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Haute école de gestion  
Genève

# **Risks and opportunities of investing in frontier markets.**

**Bachelor Project submitted for the obtention of the  
Bachelor of Science HES in International Business Management**

by

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## Declaration

This Bachelor Project is submitted as part of the final examination requirements of the Haute école de gestion de Genève, for the Bachelor of Science HES-SO in International Business Management.

The student accepts the terms of the confidentiality agreement if one has been signed. The use of any conclusions or recommendations made in the Bachelor Project, with no prejudice to their value, engages neither the responsibility of the author, nor the adviser to the Bachelor Project, nor the jury members nor the HEG.

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Geneva 31th May 2017

Hedi BEN MALEK

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## Executive Summary

Frontier markets are generally in earlier stages of economic and capital market development compared to the better-known emerging markets. To invest in these markets, it is advisable to take into consideration the specific behaviour of frontier markets, the risks that characterise investments in these markets and their organization, as well as the particularities of their regulations. With regards to the stock markets, the comparative advantage for investors is based on a high return/risk ratio, which justifies investing in higher risk and less liquid restricted markets rather than in emerging and developed markets.

In order to establish this ratio, benchmarks are the starting point. Given that the Morgan Stanley Capital International (MSCI) is the most widely used index, monthly prices available on their database are analysed to determine and compare performances of frontier, emerging and developed markets. Concerning the frontier markets, the index examined is the MSCI Frontier Emerging Markets. The main reason is that it includes four emerging countries categorized at the border between frontier and emerging markets where many interesting investment opportunities lie.

The results obtained are unexpected given the reputation of frontier markets of having high returns despite showing high volatility. In fact, it was confirmed prior to the financial crisis of 2008 when frontier markets outperformed emerging and developed markets with a performance of 36.13 % and a Sharpe ratio of 2.03. However, since the financial crisis, frontier markets have experienced only weak recoveries and they show poorer performances than emerging and developed markets. Furthermore, the volatility observed in the MSCI Frontier Emerging Markets Index was higher than that of the MSCI World Index but it was surprisingly lower than the MSCI Emerging Markets Index.

The reason for these unexpected results could be explained by the low liquidity, the Index's method of capitalization and the economic situation post-crisis.

However, investing in those markets remains profitable. Indeed, the long-term growth potential and the diversification benefits are the main reasons for the push towards investment in frontier market equities.

# Contents

<b>Risks and opportunities of investing in frontier markets .....</b>	<b>1</b>
<b>Declaration .....</b>	<b>i</b>
<b>Acknowledgements .....</b>	<b>ii</b>
<b>Executive Summary.....</b>	<b>iii</b>
<b>Contents .....</b>	<b>iv</b>
<b>List of Tables.....</b>	<b>vi</b>
<b>List of Figures .....</b>	<b>vi</b>
<b>Introduction.....</b>	<b>1</b>
<b>Chapter 1 .....</b>	<b>3</b>
<b>1.1 Frontier markets definition .....</b>	<b>3</b>
<b>1.2 Index classification.....</b>	<b>4</b>
1.2.1 MSCI Frontier Market Index.....	5
1.2.2 MSCI Frontier Emerging Market Index .....	7
1.2.3 Other funds .....	8
<b>1.3 Frontier Markets regional particularities .....</b>	<b>8</b>
<b>1.4 Challenge facing Frontier Markets .....</b>	<b>9</b>
1.4.1 Institutional capacity and regulation in frontier markets.....	9
1.4.2 Social factors .....	10
1.4.3 Environmental factors .....	10
1.4.4 Governance factors .....	10
<b>1.5 Risk in investing in Frontier Markets .....</b>	<b>11</b>
1.5.1 Macroeconomy risks.....	11
<b>1.6 Financial risks .....</b>	<b>16</b>
1.6.1 Currency risks.....	16
1.6.2 Interest rate risk .....	16
1.6.3 Liquidity risk .....	17
1.6.4 Transaction costs.....	18
1.6.5 Passive management risk.....	19
1.6.6 Data shortage .....	19
<b>1.7 Opportunity .....</b>	<b>20</b>
1.7.1 Low labour costs.....	20
1.7.2 Positive Demographics .....	20
1.7.3 Regulation support from agency.....	21
1.7.4 Technology improvement .....	21
1.7.5 Economic growth .....	22
<b>Chapter 2 .....</b>	<b>24</b>
<b>2. Theoretical framework.....</b>	<b>24</b>
<b>2.1 Data and data sources.....</b>	<b>24</b>
<b>2.2 Measure of performance .....</b>	<b>24</b>
2.2.1 Return .....	25
2.2.2 Sharpe ratio .....	26

2.2.3	<i>Alpha</i> .....	27
<b>2.3</b>	<b>Risk measures</b> .....	<b>27</b>
2.3.1	<i>Volatility</i> .....	27
2.3.2	<i>Risk-free rate</i> .....	28
2.3.3	<i>Beta</i> .....	28
2.3.4	<i>Value at risk</i> .....	29
2.3.5	<i>Max drawdown</i> .....	29
2.3.6	<i>Correlation &amp; covariance</i> .....	30
<b>2.4</b>	<b>Analysis</b> .....	<b>34</b>
2.4.1	<i>Establish the performance of frontier markets</i> .....	34
2.4.2	<i>Alpha performance</i> .....	37
<b>2.5</b>	<b>Establishing the level of risk</b> .....	<b>38</b>
2.5.1	<i>Drawdown:</i> .....	40
<b>2.6</b>	<b>Establishing the risk adjusted performance</b> .....	<b>42</b>
<b>Chapter 3</b>	.....	<b>43</b>
<b>3.</b>	<b>Discussions</b> .....	<b>43</b>
3.1	<b>Performance</b> .....	<b>43</b>
3.2	<b>Risk</b> .....	<b>44</b>
3.3	<b>Risk return</b> .....	<b>45</b>
3.4	<b>Conclusion</b> .....	<b>45</b>
	<b>Bibliography</b> .....	<b>47</b>
	<b>Appendix 1 : MSCI Frontier countries income</b> .....	<b>51</b>
	<b>Appendix 2 : Level of growth comparison</b> .....	<b>52</b>
	<b>Appendix 3 : Economic of freedom 2017</b> .....	<b>53</b>
	<b>Appendix 4 : Debt to GDP ratio &amp; interest free rate</b> .....	<b>54</b>
	<b>Appendix 5 : Valuations of frontier currencies</b> .....	<b>55</b>
	<b>Appendix 6 : Depreciation of the ARS</b> .....	<b>56</b>
	<b>Appendix 7 : Correlations with MSCI World Sectors Indices, March 2009-December 2012</b> .....	<b>57</b>
	<b>Appendix 8 : Largest 5 countries in FM 2007 &amp; 2015</b> .....	<b>58</b>
	<b>Appendix 9 : MSCI 4 indexes</b> .....	<b>59</b>
	<b>Appendix 10 : Increase in US dollar value</b> .....	<b>60</b>
	<b>Appendix 11 : Asset allocation of 2 funds + benchmark</b> .....	<b>61</b>

## List of Tables

Table 1 Bid-Ask spreads.....	18
Table 2 Correlations with MSCI World Sector Indices, 03.2009-12.2012.....	32
Table 3 Benchmark vs private funds performances .....	33
Table 4 Portfolio summary statistics .....	37
Table 5 Sharpe ratio table .....	42

## List of Figures

Figure 1 Classification of frontier countries .....	4
Figure 2 Top 5 countries in FM as April 2017 .....	6
Figure 3 Top 5 countries in FEM as April 2017 .....	7
Figure 4 Range of economic of freedom index ranking 2012 .....	12
Figure 5 Sector weight in MSCI Frontier Emerging Markets Index compared to MSCI World.....	14
Figure 6 Correlation between GDP and MSCI EM .....	22
Figure 7 40 Week correlations with MSCI World Index .....	31
Figure 8 Annualized returns histograms comparison 2003-2016 .....	34
Figure 9 Historical performances graph 2003-2016 .....	36
Figure 10 Annualized volatility histograms comparison.....	38
Figure 11 Historical volatility graph 2003-2015.....	39
Figure 12 Historical drawdown.....	40

# Introduction

The aim of any investors is to grow their money through a wide variety of investment vehicles including stocks, bonds, commodities, mutual funds, exchange-traded funds (ETFs), options, futures and foreign exchange. They look for favourable investment opportunities, and generally prefer to maximize returns while minimizing the risk.

In the 1980s, International Finance Corporation and the World Bank found that to promote economic development in the less developed nations of the world, it was indispensable to encourage market economies to replace the Communist and Socialist models that were not working. As a result of a re-evaluation of economic development around the world and the raise of market economies, enterprises owned by the state were privatised and more economy has been founded on market principles instead of government mandates. Consequently, many bond and stock markets have been established in these countries and the main emerging economies grew very rapidly (Mobius 2013).

Emerging markets used to provide higher risk-return than developed market. However, emerging markets have evolved into advanced emerging markets and developed countries, leading to a decrease in the risk-return trade off and an increase in correlation with developed market.

Attracted by the objective to find a market with greater returns, international investors have had a deepen look on frontier markets with the intention of replacing emerging markets as a possible alternative for achieving their goal. Investors are aware that higher returns are invariably linked with higher risk (Markovitz 1952).

The common issue faced by investors is the maximisation of expected return on investment given an acceptable level of volatility. To help them know how the stock market is performing, they consult indexes of stocks for the whole market or for a segment of the market, which provide a wide array of indicators. Nonetheless, the most used indexes are capitalized weighted, meaning that individual countries are weighted according to their total market capitalization.

Frontier markets are typically riskier than developed and emerging markets, they are relatively illiquid, non-transparent and have a low level of regulation and are subject to considerable economic and political risks. Volatility, which is a statistical measure of the dispersion of returns for a given market represents the risk, but how can we explain



that volatility is lower in frontier markets than emerging ones and almost similar to developed markets, knowing that investing in the first market offers more risks than the lasts.

This study investigates the real risk in investing in frontier markets and define whether they are worth the risk by examining the risk-return relationship and overall profitability compared to other market groups. It also shows the diversification potential by analysing the correlation and the level of integration with world markets.

In order to approach the context in the best conditions, chapter 1 offers an overview of frontier markets. To do so, we start by defining what are frontier countries and their characteristics. We will then compare benchmarks used in this market so as to establish which index has the most suitable methodology to be exploited in this work. Moreover, a better awareness of challenges and opportunities existing in frontier markets will be useful to describe risks encountered when investing in frontier countries.

Chapter 2 introduces and describes the research methodology of return and risks employed in this study and provides the data and the analysis of the collected data to establish the performance, the level of risk experienced by investors, and investigate the risk-return trade-off in frontier markets compared to emerging and developed market. This study also examines whether frontier markets offer significant benefits of diversification when adding frontier markets stocks into an emerging markets portfolio.

The third chapter discusses separately the results and problems found on the performance, risk and risk adjusted performance in order to provide them individual recommendations related to the measure. At the end of the chapter, a conclusion synthesizes the problems and recommendations.

# Chapter 1

## 1.1 Frontier markets definition

There is no exact definition of what constitutes a “frontier market”. The term “frontier market” was first introduced in 1992 by the International Finance Corporation and the World Bank, to define groups of developing countries capable of becoming the next generation of emerging markets but are in earlier stages of macroeconomic and capital markets development. Frontier markets classification should not be associated with low income developing countries as the per capita Gross National Income of Frontier countries is from high income to low income<sup>1</sup>.

According to Louangrath (2014), Frontier countries could be classified into three basic groups:

- Small market but highly developed
- Countries with investment restrictions and recently open to outside investors
- Countries with lower level of development

For the sake of a better understanding of frontier markets, it is necessary to remind the characteristics of the 3 categories of classification based on Dow Jones’ description (2011):

- **Developed markets** are the most accessible to and supportive of foreign investors. Generally, there is high degree of consistency across these markets.
- **Emerging markets** generally have less accessibility relative to developed markets, but demonstrate some level of openness.
- **Frontier markets** are typically much less accessible to foreign investors, exhibit notable limitations in their regulatory and operational environments, and support a smaller investment landscape. Markets tend to be much less robust and in the earlier stages of development.

In comparison to traditional emerging markets and developed markets, the levels of growth are generally higher in frontier markets<sup>2</sup>. All developed and emerging markets today were once frontier markets prior to undergoing economic.

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<sup>1</sup> Appendix 1: MSCI Frontier countries income

<sup>2</sup> Appendix 2: Level of growth comparison

## 1.2 Index classification

For investors, global benchmarks represent the starting point for understanding the frontier world where investability is the principal criteria for a country's classification while the Gross Domestic Product (GDP) plays a secondary role. When it comes to frontier market, there are four main indexes:

- FTSE (Financial Times Stock Exchange)
- MSCI (Morgan Stanley Capital International)
- S&P (Standard and Poor)
- Russel

Benchmark providers distinguish frontier market from emerging markets by capital market size, liquidity, and accessibility levels on foreign ownership but use different selection criteria and construction methodology with a different result for each index as we can see below:

**Figure 1 Classification of frontier countries**

Classification of Frontier Countries					Unclassified or Off-Benchmark Countries but with Market Cap from the World Bank		
Country	MSCI	S&P	FTSE	Russell			
Argentina					Armenia	Georgia	Nepal
Bahrain					Barbados	Guyana	Paraguay
Bangladesh					Bolivia	Iran	Saudi Arabia
Bosnia and Herzegovina					Costa Rica	Kyrgyz Republic	Uganda
Botswana					El Salvador	Malawi	Uruguay
Bulgaria					Fiji	Mongolia	Venezuela
Côte d'Ivoire					FYR Macedonia	Montenegro	Zimbabwe
Croatia							
Cyprus							
Ecuador							
Egypt							
Estonia							
Gabon							
Ghana							
Jamaica							
Jordan							
Kazakhstan							
Kenya							
Kuwait							
Latvia							
Lebanon							
Lithuania							
Malta							
Mauritius							
Morocco							
Namibia							
Nigeria							
Oman							
Pakistan							
Panama							
Papua New Guinea							
Qatar							
Romania							
Senegal							
Serbia							
Slovak Republic							
Slovenia							
Sri Lanka							
Tanzania							
Trinidad and Tobago							
Tunisia							
Ukraine							
Vietnam							
Zambia							
<b>Total</b>	<b>24</b>	<b>34</b>	<b>21</b>	<b>39</b>	<b>Summary</b>		
					Frontier	44	
					Off Benchmark	21	
					<b>Total</b>	<b>65</b>	

As of 30 June 2015 (Russell data as of March 2015)  
Source: FTSE, IMF, MSCI, Russell, Standard & Poor's, World Bank

Source: Lazard, 2015, 15

The table shows that in 2015 there were disparities in which countries are considered frontier markets, the MSCI Frontier Markets Index included 24 countries whereas the Russell Frontier Index represented a larger set of 39 countries. This difference leads to a significant impact when measuring capitalization. It is explained by the weight of the country present or not in a benchmark, that can reduce the Market Index. In addition, 21 “unclassified” countries have market capitalization according to the world bank and represent global frontier opportunities possibly available for international investment with a potential remarkable performance and an impressive year on year growth in market capitalization but failed to meet benchmark standards.

Considering that the MSCI Index is the most widely used, this work will use MSCI Indexes for frontier, emerging and developed markets.

### **1.2.1 MSCI Frontier Markets Index**

The MSCI Frontier Markets Index (FM) as in February 2017, captures large and mid-capitalized representations across 30 Frontier Markets countries<sup>1</sup>. The index includes 127 constituents, covering about 85% of the free float-adjusted market capitalization<sup>2</sup> in each country.

Adopting free float-adjusted market capitalization weighted methodology ensures the liquidity needed for investability.

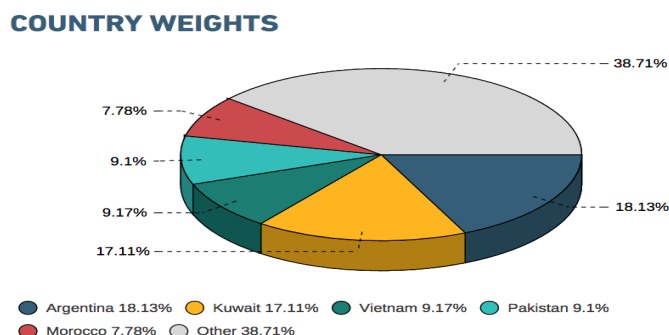
The MSCI Frontier Markets Index is a capitalization-weighted index meaning that individual components are weighted according to their total market capitalization. The larger components carry higher percentage weightings, while the smaller components in the index have lower weights. Consequently, the 5 top countries represent 61.29% of the index while the 25 others only 38.71% as the Figure 2 shows below:

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<sup>1</sup> FM countries include : Argentina, Bahrain, Bangladesh, Benin, Burkina Faso, Croatia, Estonia, Guinea-Bissau, Ivory Coast, Jordan, Kenya, Kuwait, Kazakhstan, Lebanon, Lithuania, Mauritius, Mali, Morocco, Niger, Nigeria, Oman, Pakistan, Romania, Senegal, Serbia, Slovenia, Sri Lanka, Togo, Tunisia and Vietnam.

