Actively Managed Emerging Markets Mutual Funds

An empirical study of the performance of actively managed emerging markets equity mutual funds

Master´s Thesis

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Abstract

The purpose of this paper is to investigate the worth of active management in the context of emerging markets. Most of the literature conducted within this area reports active managers providing abnormal returns for their investors. If in those markets considered efficient, fund managers are able to provide superior returns, it seems fair to assume that within inefficient markets they should be able to obtain even more successful results. This paper seeks to examine and explain the excess return of actively managed emerging market mutual funds over the period 2014-2021 and empirically determine whether active managers can generate abnormal returns. By using multi-regression models like CAPM, Fama French three-factor model and Carhart four-factor model, a portfolio of 186 emerging market funds is compared against a matching passive fund. Results show that the EM funds have not been able to produce any abnormal return, while performance would vary between sub-periods. Nevertheless, the same funds have been outperforming the passive fund relatively over the entire period, by 0.0042%.

KEY WORDS: mutual funds, emerging markets, fund performance, market efficiency

1. Introduction

This section means to introduce the reader to the paper. It mainly provides the premises, including a brief outline of the kind of research this paper aims to undertake. At the end the structure of the thesis is also presented.

1.1 Premises

Investors are always in the search for the next mispriced stock. Mutual funds have been established with the intent to scale that search up. In fact, by collecting enough capital through management fees, the task of finding mispriced stocks is delegated to an active manager who is supposed to have the skills to do that in a continuous manner (Petajisto, 2013). The alternative to that is passive fund management. While the aim for the former is to beat the market and generate superior returns, for the latter is to provide a relatively safe investment while stayed diversified (Petajisto, 2013). Within both industry and academia, the debate on whether the expensive practice of active management is worthwhile, compared to passive management, is still active (Petajisto, 2013). According to Fama (1970) active managers should not be able to provide abnormal returns since markets are considered efficient, given that the prices reflect already whatever information is available to investors (Fama, 1970). Some authors criticize that paradigm, arguing for more irrational and emotional investors, for which the market cannot be deemed efficient and thus the stocks cannot be considered fairly priced at any given time (Lo, 2008). Then, as far as the market efficiency is concerned, it is not a surprise that since the globalization of financial markets took place, developing countries gained increased scrutiny from active managers and investors (Kaminsky, Lyons, & Schmukler, 2001). In fact, the information inefficiency derived by their undeveloped and unstable political and capital systems provides higher chances for skilled active managers to find mispricing that has been overlooked by the rest of the market.

On one side, the literature offers plenty of studies proving active management a worthy practice (Fortin & Michelson, 2005), while on the other side it also documents funds invested in emerging market as being unable to generate any abnormal return for their investors (Hili, Pace, & Grima, 2016) (Basu & Huang-Jones, 2015). In view of such a contradicting landscape, this paper aims to contribute to the literature by investigating the performance of active funds againsts the

passive counterpart, in the context of emerging markets. This paper helps shedding light on whether active management is still worthwhile, and whether the risk-premium related to emerging markets investments is still not occurring.

In order to investigate this topic, this paper adopts the same methodology to that of previous studies, in particular the one from Kiymaz & Simsek (2017). A portfolio of 186 actively managed emerging market funds has been empirically analyzed and compared to a matching passive fund, using multifactor models. The analysis is conduced over a sample period going from 1st August 2014 to 30th June 2021, a span of nearly seven years. To bridge the gap within the literature, this study offers a more recent timeframe which is yet to be analyzed. Different sub-periods are further investigated, hypothesising that skilled active managers should be able to generate superior returns while readily adapting their portfolios to any kind of market conditions (Kiymaz, 2012). In particular, the sample period encompasses two recessions and two recoveries in the economy, for which recessions cover mainly the great price fall of the oil price in 2014, and the Covid-19 pandemic crisis in 2019.

On this matter, this paper concludes that over the period from August 2015 to June 2021, the emerging market funds have not been able to produce any abnormal return, while performance would vary between sub-periods. Nevertheless, the same funds have been outperforming the passive fund relatively over the entire period by 0.0042%.

1.2 Structure of the paper

The rest of the paper is structured as follows. Section 2 will introduce the reader to the main topics encompassed in this study, those being active and passive management, as well as the emerging markets. Section 3 provides a review on what other authors in this research area have found already, in terms of the worth of active management but also of the under-or-outperformance of emerging market funds. In Section 4 and 5 are presented the theories which ought to be tested and used, and the development of those hypotheses that will help in the process, respectively. Furthermore, Section 6 is dedicated to the methodological choices undertaken to realize the analysis, which is then reported in detail in Section 7. In Section 8 the results and their implications are discussed and reflected upon, whereas Section 9 includes the conclusion and final remarks.

2. Background

To properly frame the analysis, this paper begins with enlightening the reader on the topics of active management and emerging markets. First, the characteristics of mutual funds are presented, including those that make passive and active management differ from each other. To that, it follows the definition of emerging markets and their introduction to the capital market.

2.1 Mutual Funds

Within the financial industry, investors have different ways of investing their money and therefore manage their investments. One common way is directing the one´s money to financial intermediaries, like mutual funds. A mutual fund is a group of investors who decides to collect all their money in one basket, called vehicle (Hili, Pace, & Grima, 2016). The origin of this instrument is traced back to the 1774 when a German merchant established the first ever collective structure, meanwhile most of the funds have not appeared until around the 2000 (Hili, Pace, & Grima, 2016). Mutual funds provide a great solution for unsophisticated investors who wishes to access the capital markets but lacks the necessary time or financial competences (Hili, Pace, & Grima, 2016). For institutional investors such vehicles allow for asset diversification and professional asset management, which represent a much safer solution than holding a portfolio of a few securities alone (Markowitz H. M., 1999).

The number of mutual funds existent in the world has just been increasing. In fact, in 1980 they counted 564 mutual funds, while in 2002 the number increased to 8,256 (Fortin & Michelson, 2005). Overall, the majority of mutual funds is invested into equity and developed markets (Kaminsky, Lyons, & Schmukler, 2001). The main constitutes of those funds holding a global exposure are developed regions (US, Canada, Europe, and Japan), whereas only ten percent of the fund is invested in emerging markets. Countries like Brazil and Mexico gain most of the interest in Latin America (investible universe called LatAm), and Hong Kong, India and Korea in Asia. Within developing financial markets, mutual funds are still a relatively a modern phenomenon. (Kaminsky, Lyons, & Schmukler, 2001).

There are two main ways to invest into a mutual fund and those are passive and active kind of investing. Passive management is the act of investing into a well-diversified portfolio with the sole purpose of representing the market index without chasing mispriced securities (Cremers & Petajisto,

2009). Differently, active management is the act of pursuing higher return than the market, by investing into mispriced securities or forecasting trends in the market (Cremers & Petajisto, 2009).

2.1.1 Passive Management

In particular, passive asset management is practiced by investing one´s capital into exchange traded funds (ETFs) or index funds (Rudd, 1986), which are investment vehicles that includes only those securities that constitute an index. Specifically, an ETF is a subcategory of an index and therefore it would represent only certain sector or certain category of that index. Example of an ETF could be *iShares Core S&P Small-Cap ETF*, that is a vehicle distributed by BlackRock (iShares) that encompasses only companies included in the Standard & Poor Index which are domiciliated in US, and have a small capitalization (iShare - by BlackRock, 2021). On the other hand, an index fund replicates exactly a stock market index, for example the *Dow Jones Industrial Average* (Yahoo Finance, 2021). Pure index funds started to exist in 1980 and even though initially they were not that common between investors, nowadays they constitute one-fifth of all mutual funds (Petajisto, 2013).

Passive investing is known for the diversification that such not-concentrated vehicles can provide and for being at the same time relatively cheap (Petajisto, 2013). The particularity of this financial instrument in fact is that there is not a dedicated manager who actively acts and rebalances the portfolio allocation arbitrarily when he/she thinks necessary, reason for which expense ratio is low (Rudd, 1986). As a result, the portfolios are known to hold an extremely low turnover, given that the securities are hold for long time and any replacement occur sporadically (Rudd, 1986).

2.1.2 Active Management

Active asset management is any form of investing which deviates from the passive kind (Petajisto, 2013). In other words, by actively managing a portfolio the scope is not to follow an index but to deliberately choose the stocks, and periodically rebalance the portfolio, to capture mispricing in the market (Petajisto, 2013). The idea behind active management lies on the Efficient Markets Hypothesis (‘EMH’ henceforth) which states that prices at any point in time ‘fully reflect’ all available information, assuming information efficiency (Fama, 1970). However, this could be true only if certain conditions were present. First condition is that securities are being rightly priced, whereas the second is that there are no transactions costs in trading securities – and borrowing and lending is at the same interest rate. Third, all available information is available for free to all market

participants. Fourth and last, all investors agree on the implications of current information for the current price and distributions of future prices of each security (Cremers & Petajisto, 2009). In such a market where all those conditions apply (also referred to as 'market equilibrium'), the current price of a security certainly 'fully reflects' all available information, and mispricing would never occur. However, this is not the case in the real world. In fact, in reality there is a cost in trading securities, information is said to be one of the most precious and costly commodities in the world, and investors have very different opinions on the implications of current information for the prices of different securities (Cremers & Petajisto, 2009). These circumstances lead for the stocks to not always represent their fair value, and thus for arbitrageurs to exploit mispricing opportunities. The figure of the active manager is that of an arbitrageur who is skilled and well-informed enough to make a return out of discovering those unpriced stocks before anyone else (Cremers & Petajisto, 2009).

Within active management there are different ways to deviate from the index. Some managers do that by picking those stocks they believe will outperform peers (*stock selection)*, others by time-varying betting on different sectors or industries depending on worldwide economic and geopolitical conditions and risk factors (*factor timing*) (Cremers & Petajisto, 2009). On the side of the investor, there are few metrics through which an investor can measure the activeness of a manager, those being Tracking error and Active share. The former expresses the volatility of the difference between an active portfolio return and its passive benchmark index return, while the latter indicates how different the active portfolio is from its passive benchmark index (Cremers & Petajisto, 2009). By looking at Active share the investor can have an idea about the manager´s deviation from the index and thus what is the added value that the manager is trying to achieve (Cremers & Petajisto, 2009). In contrast, pure indexes would have zero Tracking error and zero Active share.

The topic and the research question of this paper are determined by the interest into active management, which practice is possible only in the presence of informational asymmetries and well-informed and skilled managers. Thus, the natural course now is to introduce the reader to the area of emerging markets given that they show generally higher informational inefficiency level than developed markets, making the investigation on active management within emerging markets further intriguing.

2.2 Emerging Markets

The focus of this study is on so-called Emerging Markets (henceforth EM), which include those countries that are still going through the developing stage, or in other words are still in transition

from being an undeveloped economy to a developed one (Meyer & Grosse, 2018). Development in these countries is taking place at different pace, and within various areas such as healthcare, education, politics, demographics, and in the overall societal system. For this reason, research institutions differ in their classifications of EM. Each institution would in fact attribute a subjective degree of the same characteristic, which brings to no worldwide general list of EM countries being accepted yet (Rodriguez & Torrez, 2008). The International Monetary Fund (IMF) for example examined countries characteristics such as country´s income, level of participation in global trade (which translates to nominal GDP), population, amount of export, and financial market integration (which translates to the level of external debt and inclusion in global indices) (IMF, 2021). Considering all these elements, the following twenty countries have been selected by the IMF (2021) as EM: Argentina, Brazil, Chile, China, Colombia, Egypt, Hungary, India, Indonesia, Iran, Malaysia, Mexico, the Philippines, Poland, Russia, Saudi Arabia, South Africa, Thailand, Turkey, and the United Arab Emirates (IMF, 2021). In US dollars, all these countries together account for 34 percent of the world´s nominal GDP (15 percent, in 1987), and for 84 percent of the world´s population (Meyer & Grosse, 2018).

What has allowed international investors to access EM has been the process of capital market liberalization (Henisz & Zelner, 2010). At the end of the 90s, the doors of EM opened to foreign investors, and due to their benefits of diversification and promising opportunities of abnormal returns, the demand for EM's exposure has grown since (Henisz & Zelner, 2010). With the purpose of taking advantage of the booming demand for such an asset class, asset managers started to establish funds dedicated to those markets (Kiymaz, 2012). The first one was established in 1987 and it is still known today as the *Templeton Emerging Markets* fund, from the name of its founder Franklin Templeton (Hili, Pace, & Grima, 2016). Since 1990 institutional investors, mainly mutual funds, are the main source of capital inflows for EM (Kaminsky, Lyons, & Schmukler, 2001). In fact, private capital flows including both foreign direct investments and portfolio investments, account for 80 percent of all flows directed to countries in the developing area of the world, replacing great share of the old-fashion bank lending (Kaminsky, Lyons, & Schmukler, 2001).

In conclusion, active management is the practice of exploiting arbitrage opportunities while assuming the EMH does not hold due to information asymmetries. Given the persistent presence of actively managed mutual funds, it is fair to assume that active management, compared to passive, effectively provides some additional value to managers and investors. Furthermore, since EM are

characterized by undeveloped and unstable economical and societal conditions, compared to developed markets, their markets should be among the most flawed in the world. Hence, they can be assumed to be hardly in equilibrium, and present abundant mispricing opportunities. This suggests that in those markets active managers who are skilled and well-informed should be able to outperformance the market. The following section reviews the past studies that have been conducted on the same topic.

3. Literature Review

This section presents the existing literature on the topic. It begins with the citation of past studies on the worthwhile of active management. It follows the presentation on what has been found to be the key features of emerging markets as an investment asset class. Lastly, proofs of both outperformance and not-outperformance of emerging markets mutual funds have been reported.

3.1 Active Management

Academicians have analysed in great extent whether active management is beneficial for investors or not (Michelson, Philipova, & Srotova, 2008). The underlying idea is that individual investors would pay the higher cost of management fees and transaction cost to and for a manager who has the skills and resources to create superior returns (Petajisto, 2013) instead of passively investing them buying into an ETF.

In a study performed by Fortin & Michelson (2005) the performance of five categories of actively managed funds have been analysed against their respective benchmark indices. A total of 831 funds, between 1976 and 2000, encompassing the categories World, Foreign, Europe, Pacific and Emerging Markets have been taken under the lent. Results show active management being worth for all categories except for the European funds (Fortin & Michelson, 2005).

Another relevant study on active management is the one of Cremers & Petajisto (2009) who collected daily data returns of equity mutual funds domiciliated in the US over the period between from 1980 to 2003. They investigated the performance of the funds and checked for outperformance relative to their matching benchmarks. Those managers holding the highest Active share are also the ones with the highest outperformance, even after accounting for fees and transaction costs (Cremers & Petajisto, 2009). In fact, their relative gross performance is between 1.51 and 2.40 percent per year relative to their benchmarks, whereas net is between 1.13 and 1.15 percent. Differently, if anyone would had invested into the lowest Active share funds, investors would have received (lost) only between 0.11 and -0.63 percent relative to the benchmark per year. This would result in no excess return for the investor. After accounting for fees, the investor would be worse off, given the negative alpha of -1.42 and -1.83 percent per year (Cremers & Petajisto, 2009).

Five years later, Petajisto documented another study on active management, by analysing 2,740 funds between 1980 and 2009 (Petajisto, 2013). The main difference with the previous research he conducted is that the analysis this time is made on a sample including the financial crises. With the aim of investigating how actively managed funds would hold on to their outperformance during economic downturns, the results are twofold. On one side, a weak underperformance against the benchmark has been detected (Petajisto, 2013), given the negative abnormal return of -0.41 percent per year coming from the average fund. On the other side, the analysis revealed a strong outperformance of funds holding the highest Active share (Petajisto, 2013). In fact, these funds have beat the index by 1.26 percent per year net-of-fees. Furthermore, the outperformance of such funds has hold on even in 2008, during economic distress. Although the financial crisis hit the whole market including actively managed funds, the latter have still outperformed the benchmark by 1 percent per year (Petajisto, 2013).

Based on the literature, active management has showed itself to be worth, in most cases. In violation of the EMH (Fama, 1991), that means that markets are generally inefficient enough for managers to exploit mispricing and provide above-benchmarks returns, despite the high expense ratio.

3.2 Emerging Markets

3.2.1. Development of Emerging Markets within Finance

Developing countries in terms of population cover 84 percent of the world (Meyer & Grosse, 2018), but EM as a financial asset accounts for only 21 percent of the world stock market capitalization, and 22 percent of the world outward Foreign Direct Investment stock (Meyer & Grosse, 2018). Nevertheless, the pace at which EM have been progressing during the past thirty years is notable, especially since when capital market liberalization took place in the mid-1990s (Meyer & Grosse, 2018). Their advancement in the financial market is witnessed by the presence of emerging countries in well-known market indices such as the MSCI All Countries Index (*MSCI ACWI Index*) (MSCI, 2021). Nowadays, this Index holds about 15 percent exposure to EM, whereas in 2002 was 4 percent (Gupta, 2021), and in 1988 EM constituted only 1 percent (Blitz, Pang, & Vliet, 2013) of the entire portfolio of the Index. The increase in proportion of EM as constitute of the Index is due to the increasing compliance of developing countries to what is defined as an accessible and investible market by the investment research firm Morgan Stanley Capital International (MSCI, 2021). In fact, developing countries must show a high degree of free movement of capital and stock market

liberalization in order to be included in Indexes like MSCI All Countries Index, or the *MSCI Emerging Markets Index* (Meyer & Grosse, 2018).

Interestingly, the type of geographical exposure within the Index also changed significantly through the years, resembling the growth rate of each individual developing country. In 2002, the biggest EM constituents within the MSCI All Countries Index were Taiwan (about 11.5 percent of the overall EM exposure), Brazil (10.5 percent) and South Africa (10 percent) (Gupta, 2021). Meanwhile, in 2020, China is the absolute first covering 40 percent of the EM exposure, and Taiwan and Korea share the second position (with an 11 percent each) (Gupta, 2021).

MSCI Emerging Markets Index is a well-known Index within the financial market, which exposure is exclusive to stocks of companies based in EM countries (Michelson, Philipova, & Srotova, 2008). It has been launched in 2001, and it aims to reflect overall 60 percent of local market capitalization of each emerging market country (MSCI, 2021). Since the composition of an index portfolio reflects the investors sentiment, as well as the companies' fundamentals and the capital flows across countries of exposure, the changes in sector allocation can provide further evidence on the progress of those countries (Johnson, 2021). In the case of EM, in 2008, the MSCI Emerging Markets Index hold 40.2 percent of exposure into energy and materials stocks. Later, in 2020, the same figure has decreased to 12.5 percent, leaving the space to technology stocks which then accounted for 20.5 percent of the portfolio. Technology, rather than energy and materials, is a synonymous of innovation, development, and ultimately economic prosperity (Johnson, 2021).

3.2.2 Active Management within Emerging Markets

Literature on active management within EM has produced a series of interesting outcomes. In fact, researchers when investigating EM and put them in the context of active management would repeatedly conclude their investigations by assigning to EM few specific features. A part from the promising abnormal returns expected by investments in countries with higher growth prospectus as EM (Section 3.2.3 will review this in more depth), those features are market inefficiency (Ojah & Karemera, 1999) (Filis, 2006) (Risso, 2009), high volatility (Blitz, Pang, & Vliet, 2013) (Henisz & Zelner, 2010) (Johnson, 2021) (Mody, 2004), and portfolio diversification (Basu & Huang-Jones, 2015) (Geert & Campbell R., 2003) (Hili, Pace, & Grima, 2016). These features are the reasons why EM are perceived from investors the way they are today, that is as a highly volatile but potentially profitable diversification opportunity.

Numerous authors researched about and tested the lack of market efficiency of EM, which seems to derive from the underlying undeveloped capital market (Risso, 2009). Most of the companies in EM are not compliant with all the regulations and reports disclosure (Filis, 2006). This is considered a big enough limitation towards (market) efficiency (Basu & Huang-Jones, 2015). Ojah & Karemera (1999) tested for market efficiency and predictability of returns in LatAm, with a focus in Argentina, Brazil, Chile and Mexico, to find out that the equity market prices follow a random walk (Section 4.1 for definition). In other words, the purpose of the research was to check whether historical stock prices can predict future prices, and their test confirms the inefficiency of these markets. Besides, also Greece has been found to be an inefficient market, when considering the Athens Stock Exchange (Filis, 2006). Furthermore, different scholars have argued that the efficiency of a market depends on the effectiveness of capital use, something with which immature markets like EM are still far behind (Filis, 2006). If the EM were to be classified from the most efficient to the least, Asia would be leading the list whereas the ex-socialist countries would be the ones closing it (Risso, 2009). In particular, within Asia, the countries of Taiwan, Japan and Singapore are found to constitute the most efficient markets, and Slovenia the very least (Risso, 2009). Given the evidence of their general market inefficiency, it can be concluded that when referring to EM the paradigm of the EMH seems to not uphold and therefore mispricing opportunities should occur.

