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ETFs versus Active Management in Emerging Debt. Who is the Winner?

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Abstract

The objective of this thesis is to see if active investment funds are able to outperform ETFs on emerging market debt. After a broad review of the literature, we analyze the monthly returns of 186 actively managed funds and 228 ETFs that focus on emerging market bonds between 2010 and 2020. Our results show that both ETFs and active funds underperform their corresponding benchmark, likely due to the high transaction cost of this asset class. On average, we observe that active funds are not able to beat their ETF counterparts, as they have lower abnormal returns and Sharpe ratio over our study period. However, the higher risk-adjusted return and lower minimum monthly return during Covid-19's sell-off support the idea of the active manager's ability to better limit the risk associated with the asset class, especially in volatile periods. We also find that active U.S. funds focusing on emerging market hard currency corporate bonds have managed to consistently outperform their passive counterparts. Finally, our results show that European ETFs have a lower tracking performance than US-based ETFs, as their market price is affected by the EUR/USD exchange rate and the decentralized structures of European financial markets.

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I would also like to express my gratitude to Raquel Da Fonseca Salvador for her moral support and advice on the structure, layout and results of this thesis.

Finally, as this thesis marks the completion of my master's degree, I deeply thank my parents for their moral and financial support throughout these five years of study.

"Clearly, giving the ability to make purchases by providing credit is, in and of itself, a good thing, and not providing the power to buy and do good things can be a bad thing. [...] The problem with debt arises when there is an inability to pay it back. Said differently, the question of whether rapid credit/debt growth is a good or bad thing hinges on what that credit produces and how the debt is repaid"

- Ray Dalio, Big Debt Crises

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1 General Introduction

Emerging market economies have grown tremendously over the past 40 years, now accounting for almost 50% of global GDP (Muller 2018). With more than 80 countries classified as emerging (Diment 2019), emerging markets have been the engine of global growth. In fact, the 18 fastest-growing emerging markets have experienced real GDP growth of at least 5% annually for the past 20 years (McKinsey Global Institute 2018). In addition to global trade, the development of debt markets have been one of the main pillars of this spectacular growth, allowing governments and companies to finance investment projects. This attractive growth combined with the stabilization of emerging financial markets in recent years has drawn the interest many foreign investors. Between 2000 and 2013, emerging countries attracted about $10 trillion of capital inflows, of which 20% was in stocks and bonds purchased by foreign investors (Kiymaz and Simsek 2017). This phenomenon was boosted by the current low-interest-rate environment in the developed world over the past 15 years as investors seek higher yields.

Throughout the history of emerging markets, the investment fund industry has been a major vector of foreign capital and helped many individual investors to get a piece of this growing pie. In 1780, France, Spain, and the Netherlands were the major investors in the nascent United States of America, and many different funds were created constituting the only way for investors to invest in developing countries (Ferri 2009). The idea was appealing to the public because it offered individual investors the opportunity to invest small amounts in profitable ventures with broad diversification to limit the risk. Today, the mutual fund industry manages more than $30 trillion in assets and remains an important source of capital for emerging markets alongside other in-

stitutional investors.

The investment fund industry is divided into two main philosophies: active and passive management, which differ in their view on market efficiency and are always in competition. Although passive management is the newer of the two strategies, its low cost and high performance have allowed it to grow significantly over the past 30 years, reaching 41% of the total investment fund industry by 2020 (Anadu et al. 2020). The rise of passive investment funds is one of the most hotly debated topics in the financial world today, as many investors are concerned about the potential impact it could have on the stability of financial markets. We have also seen the growth of passive funds focused on emerging market debt, as more and more indices and ETFs are created for this asset class. As emerging market bonds trade on market with lower liquidity, implying a lower market efficiency, we could expect active managers to exploit market anomalies and achieve higher returns than the market.

This expectation, combined with the very limited literature on the topic, led to our research question: **"ETFs versus active management in emerging debt. Who is the winner?**. To answer this question, we will first review the general literature on active and passive investing. Then, we will focus on emerging market bonds to better understand this complex asset class and see what the literature says about it. Finally, we will conduct our own studies comparing the performance of 186 actively managed funds and 228 ETFs focused on emerging market debt and compare our results to previously done studies.

2 Active and Passive Investment

2.1 Active and Passive Strategies

Market Vision and Objectives

The investment world is divided into two main investment philosophies: Passive and Active. This division has its roots in the different views that investors have about the market and the efficiency of its prices. The debate on market efficiency began in the 1900s, when L. Bachelier published his paper on the "Theory of Speculation", which explained how market prices change over time, but it took on a new dimension in the 1970s. In fact, the modern theory of efficient markets (EMH) is attributed to E. Fama in his article "Efficient Capital Markets: A Review of Theory and Empirical Work" published in 1970. According to the EMH theory, the market price at any given time reflects all available information and it is therefore impossible to obtain superior returns because no stock would be over or undervalued (Fama 1970).

Passive investors are firm believers in the EMH theory and claim that it is impossible to "beat" the market return over the long term because any market error would be directly corrected by arbitrage trading. In the book "Intelligent Investor" originally published in 1949, B. Graham describes the objectives and strategies that defensive investors (another word for passive) can use. According to Graham, the passive investor will minimize his or her effort by achieving market returns through a highly diversified portfolio (Graham et al. 2003). This strategy will allow the investor to minimize the risk taken and avoid stock picking mistakes. Passive investors make very few changes in their portfolio and often invest through index funds. These index

funds aim to provide broad market exposure by tracking a specific index (also referred as benchmark), such as the S&P500, at a low cost. Index investing has become very popular since the 2000s with the rise of exchange traded funds (ETFs), which are a unique fund structure that we will discuss in more detail later.

In contrast, active investors view the market as inefficient or partially inefficient, meaning that the price does not reflect all available information. Active investors try to achieve the so-called "alpha return" (a return above the market return) by exploiting market inefficiencies and short-term price fluctuations. For B. Graham, the active investor will spend more time and effort selecting attractive stocks (considered undervalued, for example) to build and update their portfolio. Although active investing is less diversified than passive investing, the higher return does not come from additional risk but rather from additional work by the investor (Graham et al. 2003). There are two main types of analysis investors use to achieve this abnormal return: fundamental analysis (finding stocks that are undervalued by the market) or technical analysis (timing the market based on past price levels and statistical models). Active investors need to have a good knowledge of the financial markets and most people who actively invest do so through mutual funds managed by professional portfolio managers.

The Different Strategies Used by Passive and Active Managers

Active Investment Strategies

In his book "Efficiently inefficient" (2015), L. H. Pedersen describes the different strategies an active investor can use to make abnormal returns. There are two ways investors can be compensated with higher returns than the market average. He can either be compensated by taking liquidity risk by buying assets at a discount because of the potential future trading cost or by having or creating information (Pedersen 2015). There are many different investment strategies used by active funds to make a profit based on these two principles. We can group most of them into three broad categories:

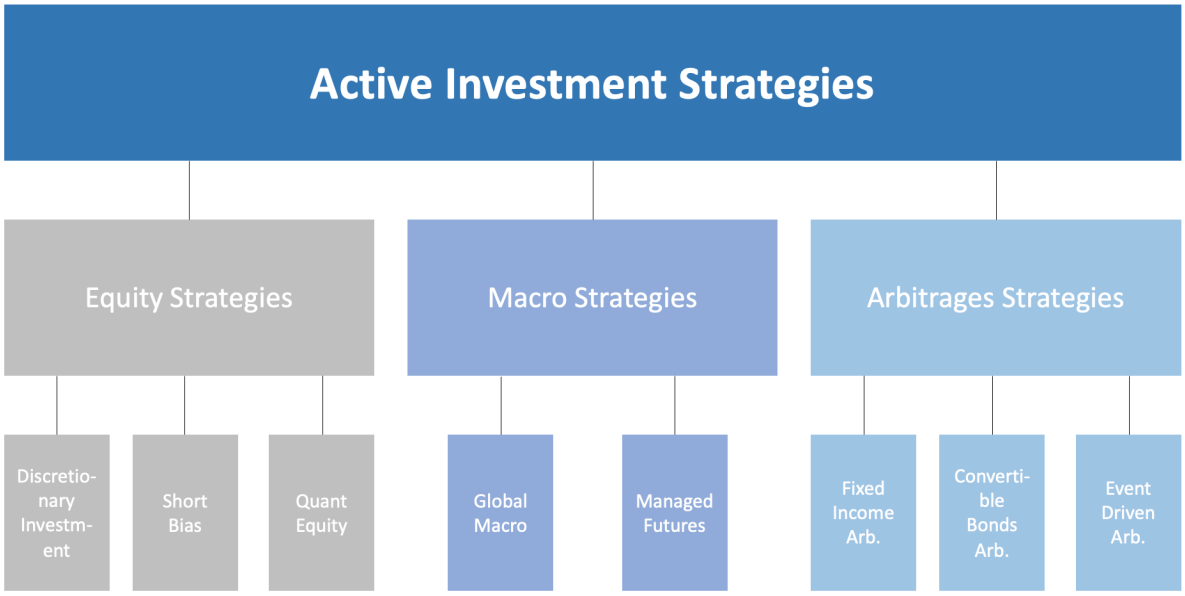


Figure 2.1: The different sources of abnormal returns (Pedersen 2015)

- **Equity Strategies:** These strategies are also often called "stock-picking strategies" and are based on finding stocks that are expected to outperform the market. "Discretionary investing" is probably the oldest and most widely used equity strategy, made famous by B. Grahams. Discretionary investors buy stocks based on their own analysis and view of the company's fundamentals. Since the 1980s, with the development of computers, quantitative equity strategies have been booming. They are also based on models and fundamental analysis, but the buying process is done by an algorithm rather than by human decisions (Pedersen 2015).

- **Macro Strategies:** Macro investment, or asset allocation, are strategies that deals with the allocation of money between different asset classes. These asset classes can be asset types (equities, fixed-income or derivatives), geographic regions, specific industries, currencies,... Macro investors focus on macro and economic trends rather than on information about a single company. Most funds that invest in Emerging Market (EM) debt use this type of strategies.

- **Arbitrage Strategies:** An arbitrage is, in theory, a risk-free profit made by buying at a low price and selling at a higher price without needing cash to initiate the

trade, also known as free lunch (Pedersen 2015). These market inefficiencies often occur as a result of the disparity in the price of an asset between two or more financial markets. Although free lunches are almost impossible to find, it is possible to identify price differences between two markets or equivalent assets. Arbitragers try to identify these market inefficiencies and hope that their trades converge to the realization of the arbitrage. Most arbitrage trades evolve liquidity or corporate events.

Passive Investment Strategies

As mentioned earlier, passive investors use long-term investment strategies in broadly diversified portfolios that are rebalanced on very rare occasions. The most common technique for passive investors is to invest in an index fund that tracks a specific market index. Originally created in the 19^{th} century as stock market indicators, indices were simple averages of the major stocks listed on particular stock exchanges. Today, market indices are defined by the SEC as a list of publicly traded securities "considered to represent a particular market or sector" (SEC.gov 2012) and selected according to a published methodology. Passive fund managers use three main strategies to replicate the performance of a market index (Ferri 2009):

- **Full Physical Replication:** This is the classic method where the fund holds all the assets that make up the index. This method is the most efficient in terms of tracking error[1] but, depending on the assets, this strategy can be costly or impractical.
- **Sampling Physical Replication:** With this strategy, the fund manager aims to replicate the index by investing in a representative sample of assets. This method is widely used by index funds that focus on illiquid assets where the transaction cost is significant.
- **Synthetic Replication:** Synthetic index funds are funds that replicate an index without holding any of the assets that compose that index. The replication is

[1] The tracking error is difference between the fund's returns and that of the benchmark

done through derivative contracts such as total return swaps (Naumenko and Chystiakova 2015). This strategy allows index funds to transfer liquidity risk to the counterparty of the contract (often a bank that must purchase the assets to hedge the contract) but it is replaced by a solvency risk (potential default of the counterparty). This strategy optimizes the cost of the fund since the entry fee to the swap contract is often lower than the trading cost incurred by physical replication (Dickson et al. 2013).

Most index funds that focus on emerging markets (EMs) debt use the sampling or synthetic replication strategy because of the lack of liquidity in these asset classes (see section: The Risk of EM Bonds).

2.2 Investment Funds Types

The Different Funds Structures

Regarding the SEC, an Investment Fund or Investment Company is " a company (corporation, business trust, partnership, or limited liability company) that issues securities and is primarily engaged in the business of investing in securities" (SEC.gov 2013a). The first investment fund was created in the Netherlands in 1774 to offer individual investors the opportunity to invest small amounts in profitable businesses with a high degree of diversification to limit the risk (Ferri 2009). Today, most people invest through investment funds because they don't have the time or knowledge to manage a diversified portfolio of such scale. Investment companies can be organized in many different forms, but they generally fall into one of the following three categories:

1. Close-end Funds:

This is the oldest structure used by investment funds, with the first U.S. closed-end fund created in the 1890s (called the Boston Personal Property Trust). Closed-end funds raise money by issuing a fixed number of shares to be traded on an exchange or

over-the-counter[2] (OTC). Because of its structure, the fund does not need to sell/purchase securities to meet redemptions or new subscriptions since the number of shares is determined (Ferri 2009). Some close-end funds have a fixed term (maturity date), which makes it easier to invest in highly illiquid assets such as private equity or real estate. However ,their limited number of shares means that the share price will fluctuate with the market and a spread may be created between the total value of the fund's underlying assets and its share price (Graham et al. 2003).

2. Open-end Funds:

To solve this price gap problem, a new structure called Open-end funds was created in the United States in 1924 with the "Massachusetts Investors Trust". These funds can redeem their shares and create new ones on demand, usually on a fixed date, allowing investors to withdraw directly from the funds at net asset value[3] (NAV). Due to their flexible amount, the shares of these funds are not traded on the market but bought or sold directly to the fund (Graham et al. 2003). This revolutionary structure quickly became the standard of the mutual fund in the U.S. when the amount of open-end funds quickly dethrone close end-funds. Today, it remains the most common structure used by investment funds and most of them use active investment strategies.

3. Exchanged Traded Funds:

ETFs are a hybrid version of the close-end and open-end structure. These funds can create or redeem shares while being traded on the stock exchange thanks to a unique liquidity system that minimizes the gap between its NAV and its market price. This structure was created primarily to optimize index funds and even today the vast majority of ETFs are passively managed. This structure is also more transparent than other mutual funds, as their holdings are disclosed daily (Ferri 2009).

[2]OTC markets are a decentralized form of financial market composed by a network of broker-dealers.

[3]The NAV is the sum of the value of all assets held by the fund less its liabilities.

Understanding ETFs Liquidity

The SEC and other financial regulators across the world allow ETF shares to trade on exchanges because of their arbitrage mechanism, which keeps the net asset value close to the ETF's price. These arbitrage trades are conducted by third parties, called Authorized Participants (APs), to avoid any conflict of interest with the fund's management company (Ferri 2009). APs are market makers[4], usually large banks, who compete for these risk-free trades within an ETF. This competition improves the efficiency of the process and reduces the risk of abusive trading practices.

APs play the most important role in the ETF creation and redemption process. In fact, these market makers exchange a basket of underlying assets equal to the previous closing NAV for an ETF creation unit with the ETF management company. APs received an ETF creation unit through a custodian bank which is equal to thousands of ETF shares, often close to 50,000 shares. Then, APs have the option of keeping the creation unit in their account and possibly trading it with other APs or splitting the creation unit and selling it to individual investors on the stock market (Ferri 2009).

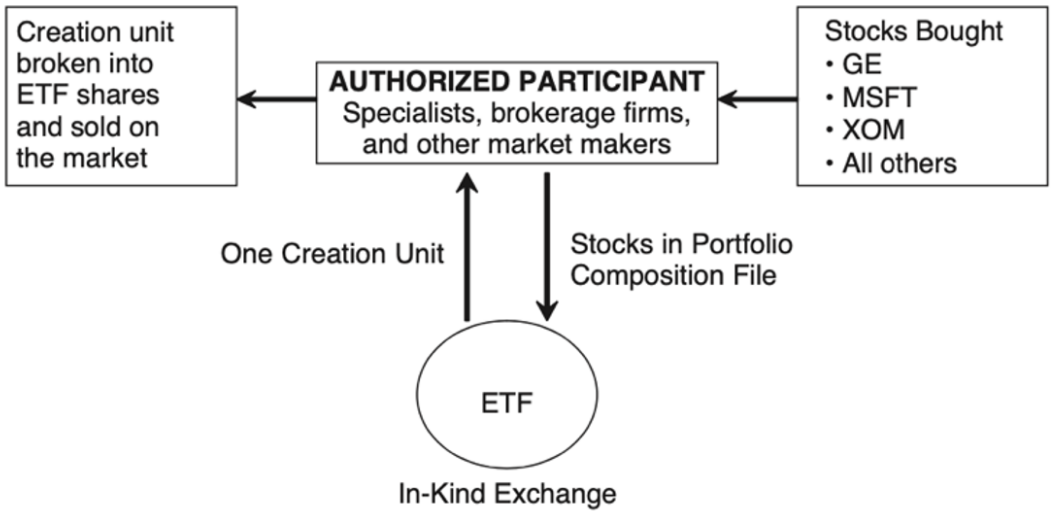


Figure 2.2: The creation process of ETF's shares (Ferri 2009)

[4]Market makers are entities that create liquidity in a market by buying and selling specific securities at any given time and making a profit on the bid-ask spread.

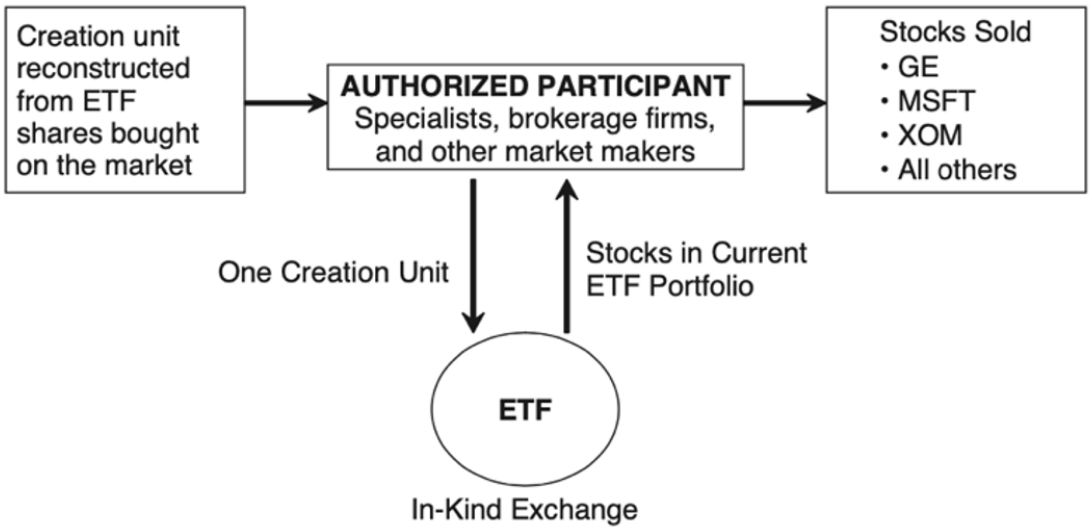


Figure 2.3: The redemption process of ETF's shares (Ferri 2009)

When the price of the ETF is trading at a premium (the price of the ETF is higher than its NAV), the creation process (see Figure 2.2) will lower the price of the ETF and aligns it with its NAV. In this process, APs purchase the underlying assets of the ETF that are needed to make up a creation unit. This basket of underlyings is then exchanged for a newly created creation unit that the APs can then split and sell to investors. In this process, the action of buying the underlying asset increases the fund's NAV and the action of selling the shares decreases their market price. By doing so, APs realize a risk-free return by buying the underlying securities at a lower price than the ETF unit sold at the end of the process. In the redemption process (see Figure 2.3), APs buy enough units of the ETF's shares to make a creation unit and exchange it for a basket of underlying assets that can then be sold on the market. This process increases the price of the ETF when it is traded at a discount (the price of the ETF is lower than its NAV).

In summary, there are two markets that constitute the liquidity of an ETF (Tortoise 2018):

- **Primary Market:** ETF primary markets are similar to mutual funds where shares are traded directly with the fund. This market is driven by the participation of

APs who trade "unit baskets" of assets for ETF shares (or the opposite).

- **Secondary Market:** In the secondary market, ETFs are similar to common stocks. All existing shares are traded between a buyer and a seller. Some market makers (other than APs) provide liquidity by buying and selling these shares benefiting from the bid-ask spread[5]. This liquidity is also called "screen" liquidity.

Fixed-income ETFs

As we will focus on Emerging Market fixed-income securities, it is important to understand the specifics of bond ETFs. Fixed-income ETFs invest in a pool of bonds of different maturities. The coupon payment is distributed frequently to investors or reinvested directly into the fund. These ETFs typically hold the bonds to maturity and the principal payment is used to purchase other bonds. On the other hand, it is more common for actively managed mutual funds to sell their bonds before they mature. However, investors should understand that bond funds are not as safe as owning bonds directly (Hill and Hougan 2015). Indeed, like traditional bond mutual funds, bond ETFs never mature meaning that no face value is guaranteed at the end. The only way to value bond ETFs is through their market price, which is influenced by supply and demand in the market.

Liquidity Problems of Bond ETFs

Fixed-income securities are not traded on centralized exchanges like equities, but on over-the-counter (OTC) networks operated by broker-dealer banks. OTC markets are less transparent than centralized exchanges and less liquid due to the smaller number of actors. As a result, fixed-income securities suffer from a higher bid-ask spread and some bonds do not trade for several days making it difficult to find a seller to unwind a position.

[5]The bid-ask spread is the difference between the buying price and the selling price of a tradable security

Because of this reduced liquidity and price transparency, the OTC price of bonds is not always a good indicator of their true price on the open market. Mutual funds and ETFs often use pricing models to find the true value of the bonds they hold (Hill and Hougan 2015). However, each institution uses its own models that give different results depending on the assumptions they make. Bond indices also use these models and the tracking error of an ETF can be higher if that ETF uses a different pricing method for computing its NAV than its index.

Finally, the lower liquidity of bonds results in a higher bid-ask spread which increases their transaction cost (90 basis points on average for high yield bonds) (Goldman Sachs 2018). Although ETFs pass on the transaction cost problem to APs during the creation/redemption process, ETFs will bear this transaction cost whenever their tracking index is rebalanced. A study by MSCI shows that high-yield ETFs suffer from a higher tracking error, ranging from 33 to 80 basis points for high yields bonds (versus a range of 1 to 6 basis points for equities), due to the higher bid-ask spread and the less accurate tracking strategy used in these markets (sampling replication) (Sparks 2018). In addition, many are concerned that the difference of liquidity between bond ETFs' holdings and their exchange-traded shares will increase the volatility of fixed-income securities.

The Benefit of Bond ETFs

Although some people are fearing the rise of bond ETFs, others believe that ETFs are improving bond markets liquidity.

Prior to the 2008 financial crisis, fixed-income liquidity was primarily provided by banks. The provision of liquidity imposed after the crisis made the role of banks as market makers for the many types of bonds too costly, leaving room for new players such as ETFs. This is especially true for corporate bonds for which ETFs hold $500 billion worth of assets, compared to $418 billion held by broker-dealers today (Tett 2020). Thus, the rise of ETFs has allowed liquidity to be maintained for some illiquid

markets, which traditional banks could not do anymore.

Because bond ETFs shares are traded on a daily basis on the market, their price is a better indicator than the bonds themselves, which are less liquid (Goldman Sachs 2018 and Hill and Hougan 2015). In fact, during market turbulence, some bond ETFs continue to trade while their underlying bonds are completely frozen providing additional liquidity to illiquid fixed-income markets.

2.3 The Rise of Passive Investing

Current Market Landscape

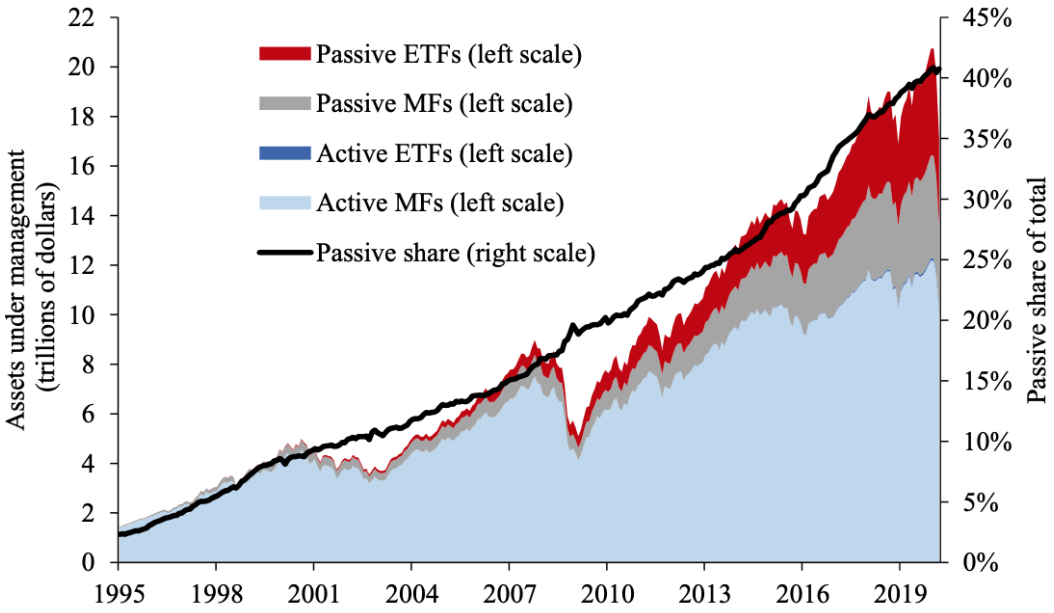


Figure 2.4: The mutual fund market evolution (Anadu et al. 2020)

The first ETF was launched in 1993 with total assets under management of $464 million. Since then, the number of ETFs has grown exponentially to a global value of $8.3 trillion, which represents more than half of the passively managed fund market (approximately $15 trillion) (Wigglesworth 2021). Passive investments accounted for

41% of the global mutual fund market in March 2020 (see Figure 2.4), up from just 10% in 2005 (Anadu et al. 2020). Yet, passive bond funds are growing more slowly and represent only 30% of the bond mutual fund market. In fact, only 21% of passively managed assets are in fixed-income (Wigglesworth 2021).

While some thought the next crisis would change the trend, the Covid-19 crisis did not reverse the massive flows into passive investment funds. During the pandemic, we observed an increase of 57% of the money inflow into ETFs compared to 2019. Even the Fed (the U.S. Federal Reserve) has used ETFs to support the fixed-income market through its stimulus program, as ETFs hold a massive share of the U.S. corporate bond market (Tett 2020). The Covid-19 crisis has had a negative impact on active funds as about 2/3 of them underperformed their benchmark in 2020 (Mackenzie 2020). In addition, a recent survey made by the CFA Institute shows that only 31% of investors believe the Covid-19 crisis will increase the future money flows into active funds (CFA Institute 2020).