<sup>2</sup> Free-float methodology market capitalization is calculated : FFM = share price x (N° of shares issued - locked-in shares). This method is considered a better way of calculating market capitalization, because it provides a more accurate reflection of market movements and stocks actively available for trading in the market.

**Figure 2 Top 5 countries in FM as April 2017**



Source MSCI

The problematic with cap-weighted index is that a large price moves in the largest components can have a dramatic effect on the value of the index.

Similarly, the set of frontier markets included in benchmarks changes year to year. “Unclassified” countries become part of frontier indices or markets are upgraded to emerging indices with a result of reduction in liquidity and value. To give an illustration, since 2007, Argentina, Jordan, Morocco and Pakistan have been downgraded from emerging to frontier while Qatar and United Arab Emirates have been in 2014 upgraded to emerging markets, reducing the top five country concentration from 78% in 2007 to 61.29% in 2017.

In May 2017, Pakistan that belongs to the top 5 countries will be upgraded to emerging markets. To offset the impact of this upgrade, other sources of liquidity and more precisely, countries and companies will get added to the index.

According to Morningstar (2014), using capital market size to determine countries allocations within a frontier-markets portfolio is arbitrary, particularly in an asset class composed of underdeveloped economies, where the equity market capitalization/GDP ratio is very unpredictable across the investment universe. In other words, the market capitalization weighting method implies that higher returns are expected for countries with the largest stock markets. However, size does not predict performance. (Gregoriou 2016).

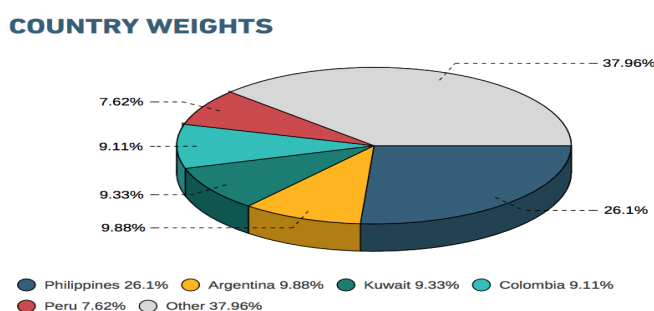
This being said, it seems reasonable to assume that an index equal weighted would cancel the overconcentration problem and mitigates the influence of irregular weight changes. This idea was made by Lamm (2011), who presented that emerging markets equally weighted had higher returns than weighting them by capitalization.

Unfortunately, owing to the lack of exploitable data, there is not yet an MSCI “equal weighted index” unlike for emerging and developed markets.

### 1.2.2 MSCI Frontier Emerging Market Index

In 2008, the MSCI introduced a broader index called MSCI Frontier Emerging Market Index (FEM) in order to annul the disproportionately large weighting to the Gulf Cooperation Council<sup>1</sup> countries (GCC) and the under-representation of the other regions. By introducing 5 small emerging markets (Colombia, Egypt, Morocco, Peru and Philippines) at the border of frontier markets, this new index reduced the exposure to the five GCC countries. Nevertheless, the unintended outcome of adding these border countries was the same as for the GCC: these 5 markets accounted for over half of the new index.

**Figure 3 Top 5 countries in FEM as April 2017**



Source: MSCI

As the figure shows, Philippines weights itself 25.04% of the index.

Although the creation of this new index did not solve the overconcentration problem, half the actively managed frontier-markets funds use the MSCI Frontier Emerging Markets Index as their benchmark. The reason claimed by Oey (2014) is that countries around the border between frontier and emerging markets are where many interesting investment opportunities lie. On the side of emerging markets, the small countries tend to be overlooked because international equity fund manager’s attention concentrates on the larger emerging markets. On the side of frontier markets, there are typically companies with strong earnings growth combined with improvement of fundamentals from these countries.

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<sup>1</sup> Bahrain, Kuwait, Oman, Qatar and United Arab Emirates

Morningstar (2014) found that adding stocks from smaller emerging markets is beneficial from a portfolio management position, thanks to the liquidity brought by the countries and the inclusion of their markets securities that allows for greater capacity.

### **1.2.3 Other funds**

Out of the 17 funds that exist today, the first five funds were launched in 2008, and the rest in 2012 or later. This explains why frontier markets funds have short track record and also why investing in these markets is a relatively new phenomenon.

It is interesting to take a deeper look on these funds and compare their performances with the MSCI Frontier Emerging Markets Index. At a later stage, this work discusses why the differences of performance between these funds and the index are enormous.

## **1.3 Frontier Markets regional particularities**

Frontier markets can be classified into a number of regional subgroups with similar investment-related characteristics such as MSCI FM Africa<sup>1</sup>, MSCI FM Asia Index<sup>2</sup>, MSCI FM Central & Eastern Europe + CIS<sup>3</sup> and MSCI FM Latin America and Caribbean<sup>4</sup>. Countries within a regional subgroup offer the same particularities in terms on risk-return relationship and correlation levels with the developed markets. This could be understood as geographic regions are likely to share similarities with regard to cultural behaviour, infrastructure and market relationship. For instance, thanks to natural resources, African frontier countries' market based is different in relation to European's market based. Additionally, European frontier countries are more correlated with developed countries owing to their strong financial connection with the EU. Last but not least, regional conflicts lead to political instability and can affect surrounding frontier markets as illustrated by the terrorist Boko Haram who has a negative impact on West Africa (Gregoriou 2016).

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<sup>1</sup> FM Africa countries include: Burkina Faso, Benin, Guinea-Bissau, Ivory Coast, Kenya, Mauritius, Mali, Morocco, Niger, Nigeria, Senegal, Togo and Tunisia

<sup>2</sup> FM Asia countries include: Bangladesh, Pakistan, Sri Lanka and Vietnam

<sup>3</sup> FM Central & Eastern Europe + Commonwealth of Independent states countries include: Czech Republic, Hungary, Poland, Russia, Croatia, Estonia, Kazakhstan, Lithuania, Romania, Serbia and Slovenia

<sup>4</sup> FM Latin America and Caribbean country includes: Argentina

## **1.4 Challenge facing Frontier Markets**

With the aim to maintain and even improve the economic growth and to be more attractive to foreign investors, Frontier Markets face considerable challenges, including poverty, urbanization, pollution, disease, corruption, unequal governance, weak institutions and a lack of regulations that could be divided into four factors described by (Odell 2016).

### **1.4.1 Institutional capacity and regulations in frontier markets**

Based on the analysis of Schneider (2013), institutional capacity is crucial to guarantee a safe regulatory system and it is also a criterion to evolve to an emerging market. Governments play a major role in the transparency of regulatory institutions in an integrated financial system where information exchange among financial supervisors and regulators is essential.

However, frontier countries suffer from a lack of developed and effective regulatory principles. The common characteristic is the lack of transparency, participation and accountability compared to developed markets. Another point is the institutional weakness due to the fact that many institutions in developing economies are relatively young. To give the illustration of Schneider (2013), certain regulatory institutions in Africa had difficulties maintaining institutional frameworks as a result of high turnover rates of their senior members and management. In addition to institutional and governance challenges, frontier markets regulators face issues on their decisions such as their quality, credibility and impact. In that event, building the professional capacity of new regulators is one of the main challenges regarding institutions. Last but not least, the lack of regulatory enforcement which represents the action against mismanagement and failure to report improper accounting and financial records.

Wickham (2013) cites the change necessary for reducing institutional fails:

- the introduction of effective mechanisms to ensure contract enforcement
- improve regulation and reduce bureaucracy
- improve communications and infrastructure
- human development and the development of labour markets
- stronger capital markets through institutional mechanisms



## 1.4.2 Social factors

These issues are often provoked by weak institutions and irregular regulatory governments.

- **Consumer:** Protection through quality control or product standards are the indispensable conditions required to gain the trust of consumers and stakeholders
- **Employees:** Protection against human rights abuses are inadequate and the standards for health and safety need to be adjusted to the developed market
- **Communities:** The relationship between a company and the communities in which it operates are deteriorated by environmental factors, land use, employment and compensation

## 1.4.3 Environmental factors

- **Climate changes:** Extreme weather events occur more often and cause more damage. Countries across Africa, Asia and Latin America are the continents the most affected causing billions of economic losses
- **Pollution:** Has an impact on economic productivity through health costs and reduced labour productivity cost. Aftermath the COP 21 in Paris, countries across the globe among several frontier markets have committed to reduce fossil fuels use
- **Resource scarcity:** Demand for resources is linked to the income rise in frontier markets. McKinsey & Co forecasts that global demand for primary energy, food, and water will increase by 25-40%. The World Economic Forum's 2016 Global Risks Report mentioned water crises as the risk number one the world will face over the next 10 years, with many frontier markets among the most vulnerable to water stress

## 1.4.4 Governance factors

- **Corruption:** Equity investors are encouraging to invest greater value to countries where corruption perceptions are lower. Frontier markets have low scores in Transparency International's Corruption Perception Index because this phenomenon is highly correlated with country's wealth
- **Accounting and disclosure:** Quality and integrity of financial statement diverge from company to company and country to country. Moreover, disclosure is often limited
- **Ownership and conflict of interests:** In frontier markets it is frequent for governments and powerful families of controlling shareholders. Therefore, conflict of interests could happen between majority and minority shareholders
- **Infrastructure:** Urbanization in frontier countries accentuates the needs for infrastructures, but they do not have the experienced resources and trained workforce to construct and manage infrastructure.

## **1.5 Risk in investing in Frontier Markets**

For many people, risk means danger and threat. In fact, risk is a concept that characterizes the uncertainty about an outcome while the probability of this outcome is known or at least estimated; if the last is unknown it is no more a situation of risk but a situation of ambiguity.

Professionals from the financial world are confronted with a multitude of risks, each having different characteristics. In practice, they limit most of them, but are aware that it is nevertheless necessary to preserve some exposure in order to generate a return.

In such circumstances and for the purpose of minimizing the risks, good risk assessment needs to define the sources of risks and the potential exposure in these markets. Since there is a multitude of different forms of risk, this study concentrates its development on forms linked to the equity markets.

Due to the facts that frontier countries generally have smaller economies or less developed capital markets than traditional emerging markets, the risk of investing in emerging markets countries are more important in frontier countries. Moreover, investing in securities in frontier and emerging markets countries does not involve the same risks as investing in securities in developed countries. This section identifies the risks encountered in frontier markets.

### **1.5.1 Macroenvironment risks**

It is difficult for foreign investors to evaluate macro environmental risks as they may not possess proper local knowledge, but they can apply a mosaic of information from other frontier markets as well as global information and career experience to make rewarding judgements about local stock.

This is made possible thanks to research and educational institutes such as the Heritage Foundation who are making effective research around the world and provide timely and accurate research on key policy issues that can help investors to quantify the risks relative to specific markets. The Index of Economic of Freedom, which is a helpful metric, scores 186 countries based on 4 main groups ranks:

- **Rule of law:** property rights, government integrity, judicial effectiveness
- **Government size:** government spending, tax burden, fiscal health
- **Regulatory efficiency:** business freedom, labour freedom, monetary freedom
- **Open markets:** Trade freedom, investment freedom, financial freedom

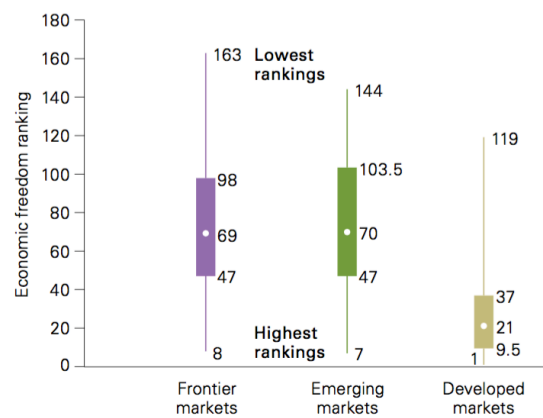
### 1.5.1.1 Political and economic instability risks

Unstable political environment and social risk refer to factors that are not directly connected to the company but are sufficiently influential to have an impact on its prosperity. As regions have often their own political particularities, an efficient way when looking at political risks would be to divide frontier countries into different regions such as Africa, GCC, Asia, American Latin. However, the goal of this work is to focus on the risk return trade-off of all frontier markets, hence permitting a better observation of all markets.

Some frontier countries have a non-democratic form of government, and are plagued with civil and social conflicts. Governmental malfeasance and severe political trouble have repercussions on investment ruling, often to the detriment of foreign investors who suffer from restrictions on foreign portfolio investment inflows or foreign exchange restrictions. Hence, Politics is the root of the majority of risks in frontier markets.

This is highlighted in a research paper written by Vanguard (2012) who stressed the fact that frontier markets and emerging countries share generally the same level of risk.

**Figure 4 Range of economic of freedom index ranking 2012**



Notes: Shaded boxes represent the middle 50% of countries' economic freedom rankings.

Source: Vanguard, using data from Heritage Foundation

Indeed, the scatter plots above show that even though the frontier markets experienced a wider range of scores than emerging markets, they were mostly rated very similarly.

Given the fact that this paper compares the average score of economy of freedom 2017 between countries included in the MSCI Frontier Emerging Markets Index and the US, it is worth noting that the difference between frontier markets and the most

powerful economy in the world is not as large as expected with 60.9 average score for the 34 countries included in the MSCI index and 75.1 for the United States<sup>1</sup>.

### **1.5.1.2 Trading barriers**

Frontier markets still remain difficult to access for foreign investor. For instance, many countries require foreigners to complete lengthy registration process before they are allowed to trade in local securities, this process can last for months, which is time consuming process. In addition, several frontier countries impose taxes on foreign investors and then reduce the expected return on investment.

Also, countries where private ownership of property is not properly protected by an effective judicial system discourage entrepreneurial initiative.

### **1.5.1.3 Sovereign risks**

“Sovereign risk is the risk that a foreign central bank will alter its foreign exchange regulations, significantly reducing or completely nullifying the value of its foreign exchange contracts. It also includes the risk that a foreign nation will either fail to meet debt repayments or not honour sovereign debt payments”<sup>2</sup>.

Excluding the risk of nationalization, sovereign risk is currently at a low level of concern owing to the healthy development and reasonable debt levels in frontier countries, which equals to the average level of 52.2% of the GDP in MSCI Frontier Emerging countries<sup>3</sup>. However, there are 11 countries above the debt to GDP ratio<sup>4</sup>, Lebanon is to be observed with 139.1% and has the only debt GDP ratio higher than 100% in frontier countries.

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<sup>1</sup> Appendix 3: Economic of freedom 2017

<sup>2</sup> <http://www.investopedia.com/terms/s/sovereignrisk.asp>

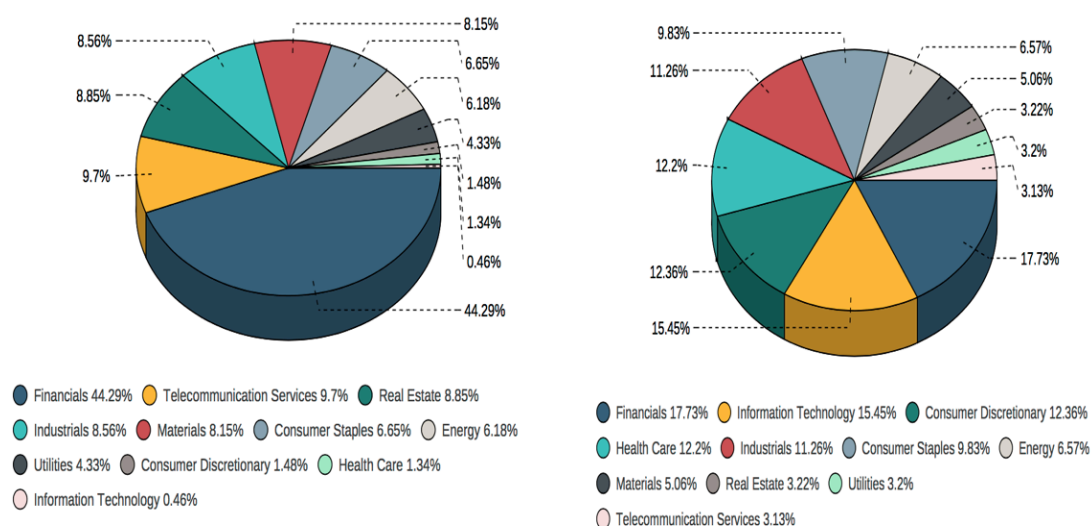
<sup>3</sup> Appendix 4 : Debt to GDP ratio & interest free rate

<sup>4</sup> A debt-to-GDP ratio of 60% is quite often noted as a prudential limit, countries with more than 60% debt to GDP ratio are from the highest to the lowest : Lebanon, Jordan, Croatia, Egypt, Slovenia, Serbia, Sri Lanka, Pakistan, Morocco, Bahrain and Togo

### 1.5.1.4 Sector risks

The risk that the stocks of many of the companies in one sector will fall in price at the same time due to systematic risks is higher in frontier markets.

