The Performance of Hedge Fund Strategies in Emerging Markets

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Abstract

In the past decades, emerging market hedge funds have been subject to significant capital inflow and today they constitute a $200 billion market. Previous research suggests that future investment opportunities exist in these regions. The objective of this study is to examine if emerging market hedge funds produce higher risk-adjusted returns than global hedge funds, focusing on how different hedge fund investment strategies perform. The research is based on the single factor Capital Asset Pricing Model (CAPM) to determine the strategies performance (alpha) net of fees. The study ranges from January 2002 to December 2016 and scrutinizes the strategies performance in seven different sub-periods. The research provides evidence that the magnitude of performance for hedge funds differ not only regarding the location of which fund managers choose to allocate the assets, but also on what kind of strategy they practice to generate return. On a risk-adjusted premise, the study finds that not all strategies in emerging markets manage to perform better than the global hedge fund market consistently over a longer period. These findings stress the importance of considering fund strategies rather than location, when comparing financial instruments. The conclusions provide helpful knowledge to both future research and financial authorities.
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1 Introduction

1.1 Background

On several occasions during the past decades, the world has experienced economic distress, such as the Asia Crisis, the IT-bubble and the recent Financial crisis (Ackermann, Richard, & Ravenscraft, 1999; Amenc, Martellini, & Vaissié, 2002; Capocci & Hübner, 2004; Fung & Hsieh, 2001). These crises have motivated investors to seek alternative investments options, as a result, hedge funds have increased significantly in popularity and large amounts of wealth are placed in this industry (Dichev & Yu, 2011; Liang, 1999). In contrast to other more classical investments like stocks and bonds, the purpose of hedge funds is to generate absolute returns, which means generating positive returns regardless of the market movement (Ackermann et al., 1999; Agarwal & Naik, 2000). The opportunity to gain positive returns in both growth and decreasing market environments are partly the reason for the increased interest in hedge funds. Further, hedge funds are complex to define but are characterized by their flexible strategies, lack of investment restrictions, limited licensing requirements, strong managerial incentives and unrestricted allocation rules (Agarwal & Naik, 2000; Brown, Goetzmann, & Ibbotson, 1999; Fung & Hsieh, 2004).

Despite indications of high risk and uncertainty, emerging markets are considered among the most attractive investment regions in terms of growth opportunities (Amenc et al., 2002). A substantial shift in asset allocation has taken place during the last decades, where the aggregate market size of emerging markets has increased nearly 40 times, from $85 billion in 1990 to $3.8 trillion in 2014\(^1\) (Lazard Asset Management, 2014). The growth opportunities in emerging market regions have attracted the hedge fund industry as well. Even though hedge funds have historically performed poorly in emerging markets, there is an upward trend showing the opposite (Naik, Ramadorai, & Strömqvist, 2007; Strömqvist, 2008). At the end of year 2016, $3.22 trillion worth of assets were held in hedge funds all over the world. Out of these, $200 billion were allocated in the region of emerging markets\(^2\) (Datastream, 2017; Preqin, 2017).

\(^1\) Data is collected from MSCI. The MSCI Emerging Markets Index captures large and mid-cap representation across 23 Emerging Markets (EM) countries*. With 829 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in each country.

\(^2\) In accordance with Eurekahedge (2017) we define “emerging markets” in this paper as developing Europe (Central and Eastern), Latin America, Russia, Asia (except Japan, Australia and New Zealand), Africa, Middle East and the Caribbean.
1.2 Problem statement

With barely any restrictions, hedge fund managers are handling large amounts of wealth using complex investment strategies to chase absolute returns in uncertain markets (Ackermann et al., 1999; Amenc et al., 2002; Naik et al., 2007). As the emerging markets are volatile, hedge funds and emerging markets seem like a perfect fit and the combination of the two should, in theory, be able to generate attractive returns (Eling & Faust, 2010; Strömqvist, 2007). The problem is that there is yet little information about how they really perform.

Research within the field of hedge funds has increased together with its popularity. However, the existing studies mainly conduct comparisons between hedge funds and passive benchmarks (Ackermann et al., 1999; Agarwal & Naik, 2004; Amin & Kat, 2003; Liang, 1999), or study differences among hedge funds and mutual funds’ risk-adjusted performance (Ackermann et al., 1999; Brown et al., 1999; Capocci and Hübner, 2004; Eling & Faust, 2010; Liang 1999). Although hedge funds have received increased academic attention, research regarding hedge funds’ behavior in emerging markets is limited. Existing studies in this field often include and consider emerging markets as a strategy (Capocci & Hübner, 2004; Eling & Faust, 2010). In turn, there are few studies on how different hedge fund strategies perform in the region of emerging markets. Hence, there is an evident knowledge gap. Additionally, due to the large amounts of assets that hedge fund managers are handling in these regions, the performance is interesting to analyze.

1.3 Purpose

Because of the increased capital inflow in both hedge funds and the emerging market regions, together with the existing knowledge gap, the purpose of this study is to examine how different hedge fund investment strategies perform in emerging markets. The study will attempt to answer the two following research questions:

1. Do emerging market hedge funds produce higher risk-adjusted returns than global hedge funds?

2. Is there a significant difference in performance depending on what strategy the hedge fund managers practice?
2 Hedge funds

2.1 Hedging
The word “hedging” describes a way to reduce risk exposure in an asset by adverse price movements in a security. This is accomplished by the hedge taking a counter-position of the related security (Connor & Woo, 2004). There is a trade-off between risk and reward, and some reward must be paid to reduce the potential risk (Mossin, 1966). A hedge that manages to eliminate all the systematic risk in a portfolio is considered a perfect hedge\(^3\). That is, the hedge is completely inversely correlated with the exposed security (Capocci, 2013).

2.2 Emerging markets
Emerging market definitions usually vary, but can broadly be described as countries that experience rapid growth and progressing into developed economies (Basu & Huang-Jones, 2015). The characteristics of emerging markets does come with a potential higher risk than the developed markets and thereby also a chance of higher returns. Political instability, high volatility, liquidity risk, exchange risks and poor corporate governance systems are some of the factors that make emerging markers not as efficient as developed economies (Bekaert & Harvey, 2002). Despite the uncertainties, emerging markets attract investors that seek high returns and wants to benefit from diversification (Basu & Huang-Jones, 2015; Ratner & Leal, 2005).

2.3 What are hedge funds
Hedge funds are pooled investments that are managed actively as private partnerships. The funds are directed towards a small group of investors; thus, the fund manager can be described as the general partner and the fund’s investors as limited partners (Connor & Woo, 2004; Eling & Faust, 2010). As previously mentioned, one main objective of hedge funds is to generate absolute return regardless of the market condition. Therefore, a low correlation with the market is important regardless of what strategy the fund uses (Fung & Hsieh, 1997; Liang, 1999). The fund management is intensely skill-based, as most hedge funds focus on identifying speculations which can result in out-performing the market (Edwards & Caglayan, 2001). Further, hedge funds are strongly driven by the fund managers’ incentives and the managers are in general rewarded based on two fees: a performance based fee and a

\(^3\) Enough diversification eliminates unsystematic risk, more about the relationship in appendix 2.
management fee (Agarwal & Naik, 2000; Liang, 1999). In addition, the fund managers usually invest a great amount of their own capital into the funds, which increases the performance incentive substantially (Liang, 1999; Connor & Woo, 2004).