Advantages of Passive Investing

Passive investments have many advantages that explain their success with investors:

- **Lower Fees:** Passive investment funds are significantly less expensive than active mutual funds, for which investors spend an average of 0.67% of the total market per year more than passive investors (French 2008). This is because active investment strategies require a lot of data analysis as well as more frequent portfolio rebalancing, which incurs more transaction costs and therefore implies a higher total expense ratio[6] (TER) than passive strategies. Furthermore, as we will see in the literature review section, most active funds have underperformed their benchmark, failing to justify their higher fees.
- **Transparency:** ETFs and index funds are more transparent than actively managed mutual funds. In fact, ETF holdings must be disclosed at the end of each

[6]The total expense ratio is the total cost of operating an investment fund

day, compared to twice a year for other funds. Active funds don't want to be too transparent because there is a risk of their investment strategy being copied. This problem, combined with the scandals of active fund managers during the dot-com bubble, has increased inflows towards ETFs (Ferri 2009).

- **Lower Capital Requirement:** In addition, ETFs have a lower minimum capital requirement because they can be purchased in individual units, which is not the case with other mutual funds that often require an initial investment of a few thousand dollars (Vanguard n.d.). This feature makes ETFs an attractive investment solution for individual investors with limited financial resources.

- **Tax Efficiency:** ETFs are more tax-efficient than other investment fund structures, primarily because they are less exposed to capital gains taxes. In the U.S., when active funds sell their holdings at a profit due to portfolio rebalancing or share redemptions, they must pay a capital gains tax that is passed on to investors. Because ETFs rarely rebalance their holdings and have an in-kind redemption process (holdings are exchanged with the APs), fewer holdings are sold within the fund itself (Hill and Hougan 2015).

Passive Investing and Market Risk

Many investors and financial professionals take a dim view of the rise of passive investing. They blame passive investment strategies for disrupting financial markets and increasing their volatility. Some even believe that the next financial crisis will be caused by passive investment funds.

1. Market Concentration:

The rise of passive investing has increased the concentration of the asset management industry. In 2019, Vanguard, Blackrock, and State Street (also known as the "Big Three" of index funds) together held 37% of the entire mutual fund industry, including passive and active funds (Anadu et al. 2020). As it can be seen in Figure 2.5, the

Herfindahl-Hirschman Index[7] (HHI) was significantly higher for the passive fund industry than for the active fund industry, demonstrating a more concentrated market. This higher concentration poses a governance problem by giving too much power to a single firm as ETF investors give their voting rights to management companies. It also increases the impact of financial market problems that these large asset management companies could face, such as cybersecurity breaches or even bankruptcy (Anadu et al. 2020). In addition, the growing power of passive investment firms on corporate boards could also pose a problem regarding their involvement in sustainable investments.

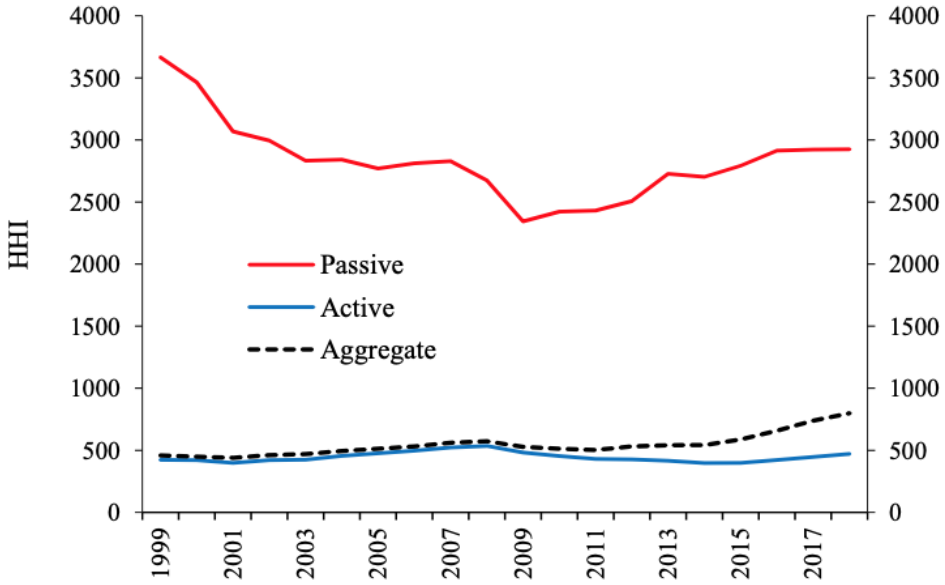


Figure 2.5: Concentration of active and passive funds (Anadu et al. 2020)

2. Index Bubble:

The biggest criticism of passive investors is their lack of analysis of company fundamentals. Passive investors invest in an index, which means that they buy all the stocks that make up that index without considering the actual value of the companies. Because many indices are market capitalization-weighted, inflows to passive funds

[7]The HHI is a measure of the concentration of a market. When the HHI is above 2000, the market is considered highly concentrated.

primarily benefit the largest companies of these indices (McMillan 2018). Therefore, many active investors are concerned that the rise of passive investors will create a bubble in the market. In addition, some studies have shown that index investing creates an "index inclusion" effect that impacts the price of the index components. In fact, companies that are freshly included in an index see their stock price rise due to demand from passive funds that track that index (Patel and Welch 2017). With respect to the bond market, some corporate fixed-income indices are weighted by the total market value of outstanding corporate bonds, giving a higher weight to highly leveraged firms. Dathan and Davydenko (2020) have shown that the increased demand for passive corporate bond funds has pushed firms to rely more on the bond market, leading to a deterioration in the debt-to-equity ratio. To reach the index threshold, some firms issue larger bonds with longer maturities which makes the market less stable in regard to fundamental analysis (Dathan and Davydenko 2020).

3. Market Volatility:

Although not yet proven, there may be a link between the growing passive fund industry and a systemic increase of the market volatility. As mentioned earlier for some bonds, the mismatch between the liquidity of ETF shares and their holdings could fragalise market with lower liquidity . In fact, in the event of a market downturn, the ETF redemption process would force APs to sell large amounts of illiquid assets, further exacerbating the market liquidity (Anadu et al. 2020). While this could also happen with active mutual funds, there is a risk that index funds could increase the co-movement between asset returns. Indeed, a move in a popular index tracked by various ETFs could cause a coordinated selling/buying action of the same assets, thereby exacerbating the movement of the index. This argument was supported by Sullivan and Xiong (2012) in their paper that show the rise of passive investing has been accompanied by an increase in the average market beta[8] (Xiong and Sullivan 2012).

[8]Market beta is an indicator of the correlation between an asset's returns and the average market returns.

2.4 Active vs. Passive Performances in the Literature

In Favor of Passive Investing

In the current literature, most studies support the underperformance of active funds (Sharpe 1966, Jansen 1968, Blake et al. 1993, Malkiel 1995, French 2008, Pace and Grima 2016) and therefore recommend that investors choose passive investing as a less costly alternative.

One of the first studies comparing the performance of active and passive mutual funds was conducted in 1966 by Sharpe. In this paper, Sharpe compares the returns of 34 funds realized during the periods 1944 and 1953 by ranking the different funds according to their risk-adjusted returns. The article concludes that the best performing funds are those with the lowest expense ratio. The paper explains that these results are justified by the market efficiency that favors index funds and penalizes active funds for which additional research does not compensate for their higher expenses. In addition, Sharpe finds no evidence that past performance is a significant predictor of future performance, meaning that the best performing funds are not guaranteed to remain so in the future.

The same conclusion was reached in a study published a little later by Jensen (1968), who was the first paper to use the regression's intercept (also called alpha) as a performance indicator. In his paper, Jansen analyzes the dividend-included performance of 115 open-ended mutual funds over a 10-year period (between 1955 and 1964). He finds that the average alpha (net of fees) over the period was -1.1%, indicating that active managers were not able to predict future stock prices well enough to recover the cost of their research. Jansen also notes that this conclusion was also true when taking returns gross of fees.

In 1995, Malkiel analyzes the impact of survivorship bias in the analysis of mutual

fund performance. In his paper, "Returns from Investing in Equity Mutual Funds 1971 to 1991", he studies the returns of all existing mutual funds each year for 20 years. His research shows that when dead funds are included in the performance analysis, actively managed funds tend to underperform the market average. This paper rejects the conclusions of some studies that supported market inefficiency and the outperformance of active funds in the 1970s and 1980s, as they suffer from survivorship bias.

More recent studies have also confirmed the underperformance of active funds. This is the case of French (2008) who looks at the difference in fees paid by active investors. Through his analysis of U.S. investment funds between 1980 and 2006, French found that, on average, active investors pay 0.67% more in fees per year than passive investors for the same average returns. Therefore, he argues that active investors could easily increase their annual returns by 0.67% by simply switching to an index fund. The article goes further and explains that active funds cannot outperform passive funds on average because the market is a zero-sum game, which implies that some active funds must underperform the market average to compensate for those that outperform it. However, the high fees imposed by active investment strategies turn the market into a negative sum game for the investor.

Pace and Grima (2016) compare the performance of European-based active and passive funds between 2003 and 2014 taking into account the survivorship bias. Their paper finds no evidence of abnormal returns achieved by active funds concluding that active funds underperform the market. Since there is no difference between the returns of actively managed funds and ETFs, the authors recommend that investors should invest through ETFs to minimize the fees paid.

Finally, evidence of active fund underperformance has also been identified in fixed-income markets. A famous article published in 1993 by Blake et al. in which 46 non-municipal bond funds were analyzed over a 10-year period starting in 1976, shows

that active bond funds underperform their benchmark by an average of 75 to 95 basis points. The paper finds positive alphas for the high yield segment but the authors believe this is due to a problem with the model used rather than true fund managers performance. Therefore, because of the negative correlation between the TER and the funds returns, the article suggests selecting bond funds with the lowest expense ratio.

In Favor of Active Investing

Although it is more rare, some studies show that active managers can outperform the market (Carhart 1997, Minor 2001, Swinkels and Tjong-A-Tjoe 2007). In addition, some articles advocate the need for active investors to support financial market stability (Grossman and Stiglitz 1980, Blitz 2014).

Swinkels and Tjong-A-Tjoe (2007) find evidence of market predictability for active managers. In their papers, they analyze 153 U.S.-based mutual funds over a 5-year period (2001-2005). Their results show that mutual funds have the ability to predict the direction, but not the magnitude, of the value and momentum investment factor. If managers can predict the direction of investment factors, they can increase or decrease their portfolio exposure to these factors and generate abnormal returns.

Minor (2001) made an analysis of the active funds listed on the nine categories of Morningstar between 1990 and 1994 to answer a previous study made by Boggle in 1998 which argue toward the supremacy of index funds (Bogle 1998). By doing the same analysis as Boggle but on a different time period, Minor find that active funds outperform their index funds equivalent in terms of risk-adjusted ratio. This analysis shows that depending on the period studied, the conclusion over active and passive management has different results.

Another study published earlier by Carhart (1998), which analyzed 1,892 equity funds between 1962 and 1993, demonstrates some evidence of abnormal returns for active funds. Using a 4-factors model, Carhart shows that some investment funds achieved

significant abnormal returns over a significant period of time and recovered their investment costs. His study also shows that past performance is a good indicator of future performance over a short period of time (only for the next year). However, the paper also finds evidence that fund expenses have a direct impact on fund performance, and funds that achieve abnormal returns most of the time bearly recover their expenses.

Other papers argue that the rise of passive funds is a risk to financial stability and that, regardless of their performance, active investors are necessary. One of the most emblematic articles in this category is the one written by Grossman and Stiglitz in 1980. This paper rejects the EMH theory because if the price perfectly reflected information, there would be no profit to be made from gathering information, which would lead to a market collapse. Grossman and Stiglitz argue that the market is in equilibrium with the number of passive and active investors where the price only partially reflects the information, so that some compensation would still be possible for information gatherers. If the number of passive investors increases, information in the market decreases, leaving profit opportunities for new active investors to enter the market and bring it back to equilibrium. This theory became known as the Grosman-Stiglitz paradox.

Blitz (2014) sees the rise of passive investing as a prisoner's dilemma where we need active investors for market stability, but everyone wants to free-ride their job through low cost index funds. Because of the Grosman-Stiglitz paradox, Blitz rejects the French view of the market as a zero-sum game. Indeed, according to him, active managers participate in the proper functioning of the market, allowing it to allocate resources efficiently and thus to generate economic growth. Without active investors, the financial market would be less liquid and passive investors would not get the same returns. Therefore, active investing should be considered a positive-sum game that creates value for investors.

2.5 Conclusion

Differences in views about market efficiency are at the heart of the separation between active and passive investments. The two types of investors use opposing investment strategies, leading them to allocate their resources differently. Over the past 20 years, the benefits of passive funds have attracted many investors and made the passive asset management industry almost as large as the active one.

The main challenge of active investing is its global underperformance relative to the market, which prevents it from justifying higher fund fees. In fact, most studies point to the inability of active managers to generate significant abnormal returns. However, depending on the time period, the asset class and the strategy used, some active funds are able to outperform their benchmark over a significant period of time.

Finally, the rise of passive investing may affect market volatility, price efficiency, liquidity, and its ethics. Although more research is needed to confirm these hypothesis, we have seen that the work of active investors could be a critical component of financial market stability.

3 Emerging Market Debt

3.1 Overview of Emerging Markets Bonds

Definition of an Emerging Market

The diversity of emerging markets (EMs) makes this concept difficult to define. The simplest definition of an EM is a country that is moving toward a developed country with the requirement of having free market economy. However, this loose definition makes it difficult to determine whether or not a country belongs in this category. Therefore, in addition to this common definition, the IMF has identified key characteristics shared by developing countries (Mody 2004):

1. Because of their development, EMs are in a state of transition from a demographic, social and economic point of view. This state of transition is linked to a higher economic growth than in developed economies.

2. This transition makes them more economically volatile than developed countries. The downside of this volatility often originates from natural disasters, external price shocks and domestic policy instability.

3. For most EMs, government policies are not yet mature, which often intensifies their already volatile economy. In fact, policies in emerging countries have been shown to be pro-cyclical in the sense that they increase economic booms and busts (Mody 2004).

More than 80 countries in Asia, Europe, Africa, and Latin America are considered emerging markets. In terms of GDP, the largest emerging countries are China, India,

Brazil, Russia, and South Korea. In 2018, EM countries debt, valued at $26.5 trillion, accounted for about 23% of all outstanding bonds in the world, of which only 20% is available to foreign investors (Dehn and Bocket 2017). Emerging market sovereign and corporate bonds can be denominated in local currency or in hard currencies such as the U.S. dollar, euro, or Japanese yen (with the vast majority of emerging market hard currency debt denominated in the U.S. dollar).

EMs Debt Market Development

In 1971, the Bretton Woods system[1] came to an end, leading to an era of looser capital controls and a boom in foreign investment flows. The term "emerging countries" was first used by Antoine Van Agtmael, triggering the attention of investors who saw opportunities in what could be the next Asian tigers (Diment 2019). Between the 1980s and 1990s, investors and economists had a negative view of emerging economies and their financial systems. This was mainly due to the poor economic performance and political instability that caused a wave of sovereign defaults in many Latin countries.

In order to restore the confidence of international investors in emerging countries and reduce the risk associated with their bonds, the US Treasury, Nicholas Brady, created in 1989 a plan to restructure the debt of defaulting EMs (Federal Reserve Board 1998). Through this plan, a new financial instrument was created, called "Brady bonds". This new type of sovereign bond was denominated in USD and was backed by a 30-year U.S. Treasury no-coupon bonds, which allowed investors to exchange their EM bonds for a more liquid assets through option contracts. This restructuring process, combined with prudent macroeconomic and financial policies, allowed many emerging countries to reduce their inflation and public deficits, thereby reducing currency and maturity risk for investors (Didier and Schmukler 2014). This process resulted in massive investment flows towards emerging countries in the 1990s that helped them develop their financial markets, making them more complex and stable.

[1] Post World War II agreement setting the terms of the international financial system, such as the fixed exchange rate with the U.S. dollar.

In a 2014 article, Didier and Schmukler analyze the major trends in EM financial markets. The main trend they observed in emerging market debt over the past few decades is their increasing reliance on local currency debt rather than foreign currency debt. This shift mainly occurred after the Asian crisis of 1997, when booming Asian countries struggled to pay back their hard currency debt due to the drastic devaluation of their currencies. The authors also describe the declining involvement of banks in corporate and government bonds due to the development of their capital markets. In fact, the bond market capitalization of Asian and Latin American countries increased by 140% between 1990 and 2000. The banking system in emerging countries has also grown, but it has refocused on consumer credit to take advantage of the increasing middle class. The stabilization of these financial markets, combined with the change in focus of the banks, is attracting many other players, such as foreign institutional investors, like pension funds and institutional insurance developing further the complexity and depth of these markets. Because of the lower liquidity of the secondary bond market in developing countries, these institutional investors often prefer to hold EM bonds to maturity. They also tend to favor government bonds over corporate bonds because of their lower average default rate. Compared with developed countries, where corporate bond market capitalization is as high as 40 percent of GDP, it represents only 10 to 23 percent of GDP in developing countries. Finally, the investor should keep in mind that the development of the financial markets is not homogeneous across emerging countries and varies considerably depending on the geographical region (see Figure 3.1).

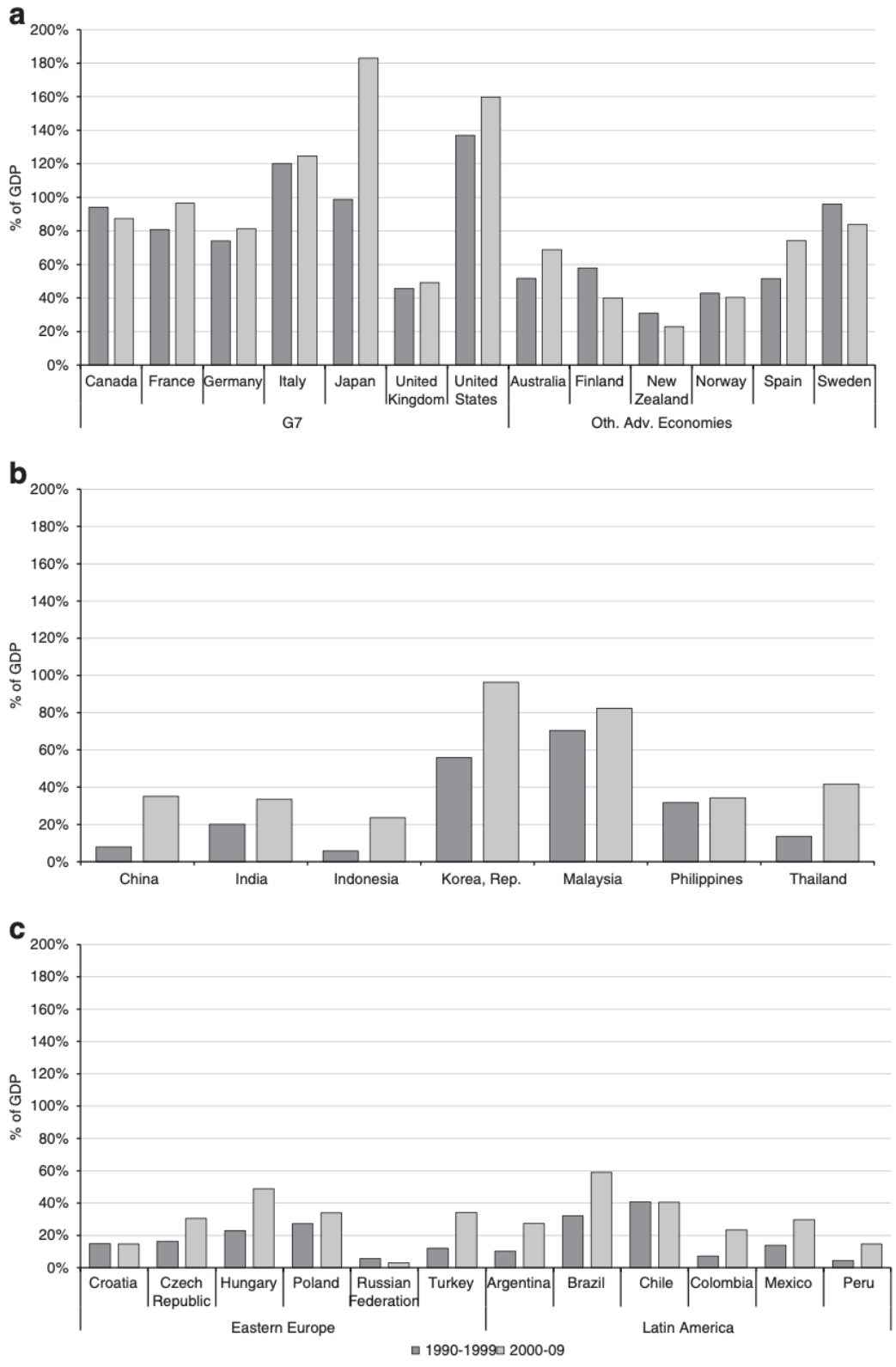


Figure 3.1: The bond market capitalization of: (a) G7 and other advanced economies; (b) Asia; (c) Eastern Europe and Latin America (Didier and Schmukler 2014)

The Advantages of EM Bonds

There are two main reasons why emerging market bonds are an attractive asset class for investors:

1. Over the past 15 years, Europe and the U.S. have experienced a period of low interest rates where, for most of that time, their real interest rates have been negative (Demertzis and Viegi 2021). This economic environment has pushed developed country bond yields to unprecedented lows, preventing investors from earning a decent return. As a result, emerging market bonds are an attractive alternative for developed countries investors willing to earn a higher yield on fixed-income securities. For example, in May 2021, the Mexican 10-year government bond had a yield of 7.05%, compared to 1.63% for the U.S. Treasury bond of the same maturity.

2. Bonds from emerging countries are also an attractive asset class for diversifying investors' portfolios. Indeed, in 2008, many developing countries were less affected by the financial crisis because their financial markets were less interconnected with those of developed countries (Didier and Schmukler 2014). The diversification potential of emerging market bonds has also been supported by some studies that highlight the lower correlation between emerging and developed countries (Divecha et al. 1992). However, as emerging markets develop, their economies will become more interconnected with those of developed countries, which will reduce this lower correlation effect.

3.2 The Different Categories of EM Bonds

Although emerging market debt is often considered as a single asset class, investors should pay attention to the different categories of EM bonds before investing in them, as they all have their own risk and return profiles. The categorization of emerging market bonds is based on the issuing entities and the currencies in which they are denominated. Therefore, the four categories of EM debt are:

Hard Currency Sovereign Bonds

This category consists of bonds issued by developing country governments in hard currency, primarily in USD (Schroders 2019), and is probably the best known category of EM bonds. Because they are issued by governments and are denominated in hard currency, which means there is no currency risk to the investor, this class of bonds is less risky than other EM bonds. For this reason, they remain the preferred choice of many foreign institutional investors (Diment 2019). In the 1990s, it was the largest emerging market bond category in terms of total market capitalization, but the shift from sovereign bonds to local currency has made it the smallest category today (see Figure 3.2).

The most widely used index in this category is the J.P. Morgan Emerging Market Bond Diversified Index (EMBI GD Index) which was created in 1992. Today, the index gathers bonds of various maturities from over 70 countries and had an average rating of BB+ which makes it an speculative investment (J.P. Morgan 2018).

Asset class	2018		2013		2008		2003	
	USD trn	% share	USD trn	% share	USD trn	% share	USD trn	% share
Total Emerging Markets	26.5		16.2		8.3		3.5	
Local currency	21.8	82%	13.0	80%	6 .1	74%	2.2	64%
Local currency government	10.5	40%	6.4	40%	3.0	37%	1.3	38%
Local currency corporate	11.3	43%	6.6	41%	3.1	38%	0.9	26%
Non-financial corporate	*4.5*	*17%*	*2.9*	*18%*	*0.8*	*9%*	*0.4*	*11%*
Financial corporates	*6.7*	*25%*	*3.7*	*23%*	*2.3*	*28%*	*0.5*	*15%*
External	4.7	18%	3.2	20%	2.2	26%	1.2	36%
External government	1.3	5%	0.8	5%	0.5	6%	0.4	12%
External corporate	3.4	13%	2.3	14%	1.7	20%	0.8	24%
External corporate	*0.7*	*3%*	*0.5*	*3%*	*0.2*	*3%*	*0.1*	*4%*
External financial	*2.8*	*10%*	*1.9*	*11%*	*1.4*	*17%*	*0.7*	*20%*

Source: Ashmore, BIS, IMF. Data as at end 2018.

Figure 3.2: Total market capitalization of the EM bonds categories (Dehn 2019)

Hard Currency Corporate Bonds

This category includes emerging market corporate bonds denominated in hard currencies (primarily USD). In terms of size, this is the third largest category of emerging market bonds, with a total market capitalization of over $3.4 trillion (see Figure 3.2). This class is considered riskier than government bonds because, on average, companies are more likely to default than their governments. Because of this view, the market often imposes a rating cap defined by the government's rating, potentially allowing investors to find undervalued corporate bonds backed by strong fundamentals (Durbin and David 2005, Diment 2019).

The J.P. Morgan Emerging Market Bond Index Broad Diversified (CEMBI GD) is the most widely used index in this category. It consists of bonds issued by more than 600 companies in 52 countries and various sectors (Diment 2019). The average rating of the index is BBB-, which is the last category considered as "Investment Grade" by Standard & Poor's.

Local Currency Sovereign Bonds

The local currency sovereign bond segment is the second largest in terms of size, accounting for over 40% of the total capitalization of the EM bond market (Dehn 2019). It is also the most liquid category, which implies a lower bid-ask spread than hard currency bonds (lower transaction cost). The default rate in this category is very low because countries can print their own money to pay off their debt, which gives them more flexibility to reduce the sovereign debt burden. However, it comes with a currency risk for foreign investors, for whom a currency devaluation would have a negative impact on their returns. Therefore, the performance of the local currency debt market is primarily influenced by the inflation rate and the interest rate of the local currency, which are the two main drivers of a currency's exchange rate (Schroders 2019).

The core index for this category is the J.P. Morgan Government Bond Index Emerging Market Global Diversified (GBI-EM GD) which was created in 2005 (Diment 2019). The index is composed of local currency bonds issued by the government of 19 countries (see Figure 3.3) and has an average rating of BBB.