**Figure 5 Sector weight in MSCI Frontier Emerging Markets Index (left) compared to MSCI World (right)**



Source:MSCI 2017

These pie charts show that sector exposure is more pronounced in frontier markets since there is one dominant sector in the above benchmark, where financial sector represents 44.29% and is followed by telecommunication services 9.7% and real estate 8.85%.

Accordingly, this fund may be subject to more risks than if it were broadly diversified over numerous industries and sectors of the economy.

Nonetheless, Wickham (2013) explains that financial sector appears to be significant as it is where stock exchanges generally develop. Precisely, when governments establish a stock exchange, the key state owned corporations, that is banks, telecoms and utilities are the only candidates available for listing within the direct control of the state.

### 1.5.1.5 Commodity risk

According to the United Nation Conference On Trade and Development (UNCTAD) report 2014<sup>1</sup>, most frontier markets are excessively dependent on commodities and

<sup>1</sup> Full report can be found: [http://unctad.org/en/PublicationsLibrary/suc2014d7\\_en.pdf](http://unctad.org/en/PublicationsLibrary/suc2014d7_en.pdf)

international commodity price developments have important development implications. Mobius (2013) does not agree with this assumption and believes it underplays the diversity of the frontier market universe, because some economies, notably Kenya and Vietnam, are oriented towards agriculture and domestic spending. Others, such as the Gulf cooperation council countries and Nigeria, may have been more driven by commodities in the past, but are now seeing rapid diversification both through hard<sup>1</sup> and soft<sup>2</sup> infrastructures expansion and the development of private domestic demand that will drive productivity growth over time.

In the same way, commodity based economies are more vulnerable to a change in price of commodities, but frontier stock markets are generally protected from short term commodity price volatility, as the companies who produce commodity are commonly owned by the government, and thus are typically not listed on local stock exchanges (Speidell 2011).

#### **1.5.1.6 Nationalization of resource risk**

Ernst & Young report 2016<sup>3</sup> identifies resource nationalisation as the main threat facing investors in the metals and mining sectors. Several governments around the world are going beyond taxation in their quest of greater revenue in introducing export levies and limits on foreign ownership. As a result, this unpredictable change in policy launched by governments of resource wealth nations could create uncertainty and destruction of value.

When a government announces its intention to renationalise a company as it was the case in Argentina in 2012 for the oil and gas giant YPF, it had a spill over effect on investors' confidence and thus had a negative impact on local companies that needed investment. (Lazard 2015)

That is to say, nationalization of resource does not have a direct impact on the stock market as multinationals contribute to the GDP of a country, but are not represented in the stock market of the country. To give an illustration, BP's performances who operates in Nigeria, are represented in the MSCI World Index as BP is a UK company.

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<sup>1</sup> Roads, airport, bridges, seaports etc...

<sup>2</sup> Essential services, for instance, education and healthcare

<sup>3</sup> Full report can be found at : [http://www.ey.com/Publication/vwLUAssets/resource-nationalism-update-march-2016/\\$FILE/ey-resource-nationalism-update-march-2016.pdf](http://www.ey.com/Publication/vwLUAssets/resource-nationalism-update-march-2016/$FILE/ey-resource-nationalism-update-march-2016.pdf)

## **1.6 Financial risks**

### **1.6.1 Currency risk**

Investing abroad involves a higher risk of investment exposure to potentially volatile currency since adverse moves in exchange rates can dramatically impact the performance of frontier countries. Besides, MSCI Frontier Markets Index and MSCI Frontier Emerging Markets Index are in USD, which include currency effects while local returns exclude currency effects.

In comparison to emerging markets currencies, frontier markets currencies usually have less liquid and deep foreign exchange markets. Thus, these markets are characterized by a higher currency volatility, wider bid-ask spreads and larger commissions.

It is true that many frontier countries' currencies are undervalued on a purchasing power parity (PPP) basis, where baskets of goods are cheaper in low income countries than its opposite (Wickham 2013)<sup>1</sup>. Despite these currencies are expected to appreciate over the medium to long term, some political events are outside control and can challenge this thought. For instance, Argentina currency has depreciated for more than 400% against the dollar<sup>2</sup> since the valuations of frontier markets currencies table was done.

For these reasons, prudent investors should take a globally diversified approach with sensible country and regional allocation when investing abroad.

### **1.6.2 Interest rate risk**

The report of Aberdeen (2014) says that the risk of interest rates increase because of fundamental or technical factors is a major risk for local currency bonds. Interest risk could arise from poorly managed monetary policy or in terms of trade shock<sup>3</sup> that could lead to an inflation spike, although the latter is possibly a lower risk given the small size and low foreign ownership of frontier local market bonds.

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<sup>1</sup> Appendix 5 : Valuations of frontier market currencies

<sup>2</sup> Appendix 6 : Devaluation of the ARS

<sup>3</sup> reflects a sudden, large, and enduring change either in import or export prices that tend to affect income

### 1.6.3 Liquidity risk

Investors in capital markets, commonly via secondary markets, require exit opportunities in order to match the maturity of available securities to their own preferred portfolios. Even though the role of brokers willing to build inventories of financial instruments are essential, they are frequently denounced as simple speculators. Liquidity providers are generally attracted to a large number of borrowers and lenders. In the meantime they need trading mechanisms like supporting clearing<sup>1</sup> and settlement systems that do not impose exorbitant transaction costs (Schizas 2012).

However, liquidity concerns more investors seeking for short term and middle term results, while on the contrary, long term investors are less affected by thinly traded securities.

As many stock markets in frontier countries are in the process of emerging countries, their free float and trading volumes are generally lower than those in more developed markets and they are confronted with non-existent or not properly enforced trading legislation.

In frontier markets securities, the average three-month on Average Daily Trade Value<sup>2</sup> accounted for \$589 Billion while \$9.21 Trillion and \$18.06 Trillion for emerging and developed markets respectively. The ADTV indicates that frontier markets securities are more thinly traded than their developed and emerging markets counterparts. As a result, investors are reluctant to invest in low liquidity markets for the simple reason that when the market is bearish or they believe it would be, it could be difficult to liquidate their position to another party. It could be frustrating to be locked in a bearish market and see the value of your stock going down without being able to sell it.

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<sup>1</sup> Clearing is the procedure by which an organization acts as an intermediary and assumes the role of a buyer and seller in a transaction to reconcile orders between transacting parties

<sup>2</sup> As on the 31.12.2013 and Based on the FTSE Frontier Index including: Argentina, Bahrain, Bangladesh, Botswana, Bulgaria, Cote d'Ivoire, Croatia, Cyprus, Estonia, Ghana, Jordan, Kenya, Lithuania, Macedonia, Malta, Mauritius, Nigeria, Oman, Qatar, Romania, Serbia, Slovakia, Slovenia, Sri Lanka, Tunisia, Vietnam



**Table 1 Bid-Ask spreads**

Bid-Ask Spreads.		
Bid-Ask Spreads	Average	Median
U.S. (sample)	0.06%	0.06%
PANAMA	0.11%	0.11%
QATAR	0.36%	0.33%
JORDAN	0.84%	0.64%
TUNISIA	1.13%	0.73%
GEORGIA	0.78%	0.78%
VIETNAM	1.24%	0.88%
ROMANIA	1.80%	1.14%
LITHUANIA	2.53%	1.35%
LATVIA	1.76%	1.54%
SLOVENIA	3.02%	2.25%
ESTONIA	2.52%	2.26%
SRI LANKA	3.77%	2.33%
BAHRAIN	2.89%	2.89%
CROATIA	5.33%	3.26%
UKRAINE	8.12%	4.29%
KAZAKHSTAN	7.66%	5.21%
JAMAICA	5.93%	5.35%

*Source: Bloomberg, Oct. 2008, 155 frontier stocks with data.*

Source: Kamar Jaffer 2013

As shown in the table a lack of liquidity might cause a broader bid-ask spreads<sup>1</sup>, and therefore, higher trading costs when dealing with frontier securities. Moreover, in many frontier markets, this mechanism does not work well. Sellers often know their holdings better than buyers and refuse to sell below a certain price. Volume therefore dries up.

Liquidity issues should not be confused with accessibility of frontier-market products. An abundance of options does not exist, but frontier-market funds and ETFs are available to the average investor.

#### 1.6.4 Transaction costs

Transaction costs are the labour required to bring a good or service to market. From a financial point, it includes the local brokers' commission and spreads seen in the liquidity risk. In frontier markets, transaction costs are higher than those of developed markets and make short term investing an unproductive enterprise.

Indeed, transaction costs in frontier markets can be extremely high. Marshall, Nguyen, and Visaltanachoti found that trading costs for frontier markets were three times higher

<sup>1</sup> A bid-ask spread is the amount by which the ask price exceeds the bid price for an asset in the market. The bid-ask spread is essentially the difference between the highest price that a buyer is willing to pay for an asset and the lowest price that a seller is willing to accept to sell it

than trading costs for U.S equities. Transactions costs reduce returns and lower diversification benefits.

In addition, owing to the relative immaturity of frontier markets, operational risks could be included in transaction costs. For instance, the probability of failed trades is greater, settlement process is less automated and more prone to error, which could generate supplementary costs.

### **1.6.5 Passive management risk**

In MSCI index, the funds are not “actively” managed. Consequently, the stock would not necessarily be sold if it is in financial trouble unless that stock is removed from the index.

### **1.6.6 Data shortage**

Estimating risk in frontier markets is a challenge because data are thin or non-existent in these financial markets. There are also plenty of difficulties faced by analysts in undertaking valuation such as limited adequate market data, treatment of risk and uncertainty, dealing with currency issues and inflation pressures and especially the differences in accounting practices.

Despite the awareness of the importance in international standardization of accounting practices, significant differences are common between companies and countries in frontier markets. Measures to standardize accounting practices must be taken with the integration of the U.S. GAAP set by the Federal Accounting Standards Board (FASB) or the International Accounting Standards (IAS) set by the International Accounting Standards Committee (IASC). Moreover, instead of using accrual methods used in developed markets, the absence of capital markets and the preference to use cash-based accounts are still usual in these markets.

The direct consequences are the colossal work and time spent by analysts in applying sophisticated mathematical models that could be more productively spend on improving the data available in frontier markets.

Although frontier markets are relatively young and the lack of track record is linked, it is essential to develop a solid and standardized database for these countries, especially to attract investors who need relevant data to apply financial ratios (Okere 2007).

## **1.7 Opportunity**

Many elements suggest that several frontier markets would be the next emerging markets story in the next decade, following the path of United Arab Emirates and Qatar, which recently graduated from frontier to emerging status.

While frontier countries are risky, many are now in periods of relative stability, with political reform and greater democracy allowing for further development and investment in infrastructure and a more favourable business environment for investors. So, stronger GDP growths in frontier markets are the direct consequence from those improvements (Conway, Schroders 2013).

### **1.7.1 Low labour costs**

China has been the de facto global factory for a decade. Nevertheless, increasing labour costs in recent years have had the consequence for many companies to choose frontier markets such as Vietnam and Bangladesh as their new manufacture countries, being one of the growth drivers.

### **1.7.2 Positive Demographics**

In contrast with developed markets, frontier countries benefit from a strong growth reinforced by a large and relative young population. As the stock of labour has an impact on the long term growth, a large ratio of young people to the total population can lead to a bigger workforce, as well as a larger purchaser base for business to sell to.

Furthermore, the report of the FTSE Russel (2014) explains that globalization is creating jobs and thus increase the ability to absorb a fast growing population into the workforce in frontier countries and it justifies why the growing percentage of the population in these countries are moving to cities where high productivity urban manufacturing jobs are.

At the same time, strong demographics could also be a challenge for some frontier countries who face structural issues, or, and huge youth unemployment issues.

### 1.7.3 Regulation support from agency

Frontier countries have been benefiting from open trade and international organizations such as the International Organization of Securities Commissions<sup>1</sup> (IOSCO), regional stock exchange associations, World Bank, International Monetary Fund<sup>2</sup> (IMF) and The Organization for Economic Co-operation and Development<sup>3</sup> (OECD). They have assisted frontier countries and emerging countries in the standardization of existing equity markets, the improvement of their stock exchanges and to develop the necessary regulatory, legal, clearing and settlement systems needed to attract foreign portfolio capital (Schneider 2013).

The transmission and availability of trading technology platforms and electronic communication have further allowed the development of market infrastructure (FTSE Russel 2014).

Governments in developing markets are aware that in order to improve their financial market, the basic principles of effective regulation, including transparency and accountability of regulators and promoting a more predictable regulatory process must be implemented.

### 1.7.4 Technology improvement

The phenomenon seen in frontier markets could be called "technological leaps". It expresses the ability in these countries to adopt technology that has been developed in the advanced economies while skipping expensive infrastructure build out. As an illustration, Kenya's development in mobile telephony banking offers the population to transfer money without the need for a bank account via SMS (Lazard 2015).

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<sup>1</sup> Guiding Principles of Regulatory Quality and Performance can be found in: <https://www.oecd.org/fr/reformereg/34976533.pdf>

<sup>2</sup> International Working Group of Sovereign Wealth Funds (IWG) principles can be found in : [http://www.ecgi.org/codes/documents/iwg\\_santiago\\_principles\\_oct2008\\_en.pdf](http://www.ecgi.org/codes/documents/iwg_santiago_principles_oct2008_en.pdf)

<sup>3</sup> Policy Framework for investment 2015 can be found in : <http://www.oecd.org/daf/inv/investment-policy/Policy-Framework-for-Investment-2015-CMIN2015-5.pdf>

### 1.7.5 Economic growth

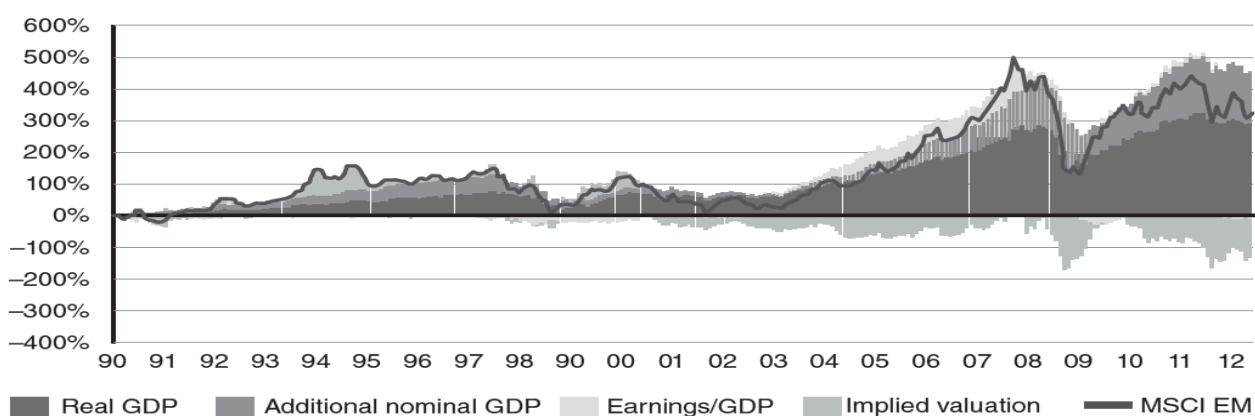
All previous factors including low debt relative to GDP, the construction of new critical infrastructure and an abundance of natural resources contribute to an economic growth in frontier markets. According the International Monetary Fund, Real and Nominal GDP growth in frontier markets are estimated to continue to perform better than advanced economies for decades to come, so it becomes the primary reason for interest as an investment option. Actually, it is exact to assume there is a link between economic growth and market returns but for domestic firms to profit from economic growth, it is a long term process.

However, it is also important to remind investors who are attracted by high economic growth rates that frontier economies are starting from a low base and then it is easier to produce 4% GDP growth in a country (Koweit) with 288.4 Billion \$ GDP in 2016 rather than in USA, where GDP for the same year reach 17.947 Trillion<sup>1</sup>.

Concerning the relationship between economic growth and equity market return for frontier market providing data since 2000, Philips (2013) find a weak relationship (0.07 R-squared), meaning higher economic growth did not correspond with higher market returns and in fact led, on average, to slightly lower returns.

Despite the belief that stock market returns are not correlated with economic growth, this is not the case when a country is industrializing and growing particularly rapidly according to Conway (2013) studies.