2.4 Hedge funds vs. mutual funds

Table 1 below presents the main features, and thereby the differences, of hedge funds and mutual funds. Mutual funds are diversified as well as easy to buy and sell for the public; almost any investor can access these funds and invest in publicly traded assets. In comparison, hedge funds are private investment companies that have sophisticated investors with a great net worth (Ackermann et al., 1999). Unlike mutual funds, hedge funds have lock-up periods, which limit the ability to withdraw an investment. Although, the lock-up periods also enable greater risk-taking for hedge funds as the fund manager knows when money can, and will be, removed from the fund (Liang, 1999). Mutual fund managers are compelled to report their performance, but there are no equivalent requirements for hedge fund managers. Consequently, there is less accurate data for hedge funds as poor performing hedge funds are often not reported (Strömqvist, 2009). Conclusively, there is also a difference regarding the incentives of the two fund types. As stated above, the fee structures in hedge funds are performance based, often with a bonus incentive. In contrast, the fee structures for mutual funds are generally based on the fund size (Ackermann et al., 1999; Agarwal & Naik, 2000; Liang, 1999).

Table 1: Comparison of Hedge funds and mutual funds

<table>
<thead>
<tr>
<th></th>
<th>Hedge fund</th>
<th>Mutual fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>Placement rules</td>
<td>Free</td>
<td>Limited</td>
</tr>
<tr>
<td>Return target</td>
<td>Absolute</td>
<td>Relative</td>
</tr>
<tr>
<td>Owners</td>
<td>Few</td>
<td>Thousands</td>
</tr>
<tr>
<td>Investor type</td>
<td>Pension funds, endowment funds, high net worth individuals</td>
<td>Retail investors</td>
</tr>
<tr>
<td>Transparency</td>
<td>Information for investors only</td>
<td>Annual reports are published</td>
</tr>
<tr>
<td>Fees</td>
<td>Fixed and performance based</td>
<td>Fixed</td>
</tr>
</tbody>
</table>

Note: Table 1 illustrate how hedge funds and mutual funds differ in placement rules, returns target, owner style, investor types, information transparency and fee structure.

2.5 Hedge fund strategies

The investment strategy of a hedge fund determines how the fund is managed; hence, it indicates how the manager will use investment techniques to generate the desired returns. The
strategies’ approach is crucial for the funds development and consequently, it is important for the investors (Connor & Woo, 2004).

There are different opinions regarding how to categorize hedge fund strategies. In order to display this debated categorization, three alternative approaches will be presented here. The first categorization divides strategies by “location” and “style”. These two parameters correspond to what position the investment takes; long or short, and what asset classes the funds invest in; e.g. currencies, commodities etc. (Fung & Hsieh, 1997). The second alternative categorizes strategies as “return enhancers” or “risk reducers”. Return enhancing strategies target high returns with a generally higher portfolio risk. Risk reducing strategies on the other hand, seek positive excess returns with a relatively lower risk in the portfolio (Amenc et al., 2002). The third approach divides funds into market neutral or directional funds. The neutral funds are characterized by low correlation with the market while directional funds have higher correlation with the market since they speculate in market fluctuations (Connor & Woo, 2004).

2.6 Classification of hedge fund strategies
Much like the situation regarding categorization of hedge fund strategies, there are several different definitions of hedge fund strategies. Eurekahedge is one of the world’s largest independent data providers of hedge fund information, and the five hedge fund strategies presented below are in accordance with Eurekahedge’s classifications (2017).

2.6.1 Arbitrage
Arbitrage strategies are risk reducers. By purchasing and immediately reselling assets, arbitrage strategies can take advantage of price inefficiencies in a variety of different or similar market situations. Arbitrage strategies often have relatively low risk. These sorts of transactions are almost independent of fluctuations in the market, which should make them an efficient investment when there is a negative growth in the market (Eurekahedge, 2017).

2.6.2 Managed futures
Managed futures are investments in future contracts, completed through professional fund managers both directly and through a Commodity Trading Advisor4, CTA. In general, CTAs

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4 In the US, Commodity Trading Advisors, CTAs, need a license from the Commodity Futures Trading Commission.
use proprietary trading, which means that the investor invests primarily for his own sake rather than for his clients. This is often done with help of complex computer programs where they take long or short positions in future contracts including metals, grains, equity indexes, commodities and foreign currencies. Managed futures decrease the risk of portfolios by diversifying in different asset classes and investments types. Portfolios that use futures reduce their risk due to the negative correlation among the securities in the portfolio (Eurekahedge, 2017).

2.6.3 Event driven
Event driven strategies are greatly speculative and depend heavily on the manager’s information. They rely on information of events that will affect the market for a short period of time: restrictions in corporations, stock buybacks, bond upgrades. They are not limited to any specific investments style or class of assets (Eurekahedge, 2017).

2.6.4 Long and short positions
Long/short strategies are one of the most frequently used strategies. To hedge market risk, investors take long- as well as short positions in the market. Doing so, managers can speculate in price falls. By taking long and short positions, market risk is reduced through risk in the individual stock (Eurekahedge, 2017).

2.6.5 Fixed income
The Fixed income strategy is a type of investment that relies on relatively predictable returns at regular intervals. Fixed income strategies depend on mathematical programs that can detect mispricing and manage positions. The focus is on interest rate swaps and mortgage-backed securities (Eurekahedge, 2017).

2.7 Related literature
As stated above, the amount of literature on hedge fund strategies in emerging markets is limited. There is however, research considering hedge funds in emerging markets and strategies separately. The limited literature could be partly due to the narrow access to individual funds data (Capocci & Hübner, 2004; Strömqvist, 2007).

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5 The exchange of one set of cash flows for another at a given time
Fung and Hsieh (2011) and Eling and Faust (2010) studied long/short strategies and the value-added they generate. In Fung and Hsieh (2011) sample of 3000 hedge funds using the strategy, less than 20% of the funds produce positive alphas, which means they perform better than the market. Furthermore, they found indications that alpha declines over time, something that Fung, Hsieh and Ramadorai (2008) agree upon. In contrast, Strömqvist (2007) argue that there is an upward trend for alphas and that they might be found in emerging markets in the future. Eling and Faust (2010) also find evidence supporting positive alphas in emerging markets. Furthermore, Eling and Faust (2010) find that hedge funds are more efficient than mutual funds in allocating their assets, mainly due to the lack of restrictions.

Ackerman et al. (1999), Brown et al. (1999), Capocci and Hübner (2004) and Liang (1999) study differences among hedge funds and mutual funds’ risk-adjusted performance and their persistence to generate return. Their findings are the same, and conclude that hedge funds beat mutual funds on a regular basis, mostly due to the combination of incentive arrangements and the investment flexibilities that hedge funds allow for (Ackermann et al., 1999; Capocci & Hübner, 2004; Eling & Faust, 2010; Liang, 1999). In addition, hedge funds have a higher volatility than mutual funds and the incentive fees can explain hedge funds’ performance, but not the total risk in the portfolio (Ackermann et al., 1999). Brown et al. (1999) find that the positive risk-adjusted return of offshore hedge funds are outcomes of investment style rather than skills of fund managers. These findings are vital for the hedge funds industry, since hedge funds tend to have higher attrition rate compared to mutual funds (Agarwal & Naik, 2000; Brown, et al., 1999; Liang, 2000).

In existing research hedge funds often perform better than mutual funds, but not always the compared benchmark (Ackermann et al., 1999; Brown et al. 1999; Capocci & Hübner, 2004; Eling & Faust, 2010; Liang, 1999). Studies that examine hedge funds persistence performance with passive index benchmarks, such as gold and the S&P 500 show mixed results (Agarwal & Naik, 2004; Brown et al., 1999; Liang, 1999). Findings by Brown et al. (1999) and Liang (1999) imply that hedge funds perform better than traditional benchmarks, while the results by Agarwal and Naik (2004) vary significantly more.