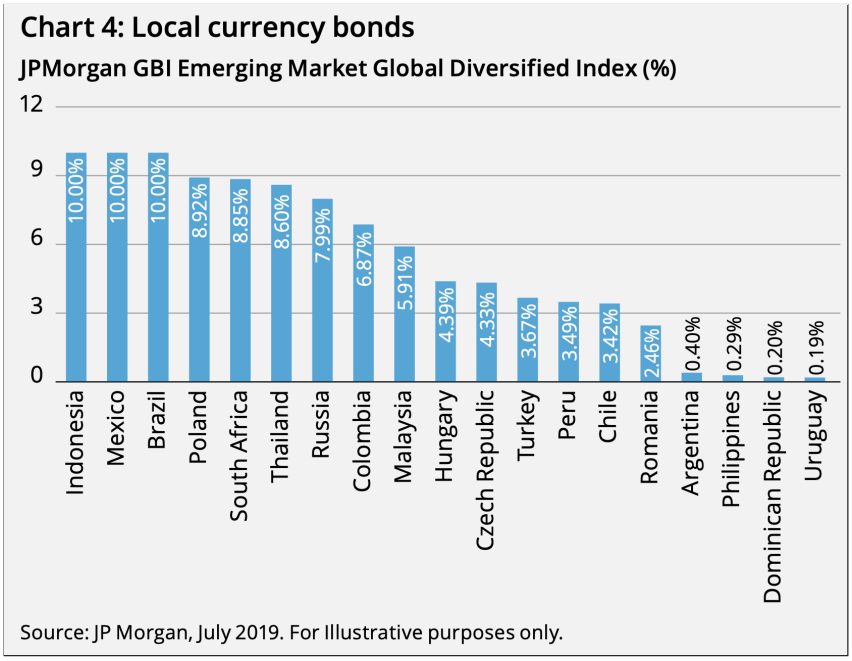


Figure 3.3: The GBI-EM GD index composition (Diment 2019)

Local Currency Corporate Bonds

Since 2013, it has been the largest EM debt category, with a total size of $11.3 trillion in 2018 (see Figure 3.2). As mentioned by Didier and Schmukler (2014), the private segment of the EM bond market is growing faster than the public segment. However, the foreign exchange risk combined with the higher corporate default rate makes it the least valued by foreign investors and mutual funds.

The primary index for this segment is the Local EM Non-Sovereign Index provided by ICE, which aggregates 296 different fixed income securities from 141 EM companies.

3.3 The Risk of EM Bonds

The Default Risk

One of the main components of bond valuation is the issuing entity's ability to repay its debt, also known as creditworthiness. In addition to their own models, investors look at credit ratings published by rating agencies as an indicator of the creditworthiness of indebted entities. As noted earlier, common market sense dictates that sovereign bonds are less risky than corporate bonds because of their lower default rate and their ability to raise taxes or print money. For the same reason, emerging countries on average have a lower credit rating than developed countries, mainly due to their higher sovereign default rates and more volatile currencies. The Figure 3.4 represents the history of major emerging market sovereign defaults that occurred prior to 2017 and their impact on the EMBI GD Index. Between 1998 and 2017, the average default rate for EM countries included in the EMBI GD Index was 0.7% with an average recovery rate of 49% (Dehn and Bocket 2017).

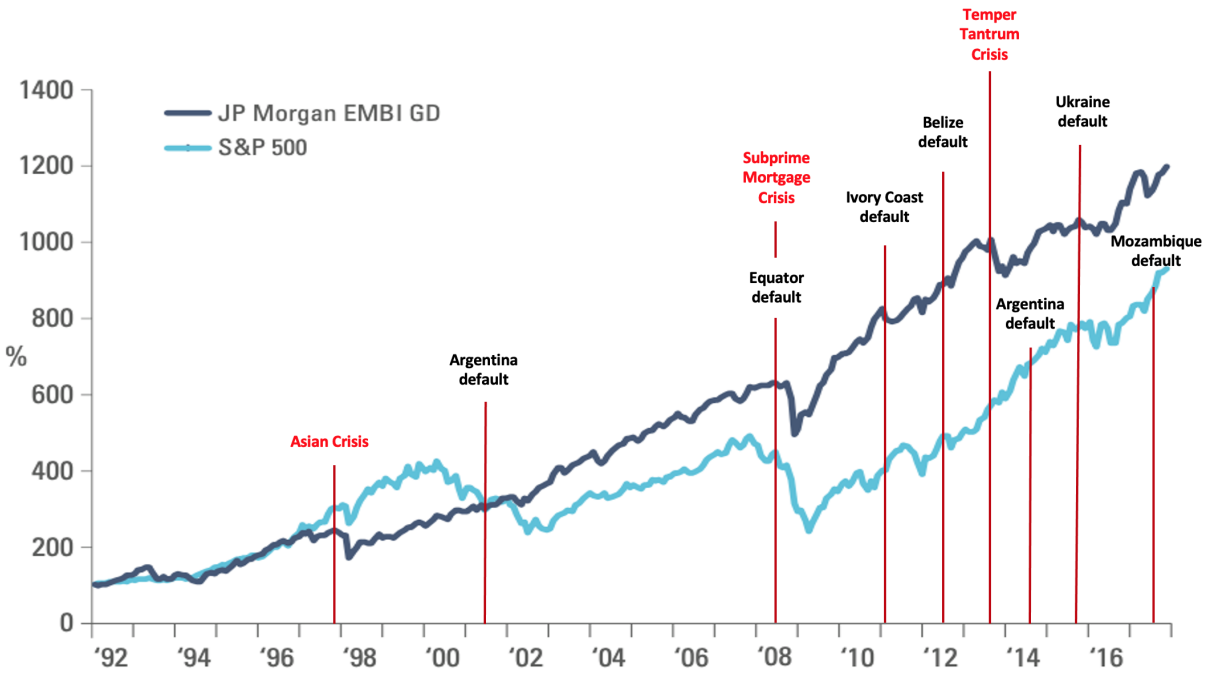


Figure 3.4: History of major crises and sovereign defaults in EM countries between 1992 and 2017 (Dehn and Bocket 2017)

Debt defaults in emerging countries can be caused by country-specific problems or by an external shocks, such as a drop in commodity prices or a rise in international interest rates. We have identified three major factors that influence the creditworthiness of an EM country or company on top of its financial strength: the U.S. interest rate, the currency of the debt issued, and the political risk.

1. The International Interest Rate and Monetary Policy Influence

The rise in international interest rates has a negative impact on the creditworthiness of emerging countries and on the valuation of their bonds. In his article, Beck (2001) observes that the LIBOR[2] is negatively correlated with the spread of emerging country bonds. This is because if the international interest rate rises, it increases the cost of borrowing from other countries, which has a negative impact on the probability of default. The decrease in the creditworthiness of EM countries caused by this event results in a higher credit spread on the bond market (Beck 2001).The higher spread increases the debt burden of emerging countries, which complicates the process of refinancing their debt.

We saw this in 2013 during the Taper Tantrum crisis, when U.S. interest rates rose as a sign of normalization and recovery of the U.S. economy after a long period of low interest rates and lax monetary policies implemented after the 2008 financial crisis (Atradius 2015). The Fed's announcement of tighter U.S. monetary policy nearly doubled the U.S. Treasury yield (from 1.7% to 3%), making the U.S. risk-free rate and the dollar more attractive to investors, leading to a massive outflow from emerging market bonds and currencies. In this context of rising international interest rates, emerging countries that rely more on local currency bonds are less affected than countries with high foreign currency debt (see: 2. Local and Hard Currency Indebtedness). We also see a minor impact on export-intensive countries, as their currency devaluation caused by rising international interest rates increases their exports and stabilizes their currency exchange rate.

[2]The London Interbank Offered Rate or LIBOR is the short-term interest rate used by banks for lending in the international interbank market.

2. Local and Hard Currency Indebtedness

After the Asian crisis in 1997, when Thailand defaulted on its debt, many emerging countries became aware of the danger of borrowing money in a foreign currency. Although hard currency debt is preferred by foreign lenders, it transfers the currency risk to the borrower. Indeed, when a country sees its currency being devalued against the currency of its debt, which can happen when international interest rates rise, its debt burden increases because the value of the debt in its local currency is now higher. Therefore, EM countries that borrow money in hard currency must have a sufficient reserve of these hard currencies to defend the exchange rate of their currency on the Forex[3] market (Dalio 2018).

When its currency devalues too much and the debt burden reaches an unsustainable level, a country can either default on it or print its own money to pay it back. The problem with printing one's own currency is that it further increases the supply of a currency for which there is very little demand, which leads to further depreciation. This vicious circle can lead to a hyperinflationary crisis like the one in the Weimar Republic in 1923 or in Argentina in 1989. Regarding Ray Dalio (2018), the countries most likely to enter an inflationary crisis are those that:

- do not have a reserve currency as local currency
- have a small reserve of foreign currency to back up the currency
- have a large foreign debt
- have large and growing deficit
- suffer from a negative real interest rate that insufficiently compensates the lender in local currency
- have a history of high inflation

[3]Forex is the abbreviation for Foreign Exchange, which is the market where currencies are traded.

However, the investor must remember that, although it is rarer, a country that relies on local currency debt can also default. Indeed, printing its own currency to repay its debt can still cause a hyperinflationary crisis for highly indebted countries. In many cases, the cost of high inflation is more costly to an economy than a debt restructuring in case of default (Parker and Riley 2013).

3. The Political Risk

The government in power and the degree of conflict in an EM country is also an important determinant of its creditworthiness. Several studies show the link between the higher sovereign credit spread of an EM country and the tenure of its political leaders or the degree of conflict (Cuadra and Sapriza 2008). This political risk is also transferred to firms located in that economy, as conflict risk and government instability increase their probability of default as well.

Moreover, in the event of a sovereign default, a country's political stability is an important determinant of the outcome and rapidity of the debt restructuring process (Trebesch 2018). Trebesch (2018) finds evidence in his article that countries with unstable governments are unlikely to emerge quickly from the default process.

The Covid-19 Impact on EM Countries Default Risk

Covid-19 had a drastic impact on EM countries and their creditworthiness. The inability of investors to predict the exact impact of the pandemic around the world triggered a general market sell-off that did not spare EM bonds. In March 2020, the EMBI GD and CEMBI GD indices fell by 15% and 13%, respectively, due to capital flight towards safer assets such as U.S. Treasuries, causing the EM spread to deteriorate (Dabrowski 2020). The decline in export demand combined with the market sell-off, has led to a deterioration in many EM currencies, increasing the debt burden of those with high hard currency debt (e.g., the Argentine peso and Turkish lira fell by more than 26% against the USD in 2020), causing Argentina and Lebanon to default on their debt.

However, the market fears of a massive debt crisis dissipated after a few months, bringing the average emerging market spread down to more decent levels (Smith 2020). In addition, many developing countries have also benefited from lower U.S. interest rates, making their borrowing more affordable and helping them find the capital needed to support their economies. But many countries with less access to local currency borrowing (Vanguard 2020) are still in a worrisome situation (e.g., Zambia, Rwanda and Ecuador) (Smith 2020). For the IMF, the average debt-to-GDP ratio of emerging countries has increased by 10%, putting many already fragile countries on the verge of default, leading the IMF to call for immediate action and more flexibility in debt restructuring. The recovery is also expected to be very different from one EM country to another, with very divergent vaccine access and deployment strategies among them (Vanguard 2020).

The Currency Risk

With local currency bonds accounting for more than 80% (see Figure 3.2) of the total capitalization of the emerging market bond market, foreign investors are beginning to take a closer look at this asset class. However, local currency bonds come with an additional risk for the investor, namely currency risk. Therefore, an investor who wishes to invest in local currency bonds has three options regarding this extra volatility:

- **Hedging the Foreign Currency Position:** With this strategy, the investor offsets his foreign currency position with another position in the opposite direction. The most common method of hedging is to use derivative contracts on the same currency, such as forward contracts or swaps, but other methods also exist, such as Cross-Hedging[4] (Eaker and Grant 1987). The problem with hedging is the cost associated with it, which can have a significant impact on investor returns. The cost of hedging a currency position depends mainly on the forward exchange rate, which takes into account the interest rate differential between the two currencies (Schroders 2019). When a country's interest rate increases, the forward

[4]Cross-Hedging is a hedging practice that uses a position in a correlated asset to offset the exposure of another asset.

rate of the currency appreciates, as the currency becomes more attractive. If we take the example of an Australian investor in 2019, a Mexican government bond in local currency would normally yield 7%, but after hedging this yield is reduced to 0.2% (in AUD). In contrast, a Spanish bond that yields about 0.2% in EUR would yield about 2% in AUD after hedging because of the negative interest rate in Europe (Schroders 2019). To reduce the cost of hedging, a portfolio manager may decide to hedge only the USD position, which in most cases would offset more than half of the currency volatility, as many emerging market currencies are still pegged to the USD. The portfolio manager may also employ an active hedging strategy, which involves hedging only certain positions for a limited period of time in order to benefit from favorable currency appreciation.

- **Leaving the Position Unhedged:** It is estimated that currency exposure accounts for about 60% of the total volatility of emerging market local currency bonds for foreign investors (Schroders 2019). Therefore, although riskier, the unhedged currency position allows the investor to benefit from the bond's total return. In addition, having a position in another currency is a source of diversification that would protect the investor in the event of a potential depreciation of his own currency.

EMFX	AUD	NOK	NZD	CAD	EUR	SEK	GBP	CHF	JPY
1 Year	0.72	0.73	0.79	0.72	0.47	0.36	0.51	-0.01	-0.35
3 Years	0.64	0.63	0.57	0.46	0.59	0.57	0.30	0.27	0.30
5 Years	0.77	0.69	0.62	0.64	0.59	0.57	0.32	0.33	0.37
7 Years	0.76	0.69	0.67	0.66	0.59	0.58	0.34	0.39	0.26
9 Years	0.83	0.76	0.76	0.73	0.69	0.69	0.47	0.59	0.19

Source: Bloomberg, J.P. Morgan. Correlation based on monthly returns versus USD. Data to 30/08/19.

Figure 3.5: Currency correlation with a basket of EM local currencies based on USD monthly exchange rate (Schroders 2019)

To assess the risk of this strategy, the investor can look at the correlation (relative to the USD exchange rate) between his own currency and the EM local currency

to which he is exposed (see figure 3.5). The higher the correlation, the safer this unhedged strategy is for the investor.

- **Avoiding Local Currency Bonds:** As mentioned earlier, most foreign investors still prefer to invest in developing markets through hard currency bonds, which do not suffer from additional currency volatility. However, the investor should be aware that the currency risk is transferred to the borrower, thus increasing the risk of default (see subsection: The Default Risk). In addition, for non-European or U.S. investors, it is difficult to find emerging market bonds denominated in their own currency, which exposes them to the additional volatility of their currency compared to the USD or EUR (Schroders 2019).

The Liquidity Risk

In general, most bonds are traded on over-the-counter (OTC) markets that are a decentralized form of markets compared to traditional stock exchanges. OTC markets, also called quote-driven markets, are structured as a network of broker-dealers where the investor trades securities directly through them. The name of this type of market comes from the fact that investors literally buy assets "over the counter" of brokers at the quoted price of the day (Harris 2015). Brokers have access to the last price and volume traded of an asset in the OTC market through an inter-dealer electronic quotation system called the OTC Bulletin Board (OTCBB) (SEC.gov 2013b).

The main risk associated with this type of market is their lower liquidity. An investor who wishes to unwind a position must first find a buyer in the OTC market through a broker-dealer. Because EM bonds are not the most frequently traded securities in OTC markets, this process can take some time and incur costs (Duffie et al. 2004). Indeed, once a counterparty has been found, there is a negotiation process around the price because EM bonds often don't trade for several days and the past price is no longer a good indicator of the bond's true value. Because this "search and negotiation" process is difficult for dealers, the bid and ask price of low liquidity assets is significantly

higher, resulting in a higher transaction cost for the investor (Pedersen 2015). For this reason, EM bonds are said to be thinly traded, meaning that it is difficult to trade them without affecting their price.

On average, sovereign bonds are slightly more liquid than corporate bonds, but both are subject to significant liquidity risk (Hund and Lesmond 2008). The liquidity of EM bonds is a major determinant of their issuer credit spread. In fact, one study found that if the cost of liquidity (as measured by the bid-ask spread) increases by 1 basis point, the average spread for EM corporate bonds increases by 0.25 basis points and by 0.63 basis points for sovereign bonds. In addition, the cost of this illiquidity has a negative impact on the performance of investment funds that focus on emerging market debt. For ETFs, this cost translates into a higher tracking error, which is one of the most important measures for the investor. In their paper, Darolles et al. (2016) find that EM bond ETFs benefit from a diversification effect that reduces the impact from the lower liquidity of their holdings. However, they find that this diversification benefit no longer holds in times of crisis, when the tracking error of EM bond ETFs increases significantly (Darolles et al. 2016).

3.4 Active and Passive Investment in Emerging Markets

Performances of EM Equity and diversified funds

Due to the growing interest in emerging markets, many studies analyzed the performance of mutual funds that focus on developing countries. However, most studies only consider equity or diversified funds[5] (Chen and Jang 1994, Gottesman and Morey 2007, Huij and Post 2011, Fasano and Galloppo 2016, Kiymaz and Simsek 2017, Guerard and Chettiappan 2017) where the results between active and passive management performance are mixed.

[5] A diversified fund is a fund that includes multiple asset class such as bond and equity

In their paper, in which they analyze the performance of 215 diversified mutual funds over three different time periods (1997-1999, 2000-2002, and 2003-2005), Gottesman and Morey (2007) suggest that investors choose passively managed funds for emerging markets. The results of their analysis show that passive funds outperform active funds, as more than 50% of active managers have lower risk-adjusted returns than passive funds. The study also finds that the only fund characteristic that predicts EM fund performance is the expense ratio, which is negatively correlated with it. This result was confirmed a little later by another paper by Kiymaz and Simsek in 2017, in which they study the monthly returns of 222 U.S.-based diversified EM funds between 2000 and 2017. They find that, on average, these funds have lower risk-adjusted returns than the MSCI World and S&P/IFC indices over the entire period studied. In fact, only 1/4 of their sample has a higher Sharpe ratio than these indices, showing that the majority of fund managers fail to beat the market. In addition, Fasano and Galloppo (2016) argue that the higher concentration of active managers' portfolios in EM markets is due more to overconfidence than skill. Their paper analyzed 1665 EM equity funds and finds that passive funds, which are more diversified than active ones, have higher average performance.

Other studies reach opposite conclusions, as they support the idea that active funds focusing on EM equities can outperform the market. The first paper demonstrating this idea was written by Huij and Post in 2011, who analyzed the returns of 137 emerging market equity funds over 13 years (from 1993 to 2006) using the Carhart model. They find that some funds can generate significant abnormal returns net of fees. They also find that the amount of "winning funds" is much higher than mutual funds focused on developed countries. Guerard and Chettiappan (2017) also show that active managers' effort, focusing on EM equities, has been rewarded by the market between 2003 and 2016. In fact, their research indicates that active strategies achieve higher abnormal returns than global and non-U.S. equity funds.

In addition, most of these articles agree on one thing: EM-focused equity and diversified funds tend to outperform US-focused funds (Chen and Jang 1994, Huij and Post 2011, Kiymaz and Simsek 2017, Guerard and Chettiappan 2017). Some of them also provide evidence of the excellent diversification opportunities that these EM funds can provide to investors (Kiymaz and Simsek 2017).

Performances of EM fixed-income funds

Concerning EM bond funds, we only found two papers that analyze their performance over the past two decades (Polwitoon and Tawatnuntachai 2008, Kiymaz and Simsek 2017). Both studies come to the same conclusion: active EM bond funds fail to outperform the market, encouraging investors to choose passive funds.

The first was written by Polwitoon and Tawatnuntachai (2008) and studies the performance of 50 EM bond funds adjusted for survivorship bias between 1996 and 2005. They find that although active funds have higher total returns, they fail to outperform their passive counterparts in terms of risk-adjusted returns. In fact, they find evidence that the TER is negatively correlated with the Sharpe ratio in this asset class as well. However, their study shows that EM bond funds outperform comparable domestic funds and international bond funds, providing evidence of greater diversification benefit of the asset class.

The second study focusing on EM bond funds appeared in Kiymaz and Simsek's article published in 2017. In their paper, they analyze the returns of 78 EM bond funds between 2000 and 2017 and conclude that active managers are not able to generate consistent abnormal returns in this asset class. Indeed, their results show that the vast majority of alphas were negative and only 6% of the sample achieved a significant positive abnormal return over the 17-year period. However, these results vary considerably depending on the subperiod analyzed, showing some evidence of occasional active outperformance. As a result, the authors suggest that investors invest in emerging market bonds through ETFs, but warn the investor that ETFs also struggle

to achieve the same risk-adjusted returns as their indices.

However, because of the multiple risks associated with EM bonds, we believe that active managers still have an important role to play for investors. Indeed, an investor may still decide to invest in an active EM bond fund not because he or she expect a higher return than the market, but rather for the portfolio manager's ability to limit risk and protect his or her investment during market turbulence. This argument came out in an interview we conducted with a bond portfolio manager[6] of a Singapore-based mutual fund that focuses primarily on Asian bonds. His answer to the question "Why should an investor choose an actively managed fund rather than an ETF to invest in EM bonds?" was the following:

> *"You can compare buying an ETF to driving a car without a steering wheel. Because ETFs are a basket of securities and you are taking the view that in the longer term it will go up, you don't have to bother about selecting the right socks. It is fine when the market volatility is benign, it is fine when the market is trending up but when the market is falling, as we have seen in the recent event it becomes a problem for the investor. The role of an active manager is to navigate the volatility of the market and it is particularly important in a volatile environment. You must find the right active manager to protect your downside and to control the global duration of the bond portfolio."*

In addition, actively managing emerging market bond risks, such as currency and default risk, could also allow the portfolio manager to achieve above-market returns, at least in certain periods such as downturns. In fact, the investor can take advantage of the boom-bust cycle that emerging market economies typically experience by increasing currency hedging during the crisis phase and investing aggressively in the expansion phase of the cycle without hedging (Schroders 2019). Since many crises are caused by cycles, a portfolio manager could study the history of these cycles to go beyond his own experience and increase his ability to navigate them (Dalio 2018).

[6]For reasons of confidentiality, the interviewee wished to remain anonymous

3.5 Conclusion

Emerging market debt is a fast-growing asset class that has attracted the interest of investors around the world over the last two decades. The main advantage of this asset class is the decent yield it offers investors, especially at a time when developed countries are immersed in a low interest rate environment. In addition, EM bonds offer a diversification opportunity for investors' portfolios due to their geographic diversity and relatively low correlation with developed market assets.

One of the key trends in emerging market debt is the increasing use of local currency bonds rather than foreign currency ones. Although some investors remain reluctant to invest in local currency, this transition allows for greater stability in emerging market economies and increases the creditworthiness of issuing entities. However, not all developing countries have benefited from this trend, as it requires greater development and maturity of local financial markets.

We have also seen that the attractive yield of this asset class is linked to a higher risk. The three main risks faced by investors in emerging debt are the default risk, currency risk and liquidity risk. Because of the multiple sources of volatility, the role of the active manager should be more focused on managing the risks to protect the downside of the portfolio rather than systematically beating the market. We believe that more research is needed to explore the ability of EM bond portfolio managers to address the risk of this asset class.

Finally, the limited review of the literature on emerging market bond funds tends to favour passive management, as studies show a market underperformance from active funds. Nonetheless, most papers find that emerging market bond funds outperform equivalent U.S. bond funds in terms of risk-adjusted returns, indicating that the superior yield outweighs the risk of the asset class.

4 Empirical Study

To answer our research question, we seek to compare the returns of the vast majority of active and passive funds that invest in Emerging Market bonds. We believe that our empirical study will complement the existing literature on this topic because :

1. There are only a few existing papers that focus on Emerging Market debt and most of them are outdated studies focusing on pre 2008 periods. Moreover, none of these studies include the impact of the resent Covid-19 crisis in their analysis.

2. The current literature analyzes Emerging Market debt as a single, homogeneous asset class. However, as mentioned earlier, there is a categorization among this asset, and each category has its own characteristics and risk profile. Our empirical study will provide information on the performance and risk of these different categories.

3. Finally, we have decided to take the perspective of the investor rather than the fund manager by focusing on the final price rather than the fund's NAV. Our study will therefore take into account the liquidity problem that some ETFs may face and that is reflected by the gap between their trading price and their NAV.

4.1 Data Selection

To collect our data, we used the Bloomberg Terminal fund screener where 3531 registered funds focus on Emerging Market debt and have an operating period between 2010 and 2020. Based on different filters such as the fund's currency, the fund's structure, and its investment focus, we were able to group these funds into 12 different categories (see Table 4.1). However, we must pay attention to this classification since it is

mainly based on the "Economic association" and the "Fund Strategy" of each fund but some of them might have a minor percentage in other asset classes. Because currently no ETF is focusing on EM corporate bonds in local currency, we decided to remove this category from our analysis. In addition, to avoid potential currency mismatch, we have separated the funds that are denominated in U.S. Dollars with the one in Euro to avoid our category average to be biased by the EUR/USD exchange rate fluctuation.

Category Summary Table

Category	Fund Number	Style	Economic Association	Fund Asset Class Focus	Fund Strategy	Currency	Avg. TER (%)	Avg. AUM $ US (M)
ETF_GOV_HARD_USD	47	Passive	Emerging Markets	Fixed Income	Government	US Dollar	0.37	5039.31
ETF_GOV_HARD_EUR	86	Passive	Emerging Markets	Fixed Income	Government	Euro	0.40	3251.22
MF_GOV_HARD_USD	20	Active	Emerging Markets	Fixed Income	Government	US Dollar	0.56	173.04
MF_GOV_HARD_EUR	21	Active	Emerging Markets	Fixed Income	Government	Euro	0.84	207.07
ETF_CORP_HARD_USD	10	Passive	Emerging Markets	Fixed Income	Corporate	US Dollar	0.50	1127.41
ETF_CORP_HARD_EUR	10	Passive	Emerging Markets	Fixed Income	Corporate	Euro	0.50	1240.29
MF_CORP_HARD_USD	21	Active	Emerging Markets	Fixed Income	Corporate	US Dollar	1.58	730.90
MF_CORP_HARD_EUR	35	Active	Emerging Markets	Fixed Income	Corporate	Euro	1.30	607.59
ETF_GOV_LCL_USD	34	Passive	EM Local Currency	Fixed Income	Government	US Dollar	0.50	2151.97
ETF_GOV_LCL_EUR	41	Passive	EM Local Currency	Fixed Income	Government	Euro	0.50	2557.54
MF_GOV_LCL_USD	38	Active	EM Local Currency	Fixed Income	Government	US Dollar	1.25	1436.54
MF_GOV_LCL_EUR	51	Active	EM Local Currency	Fixed Income	Government	Euro	0.97	1285.45
ACTIVE	186						1.08	740.10
PASSIVE	228						0.46	2561.29

Table 4.1: Funds' categorisation

By categorizing the funds and cleaning up our dataset, the number of funds we will focus on has been greatly reduced. In total, we will analyze the performance of 414 funds (186 actively managed funds and 228 ETFs) between the 1st of January 2010 and the 31st of December 2020. As we can see on Table 4.1, the biggest category in terms of funds and AUM (Asset Under Management) regarding the ETFs is the Government Hard Currency with 133 funds. For the active funds, this category is the Government Local Currency with 89 funds. We can also observe that, on average for every category, ETFs have more money under management than active mutual funds (on an individual fund scale). Regarding the total expense ratio (TER), we see without surprise that active funds have higher fees than passive funds by 0.62 percentage points. The last interesting fact we can draw from this table is that there are more ETFs registered in the Bloomberg database listed on the European market than in the American market. This is due to the structure of European financial markets which are composed of many small stock exchanges rather than fewer centralized ones like

in the U.S. (Stafford 2016). Therefore, although the size of the market is smaller in Europe, one ETF will be listed on more stock exchanges in Europe than in the U.S..