**Figure 6: Correlation between GDP and MSCI EM**



Source: MSCI, IMF, Emerging Advisors Group estimates. Data to 31 August 2012

Source: Conway 2013

<sup>1</sup> Data from the Heritage Foundation

This graph shows how the MSCI Emerging Markets Index is correlated with the real GDP of Emerging countries as when the Index tends to follow the GDP growth. As well as, in emerging markets, big commodity producers are global multinationals and the largest companies are also often government owned. This paper assumes that the study done by Conway in emerging market works also for frontier markets.

## Chapter 2

### 2. Theoretical framework

The theoretical framework chapter begins with describing the theories regarding the methodology used to measure return, risk, risk adjusted performance and diversification advantage in adding frontier markets stocks in a portfolio.

Also known as the equity market, the stock market is one of the most vital components of a free-market economy, as it provides companies with access to capital in exchange for giving investors a slice of ownership.

This research calculates and analyses fundamental statistical financial measures in order to evaluate whether investing in frontier markets is worth the risk.

#### 2.1 Data and data sources

This paper is based on the use of MSCI Index and assesses the risk-return relationship associated with equity for the markets indexes as a whole. Therefore, the data used are the monthly stock price indexes of MSCI for different indexes such as the MSCI World, MSCI Emerging Markets and MSCI Frontier Emerging Markets. To obtain statistically credible results, 168 monthly observations are used over a period from 31.01.2003 to 30.12.2016.

Moreover, MSCI Frontier Markets Index has been replaced with the MSCI Frontier Emerging Markets Index for two main reasons:

- the majority of investors use this index as their benchmark
- to remove the weight of GCC

Due to the limitation in the possibility to collect primary data this research is also built on a secondary analysis which uses secondary data from well-established banks and other financial institutes that can be considered trustworthy sources.

#### 2.2 Measure of performance

This study compares the performance track records of MSCI Frontier Emerging Markets Index to MSCI Emerging Markets Index and MSCI World Index. Notably, emerging markets small caps, are included in the MSCI Frontier Emerging Markets Index, as these stocks hold some similarities to frontier equities since most frontier equities are small capitalized.

### 2.2.1 Return

A return is the gain (positive) or loss (negative) of a financial instrument that represents an ownership position in a publicly traded corporation for a particular period. Quoted as a percentage, it comprises the income and the capital gains relative to an investment. In frontier markets, the premium returns should justify the premium risk taken.

Stocks have two “returns“ components:

- Dividends
- Stock price appreciation

The formula is then:

$$\text{Total stock return} = \frac{(P1 - P0)}{P0} + \frac{D}{P0}$$

Where:

P0 = Beginning stock price

P1 = Ending stock price

D = Dividends

In other words, it is the capital yield + the dividend yield.

However, when calculating a return on indices in a stock market, the method is to calculate the index price difference between two dates (monthly in our case) to determine a gain or a loss:

$$\text{Monthly \% return} = \frac{M - M_{-1}}{M_{-1}} \cdot 100$$

Where:

M = Price index level at month M

M-1 = Price index level at month M-1



In order to have a clear idea of how the index has performed and removed the effect of good and bad month, it was necessary to annualize the returns:

$$\% \text{ Annualized return} = \left( \left( \frac{P1 - P0}{P0} - 1 \right)^{\frac{12}{N}} - 1 \right) \cdot 100$$

Where:

P1= Ending period price index level

P0 = Beginning period price index level

N = Number of months within the period

This study also compares the performance track record of MSCI Frontier Emerging Markets Index to emerging and developed markets Indexes. Notably, emerging markets small caps, are included in the MSCI Frontier Emerging Markets Index, as these stocks hold some similarities to frontier equities since most frontier equities are small caps.

### 2.2.2 Sharpe ratio

Sharpe (1994) identified the importance of looking at the risk-return relationship with the Sharpe ratio, which is the pure performance of an investment. To rephrase it, it calculates the average return per unit of risk but assume that returns are normally distributed, which is not always the case in frontier markets. The same time periods (daily, monthly and yearly) are calculated for the returns, standard deviation and the risk free interest rate.

$$\text{Sharpe ratio} = \frac{R_p - R_f}{\sigma_p}$$

Where:

R<sub>p</sub> = Performance annualized

R<sub>f</sub> = Risk free interest rate yearly

σ<sub>p</sub> = Standard deviation annualized

This study takes the annualized return and annualized volatility according to the same period of time to find a Sharpe ratio and compare the performance within the same period.

In practice

Sharpe ratio < 0	Less profitable than the risk free rate
Sharpe ratio > 0.5	Good
Sharpe ratio > 1.0	Excellent
Sharpe ratio > 1.5	Extraordinary

### 2.2.3 Alpha

This measure calculates the outperformance that one manager can obtain over the expected performance. As there is a lack of historical data in frontier markets, we will compare different funds' performance so that we can estimate the alpha of the manager.

In frontier markets, the consequent pricing anomalies can create "alpha" opportunities for active investment managers with dedicated expertise, demonstrable investment skills, and access to on-the-ground resources across disparate countries.

## 2.3 Risk measures

This paper establishes the risk of frontier markets by calculating data of MSCI Frontier Emerging Markets Index.

### 2.3.1 Volatility

Markowitz defines the standard deviation (volatility) of the returns as one of the two parameters an investor must include in its decision making process. The reason is because volatility measures the dispersion of returns by using the standard deviation or variance for given securities or markets index in our case. In other words, the higher the volatility, the riskier the index.

Standard deviation's formula is:

$$\sigma = \sqrt{\frac{\sum_{i=1}^N (r_i - r)^2}{N - 1}}$$

Where:

N = Number of observations

r = Mean of returns

r<sub>i</sub> = Return at period i

Since standard deviation of monthly returns resulted from this calculation, the outcomes are not relevant enough to analyse the risk-adjusted performance of an investment. Consequently, this study comes up with a measure of annual volatility. The calculation to annualized volatility is:

$$\% \text{ Annualized volatility} = \sqrt{(T)} \cdot \sigma_t \cdot 100$$

Where:

T = Full time period (for monthly return T = 12, daily return T=252)

$\sigma_t$  = standard deviation over a single time period

### **2.3.2 Risk-free rate**

The risk-free rate of return is the theoretical rate of return of an investment with “zero” risk. The risk-free rate represents the interest an investor would expect from an absolutely risk-free investment over a specified period of time.

In order to establish the risk-free rate for the MSCI Frontier Emerging Markets Index, in a first step this work established an average of the risk-free rates for all 34 countries of the index, which is 5.6%<sup>1</sup>.

It is worth noticing that genuine risk-free rates may not exist in frontier markets because when a government issues debt; it could very well increase the sovereign default risk.

However, as MSCI indexes are based on the US dollar and in order to simplify and avoid some weighting calculations, the risk-free rate of the US dollar is used in this study to calculate the Sharpe ratio.

### **2.3.3 Beta**

Beta is a measure of the volatility or systematic risk of a security or a portfolio in comparison to the market as a whole. Beta is used in the capital asset pricing model (CAPM), which calculates the expected return of an asset based on its beta and expected market returns. Beta is also known as the beta coefficient.

It is complex to calculate beta in frontier markets as not only these markets have short histories and low liquidity, but also it is difficult to find comparable companies.

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<sup>1</sup> Appendix 4 : Debt to GDP ratio & interest free rate

### 2.3.4 Value at risk

Value at risk (VaR) is a statistical risk metric which gives an indication of the maximum loss in the value of exposure due to adverse market movements and requires:

- a given probability
- a given time interval
- under normal conditions

Owing to the lack of data, this paper does not use the VaR measure.

### 2.3.5 Max drawdown

Because the volatility focuses only on average risk, it is important for investors to evaluate the extreme risks.

The drawdown expresses, over a given time horizon, the decline from an historical peak. This quantitative measure is used to illustrate, over a defined period of time, maximum loss and the recovery capacities of a stock thereafter, called “time to recovery”.

This paper will use the maximum drawdown based on the largest historical loss relative to the benchmark MSCI Frontier Emerging Markets Index to measure the risk taken by investors in order to generate a return.

Formula used to calculate Maximum drawdown:

$$\text{Max Drawdown} = \frac{(V_{\max} - V_{\min})}{V_{\max}}$$

Where:

$V_{\max}$  = Maximum value of the stock before the highest fall observed

$V_{\min}$  = Maximum value of the stock after the highest fall observed and before the formation of a new higher

In this work, the drawdown is calculated in excel on the price level index, only negative number are taken, as drawdown is a measure of decline:

$$=SI(P1/MAX(\$P\$0:R)-1 <=0;P1/MAX(\$P\$0:R)-1;0)$$

Where:

P1 = Today's price

P0 = First day's price of the period

R = Last day's price of the period

### 2.3.6 Correlation & covariance

The correlation coefficient is helpful to determine the degree to which two variables' movements are associated. Positive correlation indicates that two variables have a tendency to move in the same direction whereas a negative correlation indicates the opposite.

When investigating in frontier markets it is interesting to look at the correlation between emerging and developed markets. To do so, this paper uses the correlation with MSCI World Sector Indices table made by Annenberg 2013<sup>1</sup> in order to establish whether there is a diversification benefit from investing in frontier shares and including them into an international portfolio.

However, relevant studies of the correlation with MSCI Frontier Emerging Markets Index are lacking.

As a result, the correlation of MSCI Frontier Markets Index is further examined and compared principally to the MSCI Emerging Markets Index in the diversification part.

The correlation co-efficient is computed by:

$$P_{xy} = \frac{cov(x,y)}{\sigma X . \sigma Y}$$

Where :

Cov (x,y) = the degree to which returns of two assets move in tandem

$\sigma X$  = Standard deviation of asset X

$\sigma Y$  = Standard deviation of asset Y

#### 2.3.6.1 Diversification

Diversification is a tool employed by investors to mitigate or even fully eliminated the specific risk by investing in a variety of assets. Frontier markets are generally perceived as an efficient diversification when investing in Emerging markets.

Since emerging markets became more integrated into the global economy, on account of the globalization and the increasing interconnectivity between countries and industries, their diversification benefits have declined. As a result, correlations among these markets have increased and investors are then looking for market with low integration within the global market system (Annenberg 2013).

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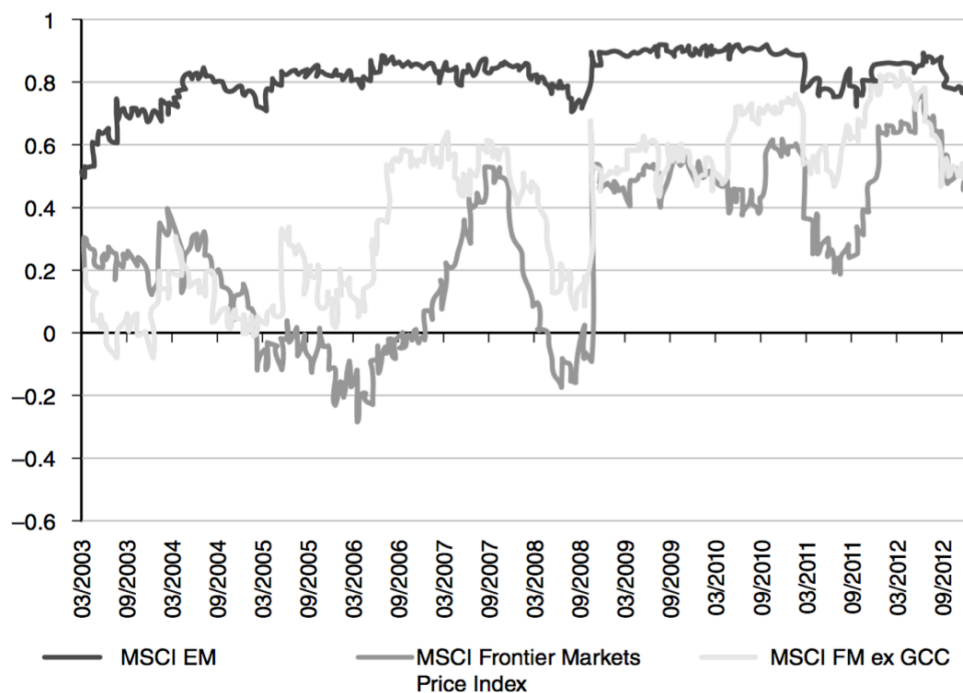
<sup>1</sup> see section "diversification"

In spite of the limited studies in frontier markets, Du Toit et al (2010) present evidence that the introduction of frontier markets equities in an internationally diversified equity portfolio is significantly advantageous, leading to portfolios with superior risk-return characteristics owing to its low correlation with emerging and developed market indexes.

Of course, it is true that although frontier markets have very low correlations with the US market, their correlation increased even more than those of emerging markets during the financial crisis in 2008. So, during extreme events like a financial crisis period, frontier markets are not the best alternative for diversification (Samarakoon 2011).

In addition, the effects of diversification may be offset when adding transaction costs and bid-ask spreads in frontier markets, which can reach 10-12 percent as it is the case in Kenya (Speidell 2011), and usually, transaction costs in frontier markets are three times higher than in the US. In spite of additional costs, investors can still benefit from diversifying their assets in frontier market equities rather than emerging markets as diversification that benefits from the latter may disappear once transaction costs are subtracted (De Roon, Nijman, and Werker, 2001).

**Figure 7 – 40 week correlations with the MSCI World Index**



Source: Bloomberg

source: Annenberg 2013

This graph shows that MSCI Frontier Markets Indexes provides more efficient diversification rather than MSCI Emerging Markets Index markets owing to their lower correlation with developed markets.

It is also interesting to compare the correlation between the different sectors in MSCI Indices.

**Table 2 Correlations with MSCI World Sector Indices, 03.2009-12.2012**

<i>Correlations</i>	<i>Financials</i>	<i>Energy</i>	<i>Materials</i>	<i>Industrials</i>	<i>Consumer discr.</i>	<i>Consumer staples</i>	<i>Healthcare</i>	<i>IT</i>	<i>Telecomm</i>	<i>Utilities</i>
MSCI World	0.95	0.93	0.69	0.98	0.96	0.88	0.86	0.90	0.85	0.82
MSCI EM	0.84	0.82	0.57	0.86	0.81	0.75	0.71	0.74	0.71	0.64
MSCI Frontier	0.53	0.46	0.39	0.51	0.47	0.38	0.34	0.44	0.33	0.39
MSCI Frontier ex-GCC	0.62	0.59	0.45	0.61	0.56	0.51	0.47	0.50	0.45	0.47

Weekly return data.

**Source: Bloomberg**

Source: Annenberg 2013

This table shows that MSCI Frontier Markets Index offers the lowest correlation amongst all the MSCI World Sector Indices. Low correlation could be also explained by the fact that the major investors in frontier markets are still locals, but on the other hand, it is important to highlight the fact that frontier markets' correlations will increase with the rising of foreign ownership in frontier stocks.

However, when looking at the benefits of diversification, MSCI Frontier Markets Index as a whole is not very helpful, as significant differences in terms of correlation exist depending on the frontier regions. This study analyses frontier markets, as a whole while deeper studies should take into consideration regional differences between frontier markets.

### **2.3.6.2 Portfolio**

In this section, this study examines the analysis of Annenberg (2013) who asks himself whether adding frontier market equities to an emerging market portfolio changes that portfolio's risk-return profile. This analysis narrows its scope to an emerging market portfolio instead of a global one in order to demonstrate how the addition of frontier equities affects risk and return. They created an hypothetical 80% emerging as well as a 20% frontier portfolios, using the respective MSCI indices as their proxies.

**Table 3 Portfolio summary statistics**

<i>Indices</i>	<i>Annualised returns</i>									
	2012	2011	2010	2009	2008	2007	2006	3-Yrs	5-Yrs	ITD
100% MSCI EM	15.15%	(20.41)%	16.36%	74.50%	(54.48)%	36.48%	29.18%	2.17%	(3.26)%	11.10%
80% MSCI EM/ 20% MSCI Frontier	13.30%	(20.69)%	16.88%	59.78%	(54.42)%	37.09%	20.80%	1.65%	(5.22)%	10.48%
80% MSCI EM/ 20% MSCI Frontier ex-GCC	14.81%	(22.12)%	15.70%	62.10%	(55.06)%	36.02%	34.89%	1.13%	(5.50)%	10.59%
MSCI World	13.18%	(7.62)%	9.55%	26.98%	(42.08)%	7.09%	17.95%	4.63%	(3.37)%	3.11%
	<i>Since inception statistics</i>									
				<i>MSCI World</i>			<i>VIX Index</i>			
	<i>Drawdown</i>	<i>Standard deviation</i>	<i>Beta (MSCI World)</i>	<i>Up</i>	<i>Down</i>	<i>Up</i>	<i>Down</i>	<i>Up</i>	<i>Down</i>	
100% MSCI EM	(62.67)%	24.10%	1.29	5.19%	(4.53)%	(2.42)%	3.93%			
80% MSCI EM/ 20% MSCI Frontier	(62.74)%	21.94%	1.18	4.70%	(4.06)%	(2.08)%	3.51%			
80% MSCI EM/ 20% MSCI Frontier ex-GCC	(62.88)%	22.18%	1.19	4.77%	(4.14)%	(2.01)%	3.47%			
MSCI World	(55.37)%	16.74%	1.00	3.47%	(3.95)%	(2.59)%	2.72%			

Source: Bloomberg, Principal Global Investors

Source: Annenberg 2013

According to the figure portfolios that combine FM and EM equities have lower volatility than the MSCI EM Index alone. Since the inception statistics, MSCI EM Index has a standard deviation of 24.1%; whilst the addition of MSCI FM for 20% of the portfolio, it reduces the portfolio's standard deviation by over two percentage points, adding in the MSCI FM ex-GCC Index reduces volatility by a little less. Nevertheless, returns are also reduced when adding MSCI Frontier Markets Index and the percentage of reduction changes drastically over the periods.