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6 Funds that are organized under foreign regulations. Outside the U.S. in the case of Brown et al. (1999)
Amin and Kat (2001) suggest that a greater risk-return profile cannot be offered by investing in hedge funds alone due to inefficiency. Instead, hedge funds become efficient in combination with passive benchmarks. This conclusion is in line with other studies, where hedge funds appear to increase the return of a portfolio by having a weak correlation to other securities in the market (Agarwal & Naik, 2000; Fung & Hsieh, 1997; Liang, 1999). Fung and Hsieh (1997) find evidence that the risk-return profile improves in a portfolio when adding hedge funds, mainly because of the low correlation with the market. Further, Amenc and Martellini (2002) demonstrate that hedge funds that are included in a portfolio should result in a decrease of risk without any change in return. Contrary, Strömqvist (2007) finds that hedge fund performance has been weak historically, and suggests that hedge funds do not provide any diversification benefit when combining it in a portfolio with other assets. (Amenc & Martellini, 2002)
3 Theoretical framework

3.1 Efficient market hypothesis

The efficient market hypothesis has since its origin been the leading theory explaining how price adjustments occur in markets. Financial markets are efficient and investors use information provided by companies, often in the form of quarterly- and annual reports, but also daily news and other analysis provided by different investors. Further, financial markets are also competitive and quick to respond to information. Therefore, in a situation with perfect information available, the market price would always represent the true price of a security (Fama, 1970).

The efficient market hypothesis also implies that the market does not have any memory. Hence, as new information becomes available, the security’s value can move up or down towards its fundamental value. A stock that reacts on daily information does not have a correlation with yesterday’s price level, which indicates a random walk7 and thereby a lack of memory in the market (Clarke, Jandik, & Mandelker, 2001). There are however, certain conditions that need to be fulfilled for the efficient market hypothesis to be valid8. Further, the theory assumes that arbitrary gains are random and that the efficient market would be impossible to out-perform without purchasing riskier assets (Fama & French, 2012).

3.2 Modern Portfolio Theory

Harry Markowitz was awarded with the Nobel Prize in Economics in 1990 for his theory called The Modern Portfolio Theory (1952) that has become one of the most central economic theories in the field of finance and investment (Elton & Gruber, 1997). Markowitz’s theory assumes that investors are risk-averse and that they can build their portfolio to maximize expected return at any given level of risk in the market. Furthermore, the theory explains that it is inadequate to focus on the expected return and risk of one specific security. Investors should rather invest in more than one security to reap the benefits from diversification and reduce risk in the portfolio (Elton & Gruber, 1997; Markowitz, 1952).

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7 Price changes have the same distribution and are independent of each other.

8 There cannot be any costs, such as brokerage fees, when you buy and sell securities. There cannot be any information asymmetries between the different operators on the market and there must be perfect information.
3.3 Capital asset pricing model and the efficient market portfolio

The Capital asset pricing model (CAPM) was founded and developed by William Sharpe (1964) and is based on Harry Markowitz portfolio selection theory (1952). Still today, the CAPM is used for various purposes such as evaluation of performance among managed portfolios and to calculate the cost of capital (Fama & French, 2004).

The CAPM is a single factor model that describes the relationship between an asset's systematic risk and its expected return (Lintner, 1965; Perold, 2004). Within the scope of the model, a market proxy is an estimation of the true market portfolio where the true market portfolio is explained as a measurement for comparing different funds to the overall market or industry (Roll, 1977). The return of the market and such a portfolio is almost impossible to accomplish. Additionally, Richard Roll (1977) showed that the true market portfolio should consist of everything in the world that has a value. Based on this, you can only make qualified attempts to create the true market portfolio (Ferson & Harvey, 1991). The market proxy generally serves as a benchmark for systematic risk (Perold, 2004).

The following equation is the estimation of CAPM:

$$ R_{it} - R_{ft} = \alpha_i + \beta_i [R_{mt} - R_{ft}] + e_{it} \quad t = 1, 2, \ldots, T $$

In the equation above, $R_{it}$ represents the return of fund $i$, in month $t$; $R_{ft}$ is the risk-free return in month $t$; $R_{mt}$ denotes the return of the market portfolio in month $t$; $e_{it}$ is the error term, $\alpha_i$ and $\beta_i$ are the intercept and slope of the regression respectively. The equation's intercept $\alpha_i$ is the so-called Jensen’s alpha (1968). Alpha measures the performance on a risk-adjusted basis and it is interpreted as a measure of over- and under-performance compared to the market proxy used (Capocci & Hübner, 2004). Jensen’s alpha will be discussed further in section 4.3.

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9 To read more about the market proxy, see appendix 2.
4 Empirical measurements

4.1 Beta

Beta is a measure of a portfolio's systematic risk or volatility in comparison to the market. The coefficient is calculated with a regression analysis and is based on historical data. A security's beta measures how sensitive the security’s return is in comparison to the market. In the efficient portfolio, the value of beta is assumed to be one (Berk & DeMarzo, 2014). Therefore, the average asset return moves 1% for each 1% movement in the market. To clarify, the beta of a security is the expected percentage return change in its return, given a one-percentage change in the return of the market portfolio (Capocci, 2013).

To calculate an asset’s beta, divide the covariance of the assets return and the benchmark’s return by the volatility (variance) of the benchmarks return.

\[
\beta_i = \frac{SD(R_i) \times Corr(R_i, R_M)}{SD(R_M)} = \frac{Cov(R_i, R_M)}{Var(R_M)} \tag{2}
\]

Beta, \(\beta_i\), determines the systematic risk for an investment and \([R_m - R_f]\), which is the risk premium in the market. By doing so, CAPM can help investors combine a portfolio to generate the desired expected return (Hamberg, 2001).

4.2 Jensen’s alpha

Jensen’s alpha (1968) is one of the most frequently used measurements when evaluating hedge fund performance (Jensen, 1968). It is calculated by running equation 1, where Jensen’s alpha is calculated as:

\[
\alpha_i = R_{it} - \left( R_{ft} + \beta_i(R_{mt} - R_{ft}) \right) \tag{3}
\]

When measuring performance of a hedge fund, or other asset classes, one needs to consider how much risk a fund contains (Ghysels, Santa-Clara, & Valkanov, 2005). A risk-adjusted measure is the excess return, calculated as the funds return subtracted with a risk-free investment, \(R_{ft}\), of a fund in relation to a selected benchmark. Here, the benchmark is simply what the fund is supposed to perform under the assumptions of the CAPM (Jensen, 1968; Alexander & Dimitriu, 2005; Sharpe, 1964). The expected alpha of the efficient market
portfolio is therefore 0, \( E(\alpha_i)=0 \) (Merton, 1973). Hence, if the fund manager succeeds to perform a positive alpha, this is known as out-performing the market. To illustrate this, a common approach is to consider the security market line, SML. The SML is a chart resulting from running the CAPM formula that demonstrates how a fund performs in contrast to the market. \( \alpha_i \) is a measure of the overall performance of the fund and the managers' ability to generate risk-adjusted return (Dybvig & Stephen, 1985). To simplify, a fund's alpha value can only be determined in two different situations, either through an increase in the expected return given the same risk level, or through a decrease in risk given that the fund succeeds to maintain the same expected return (Ross, Westerfield, Jaffe, & Jordan, 2008).

![SML](image)

**Figure 1: The Security Market Line, SML**

*Note: The Security market line illustrates the relationship between the expected return and the beta. If a fund is plotted above the SML, as the square, it is considered under-valued and the fund has out-performed the benchmark/market. If a fund is plotted under the SML, as the triangle, it is considered over-valued and the fund has under-performed in comparison to the benchmark/market. Constructed by the authors.*

### 4.3 Skewness and kurtosis

As a part of the moments\(^{10}\) in statistical analysis, skewness and/or kurtosis is present if the return falls outside of the normal distribution. Skewness shows the degree of the data's variation of direction, the asymmetry of the distribution. If the skewness is positive, the asymmetric tail of the distribution tends to spread out towards the right, more positive values. The tail of a distribution with negative skewness tends to spread out towards the left, more

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\(^{10}\) Mean, standard deviation, skewness and kurtosis. More about standard deviation in appendix 2.
negative values (left) (Scott & Horvath, 1980). Kurtosis portrays the degree of how peaked the distribution is. Distributions with a positive kurtosis indicate a peaked distribution, while negative kurtosis tends to have a flatter distribution (Greene, 2003).