For each fund, we have downloaded the monthly returns including the gross dividend distribution categorized as "Month to Month Total Returns Gross Dividends" in Bloomberg. For the ETFs, these returns are computed based on the exchange price instead of the NAV which allows us to analyze the performance of these funds from the perspective of the investor. Including the dividends distribution in the returns was necessary to compare funds that reinvest their bonds' coupons with the ones that distribute them. We also made sure to include non-active funds to avoid survivorship bias. As a result, most funds do not have data for the entire period we analyzed, either because they were created after 2010 or because they died before the end of 2020. Regarding the risk-free rate, we took the "GDBR10 index" (the Germany 10 year bond yield) to compute the excess returns for funds in Euro and the "USGG10YR Index" (the U.S. 10 year Treasury) for the ones in U.S. Dollars.

Before computing any performance indicator, we had to clean our data set. To minimize the noise in our regressions and averages, we decided to remove all the funds that had less than 30 months of data points. We also had to remove some funds with unrealistic returns that would have skewed our category averages. Finally, for some of our funds, no benchmark where attributed or the benchmark's data were not available on Bloomberg. For these funds, we have attributed a category benchmark (4.2) that was chosen based on the most used benchmark by peers funds in their respective category.

Category	Default Bmk
ETF_GOV_HARD_USD	JPEICORE
ETF_GOV_HARD_EUR	JPEICORE
MF_GOV_HARD_USD	JPEIGDEU
MF_GOV_HARD_EUR	JPEIGDEU

ETF_CORP_HARD_USD	JBCDCORE
ETF_CORP_HARD_EUR	JBCDCORE
MF_CORP_HARD_USD	JBCDCORE
MF_CORP_HARD_EUR	JBCDCORE
ETF_GOV_LCL_USD	BECLTRUU
ETF_GOV_LCL_EUR	BECLTRUU
MF_GOV_LCL_USD	BECLTRUU
MF_GOV_LCL_EUR	BECLTRUU

Table 4.2: Default benchmark for each fund category

A detailed list of all the Benchmarks (Appendix 1), ETFs (Appendix 2) and actively managed funds (Appendix 3) can be found in the Appendices section.

4.2 Methodology

To analyze and compare the performance of each funds, we will use the following performance indicators:

- **The Sharpe Ratio**
- **The Tracking Error**
- **The Information Ratio**
- **The Jansen's Alpha**

Each performance indicator will be computed for each fund and then aggregated with a category average. Since some ETFs are registered on multiple exchanges, these averages will be weighted based on the number of exchanges a fund is listed. Once computed, each of these performance indicators will be annualized.

The Sharpe Ratio

The Sharpe ratio was developed by the Nobel prize William F. Sharpe in 1994. This ratio is based on the idea that every investor should construct a portfolio that maximizes

the expected returns while minimizing its volatility (Sharpe 1966). This performance indicator is widely used in finance to compare funds' performances or optimize portfolios based on the Modern Portfolio Theory. The Sharpe ratio is computed as follows:

$$Sharpe\ Ratio = \frac{E(R_x - Rf)}{\sigma_x} \tag{4.1}$$

Where: R_x is the return of asset x

Rf is the risk free rate

σ_x is the excess return volatility of the asset x

This ratio represents the expected excess return of an asset adjusted by its volatility. To estimate the different components of this indicator, ex-post values can be used and we took the past average asset's returns and its volatility over different periods (we will compute the one year, five years, and full period Sharpe ratios). The higher the Sharpe ratio the better. If the ratio is negative, it means that, on average, the asset's returns were smaller than the risk-free rate.

The main drawback of the Sharpe ratio is the assumption that volatility is equal to portfolio risk. In fact, there is upward and downward volatility. The Sharpe ratio will penalize both sides of the volatility but the upward volatility is usually welcomed by the investor (Hargave n.d.). Finally, the volatility can easily be manipulated by increasing the length of the period over which it is computed. For instance, the annualized monthly volatility is lower than the annualized daily return and it can impact the ratio. This won't be an issue in our case since we will always compute and compare the Sharpe ratio based on the annualized monthly volatility.

The Tracking Error

The Tracking Error (TE) measures the portfolio returns compare to a benchmark over a period of time. Several methods exist to compute the TE but we will use the following formula in our analysis:

$$Tracking\ Error = Stdv(R_x - R_b) \tag{4.2}$$

Where: R_x is the return of asset x

R_b is the return of benchmark b

This metric is often used to compare mutual funds' performances and index tracking strategies. A low TE indicates that the portfolio's returns are close to the benchmark's ones. On the contrary, a high Tracking Error shows that the portfolio returns are significantly different from the benchmark. This difference can be positive in the case the fund outperforms his benchmark or negative in the case of an underperformance. Since the Objective of an ETF is to track its benchmark, a high TE will be seen as negative which is not necessarily the case for active funds.

As for the Sharpe ratio, we will use ex-post values to compute the TE of our funds. The most common way to compute this metric is to use the NAV returns of the fund. However, in this paper, we will compute the TE based on the exchange price which will have an impact on the ETFs' TE values (Vanguard 2014). Therefore, the TE computed in this paper cannot be compared with the ones from other sources. In addition, since we attributed a standard benchmark for some funds, their TE will be overstated. We also expect the TE in our studies to be higher than other fixed-income funds because of the lower liquidity of Emerging Market bonds (Sparks 2018).

The Information Ratio

The Information ratio (IR) measures the difference of returns between a portfolio and a benchmark. It is often used to evaluate the ability of portfolio manager to beat their benchmark. The IR is computed by the following formula:

$$Information\ Ratio = \frac{E(R_x - R_b)}{TE_x} \tag{4.3}$$

Where: R_x is the return of asset x

R_b is the return of benchmark b

TE_x is the Tracking Error of the asset x and the benchmark b

Like the Sharpe ratio, the IR is a risk-adjusted metric. However, the IR indicates the return gap of the asset compared to a benchmark rather than the excess return in the case of the Sharpe ratio. The denominator in the IR formula (the Tracking Error), represents the consistency of this return gap (Murphy 2020). The lower the TE is, the more consistent the outperformance (or underperformance if the IR is negative) is.

The Jansen's Alpha

The Jansen's Alpha (also simply referred as Alpha) represents the abnormal return of an asset compared to its expected return estimated by the CAPM (Capital Asset Pricing Model). It is one of the most used performance indicators to evaluate the ability of active managers to outperform their benchmark. The Jansen's Alpha can be computed by a modification of the market model such that:

$$\begin{aligned} (R_x - R_f) &= \alpha + \beta(R_b - R_f) \\ \alpha &= (R_x - R_f) - \beta(R_b - R_f) \end{aligned} \tag{4.4}$$

Where: R_x is the return of asset x

R_b is the return of benchmark b

Rf is the risk free rate

In this empirical study, the α and the β will be estimated by regressing[1] the funds' historical returns over their respective benchmark's returns. As mentioned by Blake and al. in their paper published in 1993, this model can be interpreted in two different ways:

[1] All regressions in this paper are performed with the ordinary least squares (OLS) method

1. Like Jansen in 1968, the β can be seen as the sensitivity between the fund and its benchmark. Therefore, the β is also an indicator of the riskiness of the fund compared to the followed index (Jansen 1968).

2. On the other hand, we can imagine that the fund manager has the choice to allocate the investor's money among three assets: a risk-free asset, an active portfolio, and an index fund (passive portfolio). In this interpretation, the β would represent the allocation percentage dedicated to the index fund (Blake et al. 1993).

Performance Indicators Regression

Finally, we want to see if some funds' characteristics have a significant impact over their performance. To do so, we will regress the Sharpe ratio and the Alpha of each funds over the following four independent variables:

- **GOVERNMENT?:** takes 1 if the fund focuses on government bonds, 0 otherwise.
- **HARD CURRENCY?:** takes 1 if the fund's underlying assets are denominated in hard currencies, 0 otherwise.
- **FUND SIZE:** the asset under management (AUM) of the fund.
- **TER:** the total expense ratio of the fund.

$$\begin{aligned} Alpha_{i,j} =& \beta_{1,i,j} GOVERNMENT? + \beta_{2,i,j} HARD\ CURRENCY? \\ &+ \beta_{3,i,j} FUND\ SIZE + \beta_{4,i,j} TER + \epsilon_{i,j} \end{aligned} \tag{4.5}$$

$$\begin{aligned} Sharpe\ Ratio_{i,j} =& \beta_{1,i,j} GOVERNMENT? + \beta_{2,i,j} HARD\ CURRENCY? \\ &+ \beta_{3,i,j} FUND\ SIZE + \beta_{4,i,j} TER + \epsilon_{i,j} \end{aligned} \tag{4.6}$$

Where: i is the fund's ticker

j is the fund's category

4.3 Empirical Results

Statistical Description

The Table 4.3 gives us a summary of the descriptive statistics for the funds' returns of each category. The first column of this table represents the average amount of data points a fund has in a specific category. In fact, many funds in our sample don't have the full 11 years of data because most of them were created between 2012 and 2014. This is especially true for ETFs where only 35 out of 228 funds were listed before 2012 compared to 63 out of 186 for the mutual funds. We also noticed in our data set that we have a higher proportion of active funds that have died (70 dead funds) during the analyzed period than passive funds (14 dead funds). We will discover later in our study that, in addition to the rise of passive investment in EM bonds, this higher dead rate could be explained by the poorer average performance of active funds compared to their benchmark.

Funds Descriptive Data Table								
	Avg. count	Avg. mean	Avg. std	Avg. min	Avg. median	Avg. max	Avg. Ann. Returns	Avg. Ann. Volatility
ETF_GOV_HARD_USD	65.8	0.49%	0.028	-12.79%	0.58%	6.08%	5.88%	0.096
ETF_GOV_HARD_EUR	59.5	0.36%	0.028	-12.97%	0.50%	6.48%	4.36%	0.098
MF_GOV_HARD_USD	69.4	0.25%	0.022	-9.69%	0.36%	5.52%	3.00%	0.078
MF_GOV_HARD_EUR	55.6	0.34%	0.018	-7.96%	0.45%	4.02%	4.10%	0.063
ETF_CORP_HARD_USD	61.3	0.53%	0.027	-13.54%	0.56%	6.55%	6.33%	0.095
ETF_CORP_HARD_EUR	62.7	0.41%	0.028	-10.89%	0.52%	7.96%	4.96%	0.097
MF_CORP_HARD_USD	81.3	0.34%	0.021	-12.06%	0.48%	4.99%	4.10%	0.074
MF_CORP_HARD_EUR	66.7	0.33%	0.020	-9.58%	0.42%	4.91%	3.95%	0.071
ETF_GOV_LCL_USD	73.1	0.20%	0.034	-11.94%	0.40%	8.57%	2.41%	0.116
ETF_GOV_LCL_EUR	61.7	0.16%	0.028	-10.14%	0.25%	6.79%	1.94%	0.098
MF_GOV_LCL_USD	83.8	0.13%	0.038	-12.16%	0.36%	9.74%	1.61%	0.132
MF_GOV_LCL_EUR	73.5	0.08%	0.033	-11.38%	0.29%	7.57%	0.98%	0.114
ACTIVE USD	78.8	0.20%	0.031	-11.33%	0.37%	7.77%	2.46%	0.106
PASSIVE USD	68.0	0.39%	0.030	-12.56%	0.51%	7.06%	4.63%	0.103
ACTIVE EUR	72.0	0.16%	0.026	-9.89%	0.32%	6.06%	1.97%	0.089
PASSIVE EUR	60.4	0.31%	0.028	-11.98%	0.43%	6.68%	3.68%	0.098
ACTIVE	75.2	0.18%	0.028	-10.57%	0.35%	6.87%	2.20%	0.097
PASSIVE	63.4	0.34%	0.029	-12.21%	0.46%	6.83%	4.06%	0.100

Table 4.3: Descriptive statistics of each funds' category

Regarding the returns of the funds, we see that for both U.S. and European markets, ETFs have a higher average annualized return compared to actively managed funds. If we go deeper, we see that it is the Corporate Hard Currency category that has gen-

erated the biggest average annualized returns over the past 11 years with an average of 5.65% in both markets for ETFs and 4.02% for active mutual funds. In terms of average returns, it seems that ETFs and active funds that focused on Government Local Currency bonds achieved poorer performances than the other categories. On the other hand, it is interesting to notice that Active funds seem to better manage their downside and market declines since they have on average more than 1 point of percentage more than passive funds in their minimum monthly returns over the studied period. This is true for both U.S. and European funds.

In terms of risk, as measured here by average annualized volatility, we observe that active funds are slightly less volatile than ETFs. This is particularly true for the Government and Corporate bonds categories, where the active funds' annualized volatility is around 0.02 lower than the equivalent passive category. In addition, we want to emphasize two important points. First, we observe that European funds have a slightly lower volatility than U.S. funds. But since this difference is small and not consistent across all categories, no reliable conclusion can be drawn from this observation. Secondly, for both passive and active funds, the Government Local Currency was the most risky category to focus in. Although this asset class is the most liquid one of the EM bonds, the currency risk increases the volatility which impact the funds' returns (Diment 2019).

We have done the same analysis on the different benchmarks tracked in each category. The table 4.4 allows us to see if the differences between active and passive funds in terms of risk and return are due to the fund managers or simply to the benchmark followed. The first observation we can make from this table is that there is no significant difference between the returns of active and passive benchmarks. We can therefore conclude that in terms of average returns, active managers fail to outperform their passive equivalent. However, from this table, we can also say that the better downside management and lower volatility of active funds is due to the skill of these managers. Indeed, we do not see any differences between passive and active funds in terms of minimum monthly returns and annualized volatility. Finally, the impact of the cur-

Benchmarks Descriptive Data Table								
	Avg. count	Avg. mean	Avg. std	Avg. min	Avg. median	Avg. max	Avg. Ann. Returns	Avg. Ann. Volatility
ETF_GOV_HARD_USD_BENCH	118.1	0.53%	0.023	-13.33%	0.69%	5.82%	6.41%	0.081
ETF_GOV_HARD_EUR_BENCH	112.3	0.48%	0.023	-13.20%	0.61%	5.67%	5.80%	0.081
MF_GOV_HARD_USD_BENCH	132.0	0.58%	0.024	-14.15%	0.83%	6.45%	6.97%	0.083
MF_GOV_HARD_EUR_BENCH	132.0	0.58%	0.024	-14.15%	0.83%	6.45%	6.97%	0.083
ETF_CORP_HARD_USD_BENCH	118.0	0.53%	0.020	-11.19%	0.74%	6.07%	6.36%	0.069
ETF_CORP_HARD_EUR_BENCH	115.0	0.49%	0.020	-11.19%	0.69%	6.07%	5.86%	0.069
MF_CORP_HARD_USD_BENCH	104.0	0.46%	0.019	-11.52%	0.55%	4.45%	5.48%	0.065
MF_CORP_HARD_EUR_BENCH	104.0	0.46%	0.019	-11.52%	0.55%	4.45%	5.48%	0.065
ETF_GOV_LCL_USD_BENCH	132.0	0.29%	0.031	-9.69%	0.68%	8.55%	3.50%	0.106
ETF_GOV_LCL_EUR_BENCH	130.8	0.28%	0.031	-9.53%	0.67%	8.50%	3.36%	0.106
MF_GOV_LCL_USD_BENCH	132.0	0.33%	0.030	-9.83%	0.76%	8.52%	3.98%	0.106
MF_GOV_LCL_EUR_BENCH	132.0	0.33%	0.030	-9.83%	0.76%	8.52%	3.98%	0.106
ACTIVE USD	122.7	0.46%	0.024	-11.84%	0.71%	6.47%	5.48%	0.084
PASSIVE USD	122.7	0.45%	0.025	-11.40%	0.70%	6.81%	5.42%	0.086
ACTIVE EUR	122.7	0.46%	0.024	-11.84%	0.71%	6.47%	5.48%	0.084
PASSIVE EUR	119.3	0.42%	0.025	-11.31%	0.66%	6.75%	5.01%	0.085
ACTIVE	122.7	0.46%	0.024	-11.84%	0.71%	6.47%	5.48%	0.084
PASSIVE	121.0	0.43%	0.025	-11.35%	0.68%	6.78%	5.22%	0.085

Table 4.4: Descriptive statistics of the benchmarks per categories

rency risk is also reflected in the benchmark's performances tracked by the funds in the Government Local Currency bonds category. Lower annualized returns and higher annualized volatility are a common problem for local currencies categories and are not specifically due to poor manager performance.

Performance Ratios Analysis

With respect to the Sharpe ratio, the results of our analysis are more nuanced. In the table 4.5, the average annualized Sharpe ratio over the total active period for each fund is higher for ETFs than for active funds for both European and U.S. markets, which is consistent with the results found by Polwitoon and Tawatnuntachai (2008). Indeed, if we consider our entire sample, ETFs have on average a Sharpe ratio of 0.328 compared to 0.166 for the active funds. However, if we focus only on the last five years, the conclusions are different. In the U.S., active funds focusing on Emerging Market debt have achieved a higher Sharpe ratio for this period than passive funds with a ratio of 0.508 versus 0.402. The opposite is true for European funds where ETFs have a higher annualized Sharpe ratio over the last five years than active funds. If we reduce the Sharpe ratio period to the last year, we observe that on average, active funds have a risk-adjusted return that was 0.029 higher than ETFs. This outperformance is mainly due to European active funds, which recorded a Sharpe ratio of -0.05 versus -0.85 for

European ETFs in 2020 and could be due to the ability of active fund managers to hedge the EUR/USD exchange rate. The underlying reason for these negative risk-adjusted returns of European funds could be the strengthening of the euro against the U.S. dollar as a reaction to the Covid-19 crisis.

This ability to better manage the currency risk could also explain why, over the last five years, U.S. active funds have achieved a Sharpe ratio of 0.533 in the Government Local Currency bonds category, compared to 0.304 for its passive equivalent. It is also interesting to note that the Emerging Market Corporate Hard Currency bond category appears to be the most attractive category for investors in terms of risk-adjusted returns over the past five years. However, if we look over the total period, its is the Emerging Market Government Hard Currency bond category that has the highest Sharpe ratio, with an average of 0.421.

Performance Ratios Table							
	Avg. Sharpe Ratio 1Y	Avg. Sharpe Ratio 5Y	Avg. Sharpe Ratio Active Period [2]	Avg. Tracking Error 1Y	Avg. Tracking Error Active Period	Avg. Information Ratio 1Y	Avg. Information Ratio Active Period
ETF_GOV_HARD_USD	0.327	0.458	0.405	0.033	0.029	-0.160	-0.249
ETF_GOV_HARD_EUR	-0.001	0.384	0.437	0.060	0.055	-1.183	-0.523
MF_GOV_HARD_USD	0.101	0.407	0.189	0.084	0.053	-0.264	-0.738
MF_GOV_HARD_EUR	0.185	0.363	0.616	0.044	0.038	-1.071	-0.989
ETF_CORP_HARD_USD	0.415	0.610	0.454	0.045	0.032	-0.616	-0.391
ETF_CORP_HARD_EUR	-0.035	0.518	0.465	0.079	0.079	-1.222	-0.070
MF_CORP_HARD_USD	0.369	0.527	0.267	0.043	0.027	-0.568	-0.513
MF_CORP_HARD_EUR	0.334	0.520	0.464	0.041	0.040	-1.040	-0.620
ETF_GOV_LCL_USD	0.252	0.304	0.047	0.035	0.041	-0.397	-0.422
ETF_GOV_LCL_EUR	-0.310	0.376	0.182	0.073	0.076	-1.410	-0.264
MF_GOV_LCL_USD	0.237	0.533	-0.052	0.058	0.040	0.012	-0.501
MF_GOV_LCL_EUR	-0.164	0.281	0.047	0.064	0.058	-1.052	-0.617
ACTIVE USD	0.220	0.508	0.080	0.060	0.042	-0.202	-0.569
PASSIVE USD	0.310	0.402	0.276	0.035	0.034	-0.296	-0.329
ACTIVE EUR	-0.005	0.316	0.243	0.054	0.048	-1.168	-0.847
PASSIVE EUR	-0.085	0.393	0.363	0.064	0.063	-1.245	-0.413
ACTIVE	0.109	0.417	0.166	0.057	0.045	-0.679	-0.716
PASSIVE	0.080	0.397	0.328	0.052	0.051	-0.849	-0.379

Table 4.5: Funds' performance metrics per categories

The Table 4.5 also gives us a detailed breakdown of the average annualized tracking error for each category. As expected, for U.S. funds, the tracking error of ETFs is lower than for actively managed funds. However, this is no longer true when it comes to European funds. It seems that the mismatch between the holding of the funds that are mainly in USD and the exchange currency of the funds (the Euro) increases the

[2] funds' activity period over the last 11 years

difficulty for ETFs to track their benchmark. There may also be other reasons for this higher tracking error, such as a potentially lower liquidity on the European exchanges due to a fragmented market where most ETFs' tradings are done off-exchange (Stafford 2016). A 2013 study shows that the fragmentation of the European market affects ETF spread but the results are different depending on the type of ETF (Calamia et al. 2013). In fact, the spread of synthetic ETFs increases significantly when the market concentration is lower. Synthetic replication is much more common in Europe due to the laxer regulation (UCITs regulation) on the topic where around 1/3 of European ETFs are synthetic (this proportion is higher for illiquid assets funds such as EM bonds) (Naumenko and Chystiakova 2015). Further research is needed to analyze the impact of the structure of European stock exchanges on the liquidity of Emerging Market debt ETFs in particular. When we compare different categories within the same market and investment style, we find that the Government Hard Currencies category has the lowest tracking error. In addition, the tracking error seems to increase in the event of market turmoil. The results of our analysis show that the tracking error, over the last year (which was impacted by the Covid-19 crisis), was higher than the average tracking error over the entire period for most categories.

Finally, the Table 4.5 shows the average information ratio for each category calculated over the last year and the full active period of the funds. The first thing we notice is that the IR is negative for every category. This indicates that, on average, both passive and active funds underperform their respective benchmark. We believe that this underperformance is due to the higher transaction cost caused by the lower liquidity of the asset class, which is not reflected in the benchmark returns. We will verify this conclusion through an Alpha analysis in the next section. Furthermore, if we consider the full period of activity, ETFs have a higher IR than active funds. However, this conclusion changes again if we consider only the last year. The fact that the IR of actively managed funds is higher than that of ETFs in 2020, confirms again our hypothesis that active managers are able to limit the impact of volatile market conditions on their portfolio. Regarding the European funds, we are not surprised by their lower

IR than U.S. funds because of the same reason stated earlier (EUR/USD exchange rate volatility).

The Alpha or Abnormal Returns Analysis

On the Table 4.6, we can see the annualized alpha and beta for each category with their respective average p-value and the R^2 (also called coefficient of determination) of the regressions. To minimize the noise in the regressions, we compute these coefficients over the total active period of each fund. The first point we notice is that all categories have negative annualized alpha, indicating that the funds are underperforming their benchmark. This confirms our conclusion made with the information ratios earlier. The only exception to this rule is the European Hard Currency Corporate bond category of ETFs with an average alpha of 0.13%. However, the very high average p-value of this category combined with the low R^2 makes this positive abnormal return statistically invalid. On average, passive funds have underperformed their benchmark by -0.59% on a annual basis compared to -1.86% for active funds. The higher alpha of ETFs could be explained by the in-kind redemption process of ETFs which limits the fund's exposure to the high cost of trading of EM bonds. This results is consistent with the current literature on EM debt funds' performances (Kiymaz and Simsek 2017, Polwitoon and Tawatnuntachai 2008).

For U.S. passive funds, the most attractive category in terms of alpha was the Government Hard Currency, with an alpha of -0.12%. Regarding the U.S. active funds, the highest alpha was in the hard currency corporate bond category (-1.35% per year) and it is the only active fund category with higher alpha than its equivalent passive category. This higher performance of fund managers in Emerging Corporate bonds could come from the opportunities created by the "sovereign ceiling" caused by the company's government credit rating (Durbin and David 2005). This cap stems from the view that no company is more creditworthy than its home country and thus can create an undervaluation of corporate bonds backed by strong fundamentals (Diment 2019). Having a lower average alpha's p-value for the active funds is an expected out-

comes of the regression since active managers will use investment strategy that will not fully replicate the benchmark returns.

Alpha/Beta Table					
	Ann. Alpha	Avg. Alpha p-value	Avg. Beta	Avg. Beta p-value	Avg. R^2
ETF_GOV_HARD_USD	-0.12%	0.583	0.930	4.13E-05	0.889
ETF_GOV_HARD_EUR	-0.50%	0.506	0.802	1.33E-02	0.664
MF_GOV_HARD_USD	-2.41%	0.372	0.810	2.08E-05	0.661
MF_GOV_HARD_EUR	-0.61%	0.475	0.650	1.43E-03	0.672
ETF_CORP_HARD_USD	-2.16%	0.167	1.146	4.78E-12	0.894
ETF_CORP_HARD_EUR	0.13%	0.671	0.858	1.61E-03	0.345
MF_CORP_HARD_USD	-1.35%	0.164	0.963	5.20E-07	0.875
MF_CORP_HARD_EUR	-0.35%	0.107	0.738	3.33E-02	0.640
ETF_GOV_LCL_USD	-1.11%	0.371	0.977	5.33E-05	0.830
ETF_GOV_LCL_EUR	-0.69%	0.695	0.668	3.33E-05	0.504
MF_GOV_LCL_USD	-1.59%	0.189	1.242	1.74E-08	0.946
MF_GOV_LCL_EUR	-2.83%	0.344	0.972	3.81E-06	0.721
ACTIVE USD	-1.70%	0.232	1.047	6.67E-06	0.840
PASSIVE USD	-0.71%	0.459	0.971	4.13E-05	0.867
ACTIVE EUR	-2.01%	0.355	0.810	4.20E-04	0.706
PASSIVE EUR	-0.51%	0.575	0.766	8.47E-03	0.593
ACTIVE	-1.86%	0.297	0.922	2.25E-04	0.769
PASSIVE	-0.59%	0.528	0.848	5.11E-03	0.702

Table 4.6: Average Alpha and Beta per categories

When we look at the average R^2, we find that European funds have a lower coefficient of determination than their respective U.S. categories. This implies that the European funds' regressions have less explanatory power than the U.S. funds' regressions due to a smaller proportion of the funds' variance being explained by the benchmark they track. Two main reasons could be behind this uncorrelated volatility between the European funds and there benchmark:

- The currency exposure (EUR/USD) of these funds adds a volatility component to their returns that is often not reflected in the index they track.
- The potentially higher spread of ETFs traded on a minor European exchange. This spread increases the difference between the traded price and the NAV of the fund and thus increase their overall volatility.

Moreover, for American funds, we do not observe a major difference in the R^2 between passive and active funds. However, for European funds, the higher R^2 of active funds could reflect the hedging strategy implemented by some managers to limit the volatility caused by the fluctuation of the EUR/USD exchange rate.