Regarding the benefits of diversification in frontier markets, this paper suggests that further studies that will take into account the region in the MSCI Frontier Indexes can be done in order to identify which region has the most efficient diversification benefits.



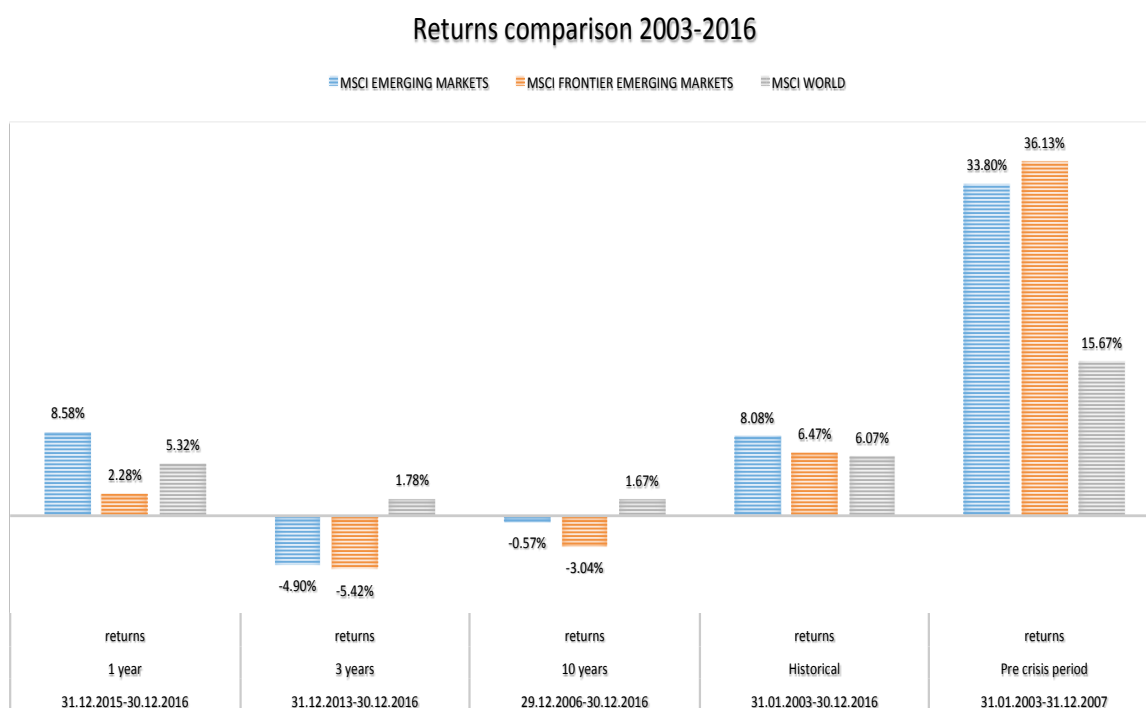
## 2.4 Analysis

The essence of this work is to establish whether investing in frontier markets is worth the risk. This chapter presents the results of the study that will drive to its conclusion. This study will analyse and compare the MSCI Frontier Emerging Markets Index with both, the MSCI Emerging Markets Index and the MSCI World.

### 2.4.1 Establish the performance of frontier markets

The MSCI Frontier Emerging Markets Index was in use after 2007 but data are available since 2003. In order to establish whether the benchmark analysed has been performing well, it is necessary to compare it with emerging markets and developed markets benchmarks.

**Figure 8 Annualized returns histograms comparison 2003-2016**



source: authors 'calculation on data from MSCI

Histograms above show the annualized return over 5 periods for the MSCI Emerging Markets Index (EM), MSCI World Index (World) and MSCI Frontier Emerging Markets Index (FEM). When just looking at the FEM returns, it is worth noticing that the index delivered attractive returns of 36.13% during the pre-crisis period, after which frontier markets seemed to have strong difficulties to recover. For the past 10 years, the frontier Index realized a negative performance owing mainly to the crisis and the falling

oil prices since 2014. The worse performance has been experienced during the period 31.12.2013 to 30.12.2016 with a loss of 5.42%. The upgrade of Qatar and the United Arab Emirates from the FEM and FM to EM Indexes affected the performance, given that these two countries counted for approximately 30% of the FM Index<sup>1</sup>.

In 2016, the benchmark enjoyed a slightly positive performance but still remained 94% lower than its highest level, before the financial crisis in 2008.

Over the past 10 years, FEM was outperformed by EM and even by the World, exhibiting losses and raising the question whether investing in FEM was still attractive in comparison with the EM and the world's. Indeed, developed markets Index have never had a loss through the given periods. These results are counterintuitive since frontier markets' performance was expected to be higher than its peers. Nevertheless, FEM has a huge potential, thanks to the strong performance of frontier markets from 2003 to 2007 that allows its historical annualized return to be higher than developed countries.

Besides, the performance is analysed on the MSCI Frontier Emerging Markets Index instead of the MSCI Frontier Markets Index where the performance is higher than the latter owing to the presence of four emerging markets with low capitalization. To give an illustration, the historical annualized return of MSCI Frontier Emerging Markets Index during the period analysed is 6.47% whereas according to the same calculation, the MSCI Frontier Markets Index's return is only 3.80%<sup>2</sup>, which represents a significant difference.

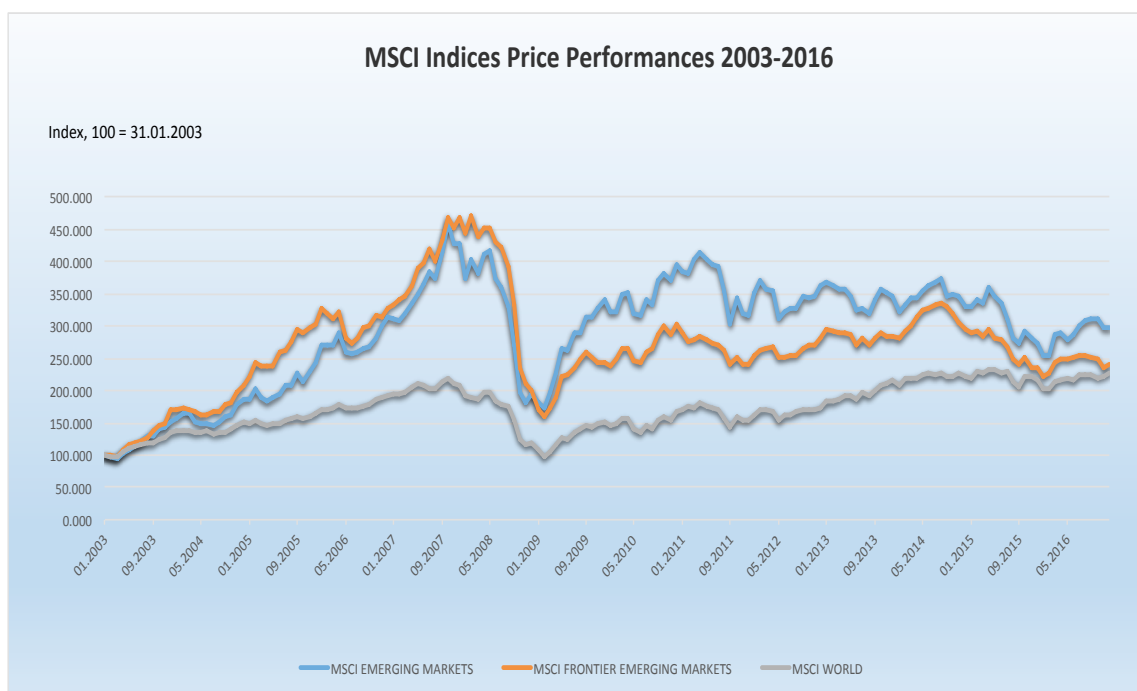
The graph below displays a better view of the three indexes' historical performance through the change in price. In order to easily compare their prices, the graph indexes their price value to 100 right from the start.

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<sup>1</sup> Appendix 8: Largest 5 countries in FM 2007 & 2015

<sup>2</sup> Appendix 9: MSCI 4 indexes

**Figure 9 Historical performances graph 2003-2016**



Source: author's calculation on data from MSCI

The graph illustrates that the FEM Index was the best performing asset class from the return perspective prior to the 2008 crisis, outperforming the EM and World Indexes.

Also, the crisis had a major impact on EM and FEM because these markets are considered as riskier and less liquid than developed markets and then tend to underperform during bearish market as investors reduce their exposure.

In the aftermath of the crash caused by the crisis, the rebound in frontier markets was not as strong, so the FEM Index underperformed the EM Index and suffered from a second slightly decline from 2014, which can also be explained by the increase in the US dollar value<sup>1</sup> over the frontier countries currency where the conversion of their local performances in US dollar for the MSCI Indexes could have led to a lower price Index. It is likely that the dollar effect was not the main cause of decline as emerging markets share the same issue.

At the end of the period, all indexes have produced a positive cumulative return. The EM Index has the greatest performance with a cumulative return of 196.89%<sup>2</sup> followed by the FEM 140.40%<sup>1</sup> and the World Index 128.18%<sup>2</sup>.

<sup>1</sup> Appendix 10: Increase in US dollar value

<sup>2</sup> Ending price at 31.12.2016 = 296.89 US\$

## 2.4.2 Alpha performance

This table shows the disparity in performance between the benchmark and different private funds.

**Table 4 Benchmark vs private funds performances**

	in USD	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Rk	3 years	Rk	5 years
MSCI Frontier Emerging Markets Index		-54.15%	11.61%	23.75%	-18.73%	8.85%	1.18%	3.94%	-20.41%	2.28%	5.35%		-15.80%		-4.93%
Templeton Frontier Markets A		0.72%	43.99%	18.59%	-18.87%	24.96%	16.89%	-15.14%	-21.99%	4.97%	3.12%		-27.90%		-8.29%
Aberdeen Global Frontier Markets Eq 12					-11.22%	24.73%	17.77%	-6.75%	-4.87%	-2.84%	2.10%		-12.01%		20.68%
Charlemagne Magna New Frontiers G								-11.06%	-6.84%	24.46%	8.30%		32.25%		32.25%
HSBC GIF Frontier Markets IC					-19.17%	25.17%	28.94%	5.19%	-9.37%	4.14%	4.76%		34.08%		47.30%
Schroder ISF Frontier Market				0.21%	-17.78%	20.75%	40.18%	5.28%	-17.02%	13.48%	6.76%		-5.14%		62.50%
Ashmore Sicav EM Frontier Equity						12.26%	37.96%	3.16%	-12.53%	8.89%	4.25%		-3.64%		58.64%
BMO LGM Frontier Markets Fund, Cl. B Acc					-2.77%	37.47%	34.66%	-1.49%	-9.28%	6.83%	4.01%		-2.94%		58.17%

Source: PRISM INVEST

For example, in the year 2013 the gap between the benchmark (1.18%) and the best performance (40.18%) is just astonishing. Surely, alpha is not the unique reason for those differences among these private funds, where the equity market capitalization is very inconsistent across the investment universe. In addition, asset allocation is not similar among these funds and logically leads to different results.

To illustrate this assumption, Templeton Frontier Markets A allocate 4.71% of its asset to the National Bank of Kuwait SAKP ORD, while Schroder ISF Frontier Market allocates 5.60% and 3.15% for the MSCI Frontier Emerging Markets Index<sup>3</sup>.

<sup>1</sup> Ending price at 31.12.2016 = 240.40 US\$

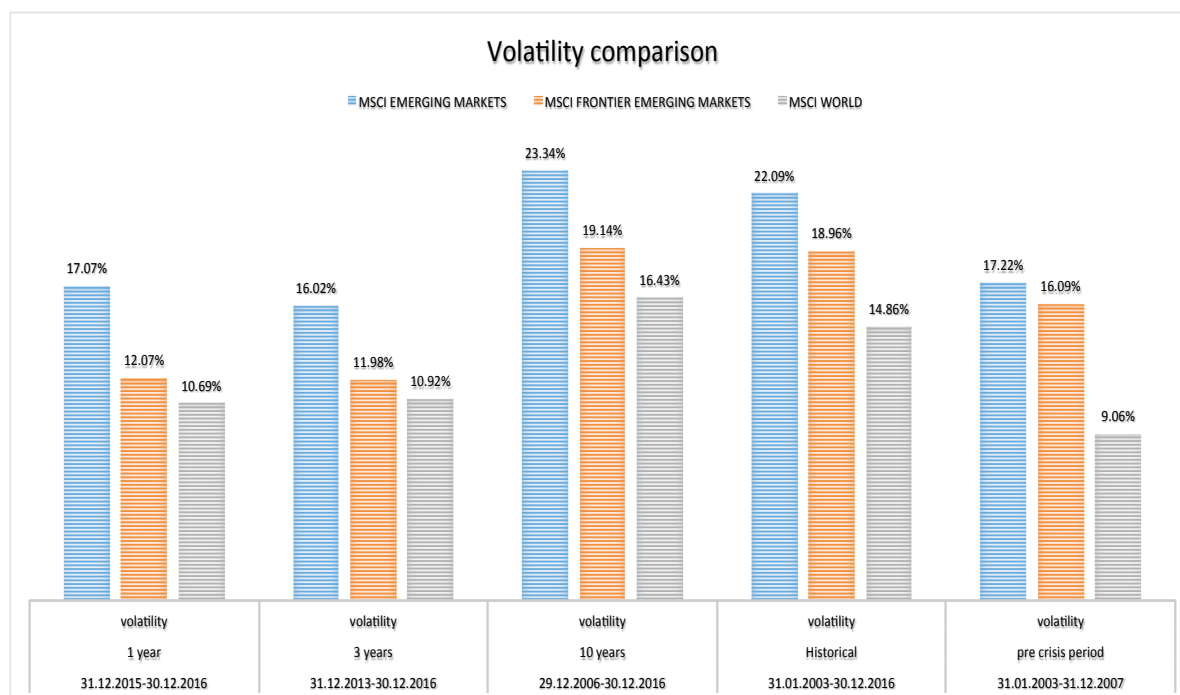
<sup>2</sup> Ending price at 31.12.2016 = 228.18 US\$

<sup>3</sup> Appendix 11: Asset allocation of 2 funds + benchmark

## 2.5 Establishing the level of risk

Many investors avoid investing in frontier equities because they consider these markets too risky and volatile. However, as shown in the figure below, the historical volatility of frontier markets has been noticeably lower than that of emerging markets and higher than that of developed markets.