In the context of active management, EM are not only a source of mispricing opportunities but also of great volatility. In fact, they are generally perceived to be highly volatile, compared to developed markets (Mody, 2004). In particular, the standard deviation of assets prices for an EM mutual fund is 5 percent points higher than that of the average foreign large-caps mutual funds (Morningstar , 2021). In order words, the prices of the stocks within EM are further spread apart in relation to the mean and hence it is harder to precisely assess their fair value. The foremost cause to volatility of EM is found to be the political and economic instability (Eling & Faust, 2010) (Henisz & Zelner, 2010). For example, as documented by Tkac (2001), expropriation has been the biggest concern for years until recently, for international companies and foreign investors (Tkac, 2001). They worried about their capital or assets being seized by the host government. In fact, in EM authorities have the power of changing regulations or deciding to not reinforce laws with the purpose to detriment investors and international companies, and thus keep them from divesting or retrieve their own profits from the country (Henisz & Zelner, 2010). Furthermore, Hensiz & Zelner (2010) found also that in response to the political instability, EM countries struggle significantly to attract direct foreign investments (Henisz & Zelner, 2010). Consequently, EM must rely on developed countries to be

granted access to credit, by issuing loans at very high interest rates. Furthermore, since the main lender for EM countries is the US, the availability to credit for these countries depends on the state of the US economy (IMF, 2021). Whenever the Fed decides to apply tightening policies to US economy, emerging economies follow and tighten. The opposite happens for them when the Fed decides to apply quantitative easing programs (IMF, 2021). Consequently, when US interest rate rises and EM tighten in their ability to take loans due to costly borrowing, individual investors would redeem their money from those economies in expectancy of economic uncertainty (Henisz & Zelner, 2010). Another cause of volatility associated with EM is the high probability of occurrence of natural disasters (Meyer & Grosse, 2018).. In fact, when a tsunami hits one of those countries and puts its economy on knees, investors would redeem their investments for the fear to be stuck in that investment position until the country will heal the losses (Meyer & Grosse, 2018). Overall, investments overseas are subjected to various risks, from political instability to sensitivity to interest rate changes, to lack of reporting standards. In the context of EMH, for which markets are assumed to be efficient and present no unpriced securities, Fama (1970) states that only way to obtain a return above the market is by engaging in riskier assets. That means that, when talking about EM, the volatility risk infers the possibility of producing a return that is above the one from other markets (Tkac, 2001) (Fama, 1970).

Markowitz (1952) and his work on diversification and modern portfolio theory (MPT) proved that investors could reduce the volatility risk of their portfolio returns (in the form of standard deviation) by selecting stocks that do not move exactly in the same way (Markowitz, 1952). In fact, the perceived benefits of investing in EM are not limited to abnormal returns. Different authors documented about the exposure to EM providing diversification benefits to one's portfolio. For example, Barry et al. (1998) investigated whether investments in EM would produce additional returns than those into developed markets like US, over the period from 1975 to 1995. Their findings show that, despite the mediocre returns level, EM have provided diversification benefits to investors (Barry, Peavy III, & Rodriguez, 1998). Atligan et al. (2015) found that, given the greater market inefficiency of developing markets compared to developed ones, international investors use cross border investments to EM as a source of diversification within their portfolio. In fact, historically, the correlation between developing and developed equity markets has been low (Atilgan, Demirtas, & Simsek, 2015). In the same year, Basu & Huang-Jones (2015) studied the performance of 498 diversified EM equity funds over the period from 2000 to 2010. Results demonstrated that most of the funds are not able to outperform their benchmark index. However, since their market beta risk is

close to the benchmark, authors speculate about that the aim of EM funds is to offer diversification benefits to investors rather than seek superior risk-adjusted returns (Basu & Huang-Jones, 2015).

In conclusion, and as a matter of fact, EM are inefficient markets. Also, when investing into EM mutual funds, investors would expect a higher return than if they were to invest in developed markets. Reason being is that developing countries, more than developed ones, are oftentimes subjected to unexpected political turmoil or natural disasters, and these events could suddenly wipe off investors' capital. However, it seems like the exposure to EM is rewarded as well by the reduction of risk through portfolio diversification, and that investors seem also willing to give up abnormal returns for achieving safer investment strategies.

3.2.3 Performance of Active Emerging Markets Mutual Funds

EM are characterized by poor information efficiency, political instability, lack of necessary skilled labour force, and overall an undeveloped economy and capital market (Mody, 2004). The proponents of the EMH, while asserting that prices should reflect all available information, suggest that in less efficient markets there is higher chance to find stocks which have been overlooked by analysts (Fama, 1970). In fact, when a stock is overlooked by the market means that its fundamentals have not yet been fairly analysed and therefore have not yet priced in in its share price. Therefore, EM, more than saturated markets, should offer investors plenty of profitable opportunities through active management (Risso, 2009).

However, academicians who have tested this rationale produced contrasting conclusions. In that regards, Wagner & Margaritis (2017) suggest that, since active EM funds only started their activities in 1990, the sample period might still be too short to frame a definitive conclusion on whether active management within EM is worth or not (Wagner & Margaritis, 2017). Nonetheless, based on the available literature today, it is possible to form a partial conclusion, which is that investors are better off investing their capital elsewhere than in active EM funds. The following two sections provide literature on the out-and-under performance of EM mutual funds.

3.2.3.1 Outperformance

On one side, the literature on the outperformance of EM funds is relatively scarce. Rodríguez (2007) investigated the performance of US domiciliated Latin American active funds against the MSCI Latin American index, between 1993 and 2003. The funds have exposure to the seven largest LatAm markets, named Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela. By use of

Jensen´s (1968) alpha he obtained a positive and significant coefficient for all the funds and concluded that LatAm managers can add value to investors by outperforming their benchmarks. Furthermore, by measuring the attribution of returns and correlating it to the fund´s performance, he also found that the managers generally hold forecasting ability (Rodríguez, 2007).

In 2011, Huij & Post explored the behaviour of 137 EM funds, from 1993 to 2006 (Huij & Post, 2011). They compared these funds against both US equity funds and S&P/International Finance Corporation (IFC) Investable emerging markets Index. The EM funds resulted to outperform both counterparts, even after accounting for management fees. The exposure to EM also exhibited strong size, value, and momentum effect, providing for each strategy a 5, an above 12, and a 13 percent return per annum, respectively. In particular, and relative to the benchmark, the first nine best performing EM funds of the sample delivered a significant superior risk-adjusted performance of more than 4 percent per annum, higher than US funds (Huij & Post, 2011).

Furthermore, Kiymaz (2015) has investigated Chinese funds, with a sample of funds covering the period from 2000 through 2013. He checked for outperformance by applying several risk-adjusted performance measures and reported a low but positive alpha net-of-fees, indicating that Chinese equity funds provide some better returns for investors than the matching benchmark (MSCI AC far East). The average mutual fund would outperform the market by an alpha value of 0.489, though not statistically significant (Kiymaz, 2015).

3.2.3.2 Not Outperformance

On the other side, plenty literature can be found on the neutral or underperformance of actively managed EM funds. Tkac (2001) examined the benefits of investing into EM funds looking at monthly returns during 1990 and 1999. Her sample includes well-diversified, regional, developed country, and EM country funds. After checking for Jensen´s alpha, all well-diversified funds, a few of regional funds and a developed country fund have been found to outperform their respective benchmarks and hold a significant alpha. Contrary, EM funds showed not statistically significant alpha while holding much higher volatility compared to the rest of the funds (Tkac, 2001).

Gottesman & Morey have also examined diversified EM mutual funds between the 1997 and the 2003. With the purpose of testing for predictability of future returns, they examined the performance of the funds against the MSCI Emerging Market Index, and results show that the funds do not outperform the benchmark. In fact, 50 percent of the actively managed funds underperform the index in eight out of nine cases (Gottesman & Morey, 2007).

Later, the period from 1999 and 2005 has been examined by Michelson et al. (2008). They collected monthly data from 55 active diversified EM funds and compared their annualized returns, Sharpe ratio, and Treynor ratio with the MSCI Index, S&P 500 Index and Emerging markets index. During the period, results show that the highest monthly average return was generated by the Emerging markets index (0.9322 percent), followed by the MSCI Index (0.4330 percent) and the S&P 500 Index (-0.0189 percent). Results from the Sharpe and the Treynor ratio provided conclusions that are on the same lines. With an average monthly return of 0.9163 percent, EM funds outperformed both MSCI Index and S&P 500 Index but not the Emerging Markets Index (Michelson, Philipova, & Srotova, 2008).

A similar timeframe (1996-2008), encompassing both bull and bear markets, has been analyzed by Eling & Faust (2010). They tested the performance of both EM mutual funds and hedge funds. Disregarding the part of the analysis on hedge funds due to their irrelevance to this paper, the study shows a sample of 629 mutual funds active in EM. Results once again confirm that EM funds do not outperform traditional passive benchmark indices. In fact, they hold negative alpha values in most of the cases, after checking for different performance measurement models. The only significant alpha, at 1 percent level, is for an underperformance of the EM funds' equally weighted portfolio of 0.23 percent, given by employment of the authors´ multifactor model (Eling & Faust, 2010).

Furthermore, Bialkowski & Otten (2011) have analyzed 140 EM equity funds that were active in the period from the 2000 to the 2008 and based in Poland. They investigated the performance by use of the multi-factor Carhart (1997) model, and further adjusted for home and international biases. Both international and domestic funds have been found to underperform their benchmark, net-of-fees. The former obtained a statistically significant negative alpha of -4.85 per year, meanwhile the latter a statistically insignificant alpha of 1.37 (Białkowski & Otten, 2011).

On slightly different lines, Blitz et al. (2013) investigated the relation between risk and return of equity EM funds, between 1989 and 2010. Where it would be expected that more risk equals higher returns, Blitz et al. found that the relation between the two is negative. In fact, for the period under analysis, the monthly portfolio based on the past 3-year volatility would provide a negative return spread of 4.4 percent per year and when accounting for volatility effect the alpha would reduce further to -8.8 percent. This indicates that investors pay too much for a risk that is not rewarded, suggesting that investing EM is not worth as much one would expect (Blitz, Pang, & Vliet, 2013).

In 2012 Kiymaz H. explored the behaviour of EM diversified equity funds, comparing their performance against market indices such as MSCI World, Wilshire Emerging markets, MSCI

Emerging markets and S&P 500 (Kiymaz, 2012). Sample includes 463 equity funds and 138 bond funds, during the period that goes from 2000 until 2011. Specifically, he took a closer look at sub-periods, including technology bubbles of U.S., the greatest expansionary time in the U.S. between 2003 and 2007, and the financial crises of 2007 and 2009. Checking for Sharpe ratio, Treynor ratio and Jensen´s alpha, Kiymaz found that overall diversified EM funds do not outperform the market indices, while performance would vary between sub-periods. Although the funds outperform the indices during the two sub-periods of recession, while still exhibit negative Sharpe ratio, they underperform during the two sub-periods of expansion. For example, between 2003 and 2007, Sharpe ratio of EM funds showed a value of 0.64, whereas MSCI EM and Wilshire EM indices would provide a ratio of 1.72 and 1.91 respectively (Kiymaz, 2012).

Basu et al. (2015), that is one of the predominant literatures on this topic, suggest that investors would be better off by passively investing into an ETF than into a diversified EM fund. In fact, their study reports unsupportive evidence on the superior performance of EM funds. Their study is one of the very few which analyzes a timeframe beyond 2006, in fact the sample period goes from 2000 to 2010. The findings show that the 498 EM funds on average underperform the MSCI Emerging Markets index by 1.74 percent per annum, under the Fama-French (1993) three-factor model. Interestingly, they also tested for financial crisis sub-period (2008 – 2010) and results confirm the funds tending to underperform the benchmark, though the coefficients are not statistically significant (Basu & Huang-Jones, 2015).

Hili et al. (2016) challenged 137 EM equity funds in beating the market, during the period from 2004 to 2014. Results show that, by applying several factor models including Jensen´s (1969) alpha and Carhart´s (1997) four factor-model, the funds seem to underperform the MSCI Emerging Markets Index. The funds domiciliated in US provide a significant negative alpha of -0.0041, those in Europe of -0.0012, and those in the EMs of -0.0018, though the last two statistically insignificant. Furthermore, they also reported evidence inferring that investing in EM funds is not worth the risk, since it seems that the riskier the fund's exposure, the smaller the alpha the investor would get (Hili, Pace, & Grima, 2016).

In 2017, Kiymaz H. investigated once again the performance of US-domiciliated EM funds, during the period between 2000 and 2017, this time with the collaboration of K. D. Simsek. The sample is constituted by 222 equity and 78 bond funds, and the results show that 95 percent of the EM funds failed, once again, to provide positive and statistically significant alphas relative to different benchmarks, including the MSCI Emerging Market Index. That is, only seven funds

demonstrated to have made investors benefiting a higher return than what an ETF with the same exposure could have provided. Within the funds sample, the alpha would range between a maximum of 0.80 and a minimum of -0.61. Furthermore, they considered four sub-periods in the analysis, and equity funds seem to be underperforming in two of them (Kiymaz & Simsek, 2017).

3.3 Measuring emerging market mutual funds' performance

Most of the literature encompassing the examination of the performance of EM funds employed similar methodologies. In fact, the most common path to examine the performance of mutual funds seems to start with carrying out risk-adjusted performance measures, like Sharpe Ratio and Traynor Ratio. These metrics are meant to inform on how the excess return of the fund's portfolio is worth the inherent risk taken. Meanwhile Sharpe ratio relates to the risk embedded in the portfolio, Traynor Ratio relates to the risk derived from the market (Alexander, 2008). Successively, the path to performance evaluation goes on by estimating the excess return by application of factor models. The most common ones within the literature on this topic are CAPM, Fama-French (1993) three-factor (FF3F henceforth) and Carhart (1997) four-factor (CA4F henceforth) models (Fama & French, 1993) (Carhart, 1997). Through CAPM, the excess return is compared to the return of the market, resulting in what is defined as the abnormal return (Jensen, 1969). The Fama-French three-factor, Fama-French five-factor and Carhart (1997) four-factor models are multifactor models and they mean to explain the relation between the portfolio's return and the risk and return of the market, and different other factors such as company size, value investing and momentum strategy (Fama & French, 1996).

In particular, Gottesman & Morey (2007) examined diversified EM funds, and their performance against the market by computing Sharpe Ratio, CAPM and mean monthly returns (Gottesman & Morey, 2007). However, Bialkowski & Otten (2011) expressed their perplexity on CAPM not being the optimal model when analysing funds' performance. In fact, they argued about FF3F model to be a better explanatory model than CAPM, though no better than CA4F model. According to them, CA4F model is the closest of these multifactor models, to what is considered a performance attribution. In practice, ´performance attribution´ is a commonly utilized analysis, usually requested by investors or anyone involved with manager selection to fund managers, that helps in understanding which investment decision has produced abnormal returns relative to benchmark, and which not (Bacon, 2019) (Białkowski & Otten, 2011). Apparently, since CA4F

model “has become the standard model to measure mutual fund performance” (Białkowski & Otten, 2011), they ended up using only that model to analyse their funds sample.

Furthermore, Eling & Faust (2010) have analysed both hedge and long-only EM funds. As of investigating the performance of long-only mutual funds, they employed the classical single-factor model, CAPM, as well as multifactor models including FF3F, CA4F, and Fung & Hsieh (1997) ´s eight-factor models. Moreover, Eling & Faust (2010) produced an extended version of the Fung & Hsieh (1997) model and created another one themselves, though more specifically to address hedge funds. In fact, the Fung & Hsieh (1997) model, its extended version, and the newly created model are not to take into consideration as alternatives models for the type of analysis this paper entails because these models add factors that refer to credit spread and bond exposure, which are both out of the scope of this paper. Results show FF3F model holding the highest explanatory power, that is about 64.08 percent of the variation in the mutual funds, meanwhile the CA4F explains 63.86 percent. CAPM, as expected, explains the least, 60.2 percent (Eling & Faust, 2010). To analyse the performance in more detail, Eling & Faust (2010) split the observed period in four sub-periods, to test for different market environments (Eling & Faust, 2010).

One year later, Huij & Post (2011) brought out a study on the performance of EM funds employing an extent regression framework. First, they utilized CA4F model to test for size, value, and momentum strategies. Secondly, while arguing for conventional factor models being unable to describe EM stock returns, the four-factor model has been extended to a five and a six factor models which have been used to test for commodities and currencies factors, in a way to further explain funds ´performance. Lastly, country effect has been added to the last regression of a seven-factor model. The findings show that the difference in alphas, between best and worst performing funds of the sample, remain unchanged when the portfolio is regressed for these additional factors. This suggests that commodities, currencies, and country-specific effect do not explain further EM funds’ returns (Huij & Post, 2011).

Basu & Huang-Jones (2015) have limited the performance evaluation analysis to CAPM and FF3F model. They, however, split the sample period into sub-periods as Eling & Faust (2010) did, only to produce the same conclusions about the funds’ underperformance. Basu & Huang-Jones (2015) ´s motivations to analyse in greater detail recessions and expansions period were firstly to analyse funds’ performance during crisis, and secondly to check whether during recessions funds perform better in virtue of information asymmetries, while performing poorly during expansions.

Hili et a. (2016), by usage of CAPM, FF3F and CA4F models, evaluated the performance of 137 equity funds whose exposure is in emerging economies. The high R-Squared (remarkably close to 1) exhibited by all the estimated regressions was what motivated their methodological choice (Hili, Pace, & Grima, 2016).

Finally, the most recent of the study is the one by Kiymaz & Simsek (2017). As of their methodology, they divided the data set in sub periods, due to the fact that the influence of market conditions on EM funds' performance can produce misleading results, unless it is observed in greater detail during bull and bear markets separately. They used the sub-periods as a robustness check. To assess performance, Kiymaz & Simsek (2017) started by computing few risk-adjusted performance measures including Information and Sortino ratios, in addition to Sharpe and Treynor ratios. As of this paper, Information and Sortino ratios are not relevant measures, since they relate to the level of activness of the fund manager in respect to the benchmark and not to the performance. Next, alphas have been estimated by usage of CAPM, FF3F model and CA4F model (Kiymaz & Simsek, 2017), commonly to the other studies.

In conclusion, most of the literature reports about the neutral-or-underperformance of EM mutual funds. Despite the market inefficiency and high volatility of EM, the actively managed EM funds are found to not produce abnormal returns in most cases, when compared to the matching benchmark. The EMH paradigm therefore becomes questionable. Furthermore, in most cases academics have studied the performance of EM mutual funds by employment of CAPM, Fama-French (1993) three-factor model and Carhart (1997) four-factor model. Hence, it follows the Theories section where the EMH is presented in greater detail, and the multifactor models are explained in their origins and applications.

4. Theories

A prerogative of the human being is to observe patterns in life and try to explain them. In pursuit of that, various explanatory theories and models have been created during the years. However, those are not absolute. On the contrary, researchers and academics work constantly on finding better and better frameworks to represent the world and the people. Meanwhile, the existing theories are keep being tested in seek for validity. In this regard, the theories presented in this section will be those tested in this paper.
The section starts by outlining the complement frameworks rooting active management practices, which are Efficient Market Hypothesis and Behavioural Finance. Furthermore, the most common fund´ performance evaluation models are presented, being CAPM, Fama-French three-factor and Carhart four-factor models. Finally, the risk-adjusted performance measure Sharpe ratio is presented.

4.1 Efficient Market Hypothesis & Behavioral Finance

In recent times, and by creation of the stock market, companies gained further access to capital, besides bank landing, by allowing investors to invest in their stocks (Bodie, Kane, & Marcus, 2014). In practice, if a company is expected to grow in the foreseen future, those investors believing in its potential would invest in its stocks today in order to see their stocks growing in value when that foreseen future would come, therefore making a profit. It seems reasonable to assume that if it was possible for investors to know today which stocks will perform well in the foreseen future, all investors will flock to buy such stocks today. Meanwhile, the bid made today would make the stock value jumping on the same day close to its fair value (Bodie, Kane, & Marcus, 2014). Following this reasoning, stock price forecasting seems an approach that would die while trying, because at every new information available in the market investors would immediately react to it, not allowing for unpriced securities. However, information comes as an unpredictable factor, and that means that if investors act upon random and unpredictable information, then changes in prices are also random and unpredictable. In order words, stock prices are said to follow a *random walk* (Malkiel, 1973). The market is efficient nevertheless, because if the unpredictability of news is an intrinsic factor of the market, the changes in stock price must also in response be random. The notion just described was defined by his pioneer Eugene F. Fama as the Efficient Market Hypothesis (Fama, 1970). In those circumstances is not possible for investors to continuously beat the market, since all information are

already priced in in the stock's value, unless investors manage to obtain information that are not publicly available i.e. insider information that is illegal, or by taking a higher risk.

Fama (1970) proposes three forms of market efficiency: weak form, semistrong form and strong form of efficiency (Fama, 1970). The main difference between the three forms is the degree of usefulness of different kind of information, within the market. The weak form of the EMH implies that all available market data is already priced in the stocks. Market data includes for example past prices and returns, and trading volume. That implies that, within a country showing a weak form of EMH, an investing strategy based on market data would result not to be profitable. The semistrong form of the EMH asserts the same implications as the weak form, but the information already been priced in this time is all publicly available information about the company in question. That kind of information could be fundamental data on the firm, earnings reports, news articles, analysts' reports and so forth. According to the semistrong form of EMH that kind of information is already instantly spoiled by investors. Most literature would argue for the markets being generally semistrong efficient (Fama, 1991). As of the strong form of the EMH, it asserts that all available information about the company is already priced in in its stock price, both public and the private kinds. This form implies that no investors would ever beat the market since all existing information on the company has already been exploited by market players. The strong form is considered unrealistic since it is impossible that investors are aware of the internal dynamics of a company (Bodie, Kane, & Marcus, 2014).