Regarding the beta, we note that, for the Government Hard Currency and the Corporate Hard Currency categories, the average beta of the ETFs are higher than the one of the active funds for their respective market (Europe or U.S.). This implies that ETFs are more correlated to their respective benchmark than actively managed funds. This result was also expected because the main objective of an ETF is to track its benchmark and, according to the interpretation of Blake and al., passive managers should therefore allocate all fund resources to the index fund (meaning applying the best strategy to track this index). However, it is not the case for the Government Local Currency bonds where both U.S. and European active funds have a higher beta than passive funds. It seems that the strategy used by active managers in this category remains highly correlated to their benchmark movements. This is particularly true for the U.S. active funds in this category, which have an average beta of 1.242 over the past 11 years.

Finally, we plotted the alphas of the passive and active funds on two histograms (see Figure 4.1 and 4.2) to analyze their respective distribution. We can draw several conclusions from these graphs:

1. For active funds, there are more statistically significant alphas (p-value less than 0.1) than for passive funds. In fact, 95 funds (more than 50% of active funds) have significant alpha over the last 11 years, compared to only 32 for ETFs.

2. We don't observe statistically significant positive alpha for ETFs. However, there are eight active funds that had an abnormal return above 2.5% with a p-value less than 0.1. Thus, while on average active funds are not able to beat their benchmark consistently, some active managers can. If we include the positive

alphas that are not statistically significant, 33 active funds made a positive abnormal return over the study period, which represents 17.7% of all our active funds.

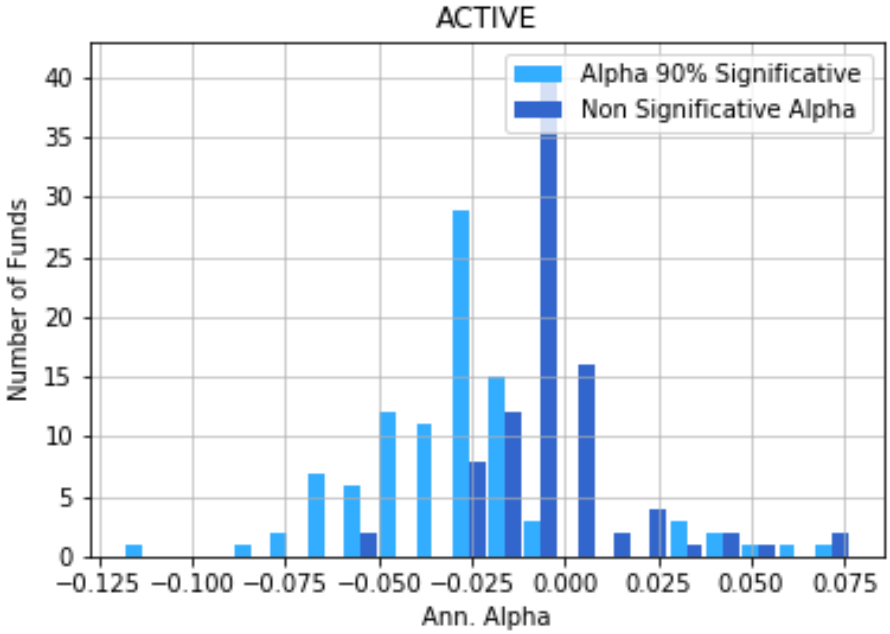


Figure 4.1: Active funds' alpha distribution

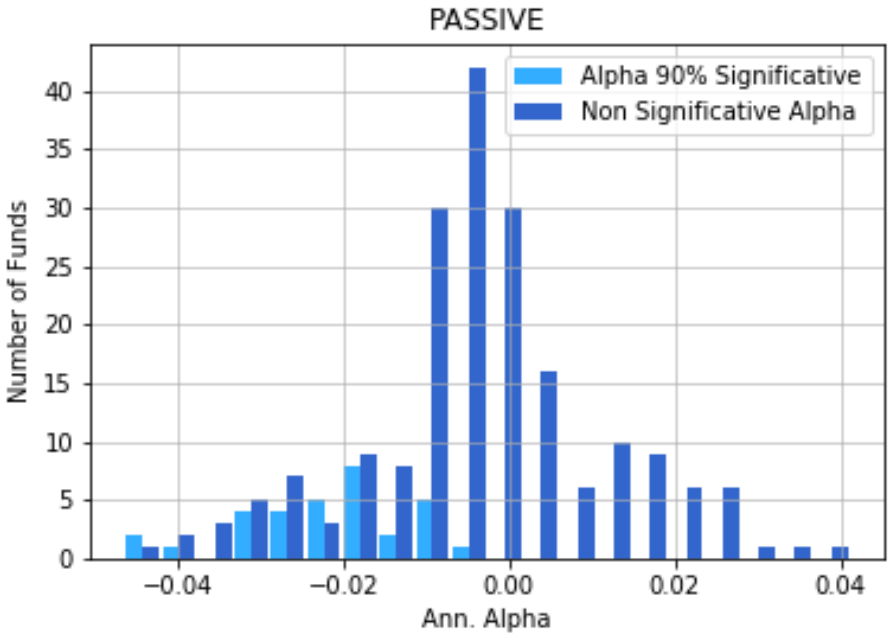


Figure 4.2: Passive funds' alpha distribution

3. We observe that the distribution of alphas for active funds is wider than that of passive funds. Indeed, the standard deviation of the alphas for active funds is 0.028 against 0.015 for ETFs. We can also analyze the tails of these two distributions by calculating their respective kurtosis. The kurtosis of the Figure 4.1 (active funds) is equal to 1.93 against 0.28 for the Figure 4.2 (the ETFs). The higher standard deviation and kurtosis of active funds' alphas indicate that when selecting a fund, the probability of reaching extreme values in terms of abnormal returns is higher for active funds than for ETFs. In addition, the positive skewness of 0.37 for this distribution indicates that right tails tend to be thicker and longer than left tails, which would limit the downside of selecting an active fund in term of alphas. However, investors should keep in mind that the probability of choosing a active fund with a negative alpha is higher than a active fund with a positive alpha (without even taking the fees into account).

Appendix 4 is a detailed list of graphs that represents the distribution of alphas for each of the 12 funds categories. It is interesting to note that only two actively managed mutual fund categories have a significant positive alphas: European Corporate Hard Currency bonds and U.S. hard currency corporate bonds. This result confirms our earlier suggestion that corporate bonds may be the category with the most opportunities and market inefficiencies for active managers to exploit.

EM Funds' Performances in Different Market Conditions

Regressions' Coefficients When the Market Rise or Fall

In this section, we will analyze the alpha and beta behavior of each category under different market conditions. For this purpose, we split the returns of our funds in two different samples depending on whether the returns of their respective benchmark were positive or negative. This analysis will allow us to confirm or not our hypothesis on the ability of portfolio managers to limit the impact of a market sell-off.

If we look at U.S. funds, we see that both active and passive funds have lower alpha when their benchmarks have positive returns. In fact, in rising market conditions, U.S. passive funds have alpha of -1.66% and -2.69% for active funds, versus -0.71% and -1.70% over the full period. The only category of American active funds that has a higher annualized alpha when its benchmarks rise is the Corporate Hard Currency bonds with an alpha of -0.09% compared to -1.35%. As a result, it remains the only active category to outperform ETFs even in bull markets.

Alpha/Beta When Market Rises					
	Avg. Ann. Alpha market rises	Avg. Alpha p-value	Avg. Beta market rises	Avg. Beta p-value	Avg. R-squared
ETF_GOV_HARD_USD	-1.54%	0.570	0.976	0.0003	0.784
ETF_GOV_HARD_EUR	0.30%	0.543	0.705	0.0622	0.432
MF_GOV_HARD_USD	-3.97%	0.452	0.878	0.0066	0.515
MF_GOV_HARD_EUR	-0.34%	0.420	0.620	0.0142	0.526
ETF_CORP_HARD_USD	-2.63%	0.338	1.139	0.0010	0.677
ETF_CORP_HARD_EUR	5.56%	0.494	0.436	0.2527	0.097
MF_CORP_HARD_USD	-0.09%	0.455	0.846	0.0156	0.728
MF_CORP_HARD_EUR	2.26%	0.209	0.558	0.1554	0.491
ETF_GOV_LCL_USD	-1.55%	0.409	0.951	0.0400	0.726
ETF_GOV_LCL_EUR	-1.81%	0.586	0.629	0.0355	0.228
MF_GOV_LCL_USD	-2.68%	0.343	1.282	0.0017	0.868
MF_GOV_LCL_EUR	-2.57%	0.409	0.932	0.0170	0.512
ACTIVE USD	-2.69%	0.380	1.075	0.008	0.726
PASSIVE USD	-1.66%	0.485	0.984	0.015	0.751
ACTIVE EUR	-1.95%	0.386	0.776	0.016	0.529
PASSIVE EUR	0.05%	0.553	0.662	0.068	0.347
ACTIVE	-2.30%	0.383	0.917	0.012	0.621
PASSIVE	-0.63%	0.525	0.791	0.047	0.508

Table 4.7: Average Alpha and Beta per categories in rising market conditions

The situation is different for European funds. On the 4.7, we see that five out of six European fund categories have a higher alpha in rising market conditions than in the overall period. Even more surprising is the high positive alpha of European Corporate Hard Currency bonds ETFs and active funds. While these results may make sense for the active funds, it is unlikely that ETFs in this category would have an abnormal annualized return of 5.56% when their benchmarks have positive returns. Again, the high p-value of 0.494 and the very low R^2 of 0.097 indicate that we should not rely on these regression's parameters because they are not representing the true ETFs' performances. To summarize, with the exception of one category, European and American active funds fail to outperform their passive counterparts in rising market conditions.

Let's now look at the impact of market declines on the alpha (see Table 4.8). The results of our analysis show that most categories of passive and active funds outperform their benchmark during market declines. However, two active fund categories have negative alphas, namely hard currency government bonds and local currency government bonds. The wider gap between active and passive alphas in these two categories, combined with the inability, on average, of portfolio managers to protect their portfolios in a bear market, makes them the least attractive categories for investors who wish to invest in active funds. We also observe two questionable results from this analysis for the alpha of the European ETF Government Local Currency bonds and the European ETFs Corporate Hard Currency bonds categories. Indeed, it is highly unlikely that these two categories of ETFs will outperform their benchmark by more than 10% per year when the latter falls. Therefore, we will not consider these results in our conclusions. With the exception of the U.S. Corporate bond funds, this analysis does not provide us supporting evidence of an active management outperformance in market downturns in terms of abnormal returns.

Finally, we believe that these alphas could be overestimated by the lower liquidity of Emerging Market bonds. Indeed, these bonds are traded on OTC markets where there is a lack of transparency regarding the price and the transactions of these securities. Some funds may have to wait a few days before they can sell their positions, which creates a lag period between the fund's returns and those of its benchmark. This lag period reduces the correlation between the benchmark (lower beta) and the funds which therefore increases the alpha (Pedersen 2015). This effect could be even stronger here because of the isolation of fund returns realized during a downturn, (due to the lower liquidity of these market conditions).

Alpha/Beta When Market Decreases					
	Avg. Ann. Alpha market declines	Avg. Alpha p-value	Avg. Beta market declines	Avg. Beta p-value	Avg. R-squared
ETF_GOV_HARD_USD	0.69%	0.293	0.937	0.0012	0.909
ETF_GOV_HARD_EUR	5.69%	0.227	0.936	0.0058	0.777
MF_GOV_HARD_USD	-2.71%	0.419	0.777	0.0724	0.598
MF_GOV_HARD_EUR	1.73%	0.548	0.697	0.1061	0.602
ETF_CORP_HARD_USD	0.67%	0.417	1.197	0.0000	0.957
ETF_CORP_HARD_EUR	10.46%	0.300	1.330	0.0219	0.493
MF_CORP_HARD_USD	0.93%	0.327	1.045	0.0050	0.848
MF_CORP_HARD_EUR	1.52%	0.375	0.822	0.0974	0.632
ETF_GOV_LCL_USD	3.79%	0.428	1.103	0.0008	0.833
ETF_GOV_LCL_EUR	11.92%	0.157	0.981	0.0028	0.591
MF_GOV_LCL_USD	-2.18%	0.423	1.221	0.0000	0.915
MF_GOV_LCL_EUR	2.15%	0.263	1.112	0.0013	0.705
ACTIVE USD	-1.66%	0.384	1.042	0.024	0.802
PASSIVE USD	1.85%	0.357	1.028	0.001	0.886
ACTIVE EUR	1.99%	0.347	0.919	0.032	0.680
PASSIVE EUR	7.91%	0.211	0.978	0.006	0.701
ACTIVE	0.27%	0.364	0.977	0.028	0.737
PASSIVE	5.49%	0.269	0.998	0.004	0.774

Table 4.8: Average Alpha and Beta per categories in decreasing market conditions

Alpha Distribution in Different Market Conditions

We will now look at the impact of changing market conditions on the alpha distribution of Emerging Market bonds funds. For this analysis, we have separated European and U.S. funds because of the currency impact suffered by euro funds and the unlikely alpha of some euro categories. If we look at the histograms of the U.S. funds (see Figure 4.3) and the first four moments of their alpha distributions (see Table 4.9), four major points are notable:

1. U.S. ETF alphas have a higher average when their benchmarks have negative returns than when they are positive. This implies a shift of this distribution to the right when the market is falling which illustrate the conclusion drawn from the table 4.8.

2. We also observe an increase in the standard deviation of the distribution of U.S. ETFs' alphas in declining market conditions. This wider distribution could be caused by the different tracking strategies used by ETFs' managers that perform differently in more difficult market conditions due to higher illiquidity of the assets the funds hold.

3. The shape of the distribution of U.S. ETF alphas also changes as there is a significant difference between the skewness and kurtosis of the distribution depending on whether the market is rising or falling (respectively -0.121 and 5.079 compared to 4.120 and 22.724). When their benchmark is experiencing negative returns, this distribution becomes skewed to the right and has thicker tails. This implies that more alphas reach extreme positive values in these conditions.

4. Finally, the results of this analysis are completely different for the American active funds. Indeed, we do not discern significant changes in the different moments of the alphas distribution according to market conditions. The distribution of alphas for American active funds thus seems independent of the sign of their benchmark returns.

Market Rise				
	Standard Deviation	Mean	Skewness	Kurtosis
ETF_USD	0.034	-0.016	-0.121	5.079
ETF_EUR	0.050	0.0005	1.033	2.734
MF_USD	0.037	-0.023	-1.973	6.249
MF_EUR	0.061	-0.005	1.591	4.096
Market Decline				
	Standard Deviation	Mean	Skewness	Kurtosis
ETF_USD	0.075	0.018	4.120	22.724
ETF_EUR	0.073	0.079	0.010	-0.718
MF_USD	0.037	-0.015	-1.995	6.832
MF_EUR	0.060	0.018	0.766	0.261

Table 4.9: Summary table of the alpha distributions in different market conditions

For European funds, we also observe in the figure 4.4 that the alpha distribution of ETFs is more affected by the market movement than that of active funds. The distribution of ETFs changes from a unimodal distribution when the market is rising to a bimodal distribution when it is falling. Since the distribution is no longer unimodal, skewness and kurtosis are inappropriate measures and can't be used to evaluate the shape of the distribution. Furthermore, for active and passive funds in Europe, we notice a rightward shift in the distribution due to an increase in the average alpha when

the market declines.

Finally, European funds have a much wider distribution of alpha than American funds. We assume that it is the impact of the change in the EUR/USD exchange rate that increases the volatility of the funds' returns and has a direct impact on alpha. We also believe that the lower impact of market conditions on the distribution of active funds is due to their strategy designed to beat their benchmarks. The fact that the funds' strategy aims to have returns uncorrelated with their benchmark makes these alphas more statistically significant and less dependent on benchmark movement.

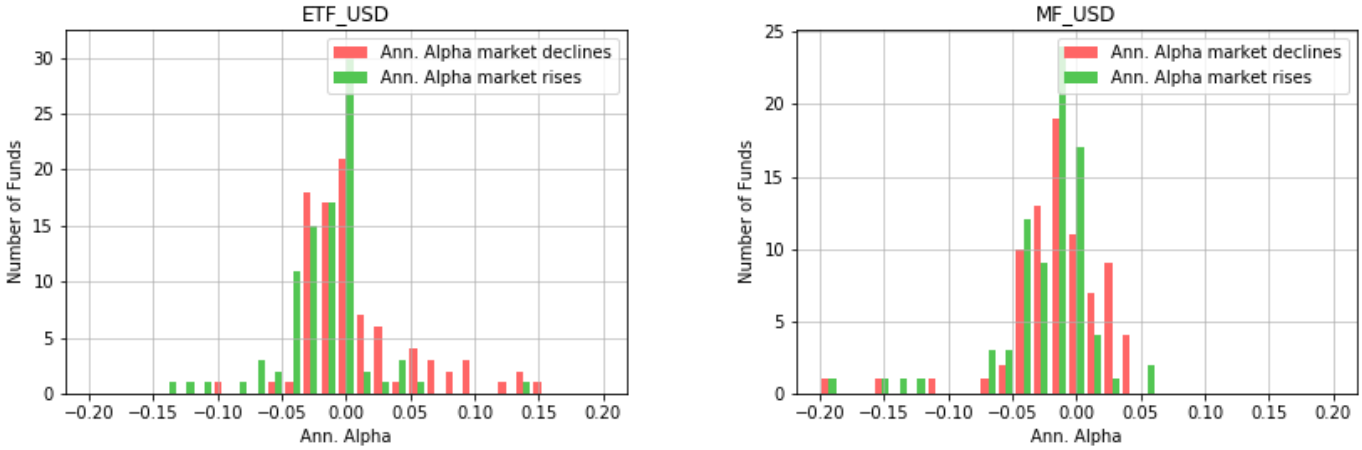


Figure 4.3: Alpha distribution of U.S. funds in different market conditions

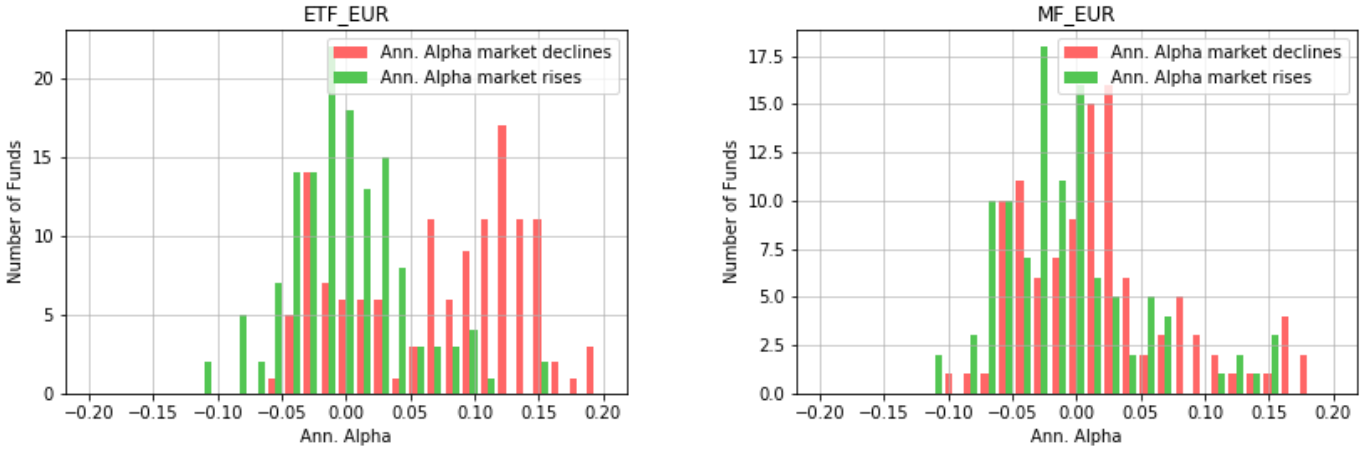


Figure 4.4: Alpha distribution of European funds in different market conditions

Funds' Beta in Different Market Conditions

We will devote the final parts of this analysis on the impact of changing market conditions to the beta. The Figures 4.5 and 4.6 represent the average excess returns of the funds relative to the excess returns of the benchmark. The betas were calculated by fitting linear regressions on the average fund returns and the average benchmark returns of the desired categories. Looking at the U.S., passive and active funds do not see their beta change with the performance of their benchmark. However, this is not the case for euro funds where we observe a reduction in correlation with their benchmark when the market is growing. The magnitude of this change is higher for European ETFs, whose beta goes from 0.92 (market down) to 0.56 (market up), compared to 0.97 to 0.81 for active funds.

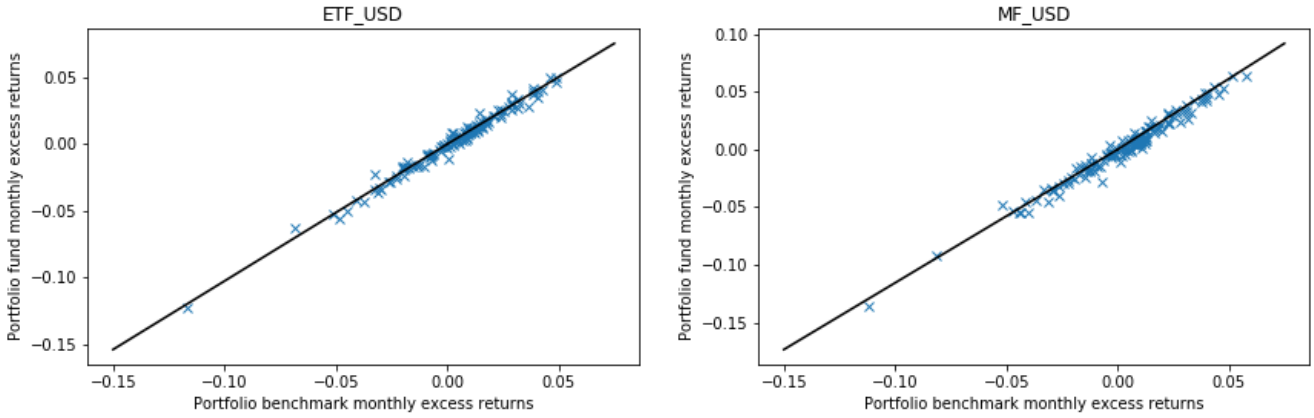


Figure 4.5: Variation of U.S. funds' beta in different market conditions

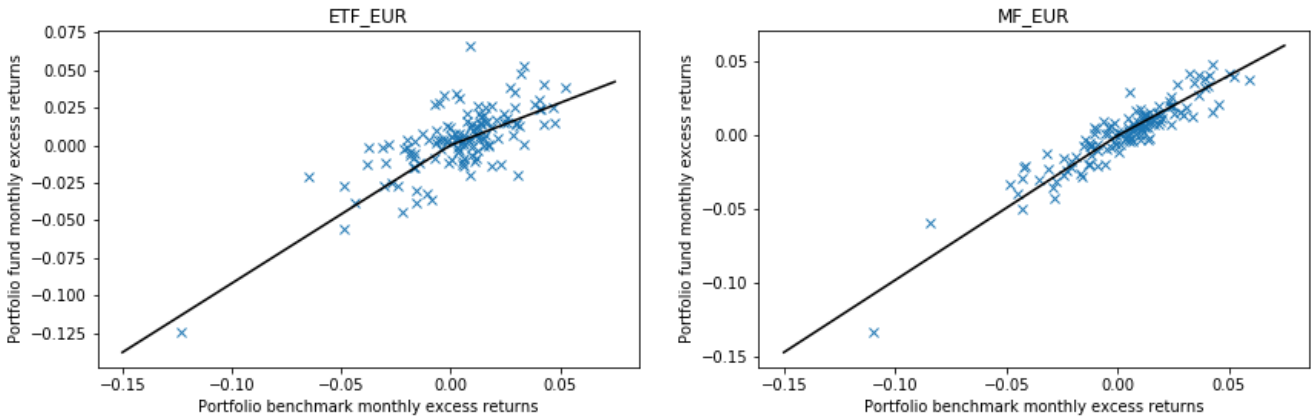


Figure 4.6: Variation of European funds' beta in different market conditions

Regressing the Performance Indicators over the Funds' Characteristics

As mentioned in the methodology, the objective of this subsection is to determine whether or not certain fund's characteristics have a significant impact on their performance measures. We hope the results of this regression will help investors interested in Emerging Market debt to choose the most attractive funds. Here is what we observed from these regressions (see Table 4.10):

- **Government or Corporate:** This factor is significant for both the Sharpe ratio and the alpha (except for the Sharpe ratio of U.S. funds). However, the sign of the coefficient changes depending on the performance measure. Indeed, we observe that investing in Emerging Market Corporate bonds has a positive impact on the alpha[3] but a negative impact on the adjusted-return. This choice will therefore depend on the investor's objectives and risk profile.

- **Hard or Local Currency:** For three out of four regressions, this variable has a significant influence on fund returns. We observe that investing in hard currency improves the alpha and Sharpe ratio of the funds. However, the magnitude of this influence is larger on the risk-adjusted returns than on abnormal ones. Therefore, although local currency bonds offer a greater liquidity and improve the country's financial stability, the currency risk and hedging cost associated with it make it less attractive to foreign investors.

- **Fund Size:** With the exception of the Sharpe ratio for U.S. funds, the fund size (in terms of assets under management) does not appear to have an impact on fund performance. The very low coefficient and high p-values in our regressions show that the potential economies of scale enjoyed by larger funds do not translate into better performance on Emerging Market debt.

[3]The negative coefficient here indicates a positive relationship with Corporate bonds since the variable takes the value 1 if it is a Government bond and 0 otherwise.

- **Total Expense Ratio:** As the table shows, the influence of TER on fund performance is consistent with the literature on the topic. We see that for most categories, the TER is negatively correlated with the Sharpe ratio and the alpha. In addition of being more expensive, funds that charge higher fees tend to underperform funds with lower fees. Thus, in general, passive funds such as ETFs are a better option for investors who wish to invest in this asset class.

Regression: Funds' Characteristics over Alpha/Sharpe								
	GOVERNMENT?	p-value	HARD CURRENCY?	p-value	Fund Size	p-value	TER	p-value
USD Funds over Alpha	-0.0047	0.0401	-0.0020	0.3835	5.419E-07	0.1619	-0.0098	2.712E-06
USD Funds over Sharpe	0.0052	0.8349	0.3407	2.622E-27	8.577E-06	0.04248	-0.0460	0.0378
EUR Funds over Alpha	-0.0097	0.0002	0.0108	7.381E-05	6.720E-08	0.9056	-0.0125	2.103E-06
EUR Funds over Sharpe	0.0803	0.0003	0.4076	5.656E-46	-3.514E-06	0.4655	0.0189	0.3894

Table 4.10: Regression coefficients of performance measures over the funds' characteristics

4.4 Conclusion

Our research shows that both active and passive funds focused on EM fixed-income underperform their respective benchmarks which is likely due to the high cost of trading of these securities. In addition, for most of the categories we analyzed, active funds were unable to outperform ETFs. This performance gap would have been even larger if we had taken into account the fees charged by both investment styles. Therefore, on average, the answer to our research question is that ETFs have higher performances than active funds in Emerging Market debt.