**Figure 10 Annualized volatility histograms comparison 2003-2016**



Source: author's calculation on data from MSCI

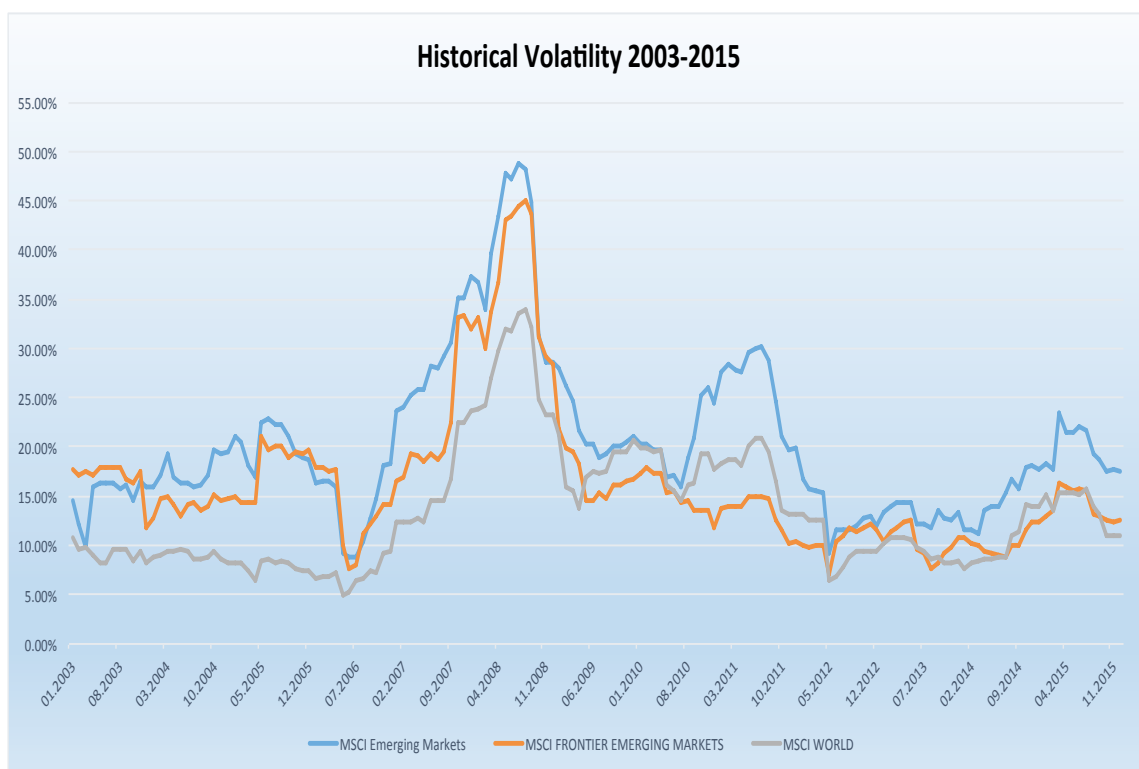
The histogram compares the volatility of the three indexes over 5 periods. In the historical period, the annualized volatility of the FEM reaches 18.96%, which is 4 points better than that of emerging markets and 4 points worse than that of developed markets.

As emerging markets have the highest volatility, and because MSCI Frontier Emerging Markets Index (FM) includes four emerging countries, it is possible that they have influenced the volatility. To check the accuracy of this assumption, it may be useful to establish the historical annualized volatility of the MSCI Frontier Markets Index. Although, the volatility of the FM remains lower than the FEM's, the obtained result is quite unexpected. Indeed, its volatility is 18.86%<sup>1</sup> with only 0.1 % difference. The reason is that the four emerging countries displayed in the FEM Index share the same characteristics regarding the low capitalization and liquidity as their counterparts.

<sup>1</sup> Appendix 9: MSCI 4 Indexes

Excluding the fact that volatility has increased for the three indexes during the crisis, the histogram above emphasises the change between the volatility gap of the FEM and the EM on one part and the FEM and the World on the other part. During the pre-crisis period, the volatility gap from frontier to emerging markets was 1.13% and 7.03% from frontier to developed markets whereas in 2016 the volatility gap between FEM and EM Indexes increased by 5% and decreased to 1.38% from FEM to World. To rephrase it, the current volatility of the FEM index is lower than it was prior to the crisis while the others remain approximately similar. It would be interesting to find an explanation for this change. This paper assumes that the withdrawal of Qatar and AUE had an impact as these markets were generally more liquid than for other frontier markets.

**Figure 11 Historical Volatility graph 2003-2015**



Source: author's calculation on data from MSCI

The graph illustrates the volatility fluctuation from 2003 to 2015. The FEM volatility started in 2003 quoting 17.80% and has essentially been lower than the EM Index volatility during its whole history, and even lower than that of the World's from 2009 to 2013. Moreover, if we exclude the pre-crisis and the crisis period, the deviation between the FEM and the World Index has been slight, which makes volatility for frontier markets relatively equal to that of developed markets at the end of the given period.

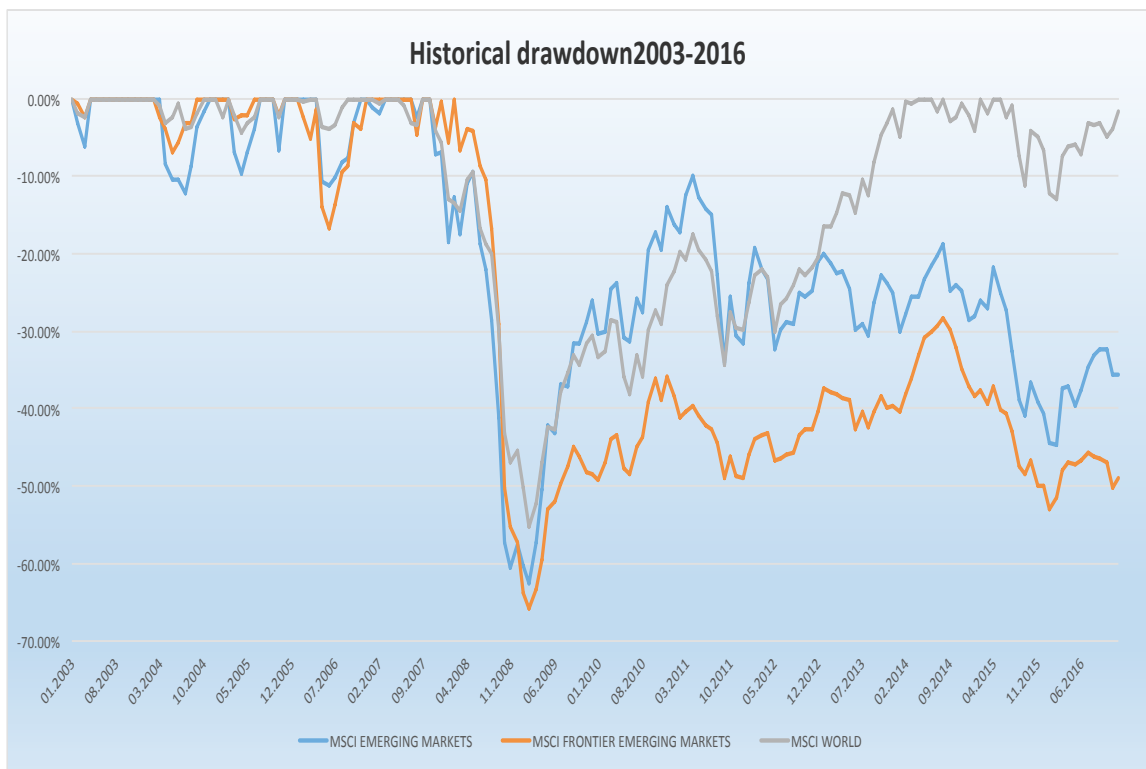
Throughout the crisis, the slope of the FEM curve was extremely sharp, showing that despite the low correlation with developed countries, FEM was affected just like the EM by the extreme event of the subprime crisis leading to a volatility peak of 45% in 2008.

At a later stage, this work explains why the volatility of frontier markets is lower than expected.

### 2.5.1 Drawdown

Having considered the average level of risk, this study also evaluates the extreme risks by comparing the maximum drawdown of the MSCI Frontier Emerging Markets Index with MSCI Emerging Markets Index and MSCI World Index.

**Figure 12 Historical drawdown**



Source: author's calculation on data from MSCI

As a result of the 2008 subprime crisis, all indexes experienced their greatest maximum drawdown and amongst them, the FEM Index has the largest maximum drawdown of -65.80% while the EM's maximum drawdown was -62.67% and -55.37% for the World's Index. Given the relatively low history of the FEM data (2003) in comparison with the EM's (1987) and the World's (1969), the graph shows that in period of extreme market stress, frontier markets' relatively illiquid stock markets can endure larger sharp declines owing to heavy selling.

Indeed, to confirm the previous theory, this paper also calculated the maximum drawdown of the MSCI Frontier Markets Index with the result that if we exclude the four emerging countries, the max drawdown experienced a huge decline of 67.25% owing to its less liquid stock markets.

When it comes to the FEM index, not only did it experienced its largest max drawdown magnitude compared to World and EM, but also it never recovered yet from its pre-crisis peak while it took approximately 5 years for the World Index and 3 years for the Emerging Index to recoup their losses.



## 2.6 Establishing the risk adjusted performance

Once performance and risk have been established, it is possible to determine the risk return relationship of frontier markets. This research limits the measure of risk return with the calculation of Sharpe ratio based on a 3.5% risk free rate.

The table above shows the annualized return, annualized volatility and Sharpe Ratio over 5 periods for the MSCI Emerging Markets Index (EM), MSCI World Index (World) and MSCI Frontier Emerging Markets Index (FEM):

**Table 5 Sharpe ratio table**

	31.12.2015-30.12.2016			31.12.2013-30.12.2016			29.12.2006-30.12.2016			31.01.2003-30.12.2016			31.01.2003-31.12.2007		
	1 year			3 years			10 years			Historical			pre crisis period		
	returns	volatility	Sharpe ratio	returns	volatility	Sharpe ratio	returns	volatility	Sharpe ratio	returns	volatility	Sharpe ratio	returns	volatility	Sharpe ratio
EM	8.58%	17.07%	0.30	-4.90%	16.02%	-0.52	-0.57%	23.34%	-0.17	8.08%	22.09%	0.21	33.80%	17.22%	1.76
FEM	2.28%	12.07%	-0.10	-5.42%	11.98%	-0.74	-3.04%	19.14%	-0.34	6.47%	18.96%	0.16	36.13%	16.09%	2.03
WORLD	5.32%	10.69%	0.17	1.78%	10.92%	-0.16	1.67%	16.43%	-0.11	6.07%	14.86%	0.17	15.67%	9.06%	1.34

Source: author's calculation on data from MSCI

This table shows an extraordinary Sharpe ratio of 2.03 for the FEM Index within the pre-crisis period. However, in the aftermath of the crisis, as the returns were lower than the risk free rate, the FEM Sharpe ratios have been negative. The worst period appeared during the last 3 years with a Sharpe ratio of -0.74 caused by a loss of 5.42%. In 2016, the risk return ratio was still negative but showed an improvement owing to the return of 2.28%.

Additionally, not only the FEM Sharpe ratios have been negative but they also exhibited a lower risk adjusted performance than that of emerging and developed markets, which make those markets more attractive for investors. Indeed, in spite of a higher volatility, emerging markets obtained a better Sharpe Ratio than frontier markets since the crisis occurred.

## Chapter 3

### 3. Discussions

#### 3.1 Performance

Should only returns in frontier markets be taken into consideration and compared to those of emerging and developed countries, the historic performance of frontier markets is situated between both, which is somewhat reasonable. However, despite the poor recent performances, frontier markets provide short data history and are affected by the economic situation.

This study uses MSCI data, which provides all published historical returns for frontier markets, but the diversification of included countries in frontier Indexes, makes it hard to generalize frontier markets performance. Furthermore, the use of weighting capital that causes overconcentration problem and exhibits extreme shifts when countries are added or removed, make difficult the use of the Index as an accurate benchmark. Consequently, investors as seen earlier cannot replicate returns and some investors are getting benchmark sceptical.

To give an illustration of the weighting problem in MSCI'S readjustment of its Frontier Markets Index, the top 5 country weights in 2007 equalled 78% whereas in 2015 the top 5 reached 63% after Qatar and United Arab Emirates had been promoted to the emerging markets. The problematic is the same for the MSCI Frontier Emerging Markets Index that enjoys a disproportionately large weight on a relatively few markets, with the top 5 country accounting for 62.04% of the index (as 28th April 2017).

Under these conditions, it is difficult to measure accurately the evolution of performance within an Index and establish the true performance of frontier countries.

In order to tackle the problem, the use of equal weighted Index for frontier markets that already exist for emerging and developed markets, would cancel the disproportion weighted problem and reduce the influence of irregular weight changes to finally present a higher return (Lamm 2011). In addition, a universal consensus on which countries are considered frontier markets or not, could also improve the situation by standardizing results depending on the index used.

## **3.2 Risk**

In the light of those results, volatility of frontier markets is lower than emerging markets, but does it mean that frontier markets are less risky?

First of all, results on volatility or standard deviation in frontier market must be interpreted with attention, because less developed markets do not include systematic risk, such as higher risks in terms of liquidity, market structure and political climates.

Secondly, the unexpectedly lower volatility of frontier markets compared to that of emerging markets does not mean that frontier countries are less risky. It could be caused by low liquidity that prevents investors from trading as often as liquid markets, leading to unchanged pricing for extended periods. More precisely, volatility may be understated owing to the bid-ask spread effect, when nobody is willing to trade an equity at the current price, either because the seller fixes higher prices and/or, because the buyer offers lower price, there would be then no new price to observe.

Finally, according Vanguard's research (2013) and FTSE Russel research (2014), the currency effect phenomenon should also be taken into account. Indeed, since frontier countries' returns in MSCI Frontier Emerging Markets Index are in the US dollar instead of being in local frontier countries' currency, the currency effect lowers the realized volatility.

Researches based on the International Monetary Fund 2013 annual report on Exchange Arrangements and Exchange Restrictions, noticed a number of frontier currencies that track the US dollar. Given the fact that multiple currencies are linked to the US dollar, this exchange rate management may possibly reduce the realized volatility that would be present if the currencies were instead free floating.

All these reasons coupled with a low correlation between frontier countries markets in the MSCI Frontier Emerging Markets Index justify the low index volatility.

In short, investors should not have blind faith for the index results as they do not reflect the real risk taken when investing in frontier markets. Moreover, considering the maximum drawdown, frontier markets should overpass the risk tolerance of many investors, as the frontier indexes have experienced the largest maximum drawdowns since their previous peak 10 years ago, maximum drawdowns from which they have not yet recovered.

### **3.3 Risk-return**

Based on the previous analysis and taking into account the Sharpe ratio, it is legitimate to conclude that frontier markets are not worth investing in. However, FEM Index does not give a precise idea of performance and risk, that which makes it difficult to establish precisely the risk-return.

Risk/return relationship assumes that the stock (or asset) is priced correctly, but it is not always the case in the FM Index owing to the low liquidity. Another factor that could influence results is that returns are monthly returns and not weekly returns, which may have been more accurate. However, weekly data were not available in the MSCI database. Furthermore, the illiquidity premium is not included in the performance, showing thereby lower figures than expected.

### **3.4 Conclusion**

Frontier markets are undergoing similar developments that emerging markets were undergoing 20-30 years ago. They also offer the same favourable investment characteristics. Of course, the potential for high returns in frontier markets involve heightened risks related to the same sectors as those of emerging markets such as economic instability, political development, commodity, liquidity, sector and currency fluctuations.

While higher risk would normally attract more returns, frontier markets have surprisingly underperformed emerging markets for the past 10 years and give also a lower risk adjusted performance than that of emerging and developed markets. After the crisis, frontier markets had difficulty to rebound because of heavy selling periods and illiquidity. Nevertheless, frontier markets have shown an excellent pre-crisis performance and are expected to rebound after a long and constant recovery in developed and emerging countries, which would hopefully invest their assets into these smaller markets.

The starting point for understanding the frontier world are the global benchmarks, but this study could not help noticing that relying totally on those indexes was inappropriate. As an example, there is no universal consensus on which country are characterized in frontier markets, which leads to significant differences on performance according to which frontier markets indexes are used. Moreover, capitalized weighted methodology gives too much weight on a limited number of countries. As a result, the performances of the indexes are not accurate and managers of private funds cannot replicate the same performance, which highlights the need for active management.

In addition, frontier markets have historically been the least correlated equity classes to the World Index, which make them less volatile than typical emerging markets. This is particularly advantageous from an emerging markets portfolio point of view as it provides investors with a diversification opportunity to potentially improve its risk/return profile in the form of reduced portfolio volatility, although extreme events cancel this benefit as they increase the correlation between frontier markets to developed markets.

This being said, this study is fully aware that the historical low volatility in frontier markets compared to that of emerging markets is also a consequence of the markets illiquidity and should normally be higher.

For most investors, the downside of frontier markets investing would appear to be greater than the benefits but for forward-thinking investors, long-term investments could also provide significant profit from increasing flows into the asset class, as these markets tend to become more popular for the conventional investors community.

In summary, despite the indexes limitation found in this study and the significant specific risks, frontier markets remain an attractive opportunity for long-term investors and diversification benefits. This work suggests that investors should adopt a dedicated strategy allocation based on a globally diversified approach with sensible frontier regional groups that offer the same market particularity. In order to do so, further investigation should be implemented.