According to proponents of the EMH theory, active management is not worth the hassle. Because the market is efficient, and stock prices reflect already whatever information available to investors, frequent trading practiced by asset managers and analysts only generates considerable trading costs, and no higher returns than what passively investing into an index would generate (Bodie, Kane, & Marcus, 2014). Jensen (1969) argued for the same thesis in his study. His findings prove that the costly resources spared by active managers on identifying mispricing in the market is not yielding to abnormal returns for investors. He then concluded that the market must hold a strong form of EMH (Jensen M. C., 1969) On the other hand, Markowitz (1999) argues that the benefits of active management go beyond the large resources spent in pursuing abnormal returns, in fact active manager also help unsophisticated investors in diversifying their idiosyncratic risk or, in other words, the risk inherent their unique portfolio (Markowitz H. M., 1999)

Despite the literature in favour of the Efficient Market Hypothesis, there is an entire field called Behavioral Finance that argues against it (Bodie, Kane, & Marcus, 2014). What poses the scepticism on the EMH is that meanwhile the EMH assumes investors to be rational individuals, the

stock market has often witnessed inexplicable anomalies in terms of stocks prices. Examples of those anomalies are the irrationality during the Global Financial Crisis or the reoccurring pattern of outperformance of small capitalization stocks over large capitalization stocks (Lo, 2008) (Huberman & Kandel, 1987). Proponents of the Behavioral Finance argue in fact that investors are subjected to irrationality and emotions while they trade, which causes for stock prices to not always reflect their fair value. Therefore, the market cannot be deemed efficient. Shiller et al. (1984) already in the 80s have documented about investors' behaviour for which overconfidence, disposition effect (tendency of investors to sell value-increasing stocks while keeping on holding decreasing ones), herding (follow the actions of the crowd), and home bias are some of the biases involved in investing decision making (Shiller, Fischer, & Friedman, 1984). In response to that, Fama (1991) has reviewed the efficient market´s paradigm and concluded that those active managers who are skilled and hold competitive advantages might be able to profit from inefficiencies, but those are only temporary and will solve in the long run (Fama, 1991).

Considering what stated above, this paper aims to challenge the EMH by employment of performance evaluation models. Since emerging economies are generally perceived as inefficient markets (Filis, 2006), skilled asset managers should be able to produce abnormal returns for their investors. The results derived from the regressions of performance evaluation models will determine whether the average EM fund has been able to generate any abnormal return over the period from 2014 to halfway into 2021.

4.2 Performance Evaluation Models

4.2.1 Capital Asset Pricing Model

The Capital asset pricing model (CAPM) is a model developed by Treynor (1965), Sharpe (1964) and Linter (1965), and it is nowadays a cornerstone of modern financial economics. It is widely used in portfolio management, and it means to measure risk, as well as to explain the relationship between risk and the expected return of assets (Fama & French, 2004). The CAPM is built on the Efficient frontier theory introduced by Harry Markowitz in 1952 (Markowitz, 1952). The theory, while it assumes that investors are risk-averse and that they only care about the mean and variance of their one-period investment return, helps in determining the composition of a portfolio which

provides the maximum return for a defined level of risk, or the lowest risk for a given level of expected return. In other words, Markowitz (1952) with his theory drew attention on the benefits of portfolio diversification and demonstrated that investors could reduce the risk by adding different kind of assets in the same portfolio, improving their reward-to-risk ratio. In a graph (Figure 1), with the expected return on the vertical axis and the volatility (measured by standard deviation) along the horizontal axis, the *Minimum-variance frontier,* is the curve that holds all possible combinations of portfolio of risky assets. The *Efficient frontier* then is a share of those portfolios which combinations of risk and return minimize the risk, given a specific level of return (Fama & French, 2004), represented by the red upward hyperbola in the graph. The dark blue line binds the worthless combinations, since it is possible to achieve a higher return for the same risk of those in the efficient frontier. Then, assuming risk-free borrowing and lending is possible, the efficient portfolio combinations move to the green straight line. The *Risk-Free investment*-dot on the vertical axis represents in fact a portfolio consisting exclusively of risk-free assets. Thus, the so-called *Tangent* or *Efficient Portfolio* lies where the efficient frontier of all risky assets meets the efficient frontier including a riskless asset.

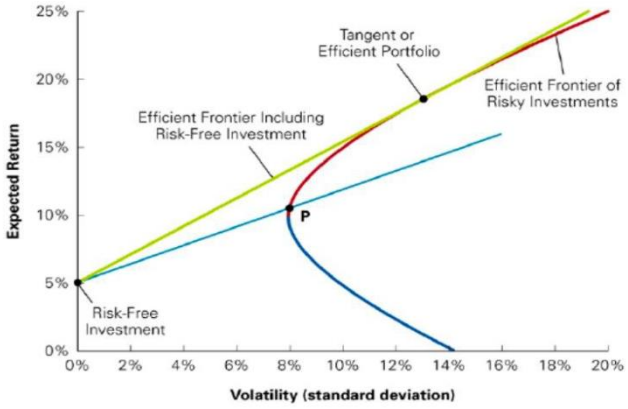

Figure 1 – Investment Opportunities

Besides the assumptions of investors being risk averse, seeking to maximize the economic utilities and having the option to lend and borrow under the risk-free rate, there are few more to the CAPM to mention. In respect to the market, investors hold homogeneous expectations and the market itself is perfect for which all assets are publicly held and traded. Besides, information is costless and available to all investors, and lastly there are no transaction costs or taxes (Fama & French, 2004). It follows that the efficient portfolio is also known as the *Market portfolio*. Furthermore, the slope of the efficient portfolio, that is the light blue line, is the Sharpe ratio (Section 4.3 for definition).

The CAPM is represented by the line connecting the risk-free investment-dot to that of the tangency portfolio. Since the market portfolio lies on the minimum-variance frontier, the algebraic

relation representing all minimum-variance portfolios should hold for the market portfolio too. The algebraic relation, the CAPM, can be written as:

$$E(R_i) = R_f + \beta_{iM}\left[E(R_m) - R_f\right], \quad i = 1, \dots, N$$

(Fama & French, 2004)

where $E(R_i)$ refers to expected return of asset i, R_f is the return on risk-free assets, $E(R_m)$ is the expected return on the market portfolio, whereas β_{iM} (beta) represents the relation between asset´s return and the variation in the market return, and $E(R_m) - R_f$ is the market risk premium.

The interpretation of the equation is that the expected excess return on any risky asset is directly proportional to the expected excess return on the market portfolio. This notion is known as *Market Equilibrium* (Alexander, 2008). According to EMH, the market equilibrium, therefore the CAPM, is supposed to be always holding (Fama, 1991). For the CAPM to be tested, Jensen (1968) introduced a method involving a time-series regression test: the Michael C. *Jensen's alpha* estimate (Jensen, 1968), which can be written as:

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}\left[R_{Mt} - R_{ft}\right] + \varepsilon_{it}$$

(Jensen, 1969) .

where α_i is the abnormal return, and ε_{it} is the error term.

Based on the CAPM, the expected value of an asset´s excess return is entirely explained by the market risk premium, and that means that in such a test, the estimate α_i (alpha) would result equal to zero. If alpha was to be above zero, it means that the market is not in equilibrium, and there is the presence of abnormal returns. Ultimately, alpha measures the fund manager´s ability to outperform the market (Jensen, 1969).

As of limitations, the CAPM model is said to be based on unrealistic assumptions, such as that investors only care about the mean and variance of their one-period portfolio returns. Also, it seems that its applicability to EM has not yet been widely consolidated (Estrada, 2000). The general and global version of the CAPM in fact assumes that all financial markets, developed and developing, are integrated (Estrada, 2000), which is clearly not the case. Furthermore, the main critic to it relates to the fact that the market risk premium is considered insufficient as a factor in explaining the risk of an asset (Fama & French, 1993). In response to that, the CAPM has been extended to other risk factors. Multifactor models are considered better performance measurements since they include various risk dimensions, and therefore are better at explaining the returns and their variation.

4.2.2 Fama-French three-factor and Carhart four-factor models

The CAPM suggests that is just beta the factor explaining the stock return, implying that only those assets holding exposure to market risk are priced. However, there are anomalies within the stock market which CAPM cannot explain (Fama & French, 1996).

Several studies documented on how firm´s characteristics have been found to be explanatory on the average stock return. Few instances of those are book-to-market equity ratio, firm size, as well as earnings to price ratio (Banz, 1981) (Basu S. , 1983) (Chan, Hamao, & Lakonishok, 1991). Therefore, Fama & French (1993) decided to extend the CAPM by adding more factors to it (Fama & French, 1996). Accordingly, the Fama French (1993) three-factor model infers that the expected return on a portfolio in excess of the risk-free rate, thus the $(R_i - R_f)$ in the equation, is explained by the relation between its return and three different risk factors: the market portfolio, Small-Minus-Big (SMB), and High-Minus-Low (HML) (Fama & French, 1996). The SMB factor adjusts for the exposure of the general outperformance of small capitalization portfolios over large ones, a pattern which evidence is provided by Huberman & Kandel (1987). The HML factor adjusts for propensity of a strategy towards value stock portfolios, which Chan & Chen (1991) has proven to be the pattern during relative distress (Huberman & Kandel, 1987) (Chan & Chen, 1991). The Fama French (1993) three-factor model can therefore be written as:

$$R_{it} - R_{ft} = \alpha_i + b_i(R_M - R_f) + s_i\, SMB_t + h_i\, HML_t + \varepsilon_{it}$$

(Fama & French, 1996).

Another widely used model in the literature of performance evaluation is Mark M. Carhart (1997) four-factor model, which builds on the renowned three-factor model by Fama and French (1993) (Carhart, 1997). In this model, the alpha measures the excess return adjusted not only for market, value, and size factors but also for a momentum factor (WML) (Carhart, 1997). The additional factor captures the Jagedeesh and Titman´s (1993) one-year momentum anomaly, that is the tendency of overexposure to past winning stocks which typically outperforms losing stocks (Carhart, 1997). It can be written as:

$$R_{it} - R_{ft} = \alpha_i + b_i(R_M - R_f) + s_i SMB_t + h_i HML_t + p_i\, WML_t + \varepsilon_{it}$$

(Carhart, 1997).

4.3 Sharpe Ratio

There are few risk-adjusted performance measures derived from the CAPM that are commonly used when evaluating portfolio performance, and in particular when comparing historical performance of mutual funds. The main one is Sharpe ratio, introduced by William F. Sharpe (1966) (Sharpe, 1966), and is a measurement of the portfolio outperformance per unit of the portfolio´s volatility, often referred to as reward-to-volatility ratio. It can be written as:

$$Share\ Ratio = \frac{R_i - R_f}{\sigma}$$

(Alexander, 2008)

where $(R_i - R_f)$ results to the excess return, and σ is the standard deviation of the portfolio excess return. Higher the excess return or lower the volatility, will result in a higher Sharpe ratio. Therefore, the higher the Sharpe ratio, the better.

However, this ratio is not used as standalone measures due to its limitations. In fact, as a non-regression ratio, it cannot indicate whether the better or worse performance of a fund or a stock in comparison to another is statistically significant, thus if it has any financial meaning (Hili, Pace, & Grima, 2016). That is why the Sharpe ratio is used along with regression-based measures such as the multifactor models just presented.

5. Hypotheses development

Keeping the previously presented literatures and theories in mind, this section discusses the focus area of this paper and presents the underlying hypotheses tested.

The EMH paradigm infers that the market is efficient and that every security in the market is instantly priced in at every new released information (Fama, 1970). The market is therefore in equilibrium and even if managers and investors attempt to exploit mispricing, those are only temporary. In fact, in the long run the market is always in equilibrium and thus efficient (Fama, 1970).

Nevertheless, the worthwhile of active management as a source of profit is a recurrent topic in finance. Active managers, or investors, to keep doing what they do they must feel confident about the fact that the time and resources spent on studying the stocks eventually pays out, beyond what passive investments can provide. Literature on this matter proves that active management is worth in most cases, and that active managers produce abnormal returns, despite the high expense ratios (Cremers & Petajisto, 2009) (Petajisto, 2013) (Fortin & Michelson, 2005). Given the facts seeming to violate the EMH, this paper checks the validity of the EMH by testing the following hypothesis.

1. *Given the efficient market hypothesis paradigm, through active management it is not possible to obtain abnormal returns, therefore active funds do not outperform passive ones over the entire sample period.*

The hypothesis 1 thus infers that the EMH holds, and through active management is not possible to obtain abnormal returns.

Furthermore, in the context of EM, the market efficiency is highly questioned (Risso, 2009). That is because those developing countries which represent the EM, are characterized by an undeveloped and unstable political and capital system (Mody, 2004). The difficulty in obtaining information in these countries makes their markets to be considered inefficient. Following this rational, which is highly unsupportive to the market equilibrium on which the EMH relies on, active management within these markets should be both occurring and worthwhile. In fact, market inefficiencies, including anomalies and mispricing, are the opportunities which active managers are constantly after. However, the literature on the topic of active management within EM does not reflect

that. In fact, it abundantly documents the contrary (Gottesman & Morey, 2007) (Michelson, Philipova, & Srotova, 2008) (Eling & Faust, 2010). Some authors have even suggested that passively investing into an ETF is worthier than actively investing into a diversified EM equity fund (Basu & Huang-Jones, 2015). In light of that, this paper aims to investigate whether skilled and well-informed active managers are able to obtain abnormal returns by operating within inefficient markets. The second hypothesis tested is therefore the following.

2. *Given the efficient market hypothesis paradigm, by practicing active management in inefficient markets it is possible to obtain abnormal returns, during the entire sample period.*

Hypothesis 2 thus infers that the EMH does not hold within inefficient markets and that through active management managers and investors should be obtaining abnormal returns.

Past studies have for the most documented the performance of EM funds covering the period between the 1990 and 2010 (Kiymaz, 2012) (Wagner & Margaritis, 2017) (Hili, Pace, & Grima, 2016). This paper seeks to contribute to the existing literature on this topic analysing the financial performance of EM funds over a period of time which has yet to be investigated.

Digging a bit deeper into the findings on this topic, Basu & Huang-Jones (2015) documented that EM funds underperform during recessions because the high volatility of these markets would scare away investors during a turmoil. The sudden redemption from the fund of a hefty sum of capital would influence the NAV of the fund and therefore making it look like it has underperformed the market (Basu & Huang-Jones, 2015). Contrarily, other studies documented about EM funds outperforming the indices during recession but underperforming during expansion (Kiymaz, 2012), due to information asymmetries. Given the undefined conclusion, it is paramount to take this analysis further. In fact, market conditions are found to be significantly influencing in the evaluation of performance of EM (Kiymaz & Simsek, 2017, s. 59), suggesting that it is important to take market trends in consideration when analysing this asset class. Therefore, the third and fourth hypothesis aim to take the Hypothesis 2 to the next level, by speculating that active managers who are skilled and well-informed should be able to obtain abnormal returns throughout all market conditions, that is during both recession and recovery times. The next two hypotheses are thus the following.

3. *Given the efficient market hypothesis paradigm, by practicing active management in inefficient markets it is possible to obtain abnormal returns, during economic recessions.*

4. *Given the efficient market hypothesis paradigm, by practicing active management in inefficient markets it is possible to obtain abnormal returns, during economic recoveries.*

The answers to Hypotheses 3 and 4 will lead to a more thorough conclusion on this matter.

In order to answer to the four hypotheses, this paper takes inspiration from the methodology employed by Kiymaz & Simsek (2017). The authors have investigated the same topic by comparing the diversified EM funds to different indices (Kiymaz & Simsek, 2017). In particular, the Hypothesis 1 will be answered by comparing the portfolio of a sample of 186 actively managed EM funds (active management) against the benchmark (passive management), to find out whether the former is worthwhile compared to the latter. The Hypothesis 2 is answered by exploring the performance of the same 186 EM funds against the market, in the context of inefficient markets, for which is expected the presence of abnormal returns. Finally, to answer Hypothesis 3 and 4, the entire sample period is split into four sub-periods: two recessions and two recoveries in the economy. Those will be further explored following the methodology used for testing Hypothesis 2.

The rest of the paper is structured as the following. In the next section (Section 6) the methodological choices taken during the process are reported in detail, from the data gathering to the type of estimation models selected to compute the analysis. Further, Section 7 presents the results derived from the analysis, including their implications. Finally, in Section 8 the results from the analysis and their implications are further discussed and reflected upon. Section 9 reports conclusion and suggested further research.

6. Methodology

This section presents the methodological approach employed throughout the study. Firstly, it is described the data used in the analysis, from sample retrieving to selection of asset pricing models´ factors. Further, the reader will be informed about the research design that has been implemented in this study to test the hypotheses, including what kind of asset pricing models were selected and the statistical notions used to understand the financial meaning of the results. Additionally, the robustness checks that have been performed on the data to solve for various biases, and thus to assure reliability, are presented. The section concludes with the limitations of the chosen methodology.

6.1 Data

6.1.1 Sample retrieving

The scope of this thesis is to examine the performance of actively managed EM equity mutual funds against their passive version, during the whole period and both recession and expansion periods. The very first elements needed for this kind of analysis are the returns of both the active funds and the passive fund. Regarding the active funds, the sample gathering started with Morningstar Direct, that is a financial database which provides, between other things, classifications of different mutual funds domiciliated all over the world (Kiymaz & Simsek, 2017). The target for this study is those funds holding a geographical exposure encompassing all investible developing countries. According to previous analysis made on the same topic, the funds to choose are those diversified in their exposure in EM, not to be confused with regional or country specific funds *(Kiymaz & Simsek, 2017) (Basu & Huang-Jones, 2015) (Gottesman & Morey, 2007)*. In this regard, Morningstar Direct is the only database at present that is found to have a classification under Morningstar Institutional Category called "Diversified emerging markets". By Morningstar´s definition, diversified EM funds are those funds which "*seek capital appreciation by investing primarily in equity securities issued in emerging markets worldwide. These funds generally do not concentrate their investments in any one region.*" *(Gottesman & Morey, 2007, p. 112)*. Table 1 below shows the first sample, comprised of active open-ended long-only equity diversified EM funds.

Table 1 - *First screening: investment fund universe*

Source: author´s own work

Dataset	
Funds available for search in Morningstar Direct	597176
Criteria	
Fund type	Active open-ended mutual funds
Global Broad category group	Equity
Morningstar Institutional Category	Diversified emerging markets
Base currency	US dollar
Initial sample – No. of funds	1602

The sample is limited to long-only funds since short selling is not a common instrument within the universe of EM yet, because not being readily available as compared to developed markets *(Eling & Faust, 2010)*. Lack of literature and complexity of related pricing asset models are also reason for which other financial instruments have not been taken into consideration in this study *(Eling & Faust, 2010)*. Besides, the funds are USD denominated funds, to facilitate the data processing.

Next, the sample has been further screened by different criteria. The first exclusion regards those funds that still fall into the initial sample but are regionals. Secondly, the sample contained a lot of different share classes of the same fund, and they all are unnecessary for the analysis. It is common practice for asset management companies to offer different asset classes of the same product, reason being is that different kind of clients require different product features *(Hili, Pace, & Grima, 2016)*. For example, retail investors are different in their prerogatives, compared to institutional investors, given their limited capital to invest and shorter investment horizon. Institutional investors have typically greater access to capital, allowing them to take on multiple investments and holding them for a longer-time horizon. These differences are reflected on the different asset classes available of the same product. The exclusion of multiple share classes of the same product will avoid for multiple counting of the same returns *(Hili, Pace, & Grima, 2016)*. Morningstar Direct allows for removing second units of the same fund by screening for the oldest share class between them, which most likely is the Institutional class. That is because when the collective vehicles have been first established the institutional class were the first available, and retail investors were yet not allowed to invest *(Meyer & Grosse, 2018)*. Nevertheless, a more thorough manual screening was needed afterwards to eliminate few more irrelevant share classes. Those have been qualitatively assessed based on the name of the fund, asset class, and their geographical exposure.

A further exclusion regards Frontier strategies which often, due to the still unspecific emerging countries' classification, end up in the same category of EM. Funds holding exposure in frontier markets entail countries that are outside of the EM universe because they are too small, too illiquid, and with a too high inherent risk to be considered an emerging market *(Kiymaz & Simsek, 2017)*.

Those EM funds that do not include China in their investable universe are also omitted, as well as index funds and funds of funds. Index funds are passively managed funds and funds of funds are funds constituted by holdings in other mutual funds, therefore not applicable to the present analysis *(Kiymaz & Simsek, 2017)*.

Furthermore, those funds which data available was of less than twelve months have been excluded, which is a practice employed by many of the reviewed studies *(Kiymaz & Simsek, 2017) (Basu & Huang-Jones, 2015) (Białkowski & Otten, 2011)*. Also funds that have not survived throughout the sample period have been excluded (Section 6.3 for methodological limitations). Differently, funds which have been established during the sample period are included in the sample. Finally, mutual funds return data availability restricted the sample in the way that funds with no data available have of course been omitted. Below, Table 2 presents the exclusion criteria applied to the initial sample, resulting in the final sample of 186 EM funds – see Appendix A for the complete list of sample funds.

Table 2 - Second screening: investment fund universe

Source: author´s own work

Dataset	
	No. of funds
Initial sample	*1602*
Exclusion Criteria	
Regional funds	26
Not oldest share class	1257
Frontier funds	14
Ex-China funds	4
Fund of Fund	2
Index Funds	9
Date of inception > 06.2020	15
Non-surviving funds	64
Unavailable data	25
Excluded funds	1416
Final sample	186

Funds data from Morningstar Direct includes also fund size, annual management fees, turnover percentage, prospectus benchmark, manager name, Morningstar Index. Following past studies´ methodology, the time-series of gross monthly diversified EM fund returns from August 2014 to June 2021 have been retrieved from Lipper Refinitiv Eikon (Formerly known as Thomas Reuters), which provides access to Datastream *(Eling & Faust, 2010)*. Returns are calculated as the percentage return of the present month minus previous month´s return, divided by previous month´s return.

As of sample period, the retrieved data covers from 1st August 2014 to 30th June 2021, a span of nearly 7 years. The primary intent in choosing such timeframe is to contribute to the literature. In fact, past studies cover mostly periods between 1990 and 2010 about *(Kiymaz, 2012) (Wagner & Margaritis, 2017) (Hili, Pace, & Grima, 2016) (Basu & Huang-Jones, 2015) (Petajisto, 2013)*. There are few exceptional cases which period goes for example from 2000 to 2017 *(Kiymaz & Simsek, 2017)*. This study looks at more recent years, for which investigations have yet to be conducted. Furthermore, the purpose of this study is to analyse the investment performance also during different market conditions *(Kiymaz & Simsek, 2017, s. 59)*. Inspired by other studies *(Basu & Huang-Jones, 2015) (Kiymaz & Simsek, 2017)*, the observation period has been further divided into four sub-periods: two recessions and two expansions periods. The sub-periods are defined as follows.