However, while it is not the majority, we also found evidence that some active funds can make lasting positive abnormal returns. This is particularly the case for the U.S. active Corporate Hard Currency funds, which achieved higher alpha than their ETF counterparts, regardless of market conditions. In addition, active management showed satisfactory results in managing volatility and downside risk, as active funds

achieved a higher average Sharpe ratio, Information and, a lower minimum returns than passive funds during the Covid-19 market sell-off in 2020.

Finally, our research also revealed that European ETFs struggle more than U.S. ETFs in terms of index tracking. The correlation between these funds and their benchmarks is unstable and changes dramatically depending on whether the market is going up or down. The most likely cause of this unstable beta and higher average tracking error is the fluctuating EUR/USD exchange rate, which impacts the volatility of these mostly unhedged ETFs. This problem has also been detected in the performance of European active funds, but on a smaller scale, suggesting that active funds has been able to manage this problem better.

5 General Conclusion

The objective of this thesis was to determine whether active managers were able to outperform ETFs on emerging market debt as well as gaining a better understanding of this asset class. We chose this topic because it is at the center of debates that are currently animating the financial world and its regulators. Indeed, on the one hand, we have witnessed the rise of passive investment funds such as ETFs that have taken over the mutual fund industry, which worries many investors about the impact this trend could have on financial stability. On the other hand, many investors increasingly poured capital into emerging market bonds in order to get a decent return compared to developed countries, due to the low-interest-rate environment that started around 15 years ago. Furthermore, the literature on the performance of EM bond funds is very limited and does not fully capture the complexity and diversity of this asset class. We, therefore, hope that the results of our thesis will fill this gap and help investors to make the right decision when investing in emerging market debt.

In our study, we analyze the monthly returns of 414 investment funds focused on emerging market debt between 2010 and 2020. Our sample includes active funds and ETFs based in the United States and Europe. To refine the quality of our results, we divided our sample into 12 categories based on fund characteristics and objectives. In fact, two major trends within the EM bond universe have made the asset class more complex and prevent us from studying it as a whole. The first is the rise of local currency debt, which has become more important than hard currency debt and now accounts for more than 80% of all EM bonds. The second is the growing development of emerging market corporate bonds, which are now a recognized asset class for international and institutional investors.

The main result of our analysis is that, on average, ETFs performed better in terms of alpha and risk-adjusted return than actively managed mutual funds over our 11-year period. This conclusion is also reflected in the negative correlation we found between the TER of the funds and their performance. For both ETFs and mutual funds, we observed negative alphas relative to their respective benchmarks due primarily to the high transaction cost imposed by the asset class's low liquidity, which is not reflected in the index returns. Furthermore, the underperformance of active funds does not seem to depend on the condition of the market since this observation does not change when the market goes up or down. These results are consistent with the majority of the literature on active and passive investment strategies and EM bond funds.

Separating the U.S. funds from the European funds, we noticed that the European ETFs have a harder time tracking their benchmark. We found that European ETFs have a higher tracking error than U.S. ETFs and that their tracking performance is strongly impacted by changing market conditions since there is a significant difference in their beta when the market goes up or down. This problem also translated into a lower R^2 of the regression run on these funds, indicating that a smaller proportion of the funds' variance is explained by their benchmark. We believe that the difficulties encountered by European ETFs are mainly due to the volatility of the EUR/USD exchange rate and the lower concentration of European equity markets. Further research on European ETFs focused on emerging market debt is still needed to confirm these results.

However, while we found that ETFs appear to be the best option for investors looking to invest in emerging market debt, we also discovered evidence of significant outperformance by active managers in a specific category and over shorter time periods. Indeed, our findings show that U.S. active managers of emerging market corporate bond funds have outperformed their ETF counterparts in terms of Sharpe ratio and alpha over the past 11 years. In addition, we also find that active funds achieved

higher risk-adjusted returns than passive funds in most categories during the 2020 Covid-19 sell-off. This result supports our previous argument regarding the ability of active managers to mitigate the various risks associated with EM bonds and protect the downside of their portfolios. The three main risks driving the volatility of the asset class that we identified in our thesis are the default risk, currency risk and liquidity risk.

Finally, the short- and medium-term future trends of the asset class are uncertain. Although the impact of the pandemic on developing countries has been less catastrophic than expected, it has left many emerging countries in a difficult position with respect to their debt levels. Unequal access to vaccines among emerging countries will have a significant impact on their economic recovery and, as a result, will further widen the differences between bond issuing entities in this asset class. There is also a risk of a U.S. rate hike in response to a potential return of inflation which could also impact many developing countries that rely on foreign debt. The reduced visibility imposed by the current situation will certainly increase volatility of the asset class but will certainly create opportunities for investors.

Bibliography

Anadu, K., Kruttli, M., McCabe, P., & Osambela, E. (2020). The shift from active to passive investing: Risks to financial stability? *Federal Reserve Bank of Boston*. https://doi.org/0.17016/FEDS.2018.060r1

Atradius. (2015). Us interest rate rise: Emerging markets at risk. *Atradius Economic Research*. https://atradius.be/fr/rapports/us-interest-rate-rise-emerging-markets-at-risk.html

Beck, R. (2001). Do country fundamentals explain emerging market bond spreads? http://ssrn.com/abstract=917126

Blake, C. R., Elton, E. J., & Gruber, M. J. (1993). The performance of bond mutual funds. *The Journal of Business*, *66*(3), 371. https://doi.org/10.1086/296609

Blitz, D. (2014). The dark side of passive investing. *Journal of Portfolio Management*, *41*(1). https://doi.org/10.3905/jpm.2014.41.1.001

Bogle, J. C. (1998). The implications of style analysis for mutual fund performance evaluation. *The Journal of Portfolio Management*, *24*(4), 34–42. https://doi.org/10.3905/jpm.1998.409652

Calamia, A., Deville, L., & F., R. (2013). Liquidity in european equity etfs: What really matters? *GREDEG CNRS Working Paper*. http://www.gredeg.cnrs.fr/working-papers/gredeg-wp-2013-10.pdf

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of Finance*, *52*(1), 57–82. https://doi.org/10.1111/j.1540-6261.1997.tb03808.x

CFA Institute. (2020). Is the coronavirus rocking the foundations of capital markets. Retrieved February 20, 2021, from https://www.cfainstitute.org/-/media/documents/survey/cfa-coronavirus-ec-report-2020.ashx

Chen, S., & Jang, H. (1994). On selectivity and market timing ability of u.s.-based international mutual funds: Using refined jensen's measure. *Global Finance Journal*, *5*(1), 1–15. https://doi.org/10.1016/1044-0283(94)90011-6

Cuadra, & Sapriza. (2008). Sovereign default, interest rates and political uncertainty in emerging markets. *Journal of International Economics*, *76*(4), 78–88. https://doi.org/10.1016/j.jinteco.2008.05.001

Dabrowski, M. (2020). *Is covid-19 triggering a new emerging-market crisis?* Retrieved August 17, 2020, from from%20https://www.bruegel.org/2020/03/is-covid-19-triggering-a-new-emerging-market-crisis/

Dalio, R. (2018). *Big debt crises*. Westport.

Darolles, S., Dudek, J., & Le Fol, G. (2016). Gauging liquidity risk in emerging market bond index funds. *Annals of Economics and Statistics*, *23/124*, 247–269. https://doi.org/10.15609/annaeconstat2009.123-124.0247

Dathan, M., & Davydenko, S. (2020). Debt issuance in the era of passive investment. https://doi.org/10.2139/ssrn.3152612

Dehn, J. (2019). The em fixed income universe version 8.0. *Amshore: The Emerging View*. http://www.ashmoregroup.com/sites/default/files/article-docs/EV-August19-The-EM-fixed-income-universe-version-8.0_3.pdf

Dehn, J., & Bocket, R. (2017). Em risk-free return. http://www.ashmoregroup.com/sites/default/files/article-docs/EV%5C%20Oct%5C%202017%5C%20-%5C%20EM%5C%20risk-free%5C%20return_2.pdf

Demertzis, M., & Viegi, N. (2021). Low interest rates in europe and the us: One trend, two stories. *Bruegel, Policy Contribution*, *07*. https://www.bruegel.org/wp-content/uploads/2021/03/PC-07-2021.pdf

Dickson, J. M., Mance, L., & Rowley, J. J. (2013). Understanding synthetic etfs. *Vanguard research*. https://www.vanguard.com.hk/documents/understand-synthetic-etfs-tlrv.pdf

Didier, T., & Schmukler, S. L. (2014). Debt markets in emerging economies: Major trends. *Economic Studies*, *56*(2), 200–228. https://doi.org/10.1057/ces.2014.4

Diment, B. (2019). The four pillars of emerging market debt. https://www.aberdeenstandard.com/en/insights-thinking-aloud/article-page/the-four-pillars-of-emerging-market-debt

Divecha, A. B., Drach, J., & Stefek, D. (1992). Emerging markets. *The Journal of Portfolio Management*, *19*(1), 41–50. https://doi.org/10.3905/jpm.1992.409433

Duffie, D., Gârleanu, N., & Pedersen, L. (2004). Over-the-counter markets. *Stanford University*. https://web.stanford.edu/~duffie/OTCmarkets.pdf

Durbin, E., & David, N. (2005). The sovereign ceiling and emerging market corporate bond spreads. *Journal of International Money and Finance*, *24*, 631–649. https://doi.org/10.1016/j.jimonfin.2005.03.005

Eaker, M., & Grant, D. (1987). Cross-hedging foreign currency risk. *Journal of International Money and Finance*, *6*, 85–105. https://doi.org/10.1016/0261-5606(87)90015-5

Fama, E. F. (1970). Efficient capital markets: A review of theory and empirical work. *The Journal of Finance*, *25*, 383–417. https://doi.org/10.2307/2325486

Fasano, A., & Galloppo, G. (2016). Emerging market active managers: Skilled or stubborn? *Journal of Behavioral and Experimental Finance*, *9*, 132–135. https://doi.org/10.1016/j.jbef.2015.11.001

Federal Reserve Board. (1998). Trading and capital-markets activities manual. https://www.federalreserve.gov/boarddocs/supmanual/trading/4000p2.pdf

Ferri, R. (2009). *The etf book: All you need to know about exchange-traded funds*. Wiley.

French, K. R. (2008). Presidential address: The cost of active investing. *The Journal of Finance*, *63*(4), 1537–1573. https://doi.org/10.1111/j.1540-6261.2008.01368.x

Goldman Sachs. (2018). Rethinking bond etf liquidity. https://www.gsam.com/content/dam/gsam/pdfs/us/en/ETF/rethinking-bond-etf-liquidity-august-2018.pdf?sa=n%5C&rd=n

Gottesman, A., & Morey, M. R. (2007). Predicting emerging market mutual fund performance. *The Journal of Investing*, *16*(3), 111–122. https://doi.org/10.3905/joi.2007.694780

Graham, B., Zweig, J., & Buffet, W. (2003). *The intelligent investor: The definitive book on value investing. a book of practical counsel (revised edition)*. HarperCollins.

Grossman, S., & Stiglitz, J. (1980). On the impossibility of informationally efficient markets. *The American Economic Review*, *70*(3), 393–408. http://www.jstor.org/stable/1805228

Guerard, J. B., & Chettiappan, S. (2017). Active quant:applied investment research in emerging markets. *he Journal of Investing*, *26*(4), 138–152. https://doi.org/10.3905/joi.2017.26.4.138

Hargave, M. (n.d.). *How to use the sharpe ratio to analyze portfolio risk and return*. Retrieved August 24, 2020, from https://www.investopedia.com/terms/s/sharperatio.asp

Harris, L. (2015). The functioning of financial markets. *CFA Institute*. https://www.cfainstitute.org/-/media/documents/support/programs/investment-foundations/15-the-functioning-of-financial-markets.ashx

Hill, D., J. M.and Nadig, & Hougan, M. (2015). A comprehensive guide to exchange-traded funds (etfs). *CFA*. https://www.cfainstitute.org/en/research/foundation/2015/a-comprehensive-guide-to-exchange-traded-funds-etfs

Huij, J., & Post, T. (2011). On the performance of emerging market equity mutual funds. *Emerging Markets Review*, *12*(3), 238–249. https://doi.org/10.1016/j.ememar.2011.03.001

Hund, J., & Lesmond, D. (2008). Liquidity and credit risk in emerging debt markets. https://doi.org/10.2139/ssrn.1107586

Jansen, M. (1968). Problem in selection of security portfolios. *The Journal of Finance*, *23*(2). https://doi.org/10.1111/j.1540-6261.1968.tb00815.x

J.P. Morgan. (2018). Embi global diversified. *Global Index & Portfolio Research*. https://www.jpmorgan.com/content/dam/jpm/cib/complex/content/markets/composition-docs/pdf-27.pdf

Kiymaz, H., & Simsek, K. D. (2017). The performance of us-based emerging market mutual funds. *Journal of Capital Markets Studies*, *1*(1), 58–73. https://doi.org/10.1108/jcms-10-2017-003

Mackenzie, M. (2020). Active managers fail to beat the market again. *Financial Times*. Retrieved February 20, 2021, from https://www.ft.com/content/7e4c0d91-8b6d-419b-9be3-80131d5cb462

Malkiel, B. G. (1995). Returns from investing in equity mutual funds 1971 to 1991. *The Journal of Finance*, *50*(2), 549–572. https://doi.org/10.1111/j.1540-6261.1995.tb04795.x

McKinsey Global Institute. (2018). Outperformers: High-growth emerging economies and the companies that propel them. https://www.mckinsey.com/featured-insights/innovation-and-growth/outperformers-high-growth-emerging-economies-and-the-companies-that-propel-them

McMillan, B. (2018). What's really driving market volatility? *Forbes*. Retrieved August 5, 2020, from https://www.forbes.com/sites/bradmcmillan/2018/10/26/whats-really-driving-market-volatility/?sh=5d95da8b4332

Minor, D. B. (2001). Beware of index fund fundamentalists. *The Journal of Portfolio Management*, *27*(4), 45–50. https://doi.org/10.3905/jpm.2001.319812

Mody, A. (2004). What is an emerging market? *IMF Working Paper*. https://www.imf.org/external/pubs/ft/wp/2004/wp04177.pdf

Muller, D. (2018). Emerging markets – powerhouse of global growth. *Amshore: Market Commentary*. http://www.ashmoregroup.com/insights/research/emerging-markets-%5C%E2%5C%80%5C%93-powerhouse-global-growth

Murphy, C. (2020). *Information ratio – ir*. https://www.investopedia.com/terms/i/informationratio.asp

Naumenko, K., & Chystiakova, O. (2015). An empirical study on the differences between synthetic and physical etfs. *International Journal of Economics and Finance*, *7*, 24–35. https://doi.org/10.5539/ijef.v7n3p24

Pace, J., D.and Hili, & Grima, S. (2016). Active versus passive investing: An empirical study on the us and european mutual funds and etfs. *Contemporary Issues in Bank Financial Management*, 1–35. https://doi.org/10.1108/s1569-375920160000097006

Parker, E., & Riley, D. (2013). Why sovereigns can default on local-currency debt. *Fitch Ratings Special Report*. https://www.fitchratings.com/research/sovereigns/why-sovereigns-can-default-on-local-currency-debt-10-05-2013

Patel, N., & Welch, I. (2017). Extended stock returns in response to s&p 500 index changes. *The Review of Asset Pricing Studies*, *7*(2), 172–208. https://doi.org/10.1093/rapstu/rax012

Pedersen, L. H. (2015). *Efficiently inefficient: How smart money invests and market prices are determined*. Princeton University Press.

Polwitoon, S., & Tawatnuntachai, O. (2008). Emerging market bond funds: A comprehensive analysis. *The Financial Review*, *43*(1), 51–84. https://doi.org/10.1111/j.1540-6288.2007.00186.x

Schroders. (2019). *Emerging market debt - to hedge or not to hedge?* https://www.schroders.com/fr/sysglobalassets/schroders/sites/au/insights/emerging-market-debts-to-hedge-or-not-to-hedge-2019.pdf

SEC.gov. (2012). *Market indices*. https://www.sec.gov/fast-answers/answersindiceshtm.html

SEC.gov. (2013a). *Investment companies* [https://www.sec.gov/fast-answers/answersmfinvcohtm.html].

SEC.gov. (2013b). *Over-the-counter market*. https://www.sec.gov/divisions/marketreg/mrotc.shtml

Sharpe, W. F. (1966). Mutual fund performance. *The Journal of Business*, *39*(S1), 119. https://doi.org/10.1086/294846

Smith, C. (2020). Imf calls for urgent action to prevent debt crisis in emerging economies. *Financial Times*. Retrieved October 3, 2020, from https://www.ft.com

Sparks, A. (2018). *How easy is it to track a bond market index?* https://www.msci.com/www/blog-posts/how-easy-is-it-to-track-a-bond/0860025432

Stafford, P. (2016). *The differences between us and european etf markets*. https://www.ft.com/content/aa4e3be2-baff-11e6-8b45-b8b81dd5d080

Swinkels, L., & Tjong-A-Tjoe, L. (2007). Can mutual funds time investment styles? *Journal of Asset Management*, *8*(2), 123–132. https://doi.org/10.1057/palgrave.jam.2250066

Tett, G. (2020). Etfs are canary in the bond coal mine. *Financial Times*. Retrieved August 20, 2020, from https://www.ft.com

Tortoise. (2018). Understanding etf liquidity. https://www.tortoiseecofin.com/media/2583/understanding_etf_liquidity.pdf

Trebesch, C. (2018). Resolving sovereign debt crises: The role of political risk. *Oxford Economic Papers*, 1–24. https://doi.org/10.1093/oep/gpy041

Vanguard. (n.d.). *Etfs vs. mutual funds: A comparison*. Retrieved August 10, 2020, from https://investor.vanguard.com/etf/etf-vs-mutual-fund

Vanguard. (2014). Understanding tracking difference and tracking error. https://www.vanguard.com.hk/documents/understanding-td-and-te-en.pdf

Vanguard. (2020). Emerging-market debt: Finding value in a time of pandemic. https://www.vanguardfrance.fr/portal/site/institutional/nl/en/articles/research-and-commentary/portfolio-construction/emerging-market-debt-finding-value-pandemic

Wigglesworth, R. (2021). Global passive assets hit $15tn as etf boom heats up. *Financial Times*. Retrieved May 20, 2021, from https://www.ft.com/content/7d5c2468-619c-4c4b-b3e7-b0da015e939d

Xiong, J. X., & Sullivan, R. N. (2012). How index trading increases market vulnerability. *Financial Analysts Journal*, *68*(2). https://ssrn.com/abstract=2029299

Appendices

Appendix 1: Details of the Different Benchmarks

Benchmark Summary Table			
Ticker	Name	Type	Association
JPEICORE Index	J.P. Morgan EMBI Global Core	Index	Goverment Hard
IBOXUSLT Index	USD liq EM Sovs Tri	Index	Goverment Hard
DBLQBLTR Index	DBIQ EM USD Liquid Bal	Index	Goverment Hard
IBXXLES1 Index	USD liq EM Sovs Mid Pri	Index	Goverment Hard
BURCTRUU Index	USD Emerging Markets Gov	Index	Goverment Hard
EMSG Index	0-5yEM USGovBondex-144a	Index	Goverment Hard
BEMUTRUU Index	EM USD Sov & Agency 3% C	Index	Goverment Hard
IBXXQW5 Index	IBXXQW5	Index	Goverment Hard
JPEGIGBB Index	J.P. Morgan Custom EM IG + BB	Index	Goverment Hard
BESQTRUU Index	Sovereign + Quasi-Sov	Index	Goverment Hard
BSSUTRUU Index	Sovereign	Index	Goverment Hard
JPEIRWTR Index	J.P. Morgan Emerging Markets R	Index	Goverment Hard
CFIIERUU Index	EMUSD Gov & related USD	Index	Goverment Hard
DBNELQKL Index	DBIQ EM LE He	Index	Goverment Hard
JPEIHDEU Index	J.P. Morgan EMBI Global Core H	Index	Goverment Hard
ESDE Index	0-5 Year EM USD Govt	Index	Goverment Hard
BEMUTREU Index	EM USD Sov & Agency 3% C	Index	Goverment Hard
IBXXLES3 Index	USD liq EM Sovs Mid Pri	Index	Goverment Hard

CFIIEREC Index	EMUSD Gov &related EUR H	Index	Goverment Hard
JPEIGDEU Index	J.P. Morgan EMBIG Div Hedged E	Index	Goverment Hard
BUEGTR Index	BUEGTR	Index	Goverment Hard
MSBIERTR Index	MStar EM Corp Bond TR	Index	Corporate Hard
JBCDCORE Index	J.P. Morgan CEMBI Broad Diversified	Index	Corporate Hard
JPEIEMHY Index	J.P. Morgan USD Emerging Marke	Index	Corporate Hard
JPEICORE Index	J.P. Morgan EMBI Global Core	Index	Corporate Hard
BLANTRUU Index	EM Asia Local Currency G	Index	Goverment Lcl
EMAD Index	PIMCO EM Adv	Index	Goverment Lcl
LOFEMLU Index	LOIM FWD EM Local USD	Index	Goverment Lcl
GBIE1001 Index	J.P. Morgan Government Bond In	Index	Goverment Lcl
BECLTRUU Index	EM Local Currency Liquid	Index	Goverment Lcl
GBIEMCOR Index	J.P. Morgan Government Bond In	Index	Goverment Lcl
GBIE1545 Index	J.P. Morgan Government Bond In	Index	Goverment Lcl
BLCNTRUU Index	EM LC Currency Core Govt	Index	Goverment Lcl
BLCDTRUU Index	EM Local Currency Govern	Index	Goverment Lcl
GBIEGEMF Index	GBI-EM Multi-Factor Index	Index	Goverment Lcl
BC0NTRUU Index	EM Local Currency Core 0	Index	Goverment Lcl
EML1TRUU Index	10% Country Capped	Index	Goverment Lcl
I34429US Index	EMLC GOVTR unhUSD hdgEUR	Index	Goverment Lcl

Appendix 2: Details of Each ETF

ETFs Funds Table (Passive)

Ticker	Name	ISIN	Fund Type	Economic Association	Fund Asset Class Focus	Fund Strategy	Fund Bmk Primary	Class Bmk	Curr	Expense Ratio (%)	Tot Asset US$ (M)
ETF_GOV_HARD_USD											
1615252D SW Equity	AMUNDI ETF GLOBAL EMERGING B	FR0010959668	ETF	Emerging Markets	Fixed Income	Government	IBOXUSLT	JPEICORE	US Dollar	0.3	133.203
PCY US Equity	INVESCO EMERGING MARKETS SOV	US46138E7849	ETF	Emerging Markets	Fixed Income	Government	DBLQBLTR	JPEICORE	US Dollar	0.5	2693.413
SEMB EU Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	0.45	10632.32
IEMB SW Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	0.45	10632.32
EMB US Equity	ISHARES JP MORGAN USD EMERGI	US4642882819	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	0.39	17483.119
IEMB LN Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	0.45	10632.32
VWOB US Equity	VANGUARD EMERG MKTS GOV BND	US9219468850	ETF	Emerging Markets	Fixed Income	Government	BURCTRUU	JPEICORE	US Dollar	0.25	1866.292
IEMBZ IX Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
IEMBZ EB Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
EMH5 LN Equity	SPDR 0-5 EM USD GOVERNMENT	IE00BP46NG52	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	US Dollar	0.42	213.496
ZPR5USD EU Equity	SPDR 0-5 EM USD GOVERNMENT	IE00BP46NG52	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	US Dollar	-	213.496
ISRWF US Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
IEMBL IX Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
IEMBL EB Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
SBEM SW Equity	UBS ETF USD EM SOVEREIGN	LU1324516050	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	US Dollar	0.42	676.119
UEFSUSD EU Equity	UBS ETF USD EM SOVEREIGN	LU1324516050	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	US Dollar	-	676.119
XQUA LN Equity	X USD EM BOND QUALITY WEIGHT	IE00BD4DX952	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	US Dollar	0.5	128.132
XQUAUSD EU Equity	X USD EM BOND QUALITY WEIGHT	IE00BD4DX952	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	US Dollar	-	128.132
VDET LN Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	US Dollar	0.25	603.777
VDET SW Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	US Dollar	0.25	603.777
VEMTUSD EU Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	US Dollar	-	603.777
JPEA LN Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	0.45	10632.32
JPEAUSD EU Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
JPEAL IX Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	0.45	10632.32
JPEAL EB Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	0.45	10632.32
PEMD LN Equity	INVESCO EM USD BOND	IE00BF51K132	ETF	Emerging Markets	Fixed Income	Government	BSSUTRUU	JPEICORE	US Dollar	0.35	117.857
PEMDUSD EU Equity	INVESCO EM USD BOND	IE00BF51K132	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	US Dollar	-	117.857
JPMB LN Equity	JPM USD EM SOV BD UCITS ETF	IE00BDFC6G93	ETF	Emerging Markets	Fixed Income	Government	JPEIRWTR	JPEICORE	US Dollar	0.39	592.681
SBEMA SW Equity	UBS ETF USD EM SOVEREIGN	LU1324517454	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	US Dollar	0.42	676.119
JPMB US Equity	JPMORGAN USD EMERGING MARKET	US46641Q7464	ETF	Emerging Markets	Fixed Income	Government	JPEIRWTR	JPEICORE	US Dollar	0.39	82.445
EMBUSD EU Equity	ISHARES JP MORGAN USD EMERGI	US4642882819	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	17483.119
PEMD SW Equity	INVESCO EM USD BOND	IE00BF51K132	ETF	Emerging Markets	Fixed Income	Government	BSSUTRUU	JPEICORE	US Dollar	0.35	117.857
JPMBUSD EU Equity	JPM USD EM SOV BD UCITS ETF	IE00BDFC6G93	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	US Dollar	-	592.681
JPMB SW Equity	JPM USD EM SOV BD UCITS ETF	IE00BDFC6G93	ETF	Emerging Markets	Fixed Income	Government	JPEIRWTR	JPEICORE	US Dollar	0.39	592.681
VDET T2 Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	US Dollar	-	603.777
JPEAUSD T2 Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
JPEA B2 Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
IEMB T2 Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
IEMB B2 Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	10632.32
EMBUSD B2 Equity	ISHARES JP MORGAN USD EMERGI	US4642882819	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	US Dollar	-	17483.119
AGEB EU Equity	AMUNDI GBL EM BONDS IBOX ETF	LU1681041205	ETF	Emerging Markets	Fixed Income	Government	IBOXUSLT	JPEICORE	US Dollar	-	208.193
AGEB SW Equity	AMUNDI GBL EM BONDS IBOX ETF	LU1681041205	ETF	Emerging Markets	Fixed Income	Government	IBOXUSLT	JPEICORE	US Dollar	0.3	208.193
AGEB FP Equity	AMUNDI GBL EM BONDS IBOX ETF	LU1681041205	ETF	Emerging Markets	Fixed Income	Government	IBOXUSLT	JPEICORE	US Dollar	0.3	208.193
LEMB FP Equity	LYXOR IBOXX LQD EMERG SVRG	LU1686830909	ETF	Emerging Markets	Fixed Income	Government	IBXXLES1	JPEICORE	US Dollar	0.3	339.642
LYLEMB SW Equity	LYXOR IBOXX LQD EMERG SVRG	LU1686830909	ETF	Emerging Markets	Fixed Income	Government	IBXXLES1	JPEICORE	US Dollar	0.3	339.642
LEMB LN Equity	LYXOR IBOXX LQD EMERG SVRG	LU1686830909	ETF	Emerging Markets	Fixed Income	Government	IBXXLES1	JPEICORE	US Dollar	0.3	339.642
VEMTUSD B2 Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	US Dollar	0.25	603.777
ETF_GOV_HARD_EUR											
XEMB GR Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	0.40	1739.03
XEMB EU Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	-	1739.03
IUS7 GR Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	0.45	10632.32
DXSU TH Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	-	1739.03
IUS7 TH Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	0.45	10632.32
XEMB IM Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	0.40	1739.03
XEMB SW Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	0.40	1739.03
IEMB IM Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	0.45	10632.32

