/russias-diminished-role-in-emerging-markets

Appendices

Appendix 1. List of sample funds

abrdn SICAV I - Emerging Markets Smaller Companies

AMG TimesSquare Emerging Markets Small Cap

American Century Emerging Markets Small Cap

Ashmore SICAV Emerging Markets Global Small-Cap

Danske Invest SICAV - Global Emerging Markets Small Cap

DFA Emerging Markets Small Cap Portfolio

DFA Emerging Markets Social Core Equity Portfolio

Dimensional Funds II PLC - Emerging Markets Targeted Value

Driehaus Emerging Markets Small Cap Growth

EP Emerging Markets

eQ Kehittyvät Markkinat Pienyhtiö

Evli Emerging Frontier

Fiducian Global Smaller Companies and Emerging Markets

Grandeur Peak Emerging Markets Opportunities

JOHCM Emerging Markets Discovery

JPMorgan Funds - Emerging Markets Small Cap

L&P Value EM Small Cap

Matthews Emerging Markets Small Companies

Oberweis Emerging Markets

Polunin Funds - Emerging Markets Small Cap

Principal Global Investors Funds - Origin Global Emerging Markets

RBC Funds - Emerging Markets Small Cap Equity

Schroder International Global Emerging Markets Smaller Companies

SSGA Luxembourg SICAV - Emerging Markets Small Cap ESG Screened Equity

Templeton Emerging Markets Smaller Companies

Virtus KAR Emerging Markets Small-Cap

Wasatch Emerging Markets Small Cap

William Blair SICAV - Emerging Markets Small Cap Growth