Sub-periods

i. 1st August 2014 – 29th February 2016, recession period
ii. 1st March 2016 – 31st January 2018, recovery period
iii. 1st February 2018 – 31st March 2020, recession period
iv. 1st April 2020 – 30th June 2021, recovery period

Specifically, the sub-periods have been selected based on the MSCI Emerging Market Index trends. In fact, by looking at the trending lines in Figure 2 one can visualize how the market has behaved within the EM universe during the period from August 2018 to June 2021. The sub-periods have been so selected, and few events have been identified to be the drivers of each trend.

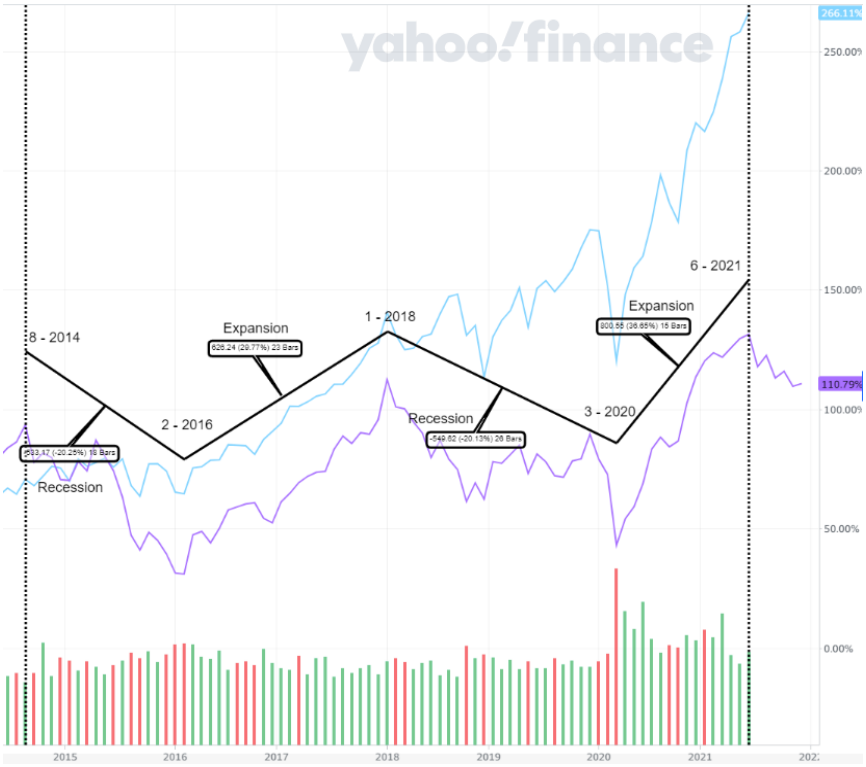

Figure 2 – *MSCI Emerging Market Index trending lines between Aug 2014 to Jun 2021*
Blue line is S&P 500, Purple line is MSCI Emerging Market Index
Source: *(Yahoo Finance, 2021)*

The first sub-period, classified for this paper as a recession, starts from August 2014 through February 2016. The main cause of such a downturn in the whole market seems to have been the volatility in the oil price which characterized that period. In fact, in 2014 the oil price reached the peak of $110 to fall during the next few years by over 70 percent *(Krauss & Eavis, 2015)*. The Organization of Petroleum Exporting Countries (OPEC), with the purpose of restoring price levels, cut its oil production and that has greatly affected those developing countries where production is based, like for example Venezuela and Brazil *(Dutt, 2016)*.

The second sub-period, between March 2016 until January 2018, is classified as an expansion since the market seems to have greatly corrected its downward trajectory. Despite Brexit, which caused disruption within the European banking system, and the election of President Trump, for which a market crash was generally expected, the volatility level has surprisingly remained virtually non-existent in that period *(Will, 2017)*. As a result, the 2017 has been a great year for the overall stock market.

The third sub-period starts in February 2018 and ends in March 2020. Trade tensions during these two years have been the main element which weakened EM equities. In fact, both the US interest

rate hikes and the US-China trade relations caused market volatility to rise, affecting emerging economies *(Sekhon & Sehgal, 2019)*. However, what has triggered a worldwide freefall in share prices at the end of 2019 has been the Covid-19 pandemic crisis (WHO, 2021). By March 2020, the stock markets declined by over 30 percent *(OECD, 2020)*.

The fourth and last sub-period covers from April 2020 to June 2021, and it has been included in the observation period to investigate the great recovery trend that followed the Covid-19 pandemic crisis.

6.1.1.1 Summary characteristics

As about the funds sample, in this section are outlined its main characteristics. Table 3 shows the general information about the average EM fund of the sample, including rating, manager tenure, turnover ratio, management fees, the price to earnings ((P/E) and price to book ratios (P/B), and the fund´s net assets. Besides, geographical and sectorial exposures are also reported. It should be noted that thirteen of the 186 funds have been excluded from these computations since asset allocation data was not available for them.

The sample of diversified EM funds from 2000 to 2011, collected by Kiymaz (2012), reported a Morningstar Rating Overall mean of 2.38 and a manager tenure mean of 5.2 years *(Kiymaz, 2012)*. Comparing that to the present and more recent sample, for which the rating mean is 3.35 and the manager tenure mean is 6.3, it seems fair to assume that fund managers dedicated to EM are increasingly satisfied with their position and their performance is improving over time. The Price/Earnings ratio is elevated at 16.90, compared to median of 11 of the MSCI Emerging Markets Index throughout the past five years. However, the data here presented is static from December 2021, and the impact of Covid-19 pandemic crisis is yet not vanished *(Mee, 2021)* Meaning, P/E ratio might be exceptionally high as of present. Meanwhile, the P/B ratio at 2.61 symbolize that the average fund holds exposure towards stocks that are fairly priced, since a value below 1 would suggest undervaluation. Furthermore, geographical and sector exposures provide a snapshot of what is the asset allocation of the average fund. This information will be useful later during the phase of passive portfolio selection (Section 6.1.3).

Table 3 - *Summary funds sample´s characteristics and asset allocation*
Sample consists of 237 Diversified Emerging Markets mutual funds. The data used to produce this table has been retrieved on the 13th December 2021.
Source: author´s own work

Funds Sample			
Characteristics	*Mean*	*Median*	*Std. Dev.*
Morningstar Rating Overall	3.35	3.00	1.07
Manager Tenure (years)	6.3	5.7	3.9
Turnover (%)	68.22	52.00	77.00
Management Fees/per annum (%)	0.89	0.92	0.27
Price/Earnings Ratio	16.90	15.25	7.10
Price/Book Ratio	2.61	2.15	1.56
Net Asset ($ millions)	956.8	78.7	3106.9
Geographical Exposure	*Mean*	*Median*	*Std. Dev.*
Emerging Markets	62.69	64.60	10.48
Developed Markets	32.22	32.35	8.54
Asia Emergent	43.15	43.81	9.51
Asia Developed	26.27	27.19	7.87
Latin America	9.95	9.34	4.95
Africa/Middle East	4.02	3.76	3.02
China	24.93	26.64	8.89
India	12.29	11.90	5.94
Taiwan	12.13	12.59	5.12
South Korea	11.06	11.48	5.10
Brazil	5.87	5.43	3.14
Sector Exposure	*Mean*	*Median*	*Std. Dev.*
Technology	20.94	21.21	6.53
Financials Services	18.10	18.71	5.75
Consumer Cyclical	13.73	13.18	5.29
Communication Services	8.93	9.37	4.59
Consumer Defensive	7.16	6.16	4.64

6.1.2 Risk-free interest rate

To investigate the performance of mutual funds requires employment of factor models like CAPM *(Fama & French, 2004)*. In such models, one of the necessary elements is the riskless rate of interest. The return of any risky investment is in fact determined by the return in excess of what an investor would get by investing into a riskless investment. In the real world no zero-risk asset exists, therefore in empirical studies it is used an alternative which is the closest to it. In the financial system, the safest investment is considered depositing money into a bank., thus, according to Bodie at al. (2014), Treasury bills are commonly considered *the* risk-free asset. Because of the short maturity such bills are characterised by, they are not sensitive to either interest rate fluctuations or inflation uncertainty *(Bodie, Kane, & Marcus, 2014)*. Many other studies on the literature applied the same

theoretical background, and utilized the 30-day or the three-month US Treasury bill rate as a proxy for the risk-free interest rate *(Kiymaz, 2015) (Hoepner, Rammal, & Rezec, 2011) (Low, 2007) (Li & Lin, 2011) (Hili, Pace, & Grima, 2016)*. The risk-free rate from the period August 2014 - June 2021 was obtained from Kenneth R. French´s data library *(French, Kenneth R. French - Data Library, 2021)*. After downloading for the Excel file "Fama/French 3 Factors" (monthly), the one-month rate on US Treasury bills, provided by Ibbotson and Associates, was extracted from the dataset.

6.1.3 Index as passive portfolio

To know what the added value inherent active management is, which is also what this paper aims to investigate, investors typically compare their active investment to its passive version *(Rudd, 1986)*. While passive investing is practiced by investing into an Index fund, or an ETF, those are meant to mirror a market index *(Petajisto, 2013)*. As a result, the market index becomes the *benchmark* of an actively managed investment. From this point onward, the 'benchmark*'* is the passive fund which the EM funds are compared against.

In seek for a coherent comparison, the benchmark should hold a portfolio that is the most representative of the fund portfolio in terms of asset class and allocation. Whenever that is not the case, and the benchmark is a mismatch, it would produce misleading conclusions on the performance of the fund. In practice, it is impossible for actively managed portfolios, which exposure get to change continuously, to be assigned a benchmark at each rebalancing. Normally there is a limited number of benchmarks available to asset managers, and they choose arbitrarily the one fitting their investment style the best. Such arbitrary benchmark index is referred to between practitioners as the prospectus benchmark *(Bodie, Kane, & Marcus, 2014)*.

Through Morningstar Direct database are available both Morningstar´s assigned benchmark index and the prospectus benchmark. The Morningstar Index assigned to every single EM fund of the sample is the "Morningstar Emerging Markets Target Market Exposure" (*Morningstar EM TME GR USD* – see Appendix B1 for factsheet), meanwhile the prospectus benchmark appearing the most within the sample is the "MSCI Emerging Markets Index" (*MSCI EM GR USD* – see Appendix B2 for factsheet). To take a decision on which benchmark is the most applicable for this study, the two indices have been qualitatively examined. Table 4 presents few of the characteristics of the two indices, including geographical and sectorial exposure. The two are not significantly different from one another, as of standard deviation, or EM coverage. There are few minor differences between the

weights attributed to the allocation of countries (India and South Korea) and sectors (Financials and Technology).

Table 4 – *Indices and average sample fund comparison*, ( ) = average fund relative to the index
Source: author´s own work

	Morningstar assigned benchmark		Prospectus benchmark		Sample
	Morningstar EM TME GR USD		MSCI EM GR USD		Average sample fund
Characteristics					
Standard deviation (%) **3 years** **5 years** **10 years**	 18.55 16.50 16.36		 18.72 16.63 16.38		 -
Geographical exposure – First five weights (%)	China 33.29 Taiwan 14.03 India 13.09 South Korea 12.88 Brazil 4.02	(-8.36) (-1.9) (-0.8) (-1.82) (+1.85)	China 34.02 Taiwan 15.64 South Korea 12.18 India 12.09 Brazil 4.05	(-9.09) (-3.51) (-1.12) (+0.20) (+1.82)	China 24.93 India 12.29 Taiwan 12.13 South Korea 11.06 Brazil 5.87
Sector exposure – First five weights (%)	Financial services 20.8 Technology 18.9 Consumer cyclical 15 Communic. services 11.3 Basic materials 8.3	(-2.7) (-2.04) (-1.27) (-2,37) (-1.14)	Technology 21.8 Financial services 19.46 Consumer discretionary 14.57 Communic. services 10.77 Basic materials 8.4	(-0.86) (-1.36) (-0.84) (-1.84) (-1.24)	Technology 20.94 Financial services 18.10 Consumer discretionary 13.73 Communication services 8.93 Basic materials 7.16

When the average fund is compared to the indices, it does not show a great divergence. In fact, letting alone the similarities between the indices, only few weights differ and are worth attention. Relative to the MSCI Index, the average fund presents the highest underweight to Taiwan (-3.51). Relative to the Morningstar Index, the average fund presents the highest underweight to both Financials (-2.7), Communic. Services (-2.37) and Technology (-2.04). Since there is a greater number of divergences between the average fund and the Morningstar Index, the MSCI Index is what has been chosen to represent the benchmark in this study. The MSCI Emerging Market Index investible universe includes the following EM: Argentina, Brazil, Chile, China, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Korea, Kuwait, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Qatar, Russia, Saudi Arabia, South Africa, Taiwan, Thailand, Turkey and United Arab Emirates (MSCI, 2021). Its monthly returns have also been retrieved from Datastream.

6.1.4 Asset Pricing Models' Factors

The employment of multifactor models implies the usage of factors, which in the case of the models employed in this paper they are size, value and momentum factors. In practice, these factors are possible to be retrieved from the Data Library of Kenneth R. French (French, Kenneth R. French - Data Library, 2021). However, Griffin (2002), in his attempt to understand whether the Fama-

French factors were country specific or global, realized that local, rather than global, would serve a better explanation of variation of stock returns (Griffin J. M., 2002). Consequently, the Data Library has been updated with additional local factors, for examples those for United Kingdom, Germany, and Switzerland (Griffin J. M., 2002). Furthermore, since the Fama-French factors have been for most of their existence only available for developed markets, Cakici et al. (2013) has questioned the need for EM factors (Cakici, Fabozzi, & Tan, 2013). In fact, through their analysis computed over the period from 1990 to 2011, they documented strong value and momentum effects in EM, confirming that local factors would provide better explanation than global factors. That once again proves the point made by Griffin (2002). Nowadays one can find in the Data Library of Kenneth R. French (French, Kenneth R. French - Data Library, 2021) also EM-specific factors (supplied by Bloomberg database). Those have been retrieved and used in this paper to implement the models by Fama French (1993) and Carhart (1997).

6.2 Research design

Having obtained the returns from both the funds and the benchmark, as well as the EM factors, one can proceed with the process by firstly selecting the best research design, including the performance evaluation model/s and the hypothesis testing methodology, and secondly preparing the data for the analysis.

6.2.1 Performance evaluation models

According to Hili et al. (2016) the non-regression ratios (like Sharpe ratio), even if they provide insights on the superiority or inferiority of performance of a fund compared to another, they do not say whether those insights are statistically significant or not, thus whether they have any financial meaning at all (Hili, Pace, & Grima, 2016). Therefore, this paper will also employ regression-based measures.

The literature review section presenting the research design employed by other authors (Section 3.3) made clear that the most used regression-based measures chosen to evaluate the performance of EM funds are CAPM, Fama French (1993) three-factor (FF3F) and Carhart (1997) four-factor (CA4F) models. However, other studies have been conducted specifically in the seek for the best fitting model to use in the EM settings. For example, the emerging European markets have been investigated by Zaremba & Czapkiewicz in 2016, by utilizing four of the well-known factor

pricing models: the CAPM (Sharpe, 1964), the FF3F model, the CA4F model and the Fama French (2015) ´s five-factor model. Results provide evidence on the Fama French (2015) ´s five-factor model being the best model in explaining anomalies in the returns (Zaremba & Czapkiewicz, 2016). A year later, Gumanti et al. (2017) studied the Indonesian market between 2005 and 2015, by comparing the FF3F model to the CA4F model. The CA4F model has been found to be a better fit to explain excess returns in Indonesia (Gumanti, Sutrisno, Andreas, & Bernardus, 2017). Differently, Shaker & Abdeldayem (2018) documented the superiority of the FF3F model in predicting stocks returns, over other four asset pricing models, those being CAPM, the CA4F model, the Chan and Faff (2005) ´s four-factor model and the Fama French (2015) ´s five-factor model. The models have been applied to the Egyptian stock market, over the period from 2003 to 2007 (Shaker & Abdeldayem, 2018). It seems like that in the settings of EM, academics have not yet reached an agreeable conclusion on what model is the best fitting to evaluate funds ´performance.

In view of such a controversial landscape, this paper follows what most of the literature has done. In particular, to test for the proposed hypotheses, this study follows the methodology employed by Kiyamaz & Simsek (2017). The scope of their study was as well to examine the performance of mutual funds that are domiciled in the US which exposure is exclusive to EM. Their sample is also composed by those funds compliant with the Morningstar classification of "Diversified emerging markets" funds (Kiymaz & Simsek, 2017). The main difference between their study and this study is that their sample covers a longer period, and it goes from the 2000 to the 2017. Besides, their analysis includes funds which allocation is to both equities and bonds, while this study covers only equity funds. Kiymaz & Simsek (2017) employed risk-adjusted performance measures like Sharpe Ratio and Treynor Ratio, as well as factor models like CAPM, FF3F and CA4F (Kiymaz & Simsek, 2017). Importantly, they investigated the funds by splitting the sample period into four sub-periods, as a robustness check, which inspired the approach of this paper to the analysis. Two of sub-periods involve two recessions and significant bear markets, whereas the other two involve economic expansions and bull markets (Kiymaz & Simsek, 2017).

6.2.2 Performance measurement

In order to investigate how the EM funds perform compared to the passive benchmark over the period from 2014 to 2021, the process of measuring performance is here explained. The reader should note that regarding the measures computed in this paper, the returns tested are gross returns.

As a preliminary step, simple monthly mean returns and risk-adjusted measures for both the funds' portfolio and the benchmark's portfolio are computed to provide insight on how the average EM fund has performed compared to the passive portfolio on a risk-adjusted basis. With that aim, the 186 EM funds had to be first transformed into an equally weighted portfolio. That is done by computing the arithmetic average of the returns across funds at each month. This methodology allows for a great removal of idiosyncratic risk, or exposure to specific risk inherent each fund (Kiymaz & Simsek, 2017). Since the sample period is composed of 86 months, it is therefore obtained a list of 86 monthly average returns. Then, the arithmetic average of those 86 returns would be the return an investor would averagely get in profit on a monthly basis, over the period from August 2014 to June 2021, if he/she was holding portfolio of 186 holdings of diversified EM mutual funds (Alexander, 2008). Furthermore, the risk-adjusted measure, the Sharpe ratio, is computed as:

$$Share\ Ratio = \frac{R_i - R_f}{\sigma}$$

(Alexander, 2008)

where $(R_i - R_f)$ is the excess return of the risky asset, and σ is the standard deviation of the portfolio excess return. In the case of this paper, R_i is the monthly return of the fund, or of the benchmark, whereas R_f is the one-month rate on US Treasury bills.

As previously mentioned, this paper adopts alpha as the main measurement of fund performance. Therefore, the secondary step to find and explain alpha, the factor models are the measurements to employ. The model used to calculate both the abnormal returns for the EM funds' portfolio and the benchmark' portfolio is the Jensen's alpha (Jensen, 1968). The portfolio return is therefore given by:

$$R_{it} - R_{ft} = \alpha_i + \beta_{iM}[R_{Mt} - R_{ft}] + \varepsilon_{it}$$

(Jensen, 1969)

where R_{it} is the return of the average fund (or benchmark) i in month t, R_{ft} is the one-month rate on US Treasury bill in month t, R_{Mt} is market return in period t, α_i is the alpha of the average fund (or benchmark) i, β_{iM} is the average fund (or benchmark) i's beta exposure to the market risk, and ε_{it} is the random residual return of the average fund (or benchmark) i in period t. The hypothesis tested by the CAPM is that alpha is not different from zero. In case of p-value greater than 0.05 the null hypothesis would be rejected in favour of the alternative, which states that alpha is said to be different form zero (next Section 6.2.3 will explain this in greater detail). A statistically significant positive α_i would infer that there is a part of the excess return of the portfolio in question that is unexplained by

the excess return of the market which, in the case of this paper, would be the added value of active management versus passive management. In terms of EMH, a positive α_i would also indicate that the market is not efficient and that fund managers are showing skills in analysing the information in the market, thus obtaining a profit out of mispriced stocks (Fama, 1970). Using the EM funds' portfolio and the benchmark's portfolio, the Jensen's alpha (1968) can be performed to answer both Hypothesis 1 and 2.

Furthermore, both abnormal returns produced by the EM funds and benchmark's portfolios are further corrected for different risk factors by employment of multifactor models. The selected factor models for the analysis of this paper are Fama French (1993) ´s three-factor and Carhart (1997) ´s four-factor models. The Fama French (1993) ´s three-factor model is defined by:

$$R_{it} - R_{ft} = \alpha_i + b_i\left(R_M - R_f\right) + s_i\, SMB_t + h_i\, HML_t + \varepsilon_{it}$$

(Fama & French, 1996)

where α_i is the three-factor alpha of the EM funds or benchmark's portfolio, the R_{ft} is the one-month rate on US Treasury bills at month t, the $\left(R_M - R_f\right)$ is the excess return on the market at month t, SMB is the return on a small-minus-big zero-investment portfolio at time t, HML is the return on a high-minus-low zero-investment portfolio at time t, and the ε_{it} is the residual. The b_i, s_i , and h_i are the estimated coefficients that indicate how the abnormal returns produced by each portfolio is correlated to each of the risk factors. Then, the Carhart (1997) four-factor model replicates the same factors and implications of the Fama French (1993) three-factor model, while adding to it one more risk factor (momentum factor), as the following:

$$R_{it} - R_{ft} = \alpha_i + b_i\left(R_M - R_f\right) + s_i SMB_t + h_i HML_t + w_i WML_t + \varepsilon_{it}$$

(Carhart, 1997)

where the WML, that is the return on a winners-minus-losers zero-investment portfolio at time t.