IUS7 EU Equity	ISHARES JPM EMERG MRKT BOND	DE000A0RFFT0	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	-	10632.32
EEMB EU Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	-	10632.32
EMBE LN Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	0.50	4532.42
IS3C GR Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	0.50	4532.42
EMBEEUR EU Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
EMBE SW Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	0.50	4532.42
IS3CEUR EU Equity	ISHARES JPM EM BOND EUR HD	DE000A1W0PN8	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
ZPR5 GR Equity	SPDR 0-5 EM USD GOVERNMENT	IE00BP46NG52	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	Euro	0.42	213.50
IS3C QT Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
DXSU QT Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	-	1739.03
IUS7 QT Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	-	10632.32
ZPR5EUR EU Equity	SPDR 0-5 EM USD GOVERNMENT	IE00BP46NG52	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	Euro	-	213.50
IS3C TH Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
EMBEL IX Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
EMBEL EB Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
EMBE IM Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	0.50	4532.42
ZPR5 QT Equity	SPDR 0-5 EM USD GOVERNMENT	IE00BP46NG52	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	Euro	-	213.50
XQUA GR Equity	X USD EM BOND QUALITY WEIGHT	IE00BD4DX952	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	Euro	0.50	128.13
UEFS GR Equity	UBS ETF USD EM SOVEREIGN	LU1324516050	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	Euro	0.42	676.12
SBEM IM Equity	UBS ETF USD EM SOVEREIGN	LU1324516050	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	Euro	0.42	676.12
EMBEZ IX Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
EMBEZ EB Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
UEFSEUR EU Equity	UBS ETF USD EM SOVEREIGN	LU1324516050	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	Euro	-	676.12
EMH5 IM Equity	SPDR 0-5 EM USD GOVERNMENT	IE00BP46NG52	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	Euro	0.42	213.50
EMBEM IX Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
EMBEM EB Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
IEMBM EB Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	-	10632.32
IEMBM IX Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	-	10632.32
SBEME SW Equity	UBS ETF USD EM SOVEREIGN EUR	LU1324516308	ETF	Emerging Markets	Fixed Income	Government	BEMUTREH	JPEICORE	Euro	0.47	676.12
FRCK GR Equity	UBS ETF USD EM SOVEREIGN EUR	LU1324516308	ETF	Emerging Markets	Fixed Income	Government	BEMUTREH	JPEICORE	Euro	0.47	676.12
XQUAEUR EU Equity	X USD EM BOND QUALITY WEIGHT	IE00BD4DX952	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	Euro	-	128.13
SBEME IM Equity	UBS ETF USD EM SOVEREIGN EUR	LU1324516308	ETF	Emerging Markets	Fixed Income	Government	BEMUTREH	JPEICORE	Euro	0.47	676.12
SBEMEEUR EU Equity	UBS ETF USD EM SOVEREIGN EUR	LU1324516308	ETF	Emerging Markets	Fixed Income	Government	BEMUTREH	JPEICORE	Euro	-	676.12
XQUA IM Equity	X USD EM BOND QUALITY WEIGHT	IE00BD4DX952	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	Euro	0.50	128.13
UEFS TH Equity	UBS ETF USD EM SOVEREIGN	LU1324516050	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	Euro	-	676.12
XQUA QT Equity	X USD EM BOND QUALITY WEIGHT	IE00BD4DX952	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	Euro	-	128.13
UEFS QT Equity	UBS ETF USD EM SOVEREIGN	LU1324516050	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	Euro	-	676.12
VGEM GR Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	Euro	0.25	603.78
VEMTEUR EU Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	Euro	-	603.78
FRCK QT Equity	UBS ETF USD EM SOVEREIGN EUR	LU1324516308	ETF	Emerging Markets	Fixed Income	Government	BEMUTREH	JPEICORE	Euro	-	676.12
XQUA TH Equity	X USD EM BOND QUALITY WEIGHT	IE00BD4DX952	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	Euro	-	128.13
VEMT NA Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	Euro	0.25	603.78
DXSU GZ Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	-	1739.03
IUS7 GZ Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	-	10632.32
IS3C GZ Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
JPEAEUR EU Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	-	10632.32
XQUE GR Equity	X USD EM BOND QUAL WGHT EUR	IE00BD4DXB77	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	Euro	0.55	128.13
XQUEEUR EU Equity	X USD EM BOND QUAL WGHT EUR	IE00BD4DXB77	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	Euro	-	128.13
JPEE LN Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	0.45	10632.32
XQUE IM Equity	X USD EM BOND QUAL WGHT EUR	IE00BD4DXB77	ETF	Emerging Markets	Fixed Income	Government	IBXXQW5	JPEICORE	Euro	0.55	128.13
VGEM GZ Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	Euro	-	603.78
VGEM QT Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	Euro	0.25	603.78
VGEM TH Equity	VANG USDEMGVB USDD	IE00BZ163L38	ETF	Emerging Markets	Fixed Income	Government	BESQTRUU	JPEICORE	Euro	0.25	603.78
PEMD IM Equity	INVESCO EM USD BOND	IE00BF51K132	ETF	Emerging Markets	Fixed Income	Government	BSSUTRUU	JPEICORE	Euro	0.35	117.86
PEMDEUR EU Equity	INVESCO EM USD BOND	IE00BF51K132	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	Euro	-	117.86
JPMB IM Equity	JPM USD EM SOV BD UCITS ETF	IE00BDFC6G93	ETF	Emerging Markets	Fixed Income	Government	JPEIRWTR	JPEICORE	Euro	0.39	592.68
JPBM GR Equity	JPM USD EM SOV BD UCITS ETF	IE00BDFC6G93	ETF	Emerging Markets	Fixed Income	Government	JPEIRWTR	JPEICORE	Euro	0.39	592.68
JPMBEUR EU Equity	JPM USD EM SOV BD UCITS ETF	IE00BDFC6G93	ETF	Emerging Markets	Fixed Income	Government	-	JPEICORE	Euro	-	592.68
IS02 GR Equity	ISHARES JPM USD EM BND USD A	IE00BYXYYK40	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	0.45	10632.32
EEMB T2 Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	-	10632.32
EMBE B2 Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
XEMB T2 Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	-	1739.03
FRCK T2 Equity	UBS ETF USD EM SOVEREIGN EUR	LU1324516308	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	Euro	-	676.12
XEMB B2 Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	-	1739.03
SBEME B2 Equity	UBS ETF USD EM SOVEREIGN EUR	LU1324516308	ETF	Emerging Markets	Fixed Income	Government	BEMUTRUU	JPEICORE	Euro	-	676.12
EMBE T2 Equity	ISHARES JPM USD EM BND EUR-H	IE00B9M6RS56	ETF	Emerging Markets	Fixed Income	Government	JPEIHDEU	JPEICORE	Euro	-	4532.42
DB38 AV Equity	X USD EM BOND EUR	LU0321462953	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	0.40	1739.03
XUEM GR Equity	X USD EM BOND 2D	LU0677077884	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	0.25	1739.03
AGEB IM Equity	AMUNDI GBL EM BONDS IBOX ETF	LU1681041205	ETF	Emerging Markets	Fixed Income	Government	IBOXUSLT	JPEICORE	Euro	0.30	208.19
XUEMEUR T2 Equity	X USD EM BOND 2D	LU0677077884	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	0.25	1739.03
XUEMEUR EU Equity	X USD EM BOND 2D	LU0677077884	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	0.25	1739.03

SEMBEUR B2 Equity	ISHARES JPM USD EM BND USD D	IE00B2NPKV68	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	0.45	10632.32
XUEM IM Equity	X USD EM BOND 2D	LU0677077884	ETF	Emerging Markets	Fixed Income	Government	CFIIERUU	JPEICORE	Euro	0.25	1739.03
EUNB GR Equity	ISHARES JPM USD EM BD GBP-HD	IE00BDFGJ734	ETF	Emerging Markets	Fixed Income	Government	JPEICORE	JPEICORE	Euro	0.50	10632.32
EMBH IM Equity	LYXOR IBOXX LQD EMERG SV-MHD	LU1686831030	ETF	Emerging Markets	Fixed Income	Government	IBXXLES3	JPEICORE	Euro	0.40	339.64
LYQS GR Equity	LYXOR IBOXX LQD EMERG SVRG	LU1686830909	ETF	Emerging Markets	Fixed Income	Government	IBXXLES1	JPEICORE	Euro	0.30	339.64
EMKTB IM Equity	LYXOR IBOXX LQD EMERG SVRG	LU1686830909	ETF	Emerging Markets	Fixed Income	Government	IBXXLES1	JPEICORE	Euro	0.30	339.64
VAG3 GR Equity	VANGUARD EMERG MKTS GOV BND	US9219468850	ETF	Emerging Markets	Fixed Income	Government	BURCTRUU	JPEICORE	Euro	-	1866.29

ETF_CORP_HARD_USD

EMCR B2 Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	MSBIERTR	JBCDCORE	US Dollar	-	1344.25
EMCRUSD T2 Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	MSBIERTR	JBCDCORE	US Dollar	-	1344.25
EMHY US Equity	ISHARES J.P. MORGAN EM HIGH	US4642862852	ETF	Emerging Markets	Fixed Income	Corporate	JPEIEMHY	JBCDCORE	US Dollar	0.50	304.58
EMCA LN Equity	ISHARES JPM USD EM CRP USD A	IE00BFM6TD65	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	US Dollar	0.50	1344.25
EMCAUSD EU Equity	ISHARES JPM USD EM CRP USD A	IE00BFM6TD65	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	US Dollar	-	1344.25
CEMB US Equity	ISHARES JP MORGAN EM CORPORA	US4642862514	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	US Dollar	0.50	215.46
EMCR LN Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	US Dollar	0.50	1344.25
EMCR EU Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	US Dollar	0.50	1344.25
EMCRL IX Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	MSBIERTR	JBCDCORE	US Dollar	-	1344.25
EMCRL EB Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	MSBIERTR	JBCDCORE	US Dollar	-	1344.25

ETF_CORP_HARD_EUR

EMCREUR EU Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	-	1344.25
IS0Q GR Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	0.50	1344.25
IS0Q EU Equity	ISHARES USD EM CORP BND	DE000A1J0BJ3	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	0.50	1344.25
EMCR IM Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	0.50	1344.25
1432055D GR Equity	ISHARES USD EM CORP BND	DE000A1J0BJ3	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	-	1344.25
1416703D GR Equity	ISHARES USD EM CORP BND	-	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	0.50	1344.25
IS0Q GZ Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	-	1344.25
IS0Q QT Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	-	1344.25
0I84 GR Equity	ISHARES J.P. MORGAN EM HIGH	US4642862852	ETF	Emerging Markets	Fixed Income	Corporate	MSBIEHTR	JBCDCORE	Euro	-	304.58
EMCREUR B2 Equity	ISHARES JPM USD EM CORP BND	IE00B6TLBW47	ETF	Emerging Markets	Fixed Income	Corporate	JBCDCORE	JBCDCORE	Euro	0.50	1344.25

ETF_GOV_LCL_USD

IEML B2 Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	US Dollar	-	5861.39
IEMLL IX Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	US Dollar	0.50	5861.39
IEMLL EB Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	US Dollar	0.50	5861.39
IGAA LN Equity	ISH EM ASIA LOCAL GOVT USD A	IE00BFM6T814	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	US Dollar	0.50	110.97
EMGA LN Equity	ISHARES JPM EM LCL GOV USD-A	IE00BFZPF546	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	US Dollar	0.50	5861.39
EMGAUSD EU Equity	ISHARES JPM EM LCL GOV USD-A	IE00BFZPF546	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLCNTRUU	BECLTRUU	US Dollar	-	5861.39
IGEA LN Equity	ISHARES EM ASIA LOCAL GOVT	IE00B6QGFW01	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	US Dollar	0.50	110.97
EMDD LN Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	US Dollar	0.55	3119.29
LEMB US Equity	ISHARES JP MORGAN EM LOCAL C	US4642865178	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1545	BECLTRUU	US Dollar	0.30	501.72
EMLB LN Equity	PIMCO EMERGING MARKETS ADVAN	IE00B4P11460	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	US Dollar	0.60	337.05
ELD US Equity	WISDOMTREE EMRG MKTS DEBT	US97717X8671	ETF	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	0.55	122.09
IEML LN Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	US Dollar	0.50	5861.39
EMDDL IX Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	US Dollar	-	3119.29
EBND US Equity	SPDR BBG BARC EM LOCAL BOND	US78464A3914	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLCDTRUU	BECLTRUU	US Dollar	0.30	875.74
EMLC US Equity	VANECK JPM EM LOCAL CCY BOND	US92189H3003	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIEMCOR	BECLTRUU	US Dollar	0.30	3017.68
EMDDL EB Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	US Dollar	-	3119.29
EMLC CI Equity	VANECK JPM EM LOCAL CCY BOND	US92189H3003	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIEMCOR	BECLTRUU	US Dollar	0.44	3017.68
EMLB EU Equity	PIMCO EMERGING MARKETS ADVAN	IE00B4P11460	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	US Dollar	-	337.05
IGEA EU Equity	ISHARES EM ASIA LOCAL GOVT	IE00B6QGFW01	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	US Dollar	-	110.97
IEML EU Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	US Dollar	-	5861.39
SYBMUSD EU Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	US Dollar	-	3119.29
IGEA B2 Equity	ISHARES EM ASIA LOCAL GOVT	IE00B6QGFW01	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	US Dollar	-	110.97
EMLB SW Equity	PIMCO EMERGING MARKETS ADVAN	IE00B4P11460	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	US Dollar	0.60	337.05
EMLI LN Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	US Dollar	0.60	337.05
EMLIUSD EU Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	US Dollar	-	337.05
EMLI SW Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	US Dollar	0.60	337.05
FEMB US Equity	FIRST TRUST EMERGING MARKETS	US33739P2020	ETF	Emerging Markets Local Currency	Fixed Income	Government	EML1TRUU	BECLTRUU	US Dollar	0.85	180.29
LOCL LN Equity	L&G LO EM MRKT LOCAL GOV BD	IE00BSVYHP04	ETF	Emerging Markets Local Currency	Fixed Income	Government	LOFEMLU	BECLTRUU	US Dollar	0.55	24.62
LOCLUSD EU Equity	L&G LO EM MRKT LOCAL GOV BD	IE00BSVYHP04	ETF	Emerging Markets Local Currency	Fixed Income	Government	LOFEMLU	BECLTRUU	US Dollar	-	24.62
EMLC LN Equity	VANECK JPM EM LOC CUR BD ETF	IE00BDS67326	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIEMCOR	BECLTRUU	US Dollar	0.30	55.79
EMLCUSD EU Equity	VANECK JPM EM LOC CUR BD ETF	IE00BDS67326	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIEMCOR	BECLTRUU	US Dollar	0.30	55.79
EMLIZ EB Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	US Dollar	0.60	337.05
EMDD B2 Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	US Dollar	-	3119.29
IEMLUSD T2 Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	US Dollar	-	5861.39

ETF_GOV_LCL_EUR

EMLIM EB Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	Euro	0.60	337.05
SYBM GR Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	0.55	3119.29
VE4E GR Equity	VANECK JPM EM LOCAL CCY BOND	US92189H3003	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIEMCOR	BECLTRUU	Euro	0.44	3017.68
EMLD FP Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	0.55	3119.29
SYBM BQ Equity	SPDR EM LOCAL GOV BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	-	3119.29
SEML IM Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	0.50	5861.39
IUSP GR Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	0.50	5861.39
EMLI IM Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	Euro	0.60	337.05
EMLIEUR EU Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	Euro	-	337.05
IUSP GZ Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	-	5861.39
EMLD IM Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	0.55	3119.29
IS0S GZ Equity	ISHARES EM ASIA LOCAL GOVT	IE00B6QGFW01	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	Euro	-	110.97
IS0S GR Equity	ISHARES EM ASIA LOCAL GOVT	IE00B6QGFW01	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	Euro	0.50	110.97
PJSA GR Equity	PIMCO EMERGING MARKETS ADVAN	IE00B4P11460	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	Euro	0.60	337.05
SYBM EU Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	-	3119.29
IEMLEUR EU Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	-	5861.39
IUSP1 EU Equity	ISHARES EM LOCAL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	-	5861.39
SYBM GZ Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	-	3119.29
SYBM TH Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	-	3119.29
IS0S EU Equity	ISHARES EM ASIA LCL GOV BND	DE000A1J0ZB9	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	Euro	-	110.97
EMLIM IX Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	Euro	0.60	337.05
EM1C GR Equity	VANECK JPM EM LOC CUR BD ETF	IE00BDS67326	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIEMCOR	BECLTRUU	Euro	0.30	55.79
EMLCEUR EU Equity	VANECK JPM EM LOC CUR BD ETF	IE00BDS67326	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIEMCOR	BECLTRUU	Euro	0.30	55.79
EMLC IM Equity	VANECK JPM EM LOC CUR BD ETF	IE00BDS67326	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIEMCOR	BECLTRUU	Euro	0.30	55.79
1413570D GR Equity	ISHARES EM ASIA LCL GOV BND	-	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	Euro	0.50	110.97
IUSP TH Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	-	5861.39
BK0F GR Equity	ISHARES JP MORGAN EM LOCAL C	US4642865178	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1545	BECLTRUU	Euro	-	501.72
IS0S TH Equity	ISHARES EM ASIA LOCAL GOVT	IE00B6QGFW01	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	Euro	-	110.97
LOCE LN Equity	L&G LO EM MRKT LOCAL GOV BD	IE00BSVYHP04	ETF	Emerging Markets Local Currency	Fixed Income	Government	LOFEMLU	BECLTRUU	Euro	0.55	24.62
PM9K GR Equity	PIMCO EMERGING MARKETS ADVAN	IE00BH3X8336	ETF	Emerging Markets Local Currency	Fixed Income	Government	EMAD	BECLTRUU	Euro	-	337.05
SEMLM IX Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	-	5861.39
SEMLM EB Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	-	5861.39
IUSPEUR T2 Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	-	5861.39
EMLD T2 Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	-	3119.29
ETL0 GR Equity	L&G LO EM MRKT LOCAL GOV BD	IE00BSVYHP04	ETF	Emerging Markets Local Currency	Fixed Income	Government	LOFEMLU	BECLTRUU	Euro	-	24.62
LOCL IM Equity	L&G LO EM MRKT LOCAL GOV BD	IE00BSVYHP04	ETF	Emerging Markets Local Currency	Fixed Income	Government	LOFEMLU	BECLTRUU	Euro	0.55	24.62
IEMLEUR B2 Equity	ISHARES JPM EM LCL GOV BND	IE00B5M4WH52	ETF	Emerging Markets Local Currency	Fixed Income	Government	GBIE1001	BECLTRUU	Euro	0.50	5861.39
SYBM B2 Equity	SPDR BBG BARC EM LOCAL BND	IE00B4613386	ETF	Emerging Markets Local Currency	Fixed Income	Government	BECLTRUU	BECLTRUU	Euro	0.55	3119.29
QDV7 GR Equity	ISHARES JPM EM LCL GOV USD-A	IE00BFZPF546	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLCNTRUU	BECLTRUU	Euro	0.50	5861.39
EMGAEUR EU Equity	ISHARES JPM EM LCL GOV USD-A	IE00BFZPF546	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLCNTRUU	BECLTRUU	Euro	-	5861.39
IGEAEUR EU Equity	ISHARES EM ASIA LOCAL GOVT	IE00B6QGFW01	ETF	Emerging Markets Local Currency	Fixed Income	Government	BLANTRUU	BECLTRUU	Euro	-	110.97

Appendix 3: Details of Each Mutual Fund

MFs Funds Table (Active)

Ticker	Name	ISIN	Fund Type	Economic Association	Fund Asset Class Focus	Fund Strategy	Fund Bmk Primary	Class Bmk	Curr	Expense Ratio (%)	Tot Asset US$ (M)
MF_GOV_HARD_USD											
DWSESUA LX Equity	DWS EMERGING SOV BD USD AUD	LU0758196686	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	-	2.964
UEB17QA LX Equity	UBS-EM BD 2017 USD - Q ACC	LU0972642523	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	0.73	284.692
DWESBMU LX Equity	DWS EMERG SOV BD MAST-USD	LU0699717764	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	0.02	82.05
UEB17QI LX Equity	UBS-EM BD 2017 USD - Q DIS	LU0972642796	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	0.73	284.692
UE17K1A LX Equity	UBS-EM BD 2017 USD - K1 ACC	LU0972642010	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	0.61	284.692
UE17K1I LX Equity	UBS-EM BD 2017 USD - K1 DIS	LU0972642101	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	0.61	284.692
DWEMSUA LX Equity	DWS EMERG SOV BD MAST-USD AU	LU0758194046	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	-	82.05
UEB17PA LX Equity	UBS-EM BD 2017 USD - P ACC	LU0972641715	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	0.97	284.692
UEB17PI LX Equity	UBS-EM BD 2017 USD - P DIS	LU0972641806	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	0.96	284.692
UE17IA3 LX Equity	UBS-EM BD 2017 USD-I-A3	LU1010338728	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	0.24	284.692
DEMUAUH KY Equity	DAIWA EMERGING TOC-USD AUD H	KYG2628L2528	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	-	2.51
DEMUBRL KY Equity	DAIWA EMERGING TOC-USD BRL H	KYG2628L2452	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	-	3.01
VGAVX US Equity	VANGUARD EM MKT GOV BND-ADM	US9219468025	Open-End Fund	Emerging Markets	Fixed Income	Government	BURCTRUU	JPEIGDEU	US Dollar	0.3	319.341
VGIVX US Equity	VANGUARD EM MKT GOV BND-INST	US9219467035	Open-End Fund	Emerging Markets	Fixed Income	Government	BURCTRUU	JPEIGDEU	US Dollar	0.29	319.341
VGOVX US Equity	VANGUARD EM MKT GOV BND-INV	US9219466045	Open-End Fund	Emerging Markets	Fixed Income	Government	BUEGTRUU	JPEIGDEU	US Dollar	0.49	319.341
DTWCUSD KY Equity	DAIWA EMERGING TOWER CUR-USD	KYG2628L1876	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	-	9.508
BEMSBAU GR Equity	BAYERNINVEST-EMK S BD AK-USD	DE000A1C78A0	Open-End Fund	Emerging Markets	Fixed Income	Government	JPGCCOMP	JPEIGDEU	US Dollar	0.63	110.587
SCEMUUA TT Equity	SCHRODER 2021 EM USD SB F-UA	TW000T4222C9	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	-	82.956
SCEMUUD TT Equity	SCHRODER 2021 EM USD SB F-UD	TW000T4222D7	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	US Dollar	-	82.956
DBEMICU LX Equity	DB ADV-EMMKT SOV DEBT-ICUSD	LU0590921382	FCP	Emerging Markets	Fixed Income	Government	JPEIGDEU	JPEIGDEU	US Dollar	0.69	51.243
MF_GOV_HARD_EUR											
U17IA1A LX Equity	UBS-EM BD 2017 USD -IA1 ACC	LU0974615469	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	0.56	284.692
UE17PIE LX Equity	UBS-EM BD 2017 USD - P DIS	LU0974615113	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	0.96	284.692
UE17PAE LX Equity	UBS-EM BD 2017 USD - P ACC	LU0974615030	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	0.96	284.692
U17K1AE LX Equity	UBS-EM BD 2017 USD - K1 ACC	LU0974615204	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	0.61	284.692
U17IA1I LX Equity	UBS-EM BD 2017 USD -IA1 DIS	LU0974616277	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	0.57	284.692
U17K1IE LX Equity	UBS-EM BD 2017 USD - K1 DIS	LU0974615386	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	0.61	284.692
UBE17QA LX Equity	UBS-EM BD 2017 USD-I-QACC	LU0974621194	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	0.74	284.692
UBE17QD LX Equity	UBS-EM BD 2017 USD-I-QDIS	LU0974624537	SICAV	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	0.74	284.692
I3TA GR Equity	ISI EMERGING MARKET BONDS	DK0016259690	Open-End Fund	Emerging Markets	Fixed Income	Government	JPGCCOMP	JPEIGDEU	Euro	1.15	25.3
ISIEMBO DC Equity	ISI EMERGING MARKET BONDS	DK0016259690	Open-End Fund	Emerging Markets	Fixed Income	Government	JPGCCOMP	JPEIGDEU	Euro	1.15	25.3
SYDEMBE DC Equity	SYDINVEST EM BONDS	DK0060406759	Open-End Fund	Emerging Markets	Fixed Income	Government	JPGCCOMP	JPEIGDEU	Euro	1.2	233.306
NORDEBA FH Equity	NORDEA EMERGING MARKET BD-AK	FI0008807532	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	1.01	572.759
NORDEBI FH Equity	NORDEA EMERGING MARKET BD-AT	FI0008807540	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	1.01	572.759
BEMSBEH GR Equity	BAYERNINVEST-EMMK S BD AK-EH	DE000A1C78C6	Open-End Fund	Emerging Markets	Fixed Income	Government	JPGCCOMP	JPEIGDEU	Euro	0.53	110.587
SYDEBED DC Equity	SYDINVEST EM BONDSB EUR D	DK0060626281	Open-End Fund	Emerging Markets	Fixed Income	Government	JPGCCOMP	JPEIGDEU	Euro	1.15	233.306
LGEMZEU ID Equity	LG EM MK GOV BOND-ZEURAUNH	IE00BD6FXL14	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	-	-
LGEMZEH ID Equity	LG EM MK GOV BOND-ZEURACCH	IE00BD6FXK07	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	-	-
LGEMKEU ID Equity	LG EM MK GOV BOND US-KEURAUH	IE00BDR5J343	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	-	-
LGEMKEH ID Equity	LG EM MK GOV BOND US-KEURAH	IE00BD49V443	Open-End Fund	Emerging Markets	Fixed Income	Government	-	JPEIGDEU	Euro	-	-
DEMIDHE LX Equity	DB ADV EMKTS IG SOV DBT-IDHE	LU0590922513	FCP	Emerging Markets	Fixed Income	Government	JPEIGDEU	JPEIGDEU	Euro	0.63	246.367
DBEMIDH LX Equity	DB ADV-EMMKT SOV DEBT-IDHE	LU0590921200	FCP	Emerging Markets	Fixed Income	Government	JPEIGDEU	JPEIGDEU	Euro	0.7	51.243
MF_CORP_HARD_USD											
MUZUACA ID Equity	MUZIN-EMRG MKTS SHORT-USD A	IE00BFNXVV87	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	0.94	905.632
MESHUAR ID Equity	MUZINICH EMMK SH DUR-HUSDAR	IE00BFNXVX02	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	1.24	905.632
MUZMSSU ID Equity	MUZIN-EMRG MKTS SHORT DUR-SU	IE00BCCW0R44	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	0.67	905.632
MESDUAH ID Equity	MUZIN-EMRG MK SH DUR-USD A H	IE00BP46WG85	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	0.74	905.632
JPEMAUI LX Equity	JPM EMER MK COR BD II-AUSDI	LU0546045641	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	1.4	28.219
JPEMDUI LX Equity	JPM EMER MK COR BD II-DUSDI	LU0546046532	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	1.9	28.219
MSEMCDA LX Equity	MORGAN ST-EMERG MKTS CP D-A	LU0603408039	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	1.69	1224.021
MSEMCDB LX Equity	MORGAN ST-EMERG MKTS CP D-B	LU0603408112	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	2.69	1224.021
MSEMCBC LX Equity	MORGAN ST-EMERG MKTS CP D-C	LU0603408203	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	2.39	1224.021
MSEMCBZ LX Equity	MORGAN ST-EMERG MKTS CP D-D	LU0603408385	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	0.9	1224.021