In a normal distribution, the kurtosis equals three. An investment with a high kurtosis will have a distribution with “fat tails”, both in the negative and positive ends. In addition, high kurtosis tends to overestimate the likelihood of realizing the mean returns (Connoly & Hutchinson, 2012).

In investment situations, few returns have normal distributions. Expected returns are often predicted based on volatility, which are assumed to be normally distributed. By using the measures of skewness and kurtosis in investment decisions, investors may find more efficient indicators of the reliability of the investments volatility (Groenveld & Meeden, 1984; Sheikh & Qiao, 2009).

![Negative skew](image1) ![Positive skew](image2) ![Positive kurtosis](image3)

**Figure 2: Skewness and kurtosis distributions**

Note: figure 2 illustrate three different distributions. Negative skewness (left), have a longer tail to the left and tend to have more negative values. Positive skewness (middle), have a longer tail to the right and tend to have more positive values. Moreover, the positive kurtosis (right), show the degree of the peak in a distribution. A distribution with greater peak than normal tend to have higher risk of extreme outcomes. A normal distribution has a skewness value of 0 and kurtosis value of 3.
5 Method and data

5.1 Method
The research follows a time-series and comparative research design, that is in accordance with previous studies (Amenc et al., 2002; Capocci & Hübner, 2004; Eling & Faust, 2010; Naik et al., 2007). In order to compare hedge fund strategies with a selected benchmark, which is the measure of what the strategies try to out-perform, the paper uses a quantitative method. Hedge fund returns are collected as secondary data and statistically analyzed. The selected time interval is January 2002 to December 2016, which offers a large sample of returns over a long timespan.

5.2 Sample selection and data collection
The objective of this paper is to examine returns of hedge funds that operate in emerging markets. All hedge fund data is collected from the Eurekahedge database\textsuperscript{11}, which comprises a large sample. To be considered an emerging market fund, at least 90% of the funds’ assets must be allocated in the region. In this research, emerging markets is defined in accordance with Eurekahedge as the regions: developing Europe (Central and Eastern), Latin America, Russia, Asia (excluding Japan, Australia and New Zealand), the Middle East, Africa and the Caribbean (Eurekahedge, 2017).

The hedge fund data regarding emerging markets on Eurekahedge consists of 349 equally weighted funds, categorized into different strategies. This study includes five strategies and the selection is described in section 5.3.1 below. Further, the selected benchmark is the Eurekahedge Hedge Fund index, from now on called the GHF index, which comprises 2797 global hedge funds.

All fund results included in this study are assembled monthly by Eurekahedge and measured in terms of profit/loss of the whole portfolio worth and are net of fees. There are no “twin” funds in the benchmark index, e.g. no onshore and offshore type of the same fund. New funds, with at least a three-month history, are rebalanced into the index while closed funds historical performance remains permanently.

\textsuperscript{11} As of March 2017.
To calculate the hedge funds risk-adjusted returns, data was collected for the one-month US Treasury Bill from the Federal Reserve’s database (Federal Reserve, 2017). Lastly, to enable a comparison between the hedge fund findings and more traditional investment alternatives, data was collected for the S&P 500 index from Yahoo Finance (Yahoo Finance, 2017).

5.3 Variables

This study includes five different hedge fund strategies to represent the strategy variable. The five strategies; arbitrage, managed futures, event driven, long/short and fixed income are selected for their variation in terms of investment characteristics. Some of which are based on reducing risk and others enhance return by taking higher risks. Arbitrage, long/short and fixed income are categorized as risk-reducing strategies while managed futures and event driven enhance risk more frequently (Connor & Woo, 2004). Further, long/short have a style of taking different positions in the market whereas fixed income locates their investments into various asset classes, such as currencies and equity (Fung & Hsieh, 1997). The event driven strategy is based on the managers’ speculation of events that will affect the market. Lastly, managed futures use sophisticated computer-programs to beat the market (Connor & Lasarte, 2004).

The benchmark variable is included as a measure to out-perform. As mentioned above it is the GHF index, which is useful since it provides performance of all underlying funds in the database, irrespective of region (Eurekahedge, 2017).

5.4 Performance measurement

Together with excess returns, this study will observe the strategies alpha, which measures the strategies risk-adjusted (systematic risk) performance (Jensen, 1968). Jensen’s alpha is frequently used in previous research and can illustrate how well a fund performs in comparison to the benchmark (Capocci & Hübner, 2004; Dichev & Yu, 2011; Eling, 2009; Eling & Faust, 2010; Fung & Hsieh, 2004; Liang, 1999)

5.5 Data analysis

To evaluate the strategies performance, several regressions were run using the CAPM. All regressions were treated with a heteroscedasticity and autocorrelation consistent covariance matrix, which accounts for potential autocorrelation and heteroscedasticity in the data.
(Newey & West, 1986; Greene, 2003). In addition, an augmented Dickey Fuller test was conducted to determine if non-stationarity was present.

Besides running regressions on the dataset for each strategy, the time period was divided into sub-periods, which enabled rolling regressions and thereby increased number of results to analyze. The complete dataset for each strategy contains 180 months and every sub-period 48 months, with a 24-month overlap for each period. The last sub-period contains 36 observations. The null hypothesis, $H_0$, for all regressions is expressed as alpha equals zero. In accordance with previous studies, the regressions are performed with significance levels of 1%, 5% and 10% (Capocci & Hübner, 2004; Eling, 2009; Eling & Faust, 2010).

5.6 Quality of method
The entire dataset in this study is secondary and collected through publicly accessible databases. Therefore, there is limited control over the quality. Since hedge funds are not required to report historical performance, the collected data might not be unbiased and this is a disadvantage of this type of information that one should be aware of when analyzing the results (Fung & Hsieh, 2000). Further, the data is hand collected by the authors and thereby carries the risk of human error.

The strategies were selected because of their diversity. However, there are more strategies in emerging markets and arguments could be made to suggest another combination of strategies based on different selection criteria. The data available for hedge funds is efficient to interpret using the CAPM, which generates desired estimations. The model has however been criticized for being simplistic and academic studies regarding hedge funds often add other performance measurement models to further analyze the variety in fund returns (Agarwal & Naik, 2000; Capocci & Hübner, 2004; Eling & Faust, 2010; Fama & French, 2004; Liang, 1999). Since alpha is determined in proportion to a benchmark assessed as suitable for the fund, it is important that the chosen benchmark is representative, otherwise one can draw misleading conclusions (CFA Institute, 2013).

5.7 Potential biases
Eurekahedge is a well-established database that covers numerous hedge funds (Capocci, 2013). The data might suffer from three potential biases, namely; backfilling bias, survivorship bias and selection bias (Fung & Hsieh, 2000). Backfilling bias occurs when a
new hedge fund is added to the database and is asked to provide historical performance. Hedge fund managers could for instance refuse to provide performance history if the result is poor. In contrast, managers also have strong incentives to overestimate their performance since this could bring more clients. This line of reasoning suggests that only managers with a good track record has the incentive to backfill their past performance which could lead to a bias (Eling & Faust, 2010). However, this problem could be solved by simply subtracting the past 12-24 monthly returns of the recently added funds (see Fung & Hsieh, 2000; Capocci & Hübner, 2004). Eling (2009) concluded that this technique would decrease the monthly return by 0.18 % on average while Fung and Hsieh (2000) reported that the monthly return would decrease by 0.12 % on average.

Funds are considered dead or closed when they stop reporting their performance to various databases (Eurekahedge, 2017). There are various reasons for this, but the most likely one is poor performance. Survivorship bias is when a fund’s assets only contain those investments that have been successful in previous periods. Several failing and closed funds are merged into other funds to cover weak performance (Fung & Hsieh, 2000). The Eurekahedge database attempt to solve this problem by letting the past performance of the closed funds be a part of the indices. In this way, the impact of the survivorship bias in this study should not be of great concern (Eling & Faust, 2010).