To test Hypothesis 3 and 4, the process will be the same as for the hypothesis 1 or 2. The regressions ran by use of CAPM, Fama French (1993) three-factor and Carhart (1997) four-factor models are going to be multiple. Specifically, in case of Hypothesis 1 and 2, the regressions are run for the entire period (August 2014 – February 2021), in case of hypothesis 3 and 4 the regressions are run for each of the sub-periods (August 2014 – February 2016, March 2016 – January 2018, February 2018 – March 2020, April 2020 – June 2021).

6.2.3 Hypothesis testing

The kind of analysis pursued in this paper requires the use of econometrics methods, in conjunction with the asset pricing models mentioned above. The analysis in fact aims to explain the performance of EM funds (dependent variable) by observing the impact that different elements (explanatory variables) have on it. The method to use, which is also the most common one, is the Ordinary Least Squares (OLS) method. This linear estimation model can be written as:

$$y = \alpha + \beta x + \varepsilon$$

(Alexander, 2008)

where y is the dependent variable, x is the explanatory variable, β is the coefficient measuring the effect that a change in the explanatory variable x will have upon y, α is the intercept parameter representing the value of y given that x is equal to zero, and ε is the error term representing those factors, other than x, which affect y (Alexander, 2008). The CAPM is an example of a linear model, which seeks to explain the excess returns (y) only based on the market risk premium (x). To be able to explain and predict the value of y, the intercept α and the coefficient β are thus the coefficients to be estimated in the attempt to minimize the error term ε as much as possible. In other words, the aim is to minimize the *sum of the squared residuals*, given as:

$$RSS = \sum_{t=1}^{T} e_t^2 = \sum_{t=1}^{T} (Y_t - (\alpha + \beta X_t))^2$$

(Alexander, 2008).

Then, to find the α and β coefficients it is enough to solve the following optimization problem:

$$\min_{\alpha,\beta} \sum_{t=1}^{T} (Y_t - (\alpha + \beta X_t))^2$$

(Alexander, 2008), which is also defined as the OLS criterion.

Then, when running the regression, the goodness fit of the regression model is measured by the *standard error of the regression*, derived from the RSS. One can look at the *regression* R^2 to measure the goodness fit, which is a value between 0 and 1, for which a large value signifies that the observed data is best fit for the model (Alexander, 2008).

In this paper, more than one explanatory variable has been used to explain the mutual funds' performance, for which the linear model becomes a multivariate linear regression model – those applied in this paper are Fama-French (1993) three-factor model and Carhart (1997) four-factor model. When the α and the different β coefficients are estimated, hypothesis tests can be performed

on the true value of a coefficient to determine whether the explanatory variable is significant enough to be included in the regression, hence whether it is statistically significant. The null and alternative hypothesis are written as:

$$H_o: \beta = 0 \text{ versus } H_o: \beta \neq 0$$

(Alexander, 2008).

Hence, the *t-statistic* allows to test the null hypothesis against an alternative by stating that the coefficient β is not equal to zero. This type of test describes how many standard deviations the OLS estimate of β is away from zero. Therefore, the rejection of the null hypothesis is dependent upon the value of the t-statistic being sufficiently away from zero, and the specification of what 'sufficiently' means is given by the significance level (Alexander, 2008). The other statistic to take into consideration is the p-value, that describes the smallest significance level at which the null is rejected given the t-statistic (Alexander, 2008). In terms of this paper, the t-statistic is used to examine the statistical significance of alpha (or the abnormal returns), for which the null hypothesis of alpha being equal to zero has been tested.

6.2.4 Robustness checks

With the aim of detecting an over-or-under-performance of the EM funds over the benchmark, the CAPM, the Fama French (1993) three-factor and the Carhart (1997) four-factor models have been estimated for both portfolios. The coefficients in the regression equation of these models are the estimates of, on one side, the population of the active funds, and, on the other side, the population of the passive fund. For the estimates to be the best possible estimates, the difference between the estimated values and the actual values of the population must be minimized (Alexander, 2008). In econometrics, that difference is defined as the *residual* (ε_t) (when talking about the population is called *error term*). However, for the OLS to produce the Best Linear Unbiased Estimators (BLUE), seven assumptions related to the datasets have to be met. These assumptions, also called Gauss-Markov´s assumptions (Alexander, 2008), are the following.

1. *The regression model is linear in the coefficients and the error term.*
2. *The error term has a population mean of zero,* that is $E(u_i|X) = 0$, where, since the error term (u_i) is the random part, it should hold a mean value of zero, while

let the independent variables of the model (*X*s) to explain the total variance of the dependent variable.

3. *All independent variables are uncorrelated with the error term*.

   This means that the regressors are assumed to be non-stochastic, or in other words their values are fixed in repeated sampling. In the case this assumption is not met, endogeneity would cause a biased model (Alexander, 2008).

4. *Observations of the error term are uncorrelated with each other* (no autocorrelation), that is $cov(ui\ ,\ uj\ |X) = 0\ i \neq j$, where *cov* stands for covariance and i and j are two different error terms.

5. *The error term has a constant variance* (no heteroscedasticity), that is $var(u_i\ |X) = \sigma^2$, where u_i is the error term and the σ^2 the variance. This means that the variance of each error term u_i, given the value of X, is constant, or homoscedastic. Contrarily, the presence of heteroscedasticity would cause inefficiencies in the reliability of the model.

6. *No independent variable is a perfect linear function of other explanatory variables* (no multicollinearity).

   If the dataset was characterized by multicollinearity, then the t-statistics could result insignificant or, even if some regressions coefficients were insignificant, the R-Square value could be unreasonably high.

7. The error term is normally distributed (optional).

(Alexander, 2008).

There are different tests which could be run on the dataset to check for these assumptions. For example, to check for multicollinearity, it could be used the Variance Inflation Factor (VIF) test. In the analysis of this paper (Section 7.1), the computations of these tests are reported and explained in more detail.

6.3 Limitations

In terms of limitations, the chosen methodological approach bared three main limitations. Firstly, the EM funds have been screened based on their USD denomination. This action implies the exclusion of all those funds denominated in foreign currencies, and therefore the whole sample reflect only funds established in developed markets (US) which hold exposure in EM, and so not those established in different countries.

Secondly, due to time constraints the funds sample has not been adjusted for survivorship

bias. The survivorship bias is the logical error of taking into consideration for the analysis only those funds that survived throughout the sample period (Basu & Huang-Jones, 2015). Practically speaking, during a certain spam of time, some funds are established whereas others are delisted. Funds can be delisted for several reasons, from the fund performing poorly, to demand being so tiny in size that the fund cannot keep up with the expenses and therefore forced to close. Nevertheless, when the sample includes only those funds that are surviving and thus succeeding, the risk is that the results from the analysis might reflect an unrealistic (optimistic) representation of the funds. If the sample were to be adjusted for survivorship bias, then the approach would have been simply to include in the sample the dead funds too, as Kiymaz & Simsek (2017) and Basu & Huang-Jones (2015) have done in their studies (Kiymaz & Simsek, 2017) (Basu & Huang-Jones, 2015).

Lastly, and regarding the assumption concerning the econometrics models for which the sample under analysis is representative of its population, it is difficult to assume that the selected sample represents the underlying population. The sample in fact only contains 186 funds and it was selected from one only source.

7. Empirical Analysis

The results of the analysis are presented in this section. Firstly, the datasets from the entire sample period and sub-periods are checked one by one for certain assumptions. The datasets should be compliant with those assumptions in order to be workable and used for the analysis, otherwise it must be manipulated. Secondly, summary statistics including mean monthly returns and standard deviation of the EM funds' portfolio and the benchmark's portfolio, as well as their Sharpe Ratio, have been computed. Lastly, the main part of the analysis reports the performance measurements results from the CAPM, the Fama French (1993) three-factor model and the Carhart (1997) four-factor model, together with their interpretation.

7.1 Robustness Checks

Given the Gauss-Markov´s assumptions (Alexander, 2008) presented in Section 6.2.4, the datasets of EM funds and benchmark must be checked for possible biases prior the analysis. If the datasets were to meet those assumptions, the OLS method would guarantee to produce the Best Linear Unbiased Estimators (BLUE). In particular, this paper has tested the datasets for multicollinearity, heteroscedasticity, and autocorrelation.

7.1.1 No multicollinearity

Multicollinearity occurs when two or more independent variables in a multivariate regression model are strongly correlated. In the presence of 'high' multicollinearity, the variance of the OLS coefficients would get to be exceedingly high, producing unprecise estimates. Whereas in case of 'perfect' multicollinearity the OLS assumption is violated and therefore the estimates would result biased (Wooldridge, 2013). To check for high or perfect multicollinearity the test to compute is the Variance Inflation Factor (VIF) (in STATA is computed by coding *estat vif* or *vif* after having run the regression) which provides the extent to which the standard error, or the square root of the variance, of the coefficient of interest has been inflated upwards (Wooldridge, 2013). To not assume high (perfect) multicollinearity each independent variable should present a VIF value below 5 (10) (Wooldridge, 2013). The VIF has been estimated for each independent variable, for each of the periods in question and for each regression. Results are reported in Appendix C1. Since all scores resulted from the estimations are below five and ten, it is now confirmed that neither high nor perfect multicollinearity is present among the explanatory variables included in the models, meaning that the

Gauss-Markov´s assumption of no multicollinearity is met.

7.1.2 No heteroscedasticity

Another assumption is the one regarding absence of heteroscedasticity, for which the error term is assumed to hold a constant variance across all sampling units (homoscedasticity). Heteroscedasticity, as mentioned already (Section 6.2.4), would cause biases in the way that the standard errors would be biased and no longer valid for the construction of confidence intervals (Alexander, 2008). However, the damage of heteroscedasticity is isolated in the variance of standard error and t-statistic, and thus it does not affect the coefficients. Nevertheless, to make the time-series data unbiased and workable at best, the datasets will be corrected for the presence of eventual heteroscedastic error terms.

In this paper the heteroscedasticity has been tested by employment of the Breush & Pagan (1980) ´s Lagrangian multiplier (Alexander, 2008), for which in STATA is computed by using the code *estat hettest* right after the regression has been ran. The null hypothesis of this test infers the residuals being homoscedastic. Given a p-value lower than 0.05 the null hypothesis of homoskedasticity is rejected and heteroskedasticity assumed. After the models CAPM, Fama French (1993) three-factor and Carhart (1997) four-factor are estimated for both the 186 EM Funds´ portfolio and the benchmark, for the entire sample period as well as for each of the sub-periods, the Breush & Pagan (1980) ´s Lagrangian multiplier has been computed. Based on the resulted p-values (see Appendix C2), the null hypothesis has not been rejected for most of the datasets, therefore homoscedasticity is assumed. However, for the three following datasets the p-value was lower than 0.05, thus the null hypothesis has been rejected and that indicates that the error term does not hold a constant variance, requesting for the datasets to be manipulated in other to become workable.

Datasets for which null hypothesis of homoscedasticity has been rejected:

	CAPM	FF3F	CAR4F
Entire sample period	-	EM Funds	EM Funds
Recovery 2	-	-	Benchmark

The data of these datasets has been manipulated by applying the robust Breush & Pagan (1980) ´s Lagrangian multiplier (Wooldridge, 2013), which in STATA is performed by adding the command *robust* at the end of the regression command.

7.1.3 No serial autocorrelation

As last robustness check, the retrieved data of both EM funds and the benchmark will be tested for the presence of serial autocorrelation, with the aim to avoid less precise estimates. In fact, the assumption is that the error terms in the regression models are uncorrelated with each other over time. To detect whether the different datasets used in the analysis present the problem of serial autocorrelation, this paper, inspired by Hili et al. (2016) ´s methodology, employs the Breusch-Godfrey LM test (Hili, Pace, & Grima, 2016). In STATA, the code to control for autocorrelation is *estat bgodfrey*. The null hypothesis of the test is that there is no serial correlation, which in case of p-value below 0.05 is rejected (Wooldridge, 2013). The rejection of the null hypothesis would lead for the assumption to not hold, and thus the need for the dataset in question to be manipulated. After running the regressions for each of the three factor models for each period, and for both the EM funds and the benchmark, most of the datasets have been found cleared of serial autocorrelation. The few datasets which present serial autocorrelation and require adjustments are here reported below. The results overview can be consulted in Appendix C3.

Datasets for which null hypothesis of serial autocorrelation has been rejected:

	CAPM	FF3F	CAR4F
Recession 1	-	EM Funds	EM Funds
Recovery 2	-	-	EM Funds

To correct the datasets from serial autocorrelation of the error terms, a different kind of regression have been run. It is called Cochrane-Orcutt regression which uses the methodology *Generalized Least Squares correction* (Wooldridge, 2013). In STATA it is implemented by replacing the *reg* command with *prais*, while adding the *corc* command at the end.

To sum up this section, since the legitimacy of the regression models rests on the Gauss-Markov´s assumptions (Alexander, 2008), both the datasets of the EM Funds´ portfolio and the benchmark's portfolio have been checked for multicollinearity, heteroscedasticity, and autocorrelation. Results show that most of the datasets met these assumptions for exception of a few. Mainly, the funds' portfolio has been found to not meet the assumption of homoscedasticity for the Sample period, when using the Fama French (1993) three-factor and Carhart (1997) four-factor models. For the same multifactor models, the funds' portfolio has been found to not meet the assumption of serial autocorrelation during Recession 1. Furthermore, both the EM Funds and the benchmark present unworkable data for the Recovery 2 when using Carhart (1997) four-factor model.

In particular, the funds' portfolio shows presence of serial autocorrelation, whereas the benchmark shows heteroscedasticity. Each of these datasets have therefore been corrected prior the analysis.

7.2 Summary statistics

To gain a first overview of the performance produced by active and passive managers within the EM, between August 2014 and June 2021, it follows the summary statistics of the data sample.

Entire sample peiriod	Obs	Mean	Std. dev.	Min	Max
Benchmark	83	0.24%	4.79%	-16.56%	11.81%
EM Funds	83	0.67%	4.68%	-17.50%	11.26%
Benchmark-Adjusted returns	83	0.44%	1.13%	-2.07%	3.53%

Recession 1	Obs	Mean	Std. dev.	Min	Max
Benchmark	19	-1.60%	4.37%	-8.10%	6.60%
EM Funds	19	-1.41%	3.95%	-8.80%	6.36%
Benchmark-Adjusted returns	19	0.19%	1.12%	-1.78%	1.91%

Recovery 1	Obs	Mean	Std. dev.	Min	Max
Benchmark	23	2.17%	3.42%	-4.40%	11.14%
EM Funds	23	2.39%	3.26%	-4.96%	11.26%
Benchmark-Adjusted returns	23	0.21%	0.71%	-1.27%	1.30%

Recession 2	Obs	Mean	Std. dev.	Min	Max
Benchmark	26	-1.54%	5.28%	-16.56%	8.68%
EM Funds	26	-1.15%	5.30%	-17.50%	8.61%
Benchmark-Adjusted returns	26	0.40%	1.02%	-1.64%	2.05%

Recovery 2	Obs	Mean	Std. dev.	Min	Max
Benchmark	15	2.68%	4.33%	-3.39%	11.81%
EM Funds	15	3.84%	3.76%	-1.30%	9.74%
Benchmark-Adjusted returns	15	1.16%	1.57%	-2.07%	3.53%

Table 5 - Summary statistics - Source: author´s own work

Table 5 show the summary statistics for both the benchmark and the EM funds, based on monthly gross returns, during the whole sample period as well as during the sub-periods of recessions and recoveries. As additional insight, the benchmark-adjusted returns has been calculated and included in the table to show the relative performance of EM funds compared to the benchmark.

The sample is composed of a total of 83 monthly return observations. Results suggest that overall EM funds outperform the benchmark, not only when considering the whole 7-year holding period but also each of the sub-periods including recessions (relatively) and recoveries. This assertation becomes even more indisputable when looking at the minimums and maximums of the monthly average returns. On the one hand, the active funds show the biggest monthly drawdown within the entire sample period and in three out of four sub-periods (-17.50, -8.80, -4.96 and -17.50 percent), compared to the benchmark (-16.56, -8.10, -4.40 and -16.56 percent). On the other hand, the benchmark reaches the highest monthly return within the entire sample period as well as in three other sub-periods (11.81, 6.60, 8.68, 11.81 percent), in exception of the first recovery period. In other words, even though the EM funds hit the biggest loss in each period, they still managed to outperform the benchmark throughout most of the holding periods under observation. Looking at the recessionary times, even when both the active funds and the passive benchmark obtained a negative average monthly return, the funds manage to not lose as much as the benchmark. Specifically, during Recession 1, the funds lose averagely 0.19 percent less (one can also say the funds outperform the benchmark relatively by 0.19 percent), whereas during Recession 2 they lose 0.40 percent less, than the benchmark.

Furthermore, looking at the benchmark-adjusted simple returns, the active funds seem to outperform the benchmark the most during the last business cycle, which covers the Recession 2 and Recovery 2, from Feb 2018 and June 2021. The funds obtain higher performance than the benchmark during both recession and recovery times by 0.40 and 1.16 percent per month, respectively. Further, since the period of recession prior Recovery 2 is also the one showing the highest volatility, whereas in Recovery 2 the funds outperform the benchmark by the highest relative return of 1.16 percent, it is fair to assume that EM funds manage to recover from downturns in the economy prompter than the benchmark. Finally, as of standard deviation, in general the benchmark presents higher dispersion in prices (volatility) compared to the active funds. Such evidence on active funds outperforming a passive fund while holding a less volatile investment certainly does not support the EMH which states that only by engaging in riskier investments one could obtain abnormal returns (Fama, 1970).

To sum up, what can be inferred looking at Table 5 is that the EM funds seem to perform better and to hold a slightly less volatile portfolio, compared to the benchmark, mostly during recovery times.

7.2.1 Sharpe Ratio

In Section 4.3 it has been presented a well-known risk-adjusted performance measure, the Sharpe ratio. When evaluating portfolio performance, and in particular when comparing historical performance of mutual funds (either passive or active), the Sharpe ratio provides useful information on the relationship between returns and risk, or on the outperformance per unit of the portfolio´s volatility (Kiymaz & Simsek, 2017). The ratio is calculated by dividing the risk premium (monthly portfolio return minus risk-free) by its standard deviation. Table 6 reports the obtained statistics for both the average active emerging market fund and the benchmark.

Period under analysis	Observations	(Return - Rf)	Standard Deviation	Sharpe Ratio
Benchmark - Entire sample peiriod	83	0.17%	4.80%	0.0362
EM Funds - Entire sample peiriod	83	0.61%	4.69%	0.1298
Benchmark - Recession 1	19	-1.60%	4.37%	-0.3652
EM Funds - Recession 1	19	-1.41%	3.95%	-0.3573
Benchmark - Recovery 1	23	2.13%	3.41%	0.6232
EM Funds - Recovery 1	23	2.34%	3.25%	0.7207
Benchmark - Recession 2	26	-1.70%	5.27%	-0.3232
EM Funds - Recession 2	26	-1.31%	5.29%	-0.2474
Benchmark - Recovery 2	15	2.68%	4.33%	0.6184
EM Funds - Recovery 2	15	3.84%	3.76%	1.0213

Table 6 - Sharpe ratio computed for EM funds' portfolio and benchmark
Source: author´s own work

The outcomes reflect the same conclusions previously stated when looking at simple returns, that is, even on a risk-adjusted basis, EM funds perform better than the benchmark. Sharpe Ratio is superior for EM funds in all periods compared to the benchmark, including both recessions and recoveries as well. In particular, during the 7-year period the average EM equity fund obtained an excess monthly return of 0.61 percent, whereas the benchmark only of 0.17 percent, with a Sharpe ratio of 0.129 and 0.0362, respectively. The highest Sharpe ratio is provided by EM funds during recovery periods. Especially in Recovery 2 the funds hold a ratio equal to 1.0213 meanwhile the benchmark 0.6184. On the other hand, the lowest ratio, hence the worst performance, is reported by both the funds and the benchmark in the second recession. Even so, the active funds performed, relatively, in a superior manner.

To conclude, EM funds deliver higher Sharpe ratio than the benchmark, during the entire

sample period as well as during recessionary and recovery times, thus superior performance. As of the above statistics, investors seem better off investing into actively managed emerging markets mutual funds than passively investing into the benchmark (MSCI Emerging Market Index). However, it is not recommended to take investment decisions looking at simple monthly mean returns or Sharpe ratio values. By employment of asset pricing models, the performance of funds is better explained and therefore more proper conclusions can be drawn.

7.3 Performance measurement results for 2014 through 2021

In the main part of the analysis alpha is estimated for both the equal-weighted portfolio of 186 active EM equity funds and the benchmark, using three different factor models: CAPM (Jensen´s alpha), Fama French (1993) three-factor (FF3F henceforth) and Carhart (1997) four-factor (CA4F henceforth) models. Active management is therefore analyzed by comparing the performance of the EM funds' portfolio to the one of the benchmark. This part of the paper will help answering the research question whether active management involving EM is worth in respect of passively investing into an index, as well as whether EM are efficient markets after all. The following sections start by presenting the performance measurement results for the entire sample period, followed by the presentation of results for the recessions and recoveries, separately. The division between sub-periods in the exposure of results is meant to provide further clarification on how EM funds perform during downturns and upturns in the economy. The results from the robustness checks (Section 7.1) implied for a few of the datasets to be manipulated prior the analysis and, when that has been the case, it is going to be specified. It must be noted that in this section are reported only the key numbers (coefficients are in decimals) extrapolated from the regressions. If necessary, the full view of each regression can be consulted in Appendix D.

7.3.1. Sample Period (1st August 2014 – 30th June 2021)

For this period, due to otherwise unworkable datasets, the time-series of monthly returns of the EM funds has been manipulated when using the FF3F and CA4F models. In fact, in both cases the assumption of homoscedasticity was not met, hence the regression has been substituted with the

robust regression of Breush & Pagan (1980) ´s Lagrangian multiplier (Wooldridge, 2013).