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## Appendix 1 : MSCI Frontier countries income

Argentina	ARG	Latin America & Caribbean	<b>Upper middle income</b>
Bahrain	BHR	Middle East & North Africa	High income
Bangladesh	BGD	South Asia	Lower middle income
Benin	BEN	Sub-Saharan Africa	Low income
Burkina Faso	BFA	Sub-Saharan Africa	Low income
Côte d'Ivoire	CIV	Sub-Saharan Africa	Lower middle income
Croatia	HRV	Europe & Central Asia	High income
Estonia	EST	Europe & Central Asia	High income
Guinea-Bissau	GNB	Sub-Saharan Africa	Low income
Jordan	JOR	Middle East & North Africa	Upper middle income
Kazakhstan	KAZ	Europe & Central Asia	Upper middle income
Kenya	KEN	Sub-Saharan Africa	Lower middle income
Kuwait	KWT	Middle East & North Africa	High income
Lebanon	LBN	Middle East & North Africa	Upper middle income
Lithuania	LTU	Europe & Central Asia	High income
Mali	MLI	Sub-Saharan Africa	Low income
Mauritius	MUS	Sub-Saharan Africa	Upper middle income
Morocco	MAR	Middle East & North Africa	Lower middle income
Niger	NER	Sub-Saharan Africa	Low income
Nigeria	NGA	Sub-Saharan Africa	Lower middle income
Oman	OMN	Middle East & North Africa	High income
Pakistan	PAK	South Asia	Lower middle income
Romania	ROM	Europe & Central Asia	Upper middle income
Senegal	SEN	Sub-Saharan Africa	<b>Low income</b>
Serbia	SRB	Europe & Central Asia	Upper middle income
Slovenia	SVN	Europe & Central Asia	High income
Sri Lanka	LKA	South Asia	Lower middle income
Togo	TGO	Sub-Saharan Africa	Low income
Tunisia	TUN	Middle East & North Africa	<b>Lower middle income</b>
Vietnam	VNM	East Asia & Pacific	Lower middle income

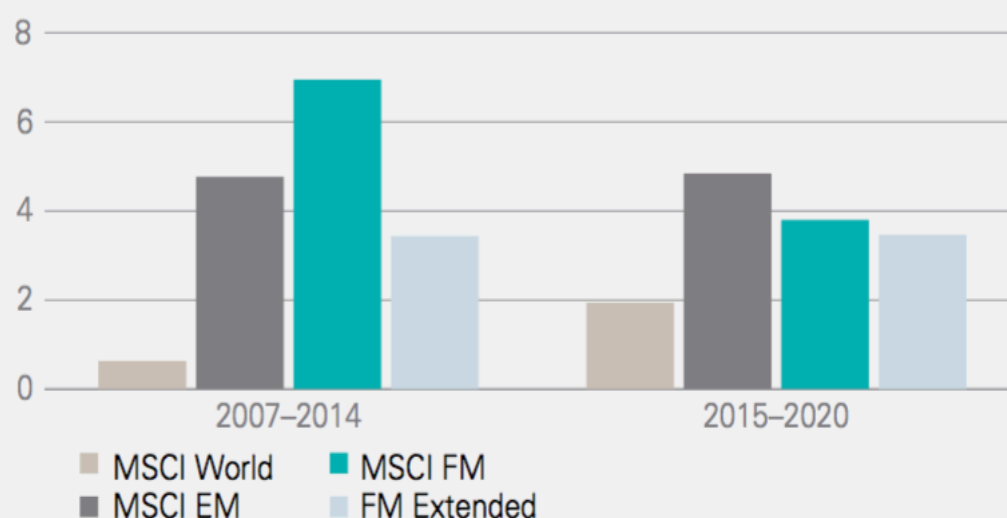
## Appendix 2 : Level of growth comparison

### Exhibit 1

### Growth in Frontier Markets Is Expected to Continue at a Relatively Fast Pace

Real GDP CAGR, 2007–2020

(%)



Real GDP data up to 2014 are from the World Bank (WDI, July 2015), the base year is 2005 and in US dollars. We used real GDP growth rates from the IMF for the 2015–2020 period, and we applied these growth rates to fill missing World Bank data prior to 2014 (only done for 9 out of 109 countries). Taiwan data are all sourced from the IMF since this country is not covered by the World Bank. CAGRs were computed for the sum of MSCI index constituents as of December of each year and for “FM Extended” we used the full list of frontier countries in the Appendix (excluding Egypt, as it is a member of the MSCI EM Index). For the period 2015–2020 we used the constituents as of 30 June 2015. Estimated or forecasted data are not a promise or guarantee of future results and are subject to change.

Source: IMF, MSCI, World Bank, Haver Analytics

## Appendix 3 : Economic of freedom 2017

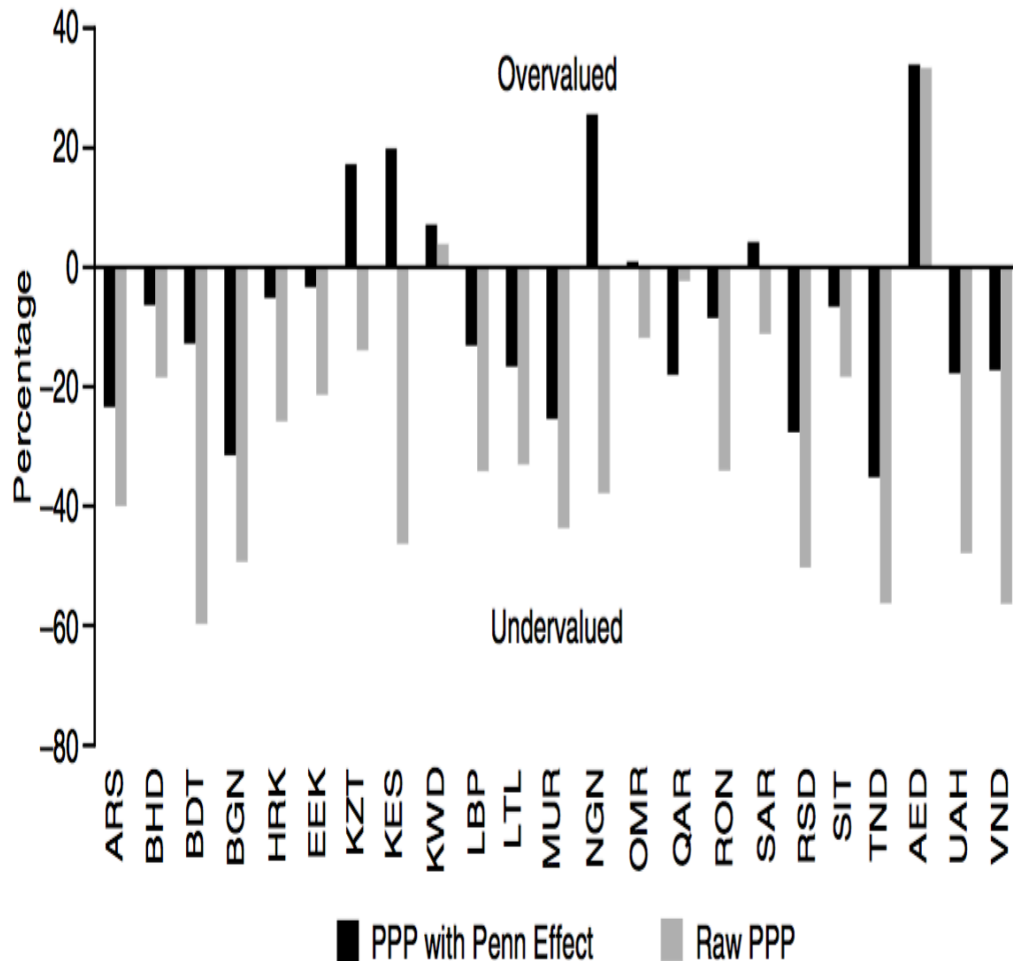
Country Name	WEBSITE	Region	World Rank	Region Rank	2017 Score	Property Rights	Judicial Effectiveness	Government Integrity	Tax Burden	Gov't Spending	Fiscal Health	Business Freedom	Labor Freedom	Monetary Freedom	Trade Freedom	Investment Freedom	Financial Freedom	
Argentina	Argentina	Americas	156	26	50.4	32.4	39.6	38.2	62.6	54.6	56.4	57.3	46.1	50.9	66.7	50	50	
Bahrain	Bahrain	Middle East	44	4	68.5	64.2	53.7	55.5	99.9	69.8	12.0	69.4	78.7	80.7	82.8	75	80	
Bangladesh	Bangladesh	Asia-Pacific	128	28	55.0	34.9	26.0	19.1	72.8	94.0	78.7	53.4	68.7	68.6	63.6	50	30	
Benin	Benin	Sub-Saharan	96	11	59.2	36.0	29.4	31.3	68.6	85.9	71.3	51.9	52.4	85.4	68.7	80	50	
Burkina Faso	Burkina Faso	Sub-Saharan	93	10	59.6	38.2	28.4	31.7	82.6	82.5	88.4	46.4	53.3	84.6	69.2	70	40	
Colombia	Colombia	Americas	37	4	69.7	63.8	25.2	39.6	80.1	74.2	89.8	77.1	77.9	77.0	81.6	80	70	
Côte d'Ivoire	Côte d'Ivoire	Sub-Saharan	75	4	63.0	42.6	45.8	34.3	78.4	84.6	87.0	62.1	50.6	73.2	72.3	75	50	
Croatia	Croatia	Europe	95	37	59.4	65.5	56.8	43.4	66.8	31.3	44.7	58.2	43.3	80.3	87.4	75	60	
Egypt	Egypt	Middle East	144	12	52.6	35.4	56.3	32.7	86.1	63.0	4.6	66.8	51.3	69.6	70.2	55	40	
Estonia	Estonia	Europe	6	2	79.1	82.6	82.8	69.9	81.2	55.8	99.8	77.0	56.9	85.7	87.0	90	80	
Guinea-Bissau	Guinea-Bissau	Sub-Saharan	119	20	56.1	33.8	48.7	28.7	89.0	87.5	75.3	46.7	60.9	77.7	65.2	30	30	
Jordan	Jordan	Middle East	53	5	66.7	60.1	49.5	49.8	91.3	73.3	55.5	63.9	58.1	86.7	82.0	70	60	
Kazakhstan	Kazakhstan	Asia-Pacific	42	11	69.0	56.1	56.5	38.0	93.3	85.7	98.9	74.5	82.5	73.9	78.5	40	50	
Kenya	Kenya	Sub-Saharan	135	27	53.5	45.1	42.7	24.7	78.5	77.9	14.4	50.0	62.4	73.8	67.2	55	50	
Kuwait	Kuwait	Middle East	61	6	65.1	55.5	56.4	41.3	97.7	40.8	99.8	61.2	61.5	73.6	78.7	55	60	
Lebanon	Lebanon	Middle East	137	11	53.3	43.8	25.3	23.3	91.8	76.1	0.0	51.5	49.5	78.4	84.4	65	50	
Lithuania	Lithuania	Europe	16	8	75.8	73.0	62.4	69.7	86.9	64.1	93.6	79.1	63.6	90.0	87.0	70	70	
Mali	Mali	Sub-Saharan	102	12	58.6	36.7	33.8	34.3	69.4	88.0	87.8	44.2	51.1	83.0	70.1	65	40	
Mauritius	Mauritius	Sub-Saharan	21	1	74.7	64.4	72.6	44.3	92.0	81.5	74.9	78.2	68.8	81.1	88.7	80	70	
Morocco	Morocco	Middle East	86	9	61.5	55.0	41.9	37.1	71.7	69.4	55.0	67.7	33.8	82.7	84.0	70	70	
Niger	Niger	Sub-Saharan	154	36	50.8	33.8	22.6	35.0	76.3	73.4	38.5	39.1	46.1	83.3	66.4	55	40	
Nigeria	Nigeria	Sub-Saharan	115	16	57.1	35.3	33.2	12.2	85.2	95.2	87.2	48.9	73.9	71.3	62.3	40	40	
Oman	Oman	Middle East	82	8	62.1	60.8	52.3	47.6	98.5	20.5	36.3	68.4	70.3	80.6	85.2	65	60	
Pakistan	Pakistan	Asia-Pacific	141	32	52.8	36.4	34.1	30.5	78.9	87.3	30.8	61.2	37.8	74.8	67.2	55	40	
Peru	Peru	Americas	43	7	68.9	58.3	28.2	38.8	80.3	85.1	98.4	69.4	62.8	83.3	87.1	75	60	
Philippines	Philippines	Asia-Pacific	58	14	65.6	49.2	37.1	38.7	78.9	89.4	97.2	62.6	57.2	80.6	76.4	60	60	
Romania	Romania	Europe	39	20	69.7	63.9	58.5	45.9	87.4	65.3	90.9	65.9	62.5	83.6	87.0	75	50	
Senegal	Senegal	Sub-Saharan	120	21	55.9	44.0	39.3	42.1	70.9	74.3	51.8	50.8	38.9	86.0	73.1	60	40	
Serbia	Serbia	Europe	99	39	58.9	50.3	40.2	38.2	83.3	40.3	46.9	62.9	65.9	80.8	77.8	70	50	
Slovenia	Slovenia	Europe	97	38	59.2	75.0	55.1	53.6	58.7	28.6	6.1	80.6	60.2	85.3	87.0	70	50	
Sri Lanka	Sri Lanka	Asia-Pacific	112	25	57.4	48.0	48.3	30.0	85.3	90.2	31.2	72.8	57.5	76.0	74.5	35	40	
Togo	Togo	Sub-Saharan	138	29	53.2	33.8	39.9	36.8	68.2	79.8	45.1	50.3	46.2	77.5	71.3	60	30	
Tunisia	Tunisia	Middle East	123	10	55.7	49.6	39.9	37.3	73.7	73.4	53.4	80.6	56.1	75.9	63.8	35	30	
Vietnam	Vietnam	Asia-Pacific	147	35	52.4	49.7	32.0	24.6	79.6	74.6	21.1	61.2	62.2	76.0	83.1	25	40	
Average score 2017					60.9													
Country Name	WEBSITE	Region	World Rank	Region Rank	2017 Score	Property Rights	Judicial Effectiveness	Government Integrity	Tax Burden	Gov't Spending	Fiscal Health	Business Freedom	Labor Freedom	Monetary Freedom	Trade Freedom	Investment Freedom	Financial Freedom	
United States	UnitedStates	Americas	17	3	75.1	81.3	75.1	78.1	65.3	55.9	53.3	84.4	91.0	80.1	87.1	80	70	

## Appendix 4 : Debt to GDP ratio & interest free rate

Country	Population (Millions)	GDP (Billions, PPF)	GDP Growth Rate	5 Year GDP Growth Rate	GDP per Capita (PPF)	Unemployment (%)	Inflation (%)	FDI Inflow (Millions)	Public Debt (% of GDP)	Interest rate(% from traded micr)
Argentina	42.4	\$972.0	1.2	2.7	\$22 554	6.7	26.5	11 654.9	56.5	26.25
Bahrain	1.2	\$64.8	3.2	3.7	\$50 095	1.2	1.8	-1 462.8	63.3	1.25
Bangladesh	159.9	\$576.5	6.4	6.3	\$3 607	4.4	6.4	2 235.4	34.0	6.75
Benin	10.9	\$22.9	5.2	5.2	\$2 113	1.1	0.3	229.3	37.5	4.5
Burkina Faso	17.9	\$30.9	4.0	5.5	\$1 724	2.9	0.9	167.4	31.0	4.5
Colombia	48.2	\$667.4	3.1	4.6	\$13 847	10.0	5.0	12 107.6	49.4	7
Côte d'Ivoire	23.3	\$78.6	8.6	6.3	\$3 316	9.5	1.2	430.2	34.7	4.5
Croatia	4.2	\$91.1	1.6	-0.4	\$21 581	16.1	-0.5	173.9	87.7	2.5
Egypt	88.4	\$1 047.9	4.2	2.5	\$11 850	12.1	11.0	6 885.0	87.7	14.75
Estonia	1.3	\$37.5	1.1	3.7	\$28 592	5.9	0.1	207.7	10.1	0
Guinea-Bissau	1.8	\$2.7	4.8	3.1	\$1 508	7.6	1.5	18.3	57.7	4.5
Jordan	6.8	\$82.7	2.5	2.7	\$12 123	12.9	-0.9	1 274.8	91.7	4.5
Kazakhstan	17.7	\$429.1	1.2	4.8	\$24 268	5.6	6.5	4 020.7	23.3	11
Kenya	44.1	\$141.9	5.6	5.5	\$3 208	9.2	6.6	1 437.0	52.7	10
Kuwait	4.1	\$288.4	0.9	4.0	\$70 166	3.5	3.4	293.5	10.6	2.75
Lebanon	4.6	\$83.1	1.0	1.8	\$18 240	7.1	-3.7	2 341.0	139.1	10
Lithuania	2.9	\$82.4	1.6	3.6	\$28 359	9.5	-0.7	863.4	42.5	0
Mali	16.3	\$35.8	6.1	3.7	\$2 199	8.5	1.4	152.9	36.3	4.5
Mauritius	1.3	\$24.6	3.4	3.5	\$19 509	7.9	1.3	208.3	58.1	4
Morocco	33.5	\$273.5	4.5	4.0	\$8 164	9.6	1.6	3 162.3	63.7	2.25
Niger	17.6	\$19.1	4.0	6.1	\$1 080	2.8	1.0	525.0	43.5	4.5
Nigeria	178.7	\$1 091.7	2.7	4.7	\$6 108	5.8	9.0	3 064.2	11.5	14
Oman	4.2	\$171.4	4.1	4.3	\$44 628	6.3	0.2	821.8	20.6	1.48
Pakistan	190.0	\$931.0	4.2	3.9	\$5 000	5.4	4.5	864.7	64.4	5.75
Peru	31.9	\$389.1	3.3	4.8	\$12 195	3.5	3.5	6 861.2	23.1	4.25
Philippines	101.4	\$741.0	5.8	5.9	\$7 254	6.7	1.4	5 234.0	37.1	3
Romania	19.8	\$413.8	3.7	2.4	\$20 787	6.9	-0.6	3 388.9	39.4	1.75
Senegal	15.0	\$36.7	6.5	4.2	\$2 451	9.3	0.1	345.2	56.8	4.5
Serbia	7.2	\$97.5	0.7	0.4	\$13 671	19.0	1.4	2 346.6	77.4	4
Slovenia	2.1	\$64.0	2.9	0.6	\$31 007	9.3	-0.5	993.3	83.3	0
Sri Lanka	21.1	\$223.0	5.2	6.1	\$10 566	4.7	0.9	681.2	74.4	7.25
Togo	7.2	\$10.8	5.3	5.4	\$1 483	7.7	1.8	52.7	61.9	4.5
Tunisia	11.1	\$127.0	0.8	1.5	\$11 428	14.8	4.9	1 001.7	54.5	4.25
Vietnam	91.6	\$552.3	6.7	5.9	\$6 024	2.1	0.6	11 800.0	59.3	6.5
								<b>Average :</b>	<b>52.2</b>	<b>5.6</b>