Hedge funds are included in the category of special funds and reporting data is voluntary for the managers. This could lead to selection bias. Given the choice to present your past performance or not, it makes sense that with a good track record one would be more willing to do so. In the same way, it makes sense to not present past performance if a manager constantly under-performs (Eling & Faust, 2010). Further, Fung and Hsieh (1997) state that the selection bias should be of minor concern since a significant number of well performing funds are uninterested in new investors and additional capital because new capital make the funds returns decrease to a certain level\textsuperscript{12}.

\textsuperscript{12} Additional financing to the fund result in less opportunities to find lucrative investments. Hence, more capital inflow will make returns decline until they are no longer profitable (Berk & Green, 2004).
6 Empirical results

6.1 Descriptive statistics

The descriptive statistics presented table 2 represent the moments, mean, standard deviation, skewness and kurtosis of the distribution for the five strategies, the benchmark and the S&P 500. The table also contains information on the minimum and maximum values of each variable.

Table 2: Descriptive statistics: monthly excess returns for strategies, GHF index and the S&P 500

<table>
<thead>
<tr>
<th></th>
<th>Mean (%)</th>
<th>Std. Dev. (%)</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Min (%)</th>
<th>Max (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHF index</td>
<td>-0.51</td>
<td>1.94</td>
<td>-0.58</td>
<td>0.20</td>
<td>-5.98</td>
<td>4.90</td>
</tr>
<tr>
<td>Arbitrage</td>
<td>-0.37</td>
<td>1.60</td>
<td>-0.73</td>
<td>-0.07</td>
<td>-4.39</td>
<td>2.95</td>
</tr>
<tr>
<td>Managed futures</td>
<td>0.18</td>
<td>4.33</td>
<td>0.57</td>
<td>4.67</td>
<td>-14.60</td>
<td>19.84</td>
</tr>
<tr>
<td>Event driven</td>
<td>0.05</td>
<td>3.57</td>
<td>-0.02</td>
<td>2.23</td>
<td>-11.73</td>
<td>14.78</td>
</tr>
<tr>
<td>Long/Short</td>
<td>-0.19</td>
<td>3.36</td>
<td>-0.42</td>
<td>1.16</td>
<td>-11.42</td>
<td>10.78</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>-0.48</td>
<td>2.05</td>
<td>-0.75</td>
<td>1.21</td>
<td>-9.33</td>
<td>4.36</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>-0.72</td>
<td>4.48</td>
<td>-0.33</td>
<td>0.65</td>
<td>-17.20</td>
<td>10.76</td>
</tr>
</tbody>
</table>

Note: All statistics are analyzed as monthly excess returns. Descriptive statistics for each strategy, the GHF index and the S&P 500 are calculated as average values from January 2002 to December 2016. The four moments mean, standard deviation, skewness and kurtosis together with minimum and maximum values are presented.

Table 3: Descriptive statistic: monthly returns for strategies, GHF index and the S&P 500

<table>
<thead>
<tr>
<th></th>
<th>Mean (%)</th>
<th>Std. Dev. (%)</th>
<th>Skewness</th>
<th>Kurtosis</th>
<th>Min (%)</th>
<th>Max (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHF index</td>
<td>0.67</td>
<td>1.38</td>
<td>-0.49</td>
<td>1.53</td>
<td>-4.48</td>
<td>5.04</td>
</tr>
<tr>
<td>Arbitrage</td>
<td>0.81</td>
<td>0.83</td>
<td>-0.43</td>
<td>1.63</td>
<td>-2.32</td>
<td>2.95</td>
</tr>
<tr>
<td>Managed futures</td>
<td>1.36</td>
<td>3.82</td>
<td>1.56</td>
<td>6.86</td>
<td>-9.49</td>
<td>21.49</td>
</tr>
<tr>
<td>Event driven</td>
<td>1.23</td>
<td>3.44</td>
<td>-0.04</td>
<td>3.23</td>
<td>-11.47</td>
<td>16.43</td>
</tr>
<tr>
<td>Long/Short</td>
<td>0.99</td>
<td>3.25</td>
<td>-0.53</td>
<td>1.23</td>
<td>-11.16</td>
<td>10.92</td>
</tr>
<tr>
<td>Fixed income</td>
<td>0.70</td>
<td>1.50</td>
<td>-2.03</td>
<td>10.44</td>
<td>-9.07</td>
<td>4.50</td>
</tr>
<tr>
<td>S&amp;P500</td>
<td>0.46</td>
<td>4.14</td>
<td>-0.69</td>
<td>1.68</td>
<td>-16.94</td>
<td>10.77</td>
</tr>
</tbody>
</table>

Note: All statistics are analyzed as monthly returns. Descriptive statistics for each strategy, the GHF index and the S&P 500 are calculated as average values from January 2002 to December 2016. The four moments mean, standard deviation, skewness and kurtosis together with minimum and maximum values are also presented.

To achieve an unbiased comparison, all the measures are calculated with an equally weighted average (Capocci & Hübner, 2004). The strategies vary in return and this suggest that managed futures are the strategy that generates the highest returns on average each month, as well as the highest maximum value (19.84 %). Further, managed futures are the strategy that takes the most risk and is the most volatile among the different strategies. It is followed
by the event driven strategy that likewise generates positive excess return, but to a lower risk than the managed future focused funds. The statistics in table 2\textsuperscript{13} are measured as excess return and could therefore be somewhat misleading at first glance with low and even negative returns\textsuperscript{14}. Considering the index returns in table 3, all the strategies provide a positive return on average each month. Both table 2 and 3 show evidence that all five strategies have performed better than the general hedge fund industry (GHF Index). Even though the hedge fund strategies are exposed to less risk, it is evident that they out-perform the S&P 500 index. These results are in line with the Modern Portfolio Theory by Markowitz (1952) as they illustrate the benefit of diversification.

When analyzing funds using estimated Value at Risk\textsuperscript{15}, investors may also analyze the distributions of the return. Negatively skewed distributions can imply a higher probability of extreme negative returns, while positive skewness implies periodic minor negative returns, where extreme negative returns are rare. If the peak of the distribution is leptokurtic (the kurtosis of the distribution exceeds 3), small fluctuations are less common since the historical returns have grouped around the mean. Correspondingly, this indicates that extreme fluctuations are more common because of the fat tails. Negative skewness and leptokurtic distributions that is present in most of the different strategies\textsuperscript{16} is an undesirable combination (Moreno & Rodríguez, 2009). The managed future strategy is the only strategy with positive skewness, making it desirable amongst investors. However, the distribution is also leptokurtic, which should make investors think twice about investing in the managed futures strategy funds.

Table 2 shows a positive relationship between risk and return, suggesting that more risk exposure increases the possibility of a higher outcome in return. This constitutes a well-known concept in financial theoretical frameworks (Sharpe, 1964). Figure 3 below divides the strategies excess returns and standard deviation into sub-periods and plots the excess return against the standard deviation. As evident from the figure, there is a clustering where the

\textsuperscript{13} Mean and standard deviation for the strategies in sub-periods can be found in appendix 1

\textsuperscript{14} Inflationary pressure pushed the US 1-month Treasury bills to average approximately 4% each month during the years 2005-2008.

\textsuperscript{15} Investors who do not agree with the classical Markowitz framework might instead care about the shape of the distribution of the returns.

\textsuperscript{16} Distributions of the returns are presented in appendix 1.
standard deviation is low. When there is a systematic increase in the standard deviation, the returns are more “spread” and vary significantly more\(^\text{17}\).