7.3.1.1 CAPM

As preannounced in the Theory section (Sec. 4), the most common measurement used to detect under-or-overperformance is alpha. Hence, to answer to the question whether active management is a worth practice, compared to passive management, the alpha produced by the EM funds has been compared to the benchmark. To obtain the coefficients, the market portfolio (independent variable) has been linearly regressed on the EM funds' portfolio as well as on the benchmark' portfolio (dependent variables). Table 7 shows the estimated coefficients for both portfolios.

CAPM - Sample period	EM Funds	Benchmark
Rm - Rf	0.9742 (0.0000)***	0.9822 (0.0000)***
α	0.0002 (0.8100)	-0.0042 (0.0000)***
R^2	0.9838	0.9553

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 7 – CAPM for the entire sample period – 83 observations
Source: author´s own work

The outcomes of the regression suggest that over the entire sample period the EM funds present a positive alpha (0.02 percent), whereas the benchmark show a negative one (-0.42 percent). However, by looking at the p-values, further details emerge. Between the two portfolios, only the benchmark seems to hold an alpha that is statistically significant, given its p-value below 0.05 for which the null hypothesis of alpha being equal to zero is rejected. That also means that whoever would have invested passively into the benchmark would have obtained a return lower than investing into the market portfolio. Furthermore, since for EM funds the null hypothesis is not rejected and therefore alpha is equal to zero, it can be inferred that the investor would not loose nor earn money out of investing actively into EM, rather than into the market portfolio, over this period. This leads to the rejection of both Hypothesis 1 and 2. As of the market beta coefficient, while it is statistically significant for both EM funds and the benchmark, it is very close to 1 in either case. This implies that, even if slightly less for the EM funds, both portfolios are almost volatile as the market. In other words, when the market goes up by 1 percent, the EM funds would go up by 0.097 percent and the benchmark by 0.098 percent. Finally, the R-squared coefficients very close to 1, of 0.9838 and 0.9822, indicate

that in both cases the estimation model has almost perfectly fit the observed data.

7.3.1.2 Fama French Three-Factor Model

In the Theory section (Sec. 4) it has been explained how the CAPM is found to be insufficient in explaining the variation in stock prices (Fama & French, 1993). As a result, two more risk factors besides the market risk have been added as explanatory variables to the FF3F model. The additional factors are SMB and HML, where the former adjusts for the exposure of the general outperformance of small capitalization portfolios over large ones (Huberman & Kandel, 1987) and the latter adjusts for propensity of a strategy towards value stock portfolios (Chan & Chen, 1991). Table 8 shows results for both portfolios when regressed against all three risk factors.

Fama French Three-Factor Model Sample period	EM Funds	Benchmark
Rm - Rf	0.9960 (0.0000)***	0.9901 (0.0000)***
SMB	0.0013 (0.9760)	-0.2401 (0.0010)**
HML	-0.1278 (0.0000)***	-0.0915 (0.0630)*
α	0.0002 (0.747)	-0.0042 (0.0000)***
R^2	0.9872	0.9637

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 8 - FF3F model for the entire sample period – 83 observations
Source: author´s own work

Overall, results from this regression are similar to those obtained using the CAPM. In particular, the benchmark is still providing a statistically significant negative alpha of -0.42 percent, whereas the null hypothesis for the EM funds has not been rejected in this case either. In other words, the investor would be better off avoiding passively investing into the benchmark, while obtaining the same return investing in either the EM funds or the market' s portfolios. This leads again to the rejection of Hypothesis 1 and 2.

In terms of the new additional beta estimates, only the HML factor is negative and statistically significant for both the EM funds and the benchmark, at 1 and 10 percent confident level respectively. That means that both portfolios' abnormal return is negatively correlated to the exposure to low book-to-market stocks, implying that both portfolios behave as growth portfolios. In particular, since the EM funds show an HML beta coefficient of -0.1278 and the benchmark of -0.0915, the negative HML has greater effect on EM funds' returns, suggesting that the EM funds' portfolio is more tailed to growth compared to the benchmark. As of the SMB coefficient, it is statistically

significant for the passive portfolio, at 5 percent confident level, allowing for the null hypothesis to be rejected. That means that the SMB effect is not neutral for the benchmark, but rather negative correlated. In fact, if the SMB factor portfolio would go up by 1, then the benchmark's portfolio would go down by 0.2401. About the EM funds, the SMB's beta estimate is not statistically different from zero, indicating neutral effect. Finally, using the FF3F model, the R-squared has increased for both portfolios, indicating a better fit between the model and the data analyzed, compared to the CAPM.

7.3.1.3 Carhart Four-Factor Model

In addition to SMB and HML factors, Carhart (1997) proposed the momentum factor (WML), after the scholars Jegadeesh N. and Titman S. demonstrated that portfolios which strategy is to buying winning stocks while selling stocks performing poorly provide significant returns (Carhart, 1997). Table 9 shows results from the multilinear regressions using CA4F model.

Carhart Four-Factor Model Sample period	EM Funds	Benchmark
Rm - Rf	0.9984 (0.0000)***	0.9904 (0.0000)***
SMB	-0.0005 (0.9910)	-0.2403 (0.0010)**
HML	-0.1050 (0.0080)***	-0.0889 (0.1540)
WML	0.0350 (0.2610)	0.0040 (0.9450)
α	-0.0001 (0.8440)	-0.0042 (0.0010)**
R^2	0.9874	0.9637

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 9 - CA4F model for the entire sample period – 83 observations
Source: author´s own work

Under the CA4F model, both the EM funds and the benchmark exhibit a negative alpha coefficient, remaining statistically insignificant for the EM funds, and significant at 5 percent confidence for the benchmark. That leads for the benchmark to the rejection of the null hypothesis of alpha being equal to zero, indicating an underperformance of -0.42 percent relative to the market, over the entire sample period. This leads to rejection of both Hypotheses 1 and 2. Furthermore, the betas coefficients of SMB and HML are all negative, though only two on four being statistically different from zero. In particular, the benchmark exhibits about the same statistically significant negative correlation to SMB factor than what has been previously found by using the FF3F model. Meanwhile, the performance of the EM funds is still statistically significantly negatively correlated

to the HML factor' s performance, even if in a lesser degree than what has been reported by using the FF3F model. Finally, the additional WML coefficient is positive for both portfolios, however not statistically significant, for which the null hypothesis of the partial effect being equal to zero is accepted. However, relatively, the active funds seem to have greater exposure to momentum strategy than the benchmark. That is because in the case the broader market momentum moves up by 1, the EM funds move up by 0.0350 in response, while the benchmark by only 0.0040.

In terms of market beta, results do not differ much from the two previous models. As of the R-squared coefficients, the CA4F model seems to be the best fit for both portfolios' data. In fact, with the CAPM the R-square for the EM Funds' portfolio was 0.9838 and for the Benchmark was 0.9553, meanwhile in this case they are 0.9874 and 0.9673 respectively.

7.3.2 Recession 1 (1st Aug 2014 – 29th Feb 2016)

During this period the oil prices have showed a lot of volatility and that affected emerging markets, as well as the whole market, greatly. The results from the analysis are here reported. The time-series of monthly returns of the EM funds has been once again manipulated when using the FF3F and CA4F models. This time it was the assumption of serial correlation that was not met, hence in those two cases the regression has been substitute with the Cochrane-Orcutt regression (Wooldridge, 2013).

7.3.2.1 CAPM

Table 10 shows the estimated coefficients for both portfolios, during the first recessionary period.

CAPM - Recession 1	EM Funds	Benchmark
Rm - Rf	0.9156 (0.0000)***	1.0007 (0.0000)***
α	-0.0015 (0.3030)	-0.0022 (0.3630)
R^2	0.9781	0.9512

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 10 - CAPM performed for the Recession period 1 – 19 observations
Source: author´s own work

During this period, both the EM funds and the benchmark show a statistically insignificant negative alpha coefficient. That translates to both portfolios not providing any excess return above the market portfolio. This leads to the rejection of Hypothesis 2 and 3. Nevertheless, since the

estimated alpha for EM Funds is -0.15 percent and for the Benchmark is -0.22 percent, it can be inferred that the active portfolio proves to be more defensive during a downturn in the economy, than the passive one. In other words, if the market were to fall by 1 percent, the active funds will follow by 0.15 percent, whereas the benchmark further by 0.22 percent. This leads to the rejection of Hypothesis 1. Furthermore, the market beta coefficient for the EM funds is slightly below 1, whereas for the benchmark is slightly above 1, where both statistically significant. This means that even if both portfolios' volatility is very close to the one of the market, the EM funds are slightly less volatile than the benchmark, whereas the benchmark is bit more volatile than the market. The R-squared is very close to 1, signalizing that for both datasets the estimation model CAPM is a good fit.

7.3.2.2 Fama French Three-Factor Model

When the alphas are estimated by using the FF3F model, some differences are to be noted in Table 11.

Fama French Three-Factor Model Recession 1	EM Funds	Benchmark
Rm - Rf	0.9425 (0.0000)***	0.9633 (0.0000)***
SMB	-0.1000 (0.1230)	-0.2801 (0.0430)**
HML	-0.1974 (0.0160)**	0.1110 (0.4840)
α	-0.0022 (0.0280)**	-0.0010 (0.6540)
R^2	0.9911	0.9637

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 11 - FF3F model for the Recession period 1 – 19 observations
Source: author´s own work

Both alphas are still negative, but if before the benchmark was losing territory over the EM funds, now the situation has reversed. Specifically, under the CAPM the EM funds were underperforming the market by 0.15 percent monthly, whereas the benchmark by 0.22 percent. In this case, the EM funds underperform the market by 0.22 percent monthly, and the benchmark by 0.10 percent. Also, the alpha for the EM funds is now statistically significant at 5 percent level, indicating that the null hypothesis is rejected, and alpha is different from zero. That means Hypothesis 1 is supported, whereas Hypotheses 2 and 3 rejected, since EM funds do not outperform the benchmark, and at the same time do not produce any abnormal return compared to the market. In terms of the size factor (SMB), it seems like both portfolios are tailed to large size companies and therefore negatively correlated to the SMB partial effect, however only for the benchmark the p-value is below 0.05 and

makes the coefficient (-0.2801) statistically significant. Differently, the HML factor is negative at -0.1974 and statistically significant only for the EM funds, meaning that their performance is negatively correlated to the performance of value stocks, or high-book to market stocks. That infers once again that the EM funds' exposure must be tailed to growth stocks. The positive coefficient for the benchmark at 0.1110, suggests that its performance is positively correlated to high book-to-market stocks (value stocks) and it must be because it its portfolio is tailed to value stocks.

The beta coefficient of the market has lowered to a value below 1 for the benchmark, compared to under the CAPM. That means that under the FF3F model both portfolios are close to be as volatile as the market, during the first recessionary period. Finally, the p-value has further increased compared to the CAPM, suggesting that this model is a better fit for the observed data.

7.3.2.3 Carhart Four-Factor Model

The EM funds and the benchmark are further regressed against market, size, value and momentum factors, and results are reported in Table 12.

Carhart Four-Factor Model Recession 1	EM Funds	Benchmark
Rm - Rf	0.9455 (0.0000)***	0.9673 (0.0000)***
SMB	-0.1078 (0.1230)	-0.2914 (0.0490)**
HML	-0.1782 (0.0590)*	0.1541 (0.4630)
WML	0.0350 (0.6720)	0.0547 (0.7410)
α	-0.0023 (0.0320)**	-0.0011 (0.6420)
R^2	0.9912	0.9640

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 12 - CA4F model for the Recession period 1 – 19 observations
Source: author´s own work

During this recessionary period, and under the CA4F model, it is further confirmed the greater underperformance relative to the market, of EM funds (-0.23 percent on a monthly basis) over the benchmark (-0.11 percent). However, only for EM funds the alpha is statistically significant, at 5 percent confidence level. This leads to the support of Hypothesis 1 which states that active managers are not able to outperform passive ones, and to the rejection of Hypotheses 2 and 3 which state that active managers produce abnormal returns within inefficient markets, including during recessions. Besides that, the correlation with SMB and the HML factors has not changed considerably for neither of the portfolios, compared to the FF3F model. The HML factor is still negative and statistically

significant for the EM funds, though it is less pronounced in this case than when the FF3F model was used. The opposite goes for the benchmark, for which the positive correlation to value factor has increased. Furthermore, the WML factor shows for both coefficients a positive value, though statistically insignificant. Nevertheless, the higher WML of the benchmark (0.0547) compared to EM funds (0.0350) suggests that the performance of the former is more correlated to the momentum factor and therefore it is more positively correlated to how the broader market momentum is performing. The market beta has not changed much from the FF3F model. Finally, the R-squared values are the highest for both portfolios, meaning that the CA4F model has the highest explanatory power as the first recession period is concerned.

7.3.3 Recovery 1 (1st Mar 2016 – 31st Jan 2018)

During this period the whole market has seen a correction in valuations after the previous recession, for which the volatility has been vritually non-existent (Will, 2017). The MSCI Emerging Market Index (benchmark) has moved upward of about 60 percent (Yahoo Finance, 2021) during this period. For the analysis, none of the datasets has been manipulated, since the assumptions on multicollinearity, heteroscedasticity, and serial autocorrelation have been met for all of them.

7.3.3.1 CAPM

As Table 13 shows, during the first recovery period the EM funds' portfolio is the only one exhibiting a positive alpha coefficient (0.07 percent). However, based on its p-value of 0.6100, the null hypothesis cannot be rejected and therefore the alpha is said to be equal to zero.

CAPM - Recovery 1	EM Funds	Benchmark
Rm - Rf	0.9367 (0.0000)***	0.9840 (0.0000)***
α	0.0007 (0.6100)	-0.0026 (0.0710)*
R^2	0.9766	0.9766

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 13 - CAPM performed for the Recovery period 1 – 23 observations
Source: author´s own work

That means that the EM funds are not able to outperform nor underperform the market on a monthly basis during this first economic upturn. This leads to the rejection of Hypothesis 2 and 4. On the other hand, the alpha coefficient for the benchmark is negative at -0.26 percent and statistically significant at 10 percent confidence level. It can thus be speculated that an investor, between the two

portfolios, would have once again preferred to be invested in the EM funds rather than in the benchmark, despite the EM funds' portfolio not producing any additional profit than the market portfolio. This leads to the rejection of Hypothesis 1. Moreover, the statistically significant market beta coefficients at 0.9367 for EM funds and 0.9840 for the benchmark indicate that both portfolios are slightly less risky than the market's, with the benchmark being the most volatile of the two. The explanatory power of the model is for both portfolios relatively high at 0.9766.

7.3.3.2 Fama French Three-Factor Model

Under the FF3F model, the coefficients show almost the same alpha values as for the CAPM. As can be seen from Table 14, only the EM funds reports a slightly higher alpha, which goes from 0.07 percent when using CAPM, to 0.11 percent in this case. However, once again, the null hypothesis of alpha being equal to zero is rejected only for the benchmark.

Fama French Three-Factor Model Recovery 1	EM Funds	Benchmark
Rm - Rf	0.9640 (0.0000)***	0.9856 (0.0000)***
SMB	0.0105 (0.9280)	-0.0180 (0.9000)
HML	-0.1477 (0.0170)**	-0.0277 (0.6930)
α	0.0011 (0.3480)	-0.0025 (0.0980)*
R^2	0.9828	0.9769

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 14 - FF3F model for the Recovery period 1 – 23 observations
Source: author´s own work

This means that EM Funds are able to outperform the benchmark, but not to produce abnormal returns, which leads to the rejection of Hypotheses 1, 2 and 4. When looking at the HML factor, the beta coefficient is negative for both portfolios, but only for the EM funds the p-value is below 0.05 and therefore statistically significant. The negative values of -0.1477 for EM funds and -0.0277 for the benchmark, remark the tendency of both portfolios to be tailed towards growth stocks, or companies that exhibit a low book-to market value, and therefore to be negatively correlated to the HML factor. In terms of the SMB factor, the beta coefficient is positive for the EM funds (0.0105) and negative for the benchmark (-0.0180). Even if in both cases the p-value is considerably above 0.05 and therefore the tests are statistically insignificant, the coefficients still indicate a noteworthy tendency. The EM funds are more exposed to companies characterized by small a capitalization and thus positively correlated to the outperformance of the market of small stocks over big ones (factor

SMB). Differently, the benchmark is negatively correlated to SMB factor, since its exposure is tailed to companies characterized by a big capitalization.

Further, the volatility for both portfolios is increased, compared to under CAPM, based on the market beta coefficients of 0.9640 (EM funds) and 0.9856 (benchmark), both statistically significant. Finally, the R-squared has increased too, showing the FF3F model to be a more suitable model for this analysis, than the CAPM.

7.3.3.3 Carhart Four-Factor Model

Empirical results under the CA4F displayed in Table 15 show both intercept values being negative at -0.06 percent for the EM funds and -0.37 percent for the benchmark.

Carhart Four-Factor Model Recovery 1	EM Funds	Benchmark
Rm - Rf	0.9953 (0.0000)***	1.0063 (0.0000)***
SMB	0.0986 (0.4320)	0.0404 (0.8010)
HML	-0.0831 (0.2280)	0.0151 (0.8610)
WML	0.1057 (0.1120)	0.0701 (0.4000)
α	-0.0006 (0.6990)	-0.0037 (0.0800)*
R^2	0.9851	0.9778

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 15 - CA4F model for the Recovery period 1 – 23 observations
Source: author´s own work

Whereas for the EM funds the alpha is statistically insignificant, for the benchmark is significant at 10 percent level. That indicates again that, meanwhile both portfolios do not produce any abnormal monthly return during this period, the benchmark's portfolio produces a loss, and the EM funds' portfolio does not. This leads to the rejection of both Hypotheses 1, 2 and 4. When looking at the rest of the factors, they are all positive except one, but none of them is statistically significant. The HML beta coefficient is less negative for EM funds than it was under the FF3F model, meaning that the performance is in this case to a lesser degree negatively correlated to the value over growth stocks' factor' performance. Also, the benchmark's HML coefficient is now positive at 0.0151, indicating that the variation in returns is positively correlated to the exposure to value stocks instead of growth stocks. Furthermore, the SMB stays positive and bit higher (0.0986) for the EM funds, whereas for the benchmark became positive. That suggests that both portfolios are positively correlated to the SMB factor and thus assumed to hold exposure to small caps during the recovery

period. One can speculate that when the economy is booming managers decide to replace the safer investments in big established companies with riskier investments into small companies to benefit from the potential higher growth rate that characterizes small caps (Carhart, 1997).

As it has been the case for the previously analyzed periods, the WML coefficient are both positive and statistically insignificant. The tendency is, however, for the EM funds to be more positively correlated to the momentum factor (0.1057), than the benchmark (0.0701). That makes sense since, contrary to active managers, passive managers do not trade frequently and responsively, based on short and sudden changes in the economy. Thus, their portfolio tends to follow less the momentum in the market and so to be less positively correlated to it. Finally, the R-squared is the highest both EM funds and benchmark have reached for this period, meaning that the CA4F model seems to be the best estimation model for the observed data.

7.3.4 Recession 2 (1st Feb 2018 – 31st Mar 2020)

This period encompasses trade tensions that caused significant volatility, including the US interest rate hikes and the US-China trade relations. Besides, at the end of 2019 the Covid-19 pandemic crisis has caught off-guard the whole economy and financial markets. By the end of this period in fact the stock markets declined by over 30 percent (OECD, 2020). For the analysis, none of the datasets has been manipulated, since the assumptions on multicollinearity, heteroscedasticity, and serial autocorrelation have been met for all of them.

7.3.4.1 CAPM

When analyzing the second recessionary period of the sample by using the CAPM, the results are the followings. Table 16 reports a positive alpha coefficient of 0.09 percent for the EM funds, and a negative one of -0.32 percent for the benchmark.

CAPM - Recession 2	EM Funds	Benchmark
Rm - Rf	1.0084 (0.0000)***	0.9974 (0.0000)***
α	0.0009 (0.5060)	-0.0032 (0.1120)
R^2	0.9849	0.9685

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 16 - CAPM for the Recession period 2 – 26 observations
Source: author´s own work

None of them is statistically significant though, and that means that the alpha value cannot

be said to be different from zero in either case, leading to the rejection of Hypothesis 2 and 3, which states that active funds should be able to produce abnormal returns in inefficient markets, including during recessions. For exception of the first recessionary period for which both the EM funds and the benchmark have been found to hold a negative alpha value, the results from the CAPM have been so far of the same kind, with the benchmark losing pace over the EM funds. That indicates that, so far, active managers outperform passive managers relatively, which leads to the rejection of Hypothesis 1. Differently, for the first time the market beta coefficient is higher for the EM funds than for the benchmark. In fact, the former exhibits an estimated coefficient above 1 (1.0084), indicating that such portfolio is more volatile than the market, whereas the latter holds a coefficient that is just below 1. The evidence for which the EM funds show above-benchmark performance while holding a riskier portfolio supports the EMH that states that only riskier investments could lead to abnormal returns (Fama, 1970). Finally, the R-square coefficients are equal to 0.9849 for the EM funds and 0.9685 for the benchmark.

7.3.4.2 Fama French Three-Factor Model

When the same dataset is analyzed under the FF3F model, the estimated alpha values show an analogous situation – see Table 17. However, in this case the alpha coefficient for the benchmark is statistically significant at 10 percent confident level, meaning that the alpha now can be said to be different from zero.