MSEMCAX LX Equity	MORGAN ST-EMERG MKTS CP D-AX	LU0691070444	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	1.69	1224.021
MSEMCBX LX Equity	MORGAN ST-EMERG MKTS CP D-BX	LU0691070790	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	2.69	1224.021
MSEMCDI LX Equity	MORGAN ST-EMERG MKTS CP-I	LU0919597632	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	0.94	1224.021
MSEMCAR LX Equity	MORGAN ST-EMERG MKTS CP-AR	LU1697575261	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	1.69	1224.021
MSEMCCX LX Equity	MORGAN ST-EMR MKT CP-CX	LU1808492976	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	US Dollar	2.39	1224.021
EBEMCIT AV Equity	ESPA BND EMRG MARKETS CORP-T	AT0000A0WJY5	Open-End Fund	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	-	93.481
EBEMCIA AV Equity	ESPA BND EMRG MARKETS CORP-A	AT0000A0WJX7	Open-End Fund	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	-	93.481
EGEMIUD ID Equity	EG EMRG MKT CORP HY-IUSDD	IE00BD2BB642	Open-End Fund	Emerging Markets	Fixed Income	Corporate	JCMBNOIG	JBCDCORE	US Dollar	1.3	112.969
EMHYUSD KY Equity	MUAM GL-EM HY COR BD-USD	KYG632391002	Open-End Fund	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	-	-
EBEMCIV AV Equity	ESPA BND EMRG MARKETS CORP-V	AT0000A0WJZ2	Open-End Fund	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	-	93.481
PECAUND LX Equity	AMUNDI F2 - EM MKTS CB-AUSD	LU0765559587	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	US Dollar	-	260.362

MF_CORP_HARD_EUR

MUZMMHE ID Equity	MUZIN-EMRG MKTS SHORT D-AH	IE00BFNXVQ35	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	0.94	905.632
MESHEAR ID Equity	MUZINICH EMMK SH DUR-HEURAR	IE00BFNXVS58	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	1.24	905.632
MEMHEAH ID Equity	MUZIN EMRG MK S DUR-HDGEURAH	IE00BPZ58P52	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	0.74	905.632
MESDPHE ID Equity	MUZIN EMRG MK S DUR-P HG EUR	IE00BYT3QR61	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	1.58	905.632
MUZMSSE ID Equity	MUZIN-EMRG MKTS SHORT DUR-SE	IE00BCCW0T67	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	0.64	905.632
MUZEMHS ID Equity	MUZIN-EMRG MKTS SH-H EUR IS	IE00BCCW0V89	Unit Trust	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	0.64	905.632
UNEMC17 LX Equity	UNIINST EM CORPORATE 2017	LU0578910415	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	118.096
UNEMCBD LX Equity	UNIINST EM CORP BONDS	LU0578899691	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	588.156
MSESHXE LX Equity	MORGAN ST-EMR MKT CP-SHX EUR	LU1842711928	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	0.9	1224.021
IE18PEI LX Equity	NN L CMF - EMK DB S DE 18PI	LU0876681932	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	62.551
IE18PEA LX Equity	NN L CMF - EMK DB S DE 18PA	LU0876673756	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	62.551
JPEMAEH LX Equity	JPM EMER MK COR BD II-AH I	LU0546045567	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	1.4	28.219
JPEMDEH LX Equity	JPM EMER MK COR BD II-DH I	LU0546046458	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	1.9	28.219
JPMCBCH LX Equity	JPM EMER MK COR BD II-CBCH	LU0546046292	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	0.7	28.219
JPMCBBH LX Equity	JPM EMER MK COR BD II-BDVHD	LU0546045997	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	0.85	28.219
MSEMCAH LX Equity	MORGAN ST-EMERG MKTS CP D-AH	LU0603408468	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	1.73	1224.021
MSEMCBH LX Equity	MORGAN ST-EMERG MKTS CP D-BH	LU0603408542	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	2.73	1224.021
MSEMAHX LX Equity	MORGAN ST-EMERG MKTS CP-AHX	LU0691070527	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	1.73	1224.021
MSEMBHX LX Equity	MORGAN ST-EMERG MKTS CP-BHX	LU0691070873	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	2.73	1224.021
MSEMZHX LX Equity	MORGAN ST-EMERG MKTS CP-ZHX	LU0947203971	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	0.94	1224.021
MSEMKZH LX Equity	MORGAN ST-EMERG MKTS CP-ZH	LU1026242203	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	0.94	1224.021
MSEMKCH LX Equity	MORGAN ST-EMERG MKTS CP-CHE	LU0845089696	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	2.43	1224.021
DMIGIDH LX Equity	DWS INVEST-EM IG SVRGN-IDH	LU0982740572	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	0.48	235.46
MSEIHEU LX Equity	MORGAN ST-EMERG MKTS CP-IH	LU1361209569	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	0.98	1224.021
DSDTFCH LX Equity	DWS INVEST-EM IG SVRGN-TFCH	LU1663860127	SICAV	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	0.06	235.46
MSECHXE LX Equity	MORGAN ST-EMR MKT CP-CHX EUR	LU1808493198	SICAV	Emerging Markets	Fixed Income	Corporate	JBCDCOMP	JBCDCORE	Euro	2.42	1224.021
EBEMCIE AV Equity	ESPA BND EMRG MARKETS CORP-C	AT0000A0Y0W0	Open-End Fund	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	93.481
PECAEND LX Equity	AMUNDI F2 - EM MKTS CB-AEUR	LU0765559405	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	260.362
PECEEND LX Equity	AMUNDI F2 - EM MKTS CB-EEUR	LU0765560163	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	260.362
PMCNEND LX Equity	AMUNDI F2 - EM MKTS CB-REUR	LU0957295339	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	260.362
PEHETDQ LX Equity	AMUNDI F2 - EM MKTS CB-HEUR	LU1081512185	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	260.362
PECBIQE LX Equity	AMUNDI F2 - EM MKTS CB-IQEU	LU1371734762	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	260.362
PECHEND LX Equity	PIONEER EM MK CORP BD-HEND	LU0765560320	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	260.362
PECEEQD LX Equity	AMUNDI F2 - EM MKTS CB-EDEU	LU0812852688	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	260.362
PECIEND LX Equity	AMUNDI F2 - EM MKTS CB-IEUR	LU0765560593	FCP	Emerging Markets	Fixed Income	Corporate	-	JBCDCORE	Euro	-	260.362

MF_GOV_LCL_USD

BLEMLCB LX Equity	BLUEBAY-EM MK LO CU BD-BUSD	LU0238483688	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	1.45	284.613
BLEMLCF LX Equity	BLUEBAY-EMRGNG MKT LO C-IUSD	LU0240775436	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	1.41	284.613
BBEMLCI LX Equity	BLUEBAY EMR MK LO CU B-IUSDP	LU0240775949	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	0.96	284.613
GMOECLD ID Equity	GMO EMRG COUNTRY LOC DEBT-AC	IE00B2B3JS24	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	936.123
BBEMLBU LX Equity	BLUEBAY-EME MK LO CU B-BPUSD	LU0240768142	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	1	284.613
ASHEUAR LX Equity	ASHMORE-EM LOC CUR BD-USDAR	LU1404981067	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.71	4302.341
BLIBSUS LX Equity	BLUEBAY-EM MK LO CU BD-IUSDD	LU0357352243	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	1.41	284.613
BLIBSRU LX Equity	BLUEBAY-EM MK LO CU B-RUSDD	LU0357315554	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	1.95	284.613
ELBIX US Equity	ASHMORE EM MKTS L/C BND-INST	US0448202079	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	0.97	28.865
ELBCX US Equity	ASHMORE EM MKTS L/C BND-C	US0448208688	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.97	28.865
ELBAX US Equity	ASHMORE EM MKTS L/C BND-A	US0448208761	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.22	28.865
BELCCDA LX Equity	BLUEBAY-EM MKT LO CU B-C USD	LU0842203704	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	0.9	284.613
ROQEMEU LX Equity	ROBECO QUANT EMR DB L/C-DUSD	LU0862488243	SICAV	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	0.716
ASEMLZ2 LX Equity	ASHMORE EM MKT LOC CUR BD-Z2	LU1078672950	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	-	4302.341
ASHEZ2U LX Equity	ASHMORE-EM LOC CUR BD-Z2 USD	LU1078673339	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	-	4302.341
ROQEMIU LX Equity	ROBECO QUANT EMR DB L/C-IUSD	LU0862488672	SICAV	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	0.716
BBEMLCU LX Equity	BLUEBAY EMER MK LO CU B-CUSD	LU0842203456	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	0.9	284.613
BAEMCUA ID Equity	BARINGS EM MK LOC DB-CUSDA	IE00BKZGKY61	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	2108.505
BAEMBUA ID Equity	BARINGS EM MK LOC DB-B USD A	IE00BKZGKM40	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	2108.505

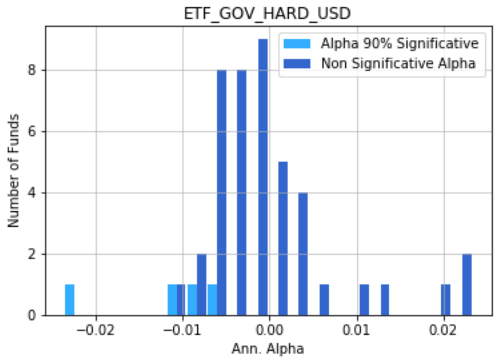
DDBAX US Equity	DREYFUS E/M DBT LOC CUR-A	US2619805284	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	JGENDVUU	BECLTRUU	US Dollar	1.27	23.701
BAEMDUA ID Equity	BARINGS EMMK LOC DB-IUSDACC	IE00BKZGL873	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	2108.505
DDBCX US Equity	DREYFUS E/M DBT LOC CUR-C	US2619805102	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	JGENDVUU	BECLTRUU	US Dollar	2.04	23.701
BBEMLQU LX Equity	BLUEBAY EMKT LOC CUR CP-QUSD	LU1170322058	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	0.8	284.613
DDBIX US Equity	DREYFUS E/M DBT LOC CUR-I	US2619804949	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	JGENDVUU	BECLTRUU	US Dollar	1	23.701
BAEMBUD ID Equity	BARINGS EMMK LOC DB-B USD DI	IE00BKZGKN56	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	2108.505
ASHEMLB LX Equity	ASHMORE-EM LOC CUR BD-IUSDD	LU0493866213	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.12	4302.341
ASHZUSD LX Equity	ASHMORE-EM LOC CUR BD-Z US A	LU0877285527	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.71	4302.341
BAEMCUD ID Equity	BARINGS EMMK LOC DB-CUSD DIS	IE00BKZGKZ78	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	2108.505
ASHIUSA LX Equity	ASHMORE-EM LOC CUR BD-I US A	LU0880945901	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.12	4302.341
DDBYX US Equity	DREYFUS E/M DBT LOC CUR-Y	US2619804600	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	JGENDVUU	BECLTRUU	US Dollar	0.9	23.701
ASHIIZU LX Equity	ASHMORE-EM LOC CUR BD-ZI USD	LU0880945737	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.71	4302.341
NELDBPU LX Equity	NORDEA 2 EMMKT LCL D/E-BI-BP	LU0772933023	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.05	316.272
NELDBIU LX Equity	NORDEA 2 EMMKT LCL D/E-BI-US	LU0772932132	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	0.61	316.272
CGIEMDA ID Equity	COLCHESTER-LCL MKT-USD UH I	IE00BQZJ1775	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	-	2604.717
NELDTEU LX Equity	NORDEA 2 EMMKT LCL D/E-BI-EU	LU0772933452	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	US Dollar	1.71	316.272
AELCBI3 LX Equity	ASHMORE-EM LOC CUR BD-I 3	LU1049821587	SICAV	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	0.16	4302.341
BCEMLDA ID Equity	BARINGS EM MKT LOC DB-AA USD	IE00BKZGK917	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	US Dollar	0.78	2108.505
BLEMLCU LX Equity	BLUEBAY-EM MK LO CU BD-RUSD	LU0240767763	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	US Dollar	1.95	284.613

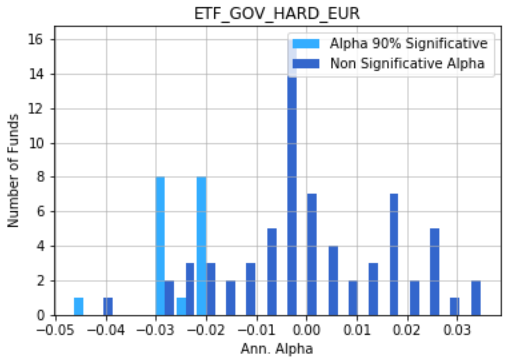
MF_GOV_LCL_EUR

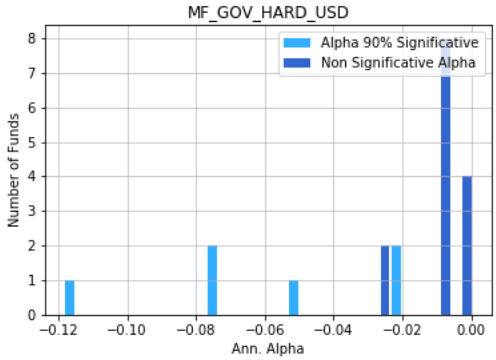
REMBISA AV Equity	RAIFFEISEN EMRG MKTS LB-SA	AT0000A0PH74	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	0.023	130.88
BLEMLCE LX Equity	BLUEBAY-EMER MK LO CU BD-REU	LU0240772680	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	1.95	284.613
EMBBLZD LX Equity	EURIZON FUND-BD EMMK LC-ZD	LU0792173360	FCP	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	565.513
BLEMLCI LX Equity	BLUEBAY-EMERGING MK LO C-I P	LU0240777309	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	0.96	284.613
BBEMLCB LX Equity	BLUEBAY-EMER MK LO CU BD-BE	LU0240772094	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	1.45	284.613
BBEMLBP LX Equity	BLUEBAY-EMER MK L C B-BEURP	LU0240773068	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	-	284.613
BBEMLCM LX Equity	BLUEBAY EMKT LOC CUR CP-MEUR	LU0720462695	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	1.45	284.613
BLEMLEB LX Equity	BLUEBAY-EMERGING MK LO C-IE	LU0240776590	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	1.41	284.613
ISEMLCB DC Equity	ISI EMERG MRKT LOC CURR BND	DK0060037026	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	JGENVUEG	BECLTRUU	Euro	1.12	10.709
JIELMBD DC Equity	JI EMG LOCAL MARK BND FND CL	DK0060009751	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	1.46	14.501
ASHZ2EI LX Equity	ASHMORE-EM LOC CUR-Z2 EU INC	LU1078673255	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	-	4302.341
RAIFEMT AV Equity	RAIFFEISEN EMRG MKTS LB-T	AT0000A0FXL8	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	0.021	130.88
RAIFEVA AV Equity	RAIFFEISEN EMRG MKTS LB-VA	AT0000A0FXM6	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	0.021	130.88
RAIFEMA AV Equity	RAIFFEISEN EMRG MKTS LB-A	AT0000A0G272	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	0.021	130.88
BBEMERD LX Equity	BLUEBAY-EMER MK LO CU B-RED	LU0357317337	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	1.95	284.613
REMBIVA AV Equity	RAIFFEISEN EMRG MKTS LB-IVA	AT0000A0MRF8	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	0.015	130.88
NELDBPE LX Equity	NORDEA 2 EMMKT LCL D/E-BIBPE	LU0772932488	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	1.05	316.272
ASEMLCI LX Equity	ASHMORE-EM LOC CURR BND-IED	LU0493865678	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	1.12	4302.341
APEMLOC IM Equity	ARCA BD PAESI EMERG VAL LOCA	IT0004687148	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	LDMP	BECLTRUU	Euro	-	228.685
EEBEMZU LX Equity	EURIZON FUND-BD EMMK LC-ZU	LU0719366196	FCP	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	565.513
ESYELCZ LX Equity	EURIZON FUND-BD EMMK LC-Z	LU0719365974	FCP	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	565.513
BBEMIED LX Equity	BLUEBAY-EMER MK LO CU B-I D	LU0375176749	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	1.41	284.613
ASHEMLR LX Equity	ASHMORE SICAV-EMK LOC CU B-R	LU0493866056	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	1.71	4302.341
ASHECIA LX Equity	ASHMORE-EM LOC CUR BD-IEURA	LU1023716233	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	1.12	4302.341
ROQEMDE LX Equity	ROBECO QUANT EMER DB L/C-DE	LU0862488169	SICAV	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	0.716
ROQEMBE LX Equity	ROBECO QUANT EMER DB L/C-BE	LU0862488086	SICAV	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	0.716
CGIEMDN ID Equity	COLCHESTER-LCL MKT-EUR UH I	IE00BP46WJ17	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2604.717
EEMBLCR LX Equity	EURIZON FUND-BD EMMK LC-R	LU0792173444	FCP	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	565.513
EEMBLRU LX Equity	EURIZON FUND-BD EMMK LC-RU	LU0792173527	FCP	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	565.513
EBEMLSD LX Equity	EURIZON FUND-BD EMK LC-SDEUR	LU1341636402	FCP	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	565.513
ASHEMLZ LX Equity	ASHMORE-EM LOC CUR BD-ZEURI	LU1385940926	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	-	4302.341
REMLBIA AV Equity	RAIFFEISEN EMRG MKTS LB-IA	AT0000A1KK81	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	130.88
ASHEEAR LX Equity	ASHMORE-EM LOC CUR BD-EURAR	LU1404976810	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	1.71	4302.341
ASHEIEU LX Equity	ASHMORE-EM LOC CUR BD-IEURU	LU1382551585	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	1.12	4302.341
CLMBEUA ID Equity	COLCHESTER-LCL MKT-EUR UH I	IE00BQZJ1999	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2604.717
BAEMLAE ID Equity	BARINGS EM MKT LOC DB-AA EUR	IE00BKZGKC42	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2108.505
APEMLOI IM Equity	ARCA BD PAESI EMERG VAL LO-I	IT0005243115	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	LDMP	BECLTRUU	Euro	-	228.685
RELBRZT AV Equity	RAIFFEISEN EMRG MKTS LB-RZ T	AT0000A1TWM7	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	0.015	130.88
RELBRZA AV Equity	RAIFFEISEN EMRG MKTS LB-RZA	AT0000A1TWN5	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	0.015	130.88
RLBRZVA AV Equity	RAIFFEISEN EMRG MKTS LB-RZVA	AT0000A1TWP0	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	130.88
BAEMAED ID Equity	BARINGS EM MK LOC DB-ADISEUR	IE00BKZGKD58	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2108.505
ASHI3AE LX Equity	ASHMORE-EM LOC CUR BD-I3AE	LU1671717707	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	-	4302.341
BAETBEA ID Equity	BARINGS EM MK LOC DB-TBEURA	IE00BKZGKP70	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2108.505
BAEMDEA ID Equity	BARINGS EM MK LOC DB-IEURACC	IE00BKZGTF08	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2108.505
BAEMCEA ID Equity	BARINGS EM MK LOC DB-C EU AC	IE00BKZGL097	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2108.505
BBEMLQE LX Equity	BLUEBAY EMKT LOC CUR CP-QEUR	LU1170321910	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENBDUU	BECLTRUU	Euro	0.8	284.613
BAEAEAU ID Equity	BARINGS EMMK LOC DB-AEUR AUH	IE00BG36TT88	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2108.505
CLMBEUD ID Equity	COLCHESTER-LCL MKT-EUR UH DI	IE00BD3RJJ07	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2604.717
BAETCEU ID Equity	BARINGS EMMK LOC DB-TCEAU	IE00BG36TY32	Open-End Fund	Emerging Markets Local Currency	Fixed Income	Government	-	BECLTRUU	Euro	-	2108.505

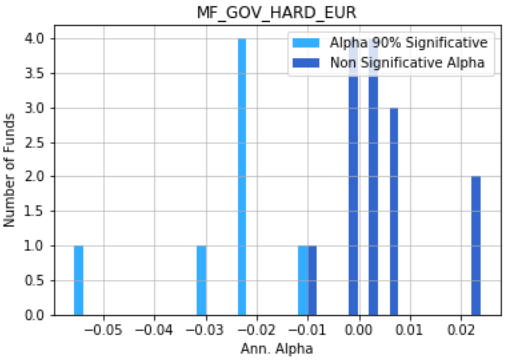
NELDTBE LX Equity	NORDEA 2 EMMKT LCL D/E-BI-EE	LU0772933296	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	1.71	316.272
NELDBIE LX Equity	NORDEA 2 EMMKT LCL D/E-BI-EU	LU0772931670	SICAV	Emerging Markets Local Currency	Fixed Income	Government	JGENVUUG	BECLTRUU	Euro	0.61	316.272

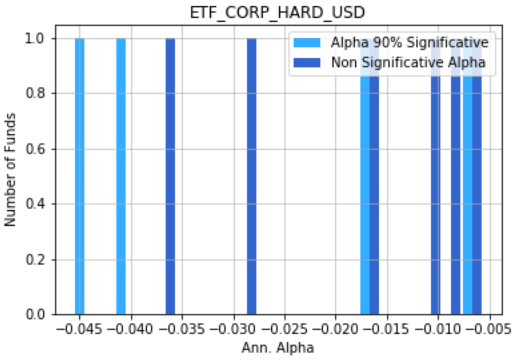
Appendix 4: Alpha Distribution Figures

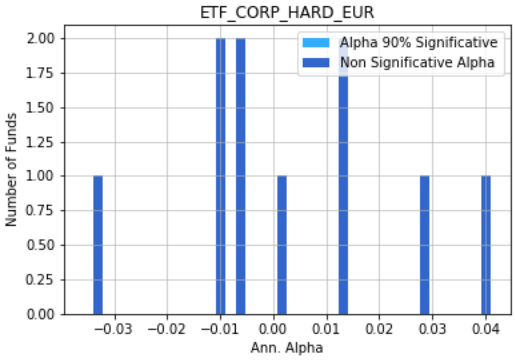


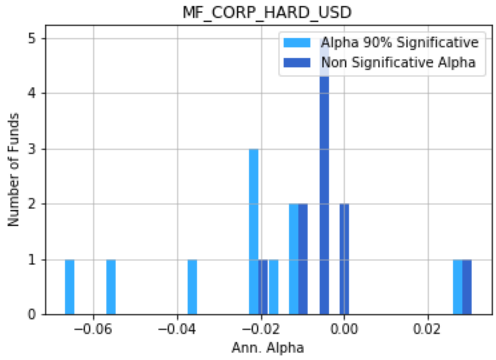


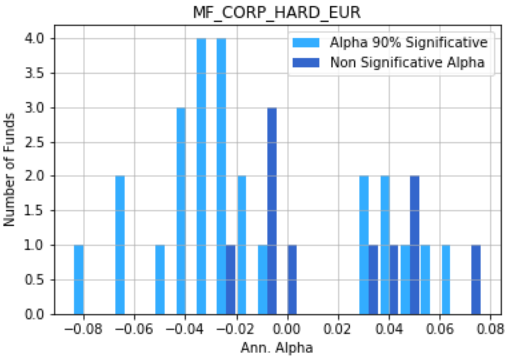


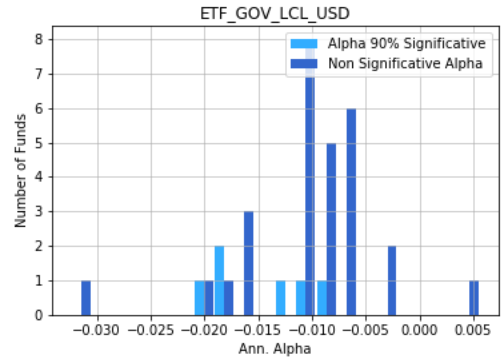








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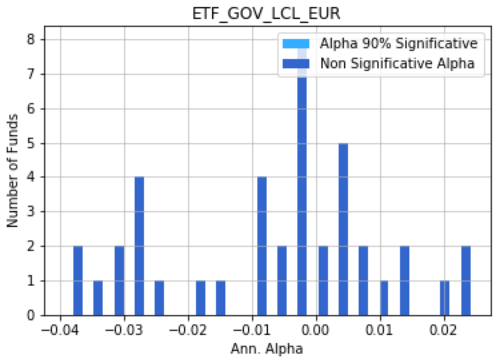
Alpha 90% Significative
Non Significative Alpha
Number of Funds
Ann. Alpha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Alpha 90% Significative
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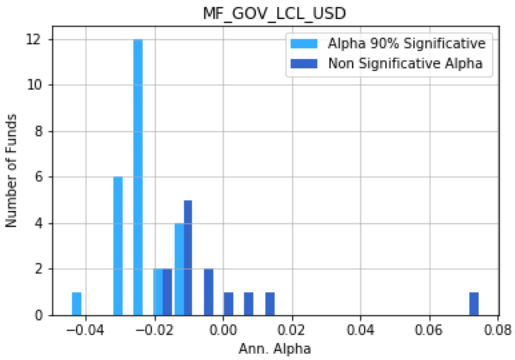
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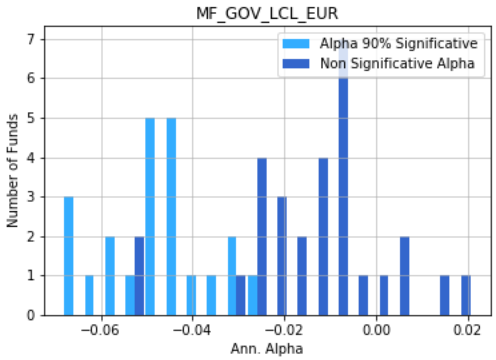
Alpha 90% Significative
Non Significative Alpha
Number of Funds
Ann. Alpha


MF_GOV_LCL_EUR
Alpha 90% Significative
Non Significative Alpha
Number of Funds
Ann. Alpha

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