![Figure 3: Combinations of risk and return for hedge funds](image)

**Figure 3: Combinations of risk and return for hedge funds**

*Note: Illustration of the combination between risk and return for hedge funds. The figure show that hedge funds with lower standard deviation have more concentrated low returns. Returns are more “spread out” as standard deviation increase. Hence, by taking more risk higher returns may be possible, but may also lead to bigger losses.*

### 6.2 Correlation

Research regarding hedge funds suggests that hedge funds improve the trade-off between risk and return in a portfolio due to their weak correlation with other securities (Fung & Hsieh, 1997; Liang, 1999). However, Eling and Faust (2010) found that hedge funds and mutual funds had a correlation coefficient of 0.91, but hedge funds generated higher alpha values than the mutual funds. One of the main arguments when advocating for investments in hedge funds is that their correlation with traditional investments is somewhat low, which makes hedge funds favorable for diversification purposes (Capocci & Hübner, 2004; Eling & Faust, 2010).

\(^{17}\) The relationship between risk and return can be somewhat clearer when the graph is plotted with absolute values instead of excess returns which is shown in appendix 1.
Table 4: Correlation between the GHF index, hedge fund strategies and the S&P 500

<table>
<thead>
<tr>
<th></th>
<th>GHF index</th>
<th>Arbitrage</th>
<th>Managed futures</th>
<th>Event driven</th>
<th>Long/short</th>
<th>Fixed income</th>
<th>S&amp;P 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHF index</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arbitrage</td>
<td>,794**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Managed futures</td>
<td>,349**</td>
<td>,451**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event driven</td>
<td>,701**</td>
<td>,449**</td>
<td>,847**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long/short</td>
<td>,814**</td>
<td>,476**</td>
<td>,143</td>
<td>,847**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fixed income</td>
<td>,882**</td>
<td>,773**</td>
<td>,287**</td>
<td>,705**</td>
<td>,764**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>,748**</td>
<td>,492**</td>
<td>,109</td>
<td>,622**</td>
<td>,724**</td>
<td>,690**</td>
<td>1</td>
</tr>
</tbody>
</table>

*** Correlation is significant at 1%

Note: table 4 illustrate the correlation coefficients between the GHF index, the five strategies and the S&P 500 index, measured from January 2002 to December 2016. Correlation coefficients values fall between -1 and 1. Positive correlation coefficients indicate that securities move in same directions and negative correlation coefficient indicate that securities move in opposite directions.

In table 4 the correlation of this study’s benchmark: GHF index, the five strategies and the S&P 500 index, from January 2002 to December 2016 is presented. As evident from the table, the variability between the different strategies is high, ranging from 0.847 (between long/short and event driven) – to 0.044 (between managed futures and event driven). Regarding the managed futures, the results show that this strategy has a lower correlation coefficient with the other strategies and both indices. In addition, the managed futures’ correlation coefficient is insignificant in three of the cases (with event driven, long/short and the S&P 500). The GHF index has a high correlation (over 0.70) with four out of five strategies and the S&P 500. Ranging in variability from 0.882 (with fixed income) – to 0.349 (with managed futures). The GHF index and S&P 500 correlation coefficient equals 0.748. Although there is relatively high correlation amongst the GHF index and S&P 500, all five strategies are more correlated with the GHF index.

6.3 Performance measurement results

The data provided in table 5\(^\text{18}\) comprises the alphas obtained from the CAPM-regression for the five strategies together with a 95% confidence interval. They are presented over the entire observation period as well as in sub-periods in order to interpret how they have performed.

\(^{18}\) The regressions where made using a heteroscedasticity and autocorrelation consistent Covariance matrix (Newey & West, 1986; Greene, 2003).
and changed during the time interval. Additionally, table 5 presents both the beta and adjusted $R^2$ values
during the time interval. Additionally, table 5 presents both the beta and adjusted $R^2$ values.

When running the regression in sub-periods, approximately 60% of the significant hedge fund strategies produce positive alphas and therefore succeeds to out-perform the benchmark. This finding implies that hedge fund managers who allocate their assets in emerging markets on average perform better than managers who place their assets in developed economies. The managed futures, event driven and long/short strategies succeed to generate positive alphas during the whole period from January 2002 until December 2016, meaning that these strategies significantly out-perform the main hedge fund index. The obtained adjusted R-square values that lies around 0.5-0.6 are in line with other research (Eling & Faust, 2010), with the managed futures as an exception.

The results in table 5 indicate that the arbitrage strategy appears to be affected by the general market environment, as it generates negative and insignificant alphas during periods of uncertainty, meaning that they performed in a way statistically indistinguishable from the benchmark. In times of growth, the arbitrary strategies manage to create positive alphas. From January 2008 to December 2013, it generates insignificant positive alphas, however, these alphas lower confidence intervals are close to zero. Figure 4 below clarifies how the different alphas have moved during the period of study and from this it is clear that the arbitrage strategy has experienced a substantial increase in performance during the past years. The arbitrary strategies beta values shown in figure 5, are also subject to a decrease throughout the same period and could constitute a possible explanation. The efficient market hypothesis alludes that with perfect information in the financial markets, the market will be efficient and out-performing the market will be impossible. Those strategies that generate return on market inefficiencies, like the arbitrary strategies, are able to out-perform the benchmark extensively. They thereby prove that financial emerging markets are inefficient and react slowly to information.

19 In the context of evaluating the CAPM, an adjusted R-square of 0.7 states that 70% of the funds’ performance is described by its risk exposure, its beta. And the other 30% can be seen as the manager’s skill or pure luck. Hence, in the CAPM, the only term that is adjusted for is the market variable $\left[R_m - R_f\right]$ (Eun, Resnick, & Saherwal, 2012)
Table 5: Regression result of the CAPM showing alpha, beta and adjusted R-square