Fama French Three-Factor Model Recession 2	EM Funds	Benchmark
Rm - Rf	1.0208 (0.0000)***	0.9996 (0.0000)***
SMB	0.0255 (0.7690)	-0.1997 (0.1180)
HML	-0.0906 (0.1080)	-0.0455 (0.5640)
α	0.0010 (0.4790)	-0.0041 (0.0500)*
R^2	0.9866	0.9723

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 17 - FF3F model for the Recession period 2 – 26 observations
Source: author´s own work

That indicates that the benchmark's portfolio underperforms the market portfolio during this recession by 0.41 percent. Since the EM funds' portfolio shows an alpha that is statistically insignificantly and not different from zero, it means that the active funds do not produce abnormal return relative to the market, though outperform the passive portfolio relatively. This leads to the

rejection of both Hypotheses 1, 2 and 3. Looking at the rest of the factors, the estimates for both SMB and HML factors show no statistically significant values. As in the other previous cases, with the exception of the first recessionary period, the HML continues to be negative for both portfolios, and that signalizes the tendency for both portfolios to continuing to be exposed to growth stocks and be negatively correlated to value-over-growth stocks' factor. When looking at the SMB, the same continuity can be inferred. Although not statistically significant, the EM funds' performance is positively correlated to exposure to SMB factor, vice versa the benchmark. The R-square coefficient has improved for both portfolios, from 0.9849 to 0.9866 for EM funds, and from 0.9685 to 0.9723 for the benchmark.

7.3.4.3 Carhart Four-Factor Model

Table 18 shows the results obtained when the regression is performed under the CA4F model.

Carhart Four-Factor Model Recession 2	EM Funds	Benchmark
Rm - Rf	1.0238 (0.0000)***	1.0140 (0.0000)***
SMB	0.0218 (0.8120)	-0.2175 (0.1070)
HML	-0.0850 (0.2130)	-0.0181 (0.8500)
WML	0.0157 (0.8780)	0.0762 (0.6030)
α	0.0009 (0.5690)	-0.0046 (0.0500)*
R^2	0.9866	0.9726

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 18 - CA4F model for the Recession period 2 – 26 observations
Source: author´s own work

The situation surrounding the alpha coefficient is the same as the one obtained under the previous estimation models. Only the benchmark shows significant alpha at 10 percent confidence level, and the negative value indicates the underperformance of -0.46 percent relative to the market. The EM funds' alpha is still not significant and positive at 0.09 percent, meaning EM funds do not produce abnormal return and therefore Hypothesis 2 and 3 is rejected. Besides, since the EM Funds relatively outperform the benchmark, Hypothesis 1 is also rejected. In regards of SMB, HML and WML factors, they all are statistically insignificant. However, the SMB is now negative for the benchmark and is equal to -0.2175. Except for the last recovery period for which SMB factor showed a positive coefficient of 0.0404 under the CA4F model, the benchmark has always been tailed to companies with large capitalization and therefore negatively correlated to the partial effect of SMB. The same factor coefficient is equal to 0.0218 for the EM funds. The type of exposure of EM funds,

between small and big caps, has varied from one sub-period to another. It seems that, during recessions, active managers tend to prefer big caps too, probably aiming for safer assets in consolidated and liquid companies during uncertain times. The HML coefficients are now both negative, same as when the entire sample period was concerned, suggesting a tendency for both active and passive EM managers to hold more investments into growth, rather than value, stocks. Interestingly, for the first time the market beta coefficient is above 1 for both portfolios. In fact, the EM funds' coefficient is 1.0238, and the benchmark's is 1.0140, both statistically significant at 1 percent confidence level. The common higher level of volatility compared to the market is probably due to the Covid-19 pandemic crisis, which caught the entire world off guard, triggered an overall selling off from equities in search for safer assets to invest in. Given that, the sudden movements in the market have caused volatility to rise generally, affecting both active and passive asset classes. Finally, the R-squared, as in all previous cases, is at its highest, compared to the CAPM and the FF3F model.

7.3.5 Recovery 2 (1st Apr 2020 – 30th June 2021)

The last period under investigation is the recovery period right after the Covid-19 pandemic crisis has happened. Even if the pandemic was still on and spreading around the world, the market witnessed a surprising recovery in this period. To put it into perspective, the S&P500 Index has increased from a NAV of $2584.590 (April 2020) to $4297.50 (June 2021), which equals to a nearly 65 percent increase. As of EM, the MSCI Emerging Market Index has gone from $924.94 to $1374.64, that translates to a 30 percent increase. Besides, it should be noted that for this period both the datasets of EM funds and the benchmark had to be manipulated when using the CA4F model, due to presence of serial autocorrelation when the EM funds are concerned, and heteroscedasticity in the case of the benchmark.

7.3.5.1 CAPM

As reported in Table 19, and apart from the first recessionary period, alpha continues to be negative for the benchmark and positive for the EM funds.

CAPM - Recovery 2	EM Funds	Benchmark
Rm - Rf	0.9713 (0.0000)***	1.0636 (0.0000)***
α	0.0015 (0.4860)	-0.0135 (0.0340)**
R^2	0.9779	0.8816

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 19 - CAPM for the Recovery period 2 – 15 observations
Source: author´s own work

Besides, during this period the EM funds exhibit the best outperformance of all periods under analysis. On a monthly basis, the EM funds produce an outperformance relative to the market equals to 0.15 percent. However, given a p-value greater than 0.05, the alpha is not statistically significant, and thus it cannot be said to be different from zero. This leads to the rejection of Hypothesis 2 and 4. Contrarily, the benchmark produces its worst performance of all periods, given its statistically significant alpha of -1.35 percent. This suggests that when the whole market is booming, passive investing is still not able to produce abnormal and superior performance, relative to the market and EM Funds respectively, leading to the rejection of Hypothesis 1. Furthermore, the beta coefficient of 0.9713 for the funds and 1.0636 for the benchmark indicates that the risk inherent the benchmark's portfolio is higher than both the market's and the EM funds' portfolios. Regarding the R-squared coefficients, both portfolios present the lowest R-squared of all periods under analysis. As compared to previous periods, the reason for the lowest R-squared could be the number of observations, which is limited to 15 months, hence 15 observations.

7.3.5.2 Fama French Three-Factor Model

The coefficients, under the FF3F model, are showed in Table 20. Although still statistically insignificant, the alpha of EM funds continues to increase, from a value of 0.15 to 0.16 percent. The benchmark has remained negative, though at a lesser degree (-1.06 percent), statistically significant at 10 percent confidence level. Since there is no presence of abnormal return produced by the EM funds, and the benchmark is underperforming compared to it, Hypotheses 1, 2 and 4 are rejected. Again, the HML factor for both the funds and the benchmark shows a negative coefficient. Since the p-value is 0.005 for the funds and 0.0920 for the benchmark, the null hypothesis is rejected in both cases and the HML partial effect can be said to be different from zero. That indicates that, for both portfolios, their significative exposure to growth stocks over value stocks made their performance negatively correlated to the performance of value factor. Furthermore, the coefficient of the SMB

factor is not statistically significant for neither of the portfolios. Nevertheless, for exception of the

Fama French Three-Factor Model Recovery 2	EM Funds	Benchmark
Rm - Rf	0.9857 (0.0000)***	1.0700 (0.0000)***
SMB	0.0535 (0.4990)	-0.1448 (0.5660)
HML	-0.1513 (0.0050)***	-0.2557 (0.0920)*
α	0.0016 (0.3760)	-0.0106 (0.0880)*
R^2	0.9899	0.9220

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 20 - FF3F model for the Recovery period 2 – 15 observations
Source: author´s own work

first recessionary period, the SMB coefficients have continued to signalize that the EM funds exposure is explained by the exposure to small caps and thus positively correlated to the partial effect of SMB factor, whereas the one of the benchmark by the exposure to big caps and thus negatively correlated to the same factor.

The market beta coefficients are very similar to the ones under the CAPM, whereas the R-squared has considerably increased. In fact, the explanatory power of the model has improved from 0.9779 to 0.9899 for the EM funds and from 0.8816 to 0.9220 for the benchmark. This indicates that the FF3F model does a better job in explaining the observed data.

7.3.5.3 Carhart Four-Factor Model

Under the CA4F model the following coefficients have been estimated (Table 21). The tendency for the EM funds of showing a positive alpha, and for the benchmark of showing a negative one, has not changed, leading to the rejection of Hypothesis 1 that states that active funds should not be able to outperform passive

Carhart Four-Factor Model Recovery 2	EM Funds	Benchmark
Rm - Rf	0.9981 (0.0000)***	1.0613 (0.0000)***
SMB	0.0505 (0.2740)	-0.1400 (0.6120)
HML	-0.2707 (0.0000)***	-0.3603 (0.0490)**
WML	-0.1067 (0.0100)**	-0.0992 (0.0980)*
α	0.0031 (0.0270)**	-0.0086 (0.1140)
R^2	0.9979	0.9242

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Table 21 - CA4F model for the Recovery period 2 – 15 observations
Source: author´s own work

ones. However, the EM funds exhibit the highest alpha of all periods and interestingly it is also significant at 5 percent confidence level. This suggests that, in support of Hypothesis 2 and 4, the EM funds are able to outperform the market by a monthly average alpha of 0.31 percent, over the last recovery period.

In terms of the HML factor, the negative correlation to it of both portfolios is still determined by their exposure into growth stocks. Such factor it is highly statistically significant for the EM funds at 1 percent confidence level, whereas for the benchmark at 5 percent level. SMB factor coefficients also continue to signalize the same tendency as before but for both portfolios the null hypothesis cannot be rejected in favour of the alternative. Furthermore, the coefficients of the WML factor are for the first time negative and statistically significant. The EM funds holds a WML coefficient of -0.1067, whereas the benchmark of -0.0992, indicating that the over-or-underperformance of both portfolios produced during this period, was not positively correlated to the broader market momentum. Every time the market momentum factor would move upward of 1, the funds would move downward of 0.1067 and the benchmark of 0.0992. Despite the Covid-19 pandemic still spreading around the world, the stock market was ramping at the highest valuations, and that has probably caused some scepticism between active managers in joining the momentum. On the other hand, does not come as a surprise that the benchmark is not positively correlated to the momentum in the market, since it is a passive fund and those are known to not be trading often or adjusting after market conditions. The market beta coefficient has not changed much compared to FF3F model and the CAPM. Differently, the R-squared coefficients are at their highest for both the EM funds (0.9979) and for the benchmark (0.9242). That confirms once again that the CA4F model is the best model to explain the observed data.

7.4 Key Takeaways

To summarize the results, Appendix E proposes an outlined version of them. Hence, based on the analysis the following conclusions can be drawn.

Hypothesis 1: rejected. Looking at the performance of both portfolios during the entire sample period one can conclude that active funds do outperform passive ones. In particular, the alpha produced by the active funds cannot be said to be statistically significantly different from zero, under any of the factor models. That means that active funds do not out-nor-underperform the market. However, the passive fund produces a negative alpha of -0.0042, which is statistically significant, under all three factor models. Therefore, relatively, active funds outperform the passive fund by -0.0042 percent during the sample period.

Hypothesis 2: rejected. During the entire sample period, EM funds show an alpha that is zero or negative, which in both cases it is statistically not significantly different from zero. That means that managers who practice active management within EM are not able to produce abnormal returns during the observed period.

Hypothesis 3: rejected. In Recession 1, the alpha produced by active funds is negative and not statistically significantly different from zero (-0.0015) when estimated under the CAPM; whereas, it becomes negative and statistically different from zero at 5 percent confidence level, under the FF3F (-0.0022) and the CA4F models (-0.0023). Furthermore, in Recession 2, under all three estimation models, the active funds obtain an alpha coefficient that is positive though not statistically significant. That means that in none of the recessionary periods active funds outperform the market.

Hypothesis 4: inconclusive. The results from Recovery 1 display alpha being slightly positive, under the CAPM and the FF3F model, however not statistically significant. Under the CA4F model, alpha becomes negative, but still not statistically significant. On the other hand, Recovery 2 shows slightly positive and not statistically significant alpha under CAPM and the FF3F model, which becomes positive (0.0031) and statistically significant at 5 percent confidence level, under the CA4F model. That means that EM funds are able to obtain abnormal return in one out of two recovery periods.

8. Discussion

This section takes the results under discussion. Additionally, few perspectives that have not been taken into consideration in this paper, but relative to its analysis and results, are set out. At the end of the section are also reported further possible research that were inspired by the present study.

8.1 Results and possible drivers of results

This paper aimed to investigate the performance of actively managed emerging market funds. First, and in the view of the market equilibrium outlined by the EMH (Fama E. F., 1991), the active funds are not supposed to produce superior return relative to passive funds. Secondly, since absence of arbitrage opportunities of the same EMH relies on markets being efficient (Fama E. F., 1991), one can speculate that in inefficient markets like EM, skilled active managers should be able to produce abnormal returns. Results under the Carhart (1997) four-factor model (the model with the highest explanatory power) show that over the period from August 2015 to June 2021, the EM funds have not been able to produce any abnormal return, while performance would vary between sub-periods. Same results have been documented by Gottesman & Morey (2007) and Kiymaz (2012), to name a few, who investigated the performance of diversified EM funds in the periods from 1997 to 2003 and from 2000 to 2011, respectively (Gottesman & Morey, 2007) (Kiymaz, 2012). Nevertheless, the same funds have been outperforming the passive fund relatively over the entire period, by 0.0042%.

There are few possible reasons for the absence of abnormal returns to occur. Hili et al. (2016) suggest that those active managers who do not obtain abnormal returns might hold an Active share that is too low. In fact, the Active share is the measure of deviation from the market index, and when it is too low the performance of their portfolio would closely follow the one of the market. Alternatively, along with Basu & Huang-Jones (2015), they speculate that EM might be no longer less informationally efficient compared to other markets, leading to no more mispricing to exploit (Hili, Pace, & Grima, 2016) (Basu & Huang-Jones, 2015). Additionally, Basu & Huang-Jones (2015) suggested that the incapacity to produce returns above the market could be due to the fact that if active managers are domiciliated in developed markets and the portfolio is run by foreign managers, they are at disadvantage in discovering and exploiting unpriced stocks in EM (Basu & Huang-Jones, 2015). That could be plausible in respect of the results of this study, since all funds of the sample are

denominated in USD and therefore located in developed markets. Furthermore, Michelson et al (2008), who documented the performance of EM funds between 1999 and 2005, found that those funds which turnover ratio is low and fund size is large are the ones performing the best in their sample. Given that the portfolio turnover of a portfolio is said to be low when it is below 30% (Petajisto, 2013), the reason for the absence of abnormal returns from the funds of the present sample could be that the average fund holds a turnover which is over 65%, therefore too high (Michelson, Philipova, & Srotova, 2008). However, that is an odd conclusion, since active managers are known to display superior performance thanks to their greater trading activity, in comparison to passively managed funds (Michelson, Philipova, & Srotova, 2008). Kiymaz (2015), who studied the performance of Chinese mutual funds, documented a positive correlation between the fund´s fees and its performance, implying the higher the fees the better the performance (Kiymaz, 2015). The absence of abnormal returns from the funds of this study might find some ground on that. In fact, the average expense ratio of the top ten worldwide EM funds of 2021 is 1.4% per annum (Jain, 2021), whereas the average annual expense ratio of the sample of this study is lower, at about 0.9%, implying that if the average fund does not show to perform well might due to the fact that the sample is comprised of those funds which fees are low.

8.1.1 Risk factors

An interesting result to lay out is the volatility showed by the EM active versus the passive fund. The volatility, measured by the market beta coefficient, and under Carhart (1997) four-factor model, showed in most of the periods under analysis a lower value for the active funds than for the benchmark. During the entire period the two portfolios' volatility have almost the same, whereas during both Recovery 1 and 2, as well as during Recession1, the benchmark showed slightly higher volatility compared to the active funds. The insights on Modern Portfolio Theory by Markowitz (1952) suggests that diversification has a beneficial impact on the risk of the portfolio, ultimately reducing it (Markowitz H. , 1952). One can therefore speculate that the lower risk inherent the average active fund compared to the benchmark, is due to greater diversified allocation of its portfolio. By looking at the geographical and sectorial exposure of both portfolios (Section 6.1.3), it is clear how the portfolio of the active funds is more diversified. As of geographical exposure, and to mention few examples, China is the biggest weights for both and counts to 34% of the entire exposure of the passive benchmark, whereas counts to 24% for the average active fund. The allocation to Taiwan accounts to 16% for the benchamrk and 12% for the average active fund. In general, the weights of

the active funds are less concentrated than those of the benchmark, allowing for greater diversification across countries and sectors. Furthermore, despite the volatility of active funds being lower than the one of the benchmark, it also shows to be very close, if not slightly higher, than the volatility of the market. Given that, during the period under analysis the active funds have not produced any statistically significant alpha, and the risk level has been close to be the same as the one of the market, the promising added value of active management is questioned. This implies that diversification might be the only benefit provided by EM funds. The same conclusion was drawn by Basu & Huang-Jones (2015). Arguably, the benefit derived by the diversification when adding emerging markets to one's portfolio might soon not be as tangible anymore as it was before 1993, due to the advancing process of financial liberalization (Basu & Huang-Jones, 2015) Nevertheless, according to the EM Investment Specialist of Schroder & Co. Ltd, an English asset manager holding 574.4 billion GBP in assets under management, the benefits of active management within EM are not limited to diversification anymore. In fact, the recent and growing importance of ESG practices and standards, makes the scrupulosity of active mangers useful when the selection of stocks in emerging markets is concerned (Rymer, 2018).

In terms of size, style and momentum factors, the results under the Carhart (1997) four-factor model show that the only statistically significant factor that influences the performance of the active funds during the sample period is the style factor. Meaning that, averagely, between the period 2014 and 2021, if the portfolio of the spread between high-book to market equity value stocks and low-book to market stocks were to move upward, the EM funds' portfolio would have gone in the opposite direction. That also implies that the trend documented by Chan & Chen (1991), for which the value stocks would outperform growth stocks, is not applicable within the EM universe during the study period, due to the prevalence of opportunities among growth stocks compared to value stocks (Chan & Chen, 1991). Even if Cakici et al. (2013) have documented strong value and momentum effects in EM, their analysis was computed over the period from 1990 to 2011. It might be that from 2014 onward the value factor trend has not more occurred.

8.1.2 Sub-periods

The performance of EM funds during the sub-periods have been for the most a disappointment. Under the Carhart (1997) four-factor model, the only period for which the funds had witnesses abnormal returns is the second and last period of recovery, that is during the post Covid-19 pandemic crisis. The alpha showed a positive value of 0.0031 and statistically significant. However,

during that particular sub-period the whole market had performed greatly, despite the high uncertainty surrounding the pandemic. In fact, the stock market was even considered overvalued by 33%, due to stocks reaching excessively pricey levels (Tully, 2021). Thus, these results arise some scepticism over the skills of active managers. In fact, skilled fund managers are generally expected to be able to correctly adjust their portfolio anticipating the movements in the market, independently if it is a bear or bull market. The conclusion reported in this paper supports the findings of the study outlined by Basu & Huang-Jones (2015), who investigated the funds during the crisis occurring between 2008 and 2010 (Basu & Huang-Jones, 2015). A plausible reason for the recurrence of underperformance during recessionary times might be the great and sudden outflow of capital that emerging market funds would experience during uncertainty times. That is when investors sell off risky assets all together in search of more stable and liquid assets in developed markets during uncertain times (Basu & Huang-Jones, 2015), lowering the NAV of the fund at once.

When the active funds are compared to the passive benchmark, results vary. During the first recession, active funds underperform relative to the benchmark, whereas during the second one they outperform. During both recoveries, active funds perform better than the benchmark. One could presume the outperformance of active funds is given by the positive correlation to the momentum factor, but that showed not to be the case since during the second recovery the funds were statistically significantly negatively correlated to it.

8.2 Emerging Markets vs Developed Markets

As the EMH affirms, the market when in equilibrium precludes active managers in their exploitation of unpriced stocks, since every single stock is already instantly priced in at every new information the market receives (Fama, 1991). The results provided by this paper infer then that EM might be close to reach the status of market equilibrium, because 80 percent of the time the portfolio comprised of 186 EM funds do not obtain any excess return above the market. Nevertheless, when EM are compared to developed markets, it is undoubtful that the formers are still politically and capitally unstable (Risso, 2009), and that eventually affect the companies located in those areas. In the context of financial markets, those stocks are in fact perceived to be riskier than those from the developed areas of the world (Henisz & Zelner, 2010). Kiymaz and Simsek (2017) reported the standard deviation of the S&P 500 Index and MSCI Emerging Markets Investable Index between 2000 and 2017, and while the first shows a standard deviation of 14.7%, the second one is 22.2% (Kiymaz & Simsek, 2017). In that regard, the EMH also affirms that investors can earn superior

returns if they engage in riskier assets (Fama, 1991). Therefore, the assets from EM should provide investors with a risk premium, and that should make the return higher than the return provided by assets in developed markets. Besides, since developed markets are considered as efficient as a market can be today (Risso, 2009), the expectation is that that funds invested in the developed part of the world would not be able to produce any return above the market (Fama, 1991).

In the attempt to tackle this angle, the performance of the portfolio of 186 EM funds has been compared to the performance of an average actively managed equity fund invested in developed countries, during the same period and sub-periods. Since the chosen fund had to be comparable to the average fund of this study, few main characteristics had to overlap, i.e. being tailed towards small caps and growth style. The chosen fund is the JPMorgan SMID Cap Equity I ('DM fund' henceforth), and it has been regressed against the developed markets-factor to check for their alphas. All factors for the estimation models have been collected from Kenneth R. French´s data library (French, Kenneth R. French - Data Library, 2021). The methodology used to do this follows the same as the one previously used in the performance analysis of this paper. Table 23 displays the results for the DM fund, which are compared to the portfolio of the EM funds. Only the results (in decimals) under the Carhart (1997) four-factor model are displayed, since it is the model showing the highest R-squared for both portfolios.