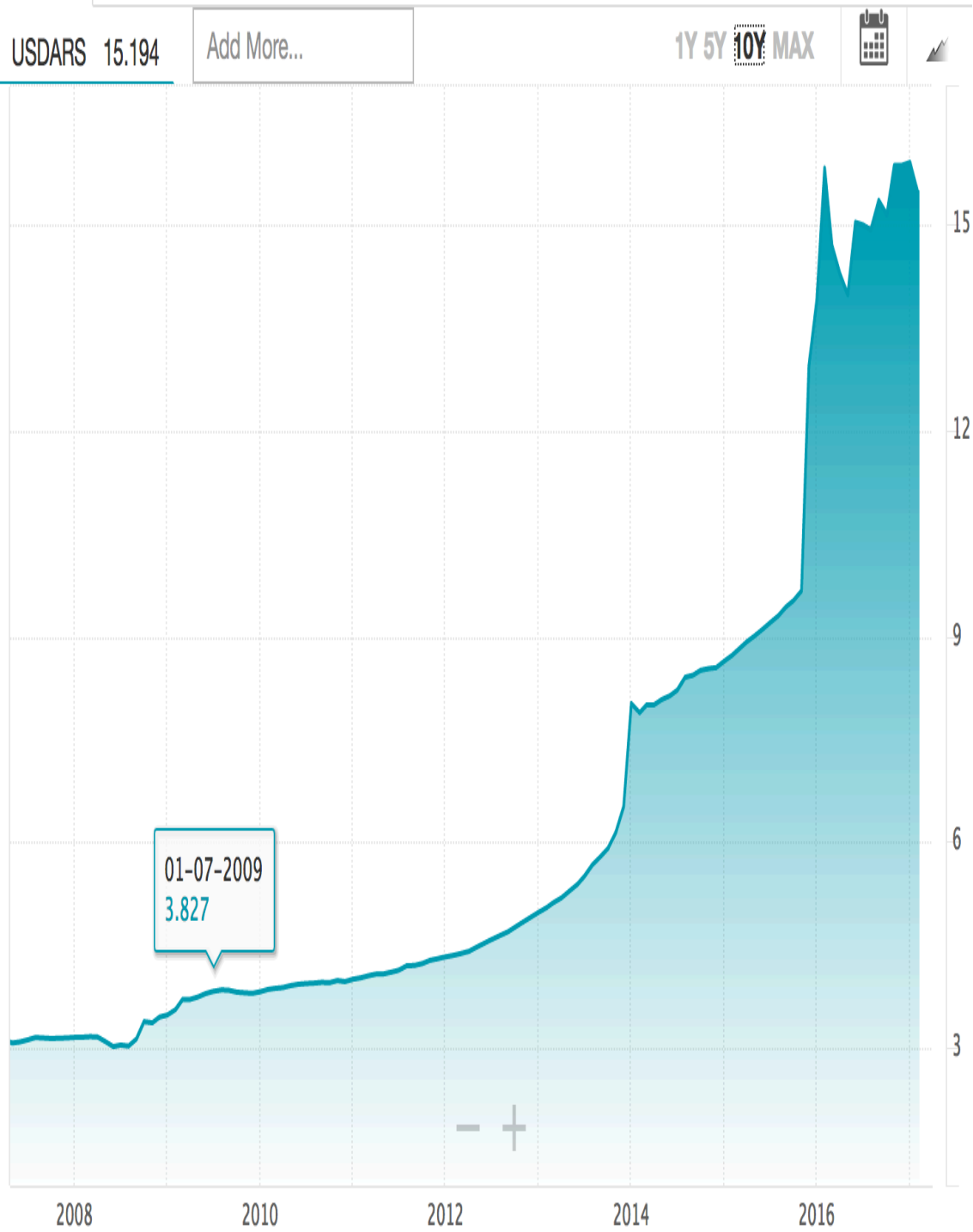
## Appendix 5 : Valuations of frontier currencies

### Valuations of frontier market currencies



ARS = Argentine peso; BHD = Bahraini dinar; BDT = Bangladeshi taka; BGN = Bulgarian lev; HRK = Croatian kuna; EEK = Estonian kroon; KZT = Kazakhstani tenge; KES = Kenyan shilling; KWD = Kuwaiti dinar; LBP = Lebanese pound; LTL = Lithuanian litas; MUR = Mauritian rupee; NGN = Nigerian naira; OMR = Omani rial; QAR = Qatari rial; RON = Romanian leu; SAR = Saudi riyal; RSD = Serbian dinar; SIT = Slovenian tolar; TND = Tunisian dinar; AED = United Arab Emirates dirham; UAH = Ukrainian hryvnia and VND = Vietnamese dong.

# Appendix 6 : Depreciation of the ARS



## Appendix 7 : Correlations with MSCI World Sectors Indices, March 2009-December 2012

### Correlations with MSCI World Sector Indices, March 2009-December 2012

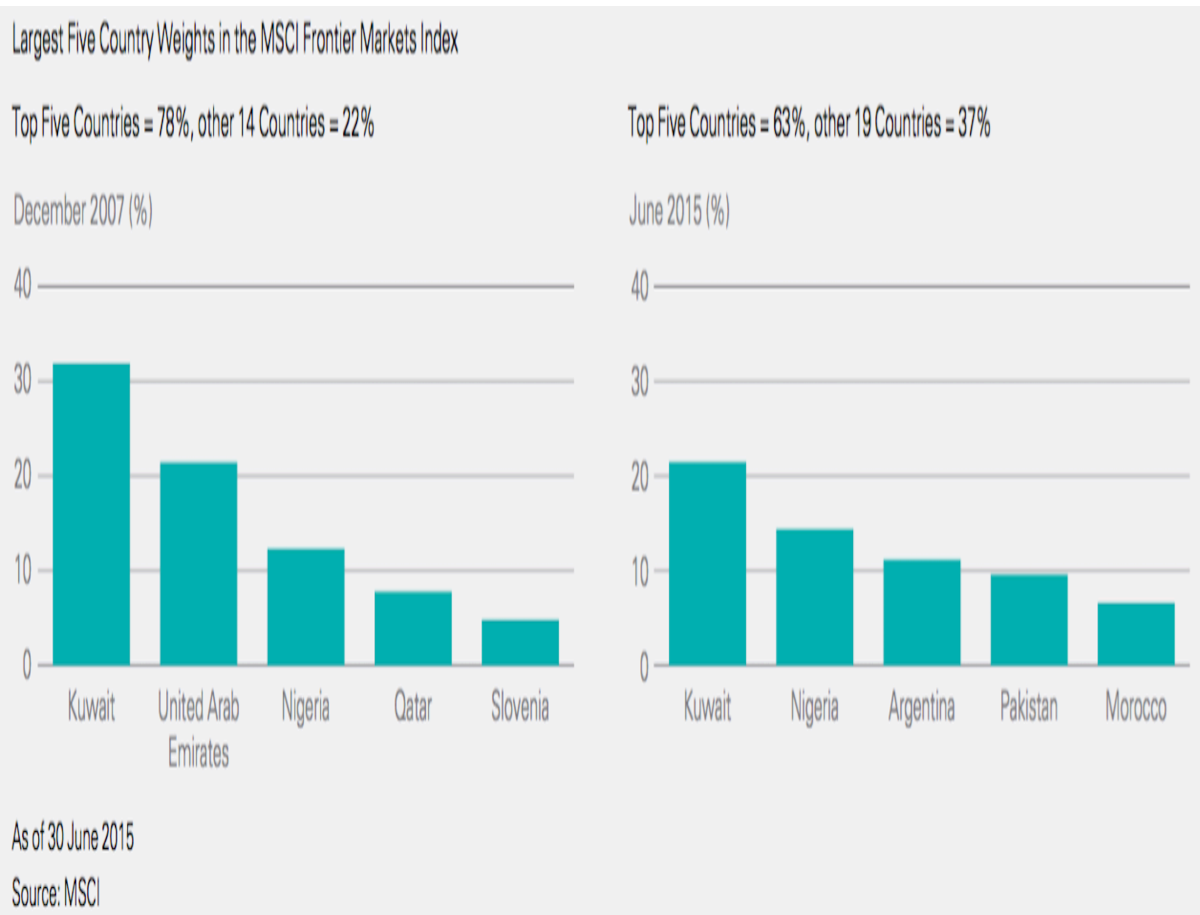
<i>Correlations</i>	<i>Financials</i>	<i>Energy</i>	<i>Materials</i>	<i>Industrials</i>	<i>Consumer discr.</i>	<i>Consumer staples</i>	<i>Healthcare</i>	<i>IT</i>	<i>Telecomm</i>	<i>Utilities</i>
MSCI World	0.95	0.93	0.69	0.98	0.96	0.88	0.86	0.90	0.85	0.82
MSCI EM	0.84	0.82	0.57	0.86	0.81	0.75	0.71	0.74	0.71	0.64
MSCI Frontier	0.53	0.46	0.39	0.51	0.47	0.38	0.34	0.44	0.33	0.39
MSCI Frontier ex-GCC	0.62	0.59	0.45	0.61	0.56	0.51	0.47	0.50	0.45	0.47

Weekly return data.

Source: Bloomberg



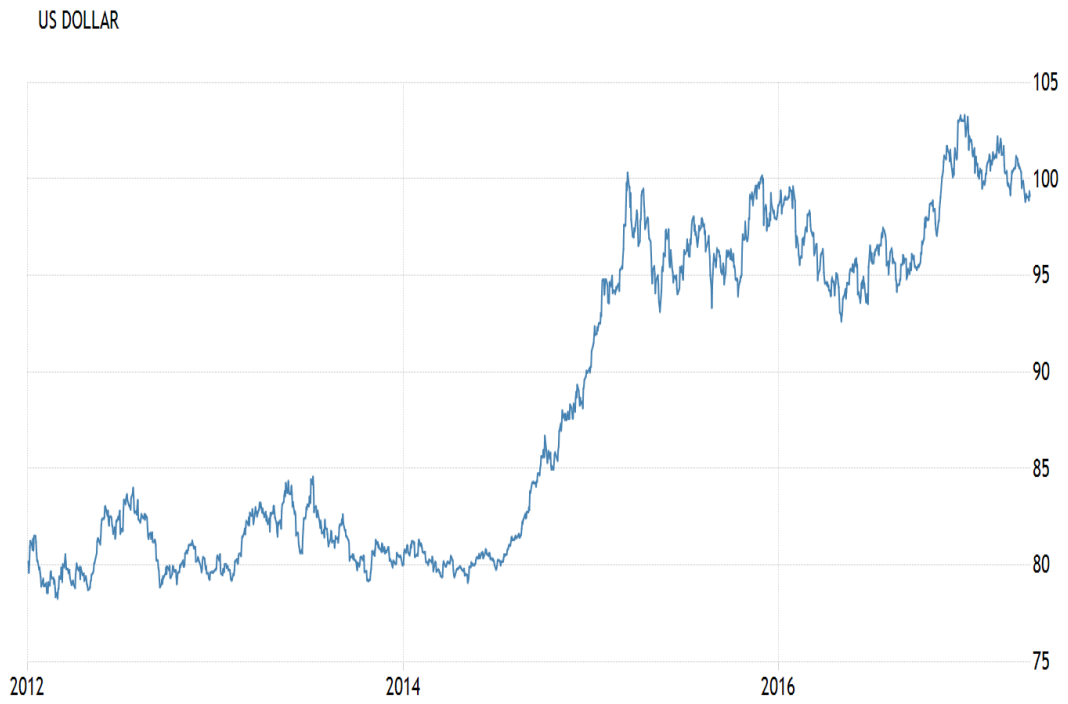
## Appendix 8 : Largest 5 countries in FM 2007 & 2015



## Appendix 9 : MSCI 4 indexes

<i>Historical annualized volatility</i>				<i>Historical annualized performance</i>			
<b>EM</b>	<b>FM</b>	<b>FEM</b>	<b>WORLD</b>	<b>EM</b>	<b>FM</b>	<b>FEM</b>	<b>WORLD</b>
22.09%	18.86%	18.96%	14.86%	8.08%	3.80%	6.47%	6.07%
<i>Max drawdown</i>							
-62.67%	-67.25%	-65.80%	-55.37%				

## Appendix 10 : Increase in US dollar value



SOURCE: WWW.TRADINGECONOMICS.COM

# Appendix 11 : Asset allocation of 2 funds + benchmark

## TEMPLETON Frontier Markets

citywire

<http://citywire.co.uk/fund/templeton-frontier-markets/c223434>

### Top 10 Holdings

United Bank Ltd ORD	4.76%
Mobile Telecommunications Company KSCP ORD	4.74%
National Bank of Kuwait SAKP ORD	4.71%
Binh Minh Plastics JSC ORD	4.23%
Kuwait Food Co KSCP ORD	4.12%
Dng Pharmaceutical Joint-Stock Co ORD	4.00%
Habib Bank Ltd ORD	3.59%
Societe Nationale des Telecommunications du Senegal SA ORD	3.39%
East African Breweries Ltd ORD	3.01%
Vietnam Dairy Products JSC ORD	2.78%

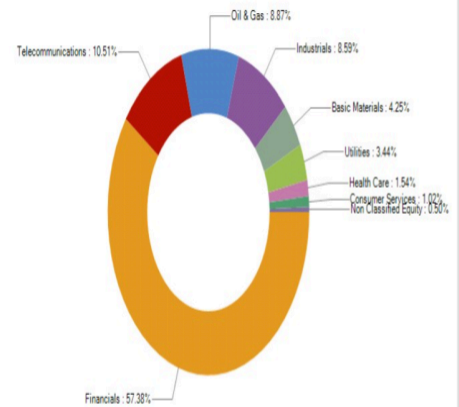
## Schroder ISF Frontier Markets

citywire

<http://citywire.co.uk/fund/schroder-isf-frontier-markets-equity/c28419>

### Asset Allocation

#### Sectors



### Top 10 Holdings

YPF SA DR	6.34%
National Bank of Kuwait SAKP ORD	5.60%
Emaar Properties PJSC ORD	5.52%
Mobile Telecommunications Company KSCP ORD	5.13%
Commercial International Bank Egypt SAE DR	4.56%
USD Cash	4.56%
United Bank Ltd ORD	4.25%
Engro Corporation Ltd ORD	3.84%
Banco Macro SA DR	3.75%
Grupo Financiero Galicia SA DR	3.37%

## MSCI Frontier Emerging Markets

APR 28, 2017

### INDEX CHARACTERISTICS

MSCI Frontier Emerging Markets	
Number of Constituents	165
Mkt Cap ( USD Millions)	
Index	205,944.91
Largest	10,395.44
Smallest	57.42
Average	1,248.15
Median	765.71

### TOP 10 CONSTITUENTS

Country	Float Adj Mkt Cap ( USD Billions)	Index Wt. (%)	Sector
PE	10.40	5.05	Financials
KW	6.48	3.15	Financials
PH	5.20	2.52	Real Estate
PH	4.95	2.40	Real Estate
PH	4.83	2.34	Industrials
PH	4.71	2.29	Financials
KW	4.60	2.23	Financials
AR	4.57	2.22	Energy
CO	4.40	2.14	Financials
PH	4.30	2.09	Financials
Total	54.43	26.43	