<table>
<thead>
<tr>
<th>Strategy</th>
<th>α</th>
<th>Lower 95%</th>
<th>Upper 95%</th>
<th>β</th>
<th>$R^2_{adj}$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arbitrage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 2002-December 2016</td>
<td>-0.04</td>
<td>-0.22</td>
<td>0.14</td>
<td>0.65 ***</td>
<td>0.63</td>
</tr>
<tr>
<td>January 2002-December 2005</td>
<td>-0.17</td>
<td>-0.55</td>
<td>0.22</td>
<td>0.56 ***</td>
<td></td>
</tr>
<tr>
<td>January 2004-December 2007</td>
<td>-0.69 ***</td>
<td>-1.28</td>
<td>-0.10</td>
<td>0.68 ***</td>
<td></td>
</tr>
<tr>
<td>January 2006-December 2009</td>
<td>-0.47 ***</td>
<td>-0.86</td>
<td>-0.09</td>
<td>0.64 ***</td>
<td></td>
</tr>
<tr>
<td>January 2008-December 2011</td>
<td>0.17</td>
<td>-0.05</td>
<td>0.38</td>
<td>0.42 ***</td>
<td></td>
</tr>
<tr>
<td>January 2010-December 2013</td>
<td>0.13</td>
<td>-0.09</td>
<td>0.34</td>
<td>0.48 ***</td>
<td></td>
</tr>
<tr>
<td>January 2012-December 2015</td>
<td>0.52 ***</td>
<td>0.14</td>
<td>0.89</td>
<td>0.13</td>
<td></td>
</tr>
<tr>
<td>January 2014-December 2016</td>
<td>0.67 ***</td>
<td>0.34</td>
<td>0.99</td>
<td>-0.11</td>
<td></td>
</tr>
<tr>
<td><strong>Managed futures</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 2002-December 2016</td>
<td>0.58 *</td>
<td>-0.05</td>
<td>1.22</td>
<td>0.78 ***</td>
<td>0.12</td>
</tr>
<tr>
<td>January 2002-December 2005</td>
<td>0.45</td>
<td>-0.45</td>
<td>1.35</td>
<td>0.40</td>
<td></td>
</tr>
<tr>
<td>January 2004-December 2007</td>
<td>-0.82</td>
<td>-2.51</td>
<td>0.87</td>
<td>0.97 ***</td>
<td></td>
</tr>
<tr>
<td>January 2006-December 2009</td>
<td>0.87</td>
<td>-1.27</td>
<td>3.00</td>
<td>1.04 ***</td>
<td></td>
</tr>
<tr>
<td>January 2008-December 2011</td>
<td>2.23 ***</td>
<td>0.80</td>
<td>3.66</td>
<td>0.21</td>
<td></td>
</tr>
<tr>
<td>January 2010-December 2013</td>
<td>0.98 ***</td>
<td>0.29</td>
<td>1.68</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>January 2012-December 2015</td>
<td>0.73 **</td>
<td>0.12</td>
<td>1.35</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>January 2014-December 2016</td>
<td>0.66 *</td>
<td>-0.07</td>
<td>1.39</td>
<td>0.26</td>
<td></td>
</tr>
<tr>
<td><strong>Event driven</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 2002-December 2016</td>
<td>0.71 ***</td>
<td>0.24</td>
<td>1.18</td>
<td>1.29 ***</td>
<td>0.49</td>
</tr>
<tr>
<td>January 2002-December 2005</td>
<td>2.21 ***</td>
<td>1.10</td>
<td>3.32</td>
<td>1.85 ***</td>
<td></td>
</tr>
<tr>
<td>January 2004-December 2007</td>
<td>1.79 ***</td>
<td>0.74</td>
<td>2.84</td>
<td>1.29 ***</td>
<td></td>
</tr>
<tr>
<td>January 2006-December 2009</td>
<td>0.75 ***</td>
<td>0.24</td>
<td>1.26</td>
<td>1.21 ***</td>
<td></td>
</tr>
<tr>
<td>January 2008-December 2011</td>
<td>-0.25</td>
<td>-0.62</td>
<td>0.11</td>
<td>1.61 ***</td>
<td></td>
</tr>
<tr>
<td>January 2010-December 2013</td>
<td>-0.42 *</td>
<td>-0.94</td>
<td>0.10</td>
<td>1.82 ***</td>
<td></td>
</tr>
<tr>
<td>January 2012-December 2015</td>
<td>-0.29</td>
<td>-0.81</td>
<td>0.23</td>
<td>1.99 ***</td>
<td></td>
</tr>
<tr>
<td>January 2014-December 2016</td>
<td>0.10</td>
<td>-0.33</td>
<td>0.53</td>
<td>1.67 ***</td>
<td></td>
</tr>
<tr>
<td><strong>Long/Short</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January 2002-December 2016</td>
<td>0.53 ***</td>
<td>0.16</td>
<td>0.90</td>
<td>1.41 ***</td>
<td>0.66</td>
</tr>
<tr>
<td>January 2002-December 2005</td>
<td>1.35 ***</td>
<td>0.79</td>
<td>1.91</td>
<td>1.67 ***</td>
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* Indicates significance at 10% level
** Indicates significance at 5% level
*** Indicates significance at 1% level

Note: Table 5 present the five strategies alpha and beta values from January 2002 to December 2016 together with seven sub-periods. Also included the alphas confidence intervals at 95% and each strategies Adjusted R-squared.
Managed futures succeed to generate positive alpha values in most sub-periods except for the period between 2004 and 2007. Even though the first three sub-periods are insignificant and have a wide confidence interval, it could be argued that the managed futures perform well when the other strategies do not. This is confirmed in figure 4. As illustrated in table 4, managed futures is the strategy that is the least correlated with both the S&P 500 and the GHF index. The vague relationship between the methods practiced by the managed futures managers’ and the financial market allows this type of strategy to generate positive alphas in both falling and rising markets. The alphas of the managed futures strategy funds have declined systematically over the past years, leaving the question if this strategy’s performance measurement will continue to decline.

Given a correlation coefficient of 0.847 and as figure 4 illustrates, the event driven and long/short funds tend to move in the same direction. The event driven and the long/short strategies both have significant positive alphas in the beginning of the studied period. In addition, the event driven strategy generates the highest significant alpha during the full study period. According to the efficient market hypothesis, the only way of achieving greater returns than the market is by acquiring more risky assets. Both strategies are subject to high beta values, as can be seen in figure 5; they are also the two strategies that are exposed to the most systematic risk. In the later periods however, none of the alphas are significantly different from zero.

Event driven strategies and long/short strategy funds creates positive alphas in periods of uncertainty and fluctuating markets\(^2\). A bold explanation for this might be that these strategies try to benefit from mispriced market events, such as profit warnings and takeovers, which occur frequently during volatile stages. On the other hand, it can help describe why the two strategies fail to continue generating positive alphas during market neutral conditions. The fixed income strategy funds generate alphas of around 0, and only produces two significant values that are negative, occurring during the periods January 2004 to December 2007 and January 2012 to December 2015. These findings suggest that the fixed income strategy fails to perform better than the global hedge fund market. Fixed income

\(^{20}\) Fluctuating and market neutral markets are in this context referred to periods when the standard deviation of the main hedge fund index and the S&P 500 have a high and low standard deviation respectively. See tables for standard deviation in appendix 2.
focuses mostly on relatively reliable returns, given that they take on almost the same risk, beta, as the global hedge fund market, it is no surprise that they perform approximately the same as GHF index.

Figure 4: The change in estimated alpha from January 2002 to December 2016

Note: Figure 4 illustrate the movement of the estimated alpha values for the arbitrage, managed futures, event driven, long/short and fixed income strategies from January 2002 to December 2016. Alpha values above zero indicate that the strategy have performed better than the benchmark/market, and alpha values below zero indicate that the strategy have performed worse than the benchmark/market.

Figure 5: The change in estimated beta from January 2002 to December 2016

Note: Figure 5 illustrate the movement of the estimated beta values for the arbitrage, managed futures, event driven, long/short and fixed income strategies from January 2002 to December 2016. Beta measure the strategies systematic risk, their sensitivity to changes in the market.
Fung and Hsieh (2011) and Fung et al. (2008) found a downward trend in the generated alphas in emerging markets at the end of their investigation period. Strömqvist (2007) however suggest that emerging market hedge funds should generate positive alphas in the future. This statement is neither confirmed nor rejected based on the results of this study. According to results in table 5 and figure 4 this seems to be true regarding the strategy managed futures, which produces positive significant alphas over the four last periods, indicating an out-performance of the benchmark. This also seems to be true for arbitrage funds that succeed to generate positive significant alphas the last two periods. The other strategies either under-perform or have insignificant alphas throughout the same periods. Contradictory to the research by Strömqvist (2007), Abugri and Dutta (2009) and Eling, and Faust (2010) declares that managers of emerging market hedge funds have changed their investment behavior after 2006, and from that period onwards show a similar pattern as the one recorded for advanced market hedge funds. Abugri and Dutta’s (2009) study is based on the entire emerging market hedge fund industry and argues that this industry does not out-perform the benchmarks on a regular basis after 2006. This argument is consistent with the results in this study, with the exception that this study suggest that this situation starts in 2008, at least regarding the event driven, long/short and fixed income strategy who all produce close to benchmark and even negative alphas constantly after that period.

6.4 Performance in different market environments

According to table 5 the arbitrage strategy is affected by the general market environment and tends to produce positive alphas when the market is in a positive trend, whilst it tends to perform negative alphas when the economy is in a negative trend. In comparison, the managed futures strategy seems to be somewhat unaffected by both the GHF index and the S&P 500 and manages to perform positive alphas regardless of the economic environment.
Figure 6: Strategy returns in different environments

Note: Figure 6 illustrates the five observed strategies, GHF main index, and S&P 500’s performance in four different market environments. Environment 1 represents each observation 45 worst months on average returns and environment 4 represents the observations 45 best months on average returns.