	SAMPLE PERIOD - 83 obs		RECESSION 1 - 19 obs		RECOVERY 1 - 23 obs		RECESSION 2 - 26 obs		RECOVERY 2 - 15 obs	
CAR4F	EM Funds	DM Fund	EM Funds	DM Fund	EM Funds	DM Fund	EM Funds	DM Fund	EM Funds	DM Fund
Rm - Rf	0.9984 (0.0000)***	1.0868 (0.0000)***	0.9455 (0.0000)***	0.8181 (0.0000)***	0.9953 (0.0000)***	0.9988 (0.0000)***	1.0238 (0.0000)***	1.2132 (0.0000)***	0.9981 (0.0000)***	0.9773 (0.0000)***
α	-0.0001 (0.8440)	-0.0013 (0.4960)	-0.0023 (0.0320)**	-0.0021 (0.6550)	-0.0006 (0.6990)	-0.0025 (0.5650)	0.0009 (0.5690)	-0.0014 (0.6740)	0.0031 (0.0270)**	0.0008 (0.9270)
R^2	0.9874	0.8875	0.9912	0.8362	0.9851	0.7045	0.9866	0.9601	0.9979	0.8347

*p-value < 0.1, significant at 10% level; **p-value < 0.05, significant at 5% level; ***p-value < 0.01, significant at 1% level.

Figure 23 - Overview of the regressions performed under Carhart four-factor model for the DM fund, compared to the EM funds, for the entire sample period and sub-periods
Source: author´s work

Results show that during August 2014 and June 2021, even if both alphas are negative and statistically insignificant, EM funds outperform the DM fund by 0.12 percent, relatively. It seems that the exposure to EM played more defensively than the one in developed markets. Further, the market beta coefficient is 0.9984 for EM funds and 1.0868, indicating that the latter are more volatile than both the EM funds and the market. This result does not support the argument expressed above, for which the engagement in riskier assets produces superior returns (Fama, 1991). However, looking at the sub-periods, further details emerge. During recessionary times, conclusions are mixed. In particular, during Recession 1, the DM fund outperformed EM Funds, while exhibiting lower

volatility; whereas during Recession 2, the EM funds are those outperforming the counterpart and exhibiting lower volatility. During recoveries the situation is more defined, for which in general EM funds outperform the DM fund, relatively. During the second recovery, the period for which the whole market performed greatly, the EM funds outperformed the counterpart by 0.31 percent – if we count that only for EM funds the alpha is statistically significant. Since in this period the market beta coefficient is higher for EM funds, one could say that in this particular case, the EMH paradigm (Fama, 1991) for which higher the risk higher the return, holds.

Overall, even though the evidence here reported does not definitely conclude that the riskier asset produces the riskier return, the EMH can be said to be partially holding. That is because of all periods under analysis, DM fund have not showed once to producing abnormal returns, which supports the EMH rational stating that in efficient markets the practice of active management does not serve managers in their search for alpha. The same conclusion was documented by Basu & Huang-Jones (2015). In the case of inefficient markets, it can be concluded that active managers might witness mispricing opportunities but that those are very few – and probably temporary (Fama, 1991). The outperformance of emerging markets funds over developed ones has been documented by other authors as well (Huij & Post, 2011).

8.3 Further research

The present research while it has produced new knowledge on the topic, it also has confirmed the underperformance of those portfolios invested in emerging markets through both active and passive management. Even if in the last recovery period the active funds have obtained a positive alpha of 0.31 percent, that could be only because that particular period at the time of the analysis has not ended yet. To obtain a more valid conclusion, the same analysis should be conducted when the sub-period Recovery 2 has ended as well. This could also be extended to the analysis of persistence of returns, with the aim to further investigate the performance.

With respect to the EM funds included in the sample and their performance over the period under analysis, further insights may be explored. In fact, certain funds´ characteristics have been found to be particularly influential in their performance (Basu & Huang-Jones, 2015) (Hili, Pace, & Grima, 2016) (Michelson, Philipova, & Srotova, 2008). Therefore, management fees, fund size, manager tenure, the type of geographical as well as sectorial exposure, active share, turnover ratio and so forth, could be examined in their relationship with the returns.

Furthermore, the multifactor models used in this research have taken into consideration risks such as market, size, value, and momentum risks. However, emerging markets are subjected to other different risks, for example the political risk. Considering that, it could be interesting to insert political risk, or natural disaster risk, in the regressions run under the different estimation models.

9. Conclusion

This study provides an analysis of active diversified emerging market equity mutual funds (EM Funds) during August 2014 and June 2021. The fund managers are examined in their ability to produce abnormal return (alpha) as well to outperform a passive counterpart. Emerging markets differ from developed markets because of their undeveloped and unstable political and capital system (Mody, 2004), which leads to information asymmetries. Therefore, EM Funds provide managers and investors with an opportunity not only to diversify their portfolio with the exposure to an alternative asset class, but also to exploit mispricing and obtain abnormal returns. The sample is comprised of 186 active EM Funds, whereas the passive fund is represented by the MSCI Emerging Market Index. The funds' performance has been analyzed by employment of regression-based models, those being CAPM, Fama French (1993) three-factor and Carhart (1997) four-factor models, for which the latter has been found to be the most appropriate fit for the data analyzed.

Findings show that EM Funds fail to provide positive and statistically significant alpha on a monthly basis, over the observed period. However, the same funds outperform relatively the passive counterpart. The passive fund in fact underperforms both the EM Funds and the market by a monthly 0.42 percent. Surprisingly, during the period, the volatility concerning the EM funds seemed to be very similar or slightly lower than the one of the market and the passive fund. By splitting the sample period in sub-periods, the performance has been further investigated during two recessions and two recoveries in the economy. Results suggest that EM funds are not able to generate alpha in either recessionary or recovery times, in exception for the second recovery for which they obtained a statistically significant alpha of 0.031 percent. In relation to the passive fund, the EM funds have constantly and relatively outperformed it, for exception of the first recovery where they have underperformed it by 0.12 percent, on a monthly basis.

These results have few implications for investors. Despite the slight and relative added value which active managers seem to bring in comparison to an Index fund or an ETF, these do not appear to be generating absolute positive returns for investors.

In the context of emerging markets, besides the questionable economical advantage of this asset class, there might be a few more incentives for still considering it. As different authors agreed upon, diversification seems to be the very first benefit. Second, since these funds have obtained absolute return during an economic recovery, it might be beneficial to consider their exposure in those circumstances when the market is booming. Thirdly, with the growing importance of ESG practices and standards might be beneficial to have a dedicated and scrupulous manager to take care of the stock selection within the emerging markets.

Bibliography

Alexander, C. (2008). *Quantitative Methods in Finance - Market Risk Analysis I.* England: John Wiley & Sons Ltd.

Atilgan, Y., Demirtas, K. O., & Simsek, K. D. (2015). Studies of Equity Returns in Emerging Markets: A Literature Review. *Emerging Markets Finance and Trade*, 757-773.

Bacon, C. R. (2019). *Performance Attribution: History and Progress.* CFA Institute Research Foundation.

Banz, R. W. (1981). The relationship between return and market value of common stocks. *Journal of Fmanctal Economtcs*, 3-18.

Barry, C. B., Peavy III, J. W., & Rodriguez, M. (1998). Performance Characteristics of Emerging Capital Markets. *Financial Analysts Journal, 54*(1), 72-80.

Basu, A. K., & Huang-Jones, J. (2015). The performance of diversified emerging market equity funds. *Journal of International Financial Markets, Institutions & Money*, 116-131.

Basu, S. (1983). The Relationship between Earnings Yield, Market Value, and Return for NYSE Common Stocks: Further Evidence. *Journal of Financial Economics*, 129-156.

Białkowski, J., & Otten, R. (2011). Emerging market mutual fund performance: Evidence for Poland. *North American Journal of Economics and Finance*, 118-130.

Blitz, D., Pang, J., & Vliet, P. v. (2013, April). The Volatility Effect in Emerging Markets. *Emerging Markets Review, 16*, pp. 31-45.

Bodie, Z., Kane, A., & Marcus, A. J. (2014). *Investments.* Maidenhead (Berkshire): McGraw-Hill Education.

Cakici, N., Fabozzi, F. J., & Tan, S. (2013). Size, value, and momentum in emerging market stock returns. *Emerging Markets Review*, 46-65.

Carhart, M. M. (1997, March). On persistence in Mutual Fund Performance. *The Journal of Finance, LII*(1), 57-82.

Chan, K. C., & Chen, N.-F. (1991, September). Structural and Return Characteristics of Small and Large Firms. *The Journal of Finance, 46*(4), 1467-1484.

Chan, L. K., Hamao, Y., & Lakonishok, J. (1991, December). Fundamentals and Stock Returns in Japan. *The Journal of Finance, XLVI*(5), 1739-1764.

Cremers, K. J., & Petajisto, A. (2009). How Active Is Your Fund Manager? A New Measure That Predicts Performance. *The Review of Financial Studies*, 3329-3365.

Duggan, W. (2019, February 26). This Day In Market History: The First Emerging Market Equity Fund Launches. *Yahoo Finance*.

Dutt, R. (2016, December 26). Five events that shook world economy in 2016.

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

Estrada, J. (2000). The cost of equity in emerging markets: A downside risk approach. *Emerging Markets Quarterly, 4*, 19-30.

Fama, E. F. (1970, May). Efficient Capital Markets: A Review of Theory and Empirical Work. *The Journal of Finance, 25*(2), pp. 383-417. Retrieved from http://www.jstor.com/stable/2325486

Fama, E. F. (1991, December). Efficient Capital Markets: II. *The Journal of Finance, XLVI*(5), 1575-1617.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics*, 3-56.

Fama, E. F., & French, K. R. (1996, March). Multifactor Explanations of Asset Pricing Anomalies. *The Journal of Finance, 51*(1), 55-84.

Fama, E. F., & French, K. R. (2004). The Capital Asset Pricing Model: Theory and Evidence. *Journal of Economic Perspectives, 18*(3), 25–46.

Filis, G. (2006). Testing for Market Efficiency in Emerging Markets: Evidence from the Athens Stock Exchange. *Journal of Emerging Market Finance*, 121-133.

Fortin, R., & Michelson, S. (2005). Active International Mutual Fund Management; Can Managers Beat the Index? *Managerial Finance, 31*(1), pp. 41-51.

French, K. R. (2021, December 09). *Kenneth R. French*. Retrieved from mba.tuck.dartmouth.edu: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

French, K. R. (2021, December 09). *Kenneth R. French - Data Library*. Retrieved from mba.tuck.dartmouth.edu: http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html

Geert, B., & Campbell R., H. (2003, February). Emerging markets finance. *Journal of Empirical Finance, 10*(1-2), pp. 3–55.

Gottesman, A. A., & Morey, M. R. (2007). Predicting Emerging Market Mutual Fund Performance. *The Journal of Investing*, 111-122.

Griffin, J. M. (2002). Are the Fama and French Factors Global or Country Specific? *The Review of Financial Studies, 15*(3), 783–803.

Griffin, J. M., Kelly, P. J., & Nardari, F. (2009). *Are Emerging Markets More Profitable? Implications for Comparing Weak and Semi-Strong Form Efficiency.* EFA 2007 Ljubljana Meetings Paper, AFA 2008 New Orleans Meetings Paper. doi:http://dx.doi.org/10.2139/ssrn.959006

Gumanti, T. A., Sutrisno, B., Andreas, A., & Bernardus, D. (2017). Empirical Study of Fama-French Three-factor Model and Carhart Four-factor Model in Indonesia. *SSRN Electronic Journal*, 1-14.

Gupta, A. (2021, November 25). *Evolution of Emerging Markets*. Retrieved from msci.com: https://www.msci.com/insights-gallery/evolution-of-emerging-markets

Habeeb, W. M. (2013). *Africa: Facts & Figures.* Philadelphia, US: Mason Crest.

Henisz, W. J., & Zelner, B. A. (2010, April). The hidden risks in emerging markets. *Harvard business review, 88*(4), pp. 88-95.

Hili, J., Pace, D., & Grima, S. (2016). Equity Mutual Fund Performance Evaluation: an Emerging Market Perspective. In *Contemporary Issues in Bank Financial Management (Contemporary Studies in Economic and Financial Analysis, Vol. 97)* (pp. 93-132). Bingley: Emerald Group Publishing Limited.

Hoepner, A. G., Rammal, H. G., & Rezec, M. (2011). Islamic mutual funds' financial performance and international investment style: evidence from 20 countries. *The European Journal of Finance*, 829–850.

Huberman, G., & Kandel, S. (1987, September). Mean-Variance Spanning. *The Journal of Finance, 42*(4), 873-888.

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

Iglesias, S. P. (2021, October 20). Bolsonaro Accused of Crimes Against Humanity in Covid Probe. *Bloomberg*.

IMF. (2021, June). A Quarterly Publication of the International Monetary Fund. (G. Bhatt, Ed.) *Finance & Development, 58*(2).

iShare - by BlackRock. (2021, December 10). *iShares Core S&P Small-Cap ETF* . Retrieved from ishares.com: https://www.ishares.com/us/products/239774/ishares-core-sp-smallcap-etf

Jain, A. (2021, April 22). These Are The Top Emerging Markets Mutual Funds. Yahoo Finance. Retrieved from:https://finance.yahoo.com/news/top-emerging-markets-mutual-funds-143846255.html?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAALQk-6qs7MloPFWnZq4moxQiVteW6T_6o8MV-bpref9jLDKQTMFVgfwyyW0ZibrKIRG34A3qwwdrrj15ZcZtC_nf5BSljU

Jensen, M. C. (1968, May). The Performance of Mutual Funds in the Period 1945-1964. *The Journal of Finance, 23*(2), 389-416.

Jensen, M. C. (1969, April). Risk, The Pricing of Capital Assets, and The Evaluation of Investment Portfolios. *The Journal of Business, 42*(2), 167-247.

Johnson, B. (2021, January 26). *Morningstar.com.* Retrieved from Morningstar: https://www.morningstar.com/articles/1018645/the-dramatic-evolution-of-emerging-markets

Joop, H., & Thierry, P. (2011). On the performance of emerging market equity mutual funds. *Emerging Markets Review*, 238-249.

Jung, J. W. (2017). *The Impact of Trade Liberalization in Africa.* Sejong-si, Korea: KIEP.

Kaminsky, G. L., Lyons, R. K., & Schmukler, S. L. (2001). Mutual Fund Investment in Emerging Markets : An Overview. *The World Bank Economic Review, Vol. 15, No. 2 (Oxford University Press)*, 315-340.

Kiymaz, H. (2012). Performance of Emerging Market Diversified Equity Funds. *International Journal of Social Sciences and Humanity Studies, IIII*(2), pp. 255-264.

Kiymaz, H. (2015). A performance evaluation of Chinese mutual funds. *International Journal of Emerging Markets*, 820-836.

Kiymaz, H., & Simsek, K. D. (2017). The performance of US-based emerging market mutual funds. *Journal of Capital Markets Studies*, 58-73.

Krauss, C., & Eavis, P. (2015, January 5). Oil´s Fall Continues into 2015, and Stock Markets Shudder. Houston, United States: The New York Times. Retrieved January 2, 2021, from https://www.nytimes.com/2015/01/06/business/oils-fall-continues-to-below-50-a-barrel.html

Li, N., & Lin, C. Y. (2011). Understanding emerging market equity mutual funds: The case of China. *Financial Services Review*, 1-19.

Lo, A. W. (2008). Efficient Markets Hypothesis. *The New Palgrave Dictionary of Economics*.

Low, S.-W. (2007). Malaysian unit trust funds' performance during up and down market conditions - A comparison of market benchmark. *Managerial Finance*, 154-166.

Malkiel, B. G. (1973). *A Random Walk Down Wall Street.* W. W. Norton & Company, Inc.

Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, *VII*(1), 77-91.

Markowitz, H. M. (1999). The Early History of Portfolio Theory: 1600–1960. *Financial Analysts Journal*, 5-16. doi:10.2469/faj.v55.n4.2281

Mee, K. (2021, December 15). *Where is the value in emerging market equities?* Retrieved from schroders.com: https://www.schroders.com/en/us/professional-investor/insights/equities/where-is-the-value-in-emerging-market-equities/

Meyer, K. E., & Grosse, R. (2018, September). Introduction to Managing in Emerging Markets. *The Oxford Handbook of Management in Emerging Markets*, pp. 1-56. doi:10.1093/oxfordhb/9780190683948.013.1

Michelson, S., Philipova, E., & Srotova, P. (2008). The Case For Emerging Market Funds. *Journal of Business & Economics Research*, 81-88.

Mody, A. (2004). *What Is an Emerging Market?* IMF, Research Department. International Monetary Fund.

Morningstar . (2021, November 22). *Emerging-Markets Funds*. Retrieved from morningstar.com: https://www.morningstar.com/best-investments/emerging-markets-funds

MSCI. (2021, December 8). *Emerging Markets - Emerging Markets Index Fachsheet.* Retrieved from msci.com: https://www.msci.com/our-solutions/indexes/emerging-markets

Muzinich & Co. (2021, December 10). *Muzinich & Co.* Retrieved from muzinich.com: https://www.muzinich.com/

Nguyen, A.-N., Shahid, M. S., & Kernohan, D. (2018). Investor confidence and mutual fund performance in emerging markets - Insights from India and Pakistan. *Journal of Economic Studies*, 1288-1310.

O´Neil, S. K. (2021, December 3). Populism Has Killed Latin America´s Once-Powerful "Technopols". *Bloomberg*.

OECD. (2020, March). Global financial markets policy responses to COVID-19. Retrieved January 2, 2022, from https://www.oecd.org/coronavirus/policy-responses/global-financial-markets-policy-responses-to-covid-19-2d98c7e0/#section-d1e26

Ojah, K., & Karemera, D. (1999). Random Walks and Market Efficiency - Tests of Latin American Emerging Equity Markets: A Revisit. *The Financial Review*, 57-72.

Pedersen, L. H. (2015). *Efficiently Inefficient.* Princeton (New Jersey): Princeton University Press.

Petajisto, A. (2013). Active Share and Mutual Fund Performance. *Financial Analysts Journal*, 73-93.

Risso, W. A. (2009). The informational efficiency: the emerging markets. *Applied Economics Letters*, 485-487.

Rodríguez, J. (2007). A Portfolio's Country Exposure Management: The Case of Latin American Mutual Funds. *Emerging Markets Finance and Trade*, 5-18.

Rodriguez, J., & Torrez, J. (2008). Emerging markets mutual funds: regional exposure and stock selection ability. *Applied Financial Economics Letters*, 53-57.

Roser, M. (2013, December 9). *Economic Growth*. Retrieved 2021, from OurWorldInData.org: https://ourworldindata.org/economic-growth

Rudd, A. (1986). Portfolio Management. *Journal of Accounting, Auditing & Finance*, 242 - 252.

Rymer, A. (2018, September 26). Five charts that explain the case for emerging markets. London, United Kingdom.

Sekhon, M., & Sehgal, C. (2019, January 14). Emerging Markets Outpace Developed Markets in the Final Quarter of 2018. Franklin Templeton. Retrieved December 20, 2021, from https://emergingmarkets.blog.franklintempleton.com/2019/01/14/emerging-markets-outpace-developed-markets-in-the-final-quarter-of-2018/

Shaker, M. A., & Abdeldayem, M. M. (2018). Examining Asset Pricing Models in Emerging Markets: Evidence from Egypt. *Corporate Ownership & Control, 16*(1), 50-57.

Sharpe, W. F. (1966, January). Mutual Fund Performance. *The Journal of Business, 39*(1), 119-138.

Shiller, R. J., Fischer, S., & Friedman, B. M. (1984). Stock Prices and Social Dynamics. *Brookings Papers on Economic Activity*, 457-510. Retrieved from https://www.jstor.org/stable/2534436

Sipra, N. (2006). *Mutual Fund Performance in Pakistan, 1995-2004.* Lahore University of Management Sciences - Lahore: Centre for Management and Economic Research (CMER) - Working paper.

Sonehorn Global Partners. (2021, December 10). *Sonehorn Global Partners*. Retrieved from stonehornpartners.com: https://www.stonehornpartners.com/

Statista. (2021, November 20). *Rural poverty line across India in 2011-12, by state and union territories*. Retrieved from statista.com: statista.com/statistics/650045/rural-poverty-line-india/

The Economist. (2021, October 16). *Latin America's economies have an opportunity to grow*. London: The Economist Group Limited. Retrieved from https://www-economist-com.esc-web.lib.cbs.dk:8443/the-americas/2021/10/16/latin-americas-economies-have-an-opportunity-to-grow

Tkac, P. A. (2001). The performance of open-end international mutual funds. *Economic Review (Federal Reserve Bank of Atlanta), 86*(3), pp. 1-17.

Treynor, J. L. (1966). How to Rate Management Investment Funds. *Harvard Business Review*, 63-75.

Tully, S. (2021, February 8). 4 metrics show the stock market is now wildly overvalued—by as much as 33%. Retrieved from https://fortune.com/2021/02/08/stock-market-stocks-overvalued-robert-shiller-metrics-data/

Wagner, M., & Margaritis, D. (2017). All about fun(ds) in emerging markets? The case of equity mutual funds. *Emerging Markets Review*, 62-78.

Will, M. (2017, December 15). These are the charts that defined the global economy in 2017. UK: World Economic Forum. Retrieved December 20, 2021, from https://www.weforum.org/agenda/2017/12/these-are-the-charts-that-defined-the-global-economy-in-2017/

Wooldridge, J. M. (2013). *Introductory Econometrics: A Modern Approach, Fifth Edition.* South-Western: Cengage Learning.

Yahoo Finance. (2021, December 10). *Dow Jones Industrial Average (^DJI)*. Retrieved from finance.yahoo.com: https://finance.yahoo.com/quote/%5EDJI/?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAAKcxmdCoG7aAZmWQFgvY-q9Qn5iO-bGMBIB7-9F8u7G7SrYwn39UGKH3kr5uHELhpfdk1PqwvH5aARgg-EXGEWSnf0E1lY1ABnzEuOhhDPBRLhTMLTrHLZHu_DwEHv4RThxzW

Zaremba, A., & Czapkiewicz, A. (2016). Digesting Anomalies in Emerging European Markets: A Comparison of Factor Pricing Models. *Emerging Markets Review*, 1-15.