To further investigate the question, figure 6 contains a graph that presents the different strategies, the benchmark and the S&P 500 and their excess returns in different market environments. The excess returns are divided into four different market environments to sort out the peaks and troughs for each individual strategy. The market situations are ranked from 1 to 4, where 1 is the average excess returns of the 45 lowest performing months and 4 is the average excess return of the 45 highest performing months for each strategy. Due to high correlation, it is no surprise that the fixed income strategy achieves the most similar returns to the GHF index in the different environments. As for the event driven strategy, long/short strategy and the S&P 500, the returns look similar in three out of the four periods. According to Eling and Faust (2010), hedge fund managers shift their allocations and adapt to changing market environments earlier than the regular investor. This result is found also in this study and is evident from figure 6, where all the hedge funds and the benchmark succeed already in market environment 2 to generate a positive return, whilst the S&P 500 still suffers from negative average excess returns.
Table 5 presents the betas of the different strategies in comparison to their benchmark, the GHF index. The strategies long/short and event driven have significant betas of over 1 during the entire period. Asserting that they should perform better than their benchmark during their best environments and perform worse during their worst environment, something that is confirmed in figure 6. Regarding the managed futures, there are a lot of betas that are not significant; hence it is difficult to explain why the managed futures perform so well during the good periods and bad during the bad periods. Another interesting finding is that the arbitrage strategy seems to succeed in fulfilling its purpose of being a risk-reducing strategy. It generates the least negative return during market environment 1 and offers, at least to some degree, downside security in harmful market environments. Hence, in figure 6, it is possible to identify a connection between risk and return as the strategies (managed futures, event driven and long/short) who take on most risk seems to perform worst during bad periods and best during good periods.
7 Conclusion

This paper investigates whether emerging market hedge funds perform better than the global hedge fund market and questions previous research that does not distinguish between different strategies when studying emerging market hedge funds (Abugri & Dutta, 2009; Eling & Faust, 2010; Fung & Hsieh, 2006). In terms of risk-adjusted return, it is evident from the results that all emerging market hedge fund strategies out-perform the GHF index during the whole investigation period. Ackermann et al. (1999), Liang (1999), Capocci and Hübner (2004) amongst others, state that hedge funds serve as an excellent investment for diversification purposes. In this study, returns of the emerging market hedge funds are higher than the alternative investment S&P 500, even though they are subject to less risk. This result is in line with the Modern Portfolio Theory by Markowitz (1952) that emphasizes the importance of diversification in a portfolio. The results from the regression of the CAPM are a bit contradicting, as they conclude that the obtained positive alphas of the regressions indicate that 60% of the strategies in the emerging market hedge funds perform better than the GHF index.

Additionally, this paper examines if there is a difference in performance depending on what strategy the fund managers’ practice. One key finding of the research is the difference in performance that each strategy delivers, and displays the importance of dividing funds into strategies rather than focusing on the degree of development in that market. This paper concludes that arbitrage strategy funds offer, at least to some degree, downside security in harmful market environments and is therefore superior for hedging purposes. Strategies with a focus on arbitrary gains have performed better than the benchmark during January 2008 to December 2016, which would not be possible under the efficient market hypothesis if financial markets were efficient. The reason for emerging markets being less efficient is usually denoted as a main reason for why they should generate higher returns than developed markets. This paper finds evidence supporting this during the last periods.

For performance purposes, there are two possible ways to determine what strategy that is superior. Based on the findings from the full investigation period, it seems that the event driven strategy is the superior as it generates the highest performance. This way of determining the overall performance might be misleading since in the first half of the
investigation period, it is evident that two strategies event driven and long/short strategies shared this position, whereas managed futures is superior from January 2008 and onwards.

An augmented Dickey Fuller test showed a problem with stationarity in the arbitrage strategy in the CAPM regression conducted. This could have been triggered by a structural break and makes the conclusion of that strategy less precise. Contradictory, the other strategies displayed no problems with stationarity. Hedge fund performance could be investigated in several ways. The correlation with the GHF index and the Adjusted R-squared regarding the managed futures strategy are low, implying that there are other elements that determine the return for this strategy. Agarwal and Naik (2004), Capocci and Hübner (2004) and Eling and Faust (2010) showed that multifactor models increase the Adjusted R-squared values and the use of these models might explain the variation in risk-adjusted return for the managed futures strategy better. However, one cannot reject that the generated return for hedge funds could depend on managerial skill as well.

7.1 Future research

A compelling application of further research would be to examine more strategies and what additional factors that determine performance of emerging market hedge fund strategies, rather than just a risk factor derived from a benchmark. This could be done using the multifactor models previously mentioned. Eling and Faust (2010) conclude in their study that multifactor models help explain the variation in return for emerging market hedge funds better than the CAPM. Analysis of what factors determine the shift in investor behavior during the last decade could provide further insight regarding what creates return in both times of economic contraction and expansion.

(Ratner & Leal, 2005)
References


Appendices

Appendix 1
Excess Returns Distributions
Returns – Absolute values
### Risk-adjusted return for sub-periods

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### Main hedge fund index

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### S&P 500

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Appendix 2

Further explanations

Standard deviation

Standard deviation, or volatility is a measure of risk of a probability distribution. Or in other words, a measure of how much an asset's return varies from its mean return. The standard deviation is calculated by taking the square root of the variance, the assets expected squared deviation from its mean.

\[ SD = \sqrt{Var(R_{it})} \]

It's a positive relationship between return and volatility, so there is a tradeoff between risk and return, the underlying assumption is that higher expected return results in higher risk, or volatility (Berk & DeMarzo, 2014).

Moving average

To get a more relevant and reliable measures we have chosen to use the method of “Moving Average” (sometimes called Moving Windows). The purpose of the method is to track trends, by smoothing out the fluctuations. One of the most used type of moving averages and the one method that we are using in this paper is, the Simple Moving Average (SMA).

The SMA is calculated by computing the average returns (or average prices if you want to calculate a stock price) over a set of days, week or months. As the term implies, moving averages is averages that moves on the timeline. Along our timeline of 180 months, from January 2002 to December 2016, we use moving averages of 48 months (observations) that overlap 24 months each time to get a total of seven “sub-averages” with the last containing 36 months. In that way, instead of getting one alpha-value for the whole observation period, we can see how the alpha have moved during different stages of the observation period, such as the last financial crisis (Law, 2009; Upton, 2011).

Risk - Systematic risk and unsystematic risk

Risk in the financial market are usually divided into systematic risk and asymmetric risk, where they sum up to the total risk. Systematic risk (undiversifiable risk), is due to market-wide news that result in fluctuations of a security's return. Risk that affect the overall market and not only a specific security or stock. Systematic risk cannot be eliminated through diversification. Systematic risk is impossible to avoid and hard to predict. Unsystematic risk
on the other hand, is inherited in different industries and companies and can therefore be diversified by investing in stock from different industries (Hamberg, 2001; Berk & DeMarzo, 2014).

According to Markowitz (1952), a portion of volatility in the portfolio can be reduced by combining different assets that don’t correlate with each other, by diversification. Hedge funds (and mutual funds) reduce their unsystematic risk by investing in assets from various industries. Hence, since diversification eliminates the unsystematic risk, investors are more interested in how to measure and understand the systematic risk (Ross, Westerfield, Jaffe, & Jordan, 2008).

**Market proxy**
The market proxy, can be explained as a measurement for comparing different funds to the overall market or industry. In other words, a benchmark is selected so that one can compare different funds’ performance in relation to a set of related various assets. A good benchmark needs to fulfil some requirements; the securities in the benchmark needs to be clearly defined where one should be able to see its weight. It also needs to be accessible, that is, a security can be purchased on the market and the return should be able to be calculated often, and it needs to have available past data. The CAPM suggest that the market proxy should be the market portfolio. However, a market portfolio for all the risky securities in the world is hard to find, whereas the S&P 500 is a commonly used and accepted market proxy since it explains the overall health of the US economy. Since hedge funds are a special case and are placed under the category of special funds and place its assets using different strategies in different countries and industries it is hard to find an appropriate benchmark that can be applied to all hedge funds. There is really no “one size fits all” benchmark. Based on the above assumptions, the Eurekahedge main index consisting of 2797 funds is a representative hedge fund performance market proxy because of its ability to explain the hedge fund industries current state of mind (Fung & Hsieh, 2004; Berk & DeMarzo, 2014).