

Risk-Return Dynamics of Frontier Markets: Insights from Modern Portfolio Theory

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Abstract

From 2015 to 2024, the frontier markets, which are thought to be the least developed part of the global market, have attracted much attention by reason of their potential benefits in diversification regarding their low correlation with developed markets. The aim of this study is to evaluate the diversification advantages of African frontier stock markets and to investigate their contribution to a global portfolio that could optimize the benefits. The Modern Portfolio Theory (MPT) in this study could be a framework for conducting correlation analysis and empirical evaluation; this could assess an altering linkage between frontier markets and conventional markets in terms of their effects on portfolio risk-return profiles. The findings suggested that African frontier markets could improve risk-adjusted returns by reducing portfolio volatility to a certain degree. It is possible to advise investors to allocate assets to frontier markets in order to enhance the construction of their global portfolios.

Keywords

African Frontier Markets; Portfolio Diversification; Modern Portfolio Theory (MPT); Risk-return Profile; Global Portfolio.

1. Introduction

Frontier capital markets, which represent the least developed segment of the global equity environment, have demonstrated potential benefits for diversification because of their historically low return correlations with developed and emerging markets (Dania and Maysami, 2017; Evans and van Vuuren, 2019) [1] [2]. Many of these frontier markets are located in Africa. These markets tend to exhibit unique economic and structural characteristics that distinguish them from more developed financial markets (Guney et al., 2017; Pätäri et al., 2019) [3] [4]. Despite their potential advantages, frontier markets also have challenges, including high transaction costs, regulatory inefficiencies, political instability, and liquidity constraints (Marshall et al., 2013; Ferreira et al., 2021) [5] [6]. This dissertation examines the diversification benefits from investing in frontier stock markets and evaluates their role in global portfolio optimisation (Narayan and Rehman, 2018; Senga, 2019) [7] [8].

Modern Portfolio Theory (MPT), which was introduced by Markowitz (1952), illustrated the importance of diversification in portfolio investment strategies. The theory hypothesizes that combining assets with low or negative return correlations can result in significant risk reduction. Frontier markets tend to be segmented from developed economies, so it may be possible for them to offer an opportunity for risk reduction. Whilst previous studies have documented the diversification potential of frontier markets, there is still a need for a comprehensive analysis of the issue as correlations tend to change over time (Fifield et al., 2002) [9].

In this context, this study aims to provide a systematic evaluation of the diversification benefits in African frontier markets under the MPT framework. While prior research has explored the

potential benefits of frontier markets, there remained a gap in their dynamic correlations with global markets over the past decades, especially regarded to the factors of raised financial integration and regional political instabilities. Regarding to these conditions, the study expected to contribute new empirical evidence on how African frontier markets can enhance risk-adjusted returns and to offer practical insights for investors and policymakers regarding optimal asset allocation in global portfolios.

2. Literature Review

According to studies, frontier markets offer potential opportunities for diversification benefits due to their low return correlations with each other and with developed stock markets (Dania and Maysami, 2017) [1]. These markets are often characterized by diverse financial systems and undeveloped regulatory frameworks. Thus, they may provide unique investment opportunities that significantly outperform those found in more developed economies. Indeed, Evans and van Vuuren (2019) [2] highlighted a growing demand for frontier markets by investment managers who are able to capitalize on opportunities. This increasing tendentiousness of the frontier markets' demand was driven by the request for higher returns and the demand for risk hedging strategies, which was associated with developed markets, particularly during periods of high volatility in the macroeconomic environment. Sukumaran et al. (2015) underlined that there are significant benefits from diversifying into frontier markets; these benefits take the form of risk reduction and higher returns [10]. By using the strategy of including frontier markets into a global investment portfolio, the authors found that investors were able to balance their accumulated return volatility in a stable range as these markets tend to move in opposition to their developed counterparts. Thus, it is worthwhile to examine the diversification advantages offered by frontier market in Africa, and to explore how this region enhances portfolio performance.

3. Theoretical Foundation – Modern Portfolio Theory

Modern Portfolio Theory was pioneered by Markowitz (1952). He emphasised the importance of minimizing portfolio risk, while at the same time maximizing return, by concentrating on the correlation between the returns of different assets. This revolutionary approach changed financial analysis from individual asset performance to systemic interactions in portfolios and had the effect of fundamentally altering investment strategies. The key assumption of the theory is that investors are rational and risk averse, and that returns follow a normal distribution. Critics argued that the assumption oversimplified market behavior. For example, according to empirical evidence, real-world returns often exhibit skewness like fat tails (Mandelbrot, 1963) [11]. The theory highlights diversification benefits by signifying that investing in diverse assets with different characteristics tends to reduce the overall risk of a portfolio. According to Modern Portfolio Theory, portfolio returns can be calculated as:

$$E(R_p) = \sum_i \mu_i E(R_i)$$

Where $E(R_p)$ is the expected return of the portfolio, which is the weight of asset in the portfolio, and $E(R_i)$ is the expected return of asset i .

The risk of a two-asset portfolio is calculated as:

$$\text{Portfolio Variance} = w_1^2 \sigma_1^2 + w_2^2 \sigma_2^2 + 2w_1w_2 \text{cov}_{1,2}$$

Where w_1 is the portfolio weight of the first asset; w_2 is the portfolio weight of the second asset; σ_1 is the standard deviation of the first asset; σ_2 is the standard deviation of the second asset; and $\text{cov}_{1,2}$ is the covariance of the two assets.

For multi-asset portfolios ($n > 2$), the variance formula should expand to:

$$\sum \sum w_i w_j \text{Cov}(R_i, R_j)$$

across all asset pairs. The covariance refers to the degree to which two assets move together. Low or negative correlations between assets in a portfolio reduces overall risk as, if the price of one asset declines, the price of the other asset increases. Modern Portfolio Theory recommends that investors should choose lowly correlated assets in a portfolio in order to reduce portfolio variance. Contemporary applications in portfolio management extend this principle to factor investing, where the replacement in traditional asset classes to uncorrelated risk factors (value, momentum and quality) (Fama and French, 1992) [12]. Pandey (2012) and Evans and van Vuuren (2019) underlined that lowly correlated assets help reduce portfolio risk [13] [2]. Their empirical studies revealed that, compared to concentrated portfolios, adding assets with low correlations can decrease portfolio volatility. Although the marginal benefits diminish as correlations increase during market crises. Furthermore, Hoang (2022) demonstrated that this effect holds specifically in frontier markets, where regional or international diversification is beneficial [14]. In particular, the portfolio should cover limited local opportunities and higher volatility make external investments to mitigate the market risk. This strategy could enhance risk-adjusted returns and also stabilize the volatility of a portfolio. The effects of fostering growth via leveraging global market dynamics underscored its importance in these frontier markets.

4. Empirical Studies of Frontier Markets

4.1. Frontier Markets in Africa

Guney et al. (2017) researched eight African frontier stock markets, including Kenya, Nigeria, and Mauritius, for the period January 2002 to July 2005 [3]. The study found that these markets have the potential for significant growth. However, these markets face political and economic risks and are driven by domestic factors, such as unstable regulatory policies, exchange rate volatility, and uncertainty in the macroeconomic environment, which may deter foreign investment. Furthermore, Senga (2019) analysed the potential of African frontier markets to provide diversification benefits [8]. This study used data for the S&P Dow Jones indices and African emerging markets over the period July 2014-September 2018. The study found that African markets offer statistically significant diversification benefits.

4.2. Frontier Markets in Asia

Nguyen (2023) researched the Vietnamese stock market from June 2008 to June 2021, with the target of analysing the ex-ante predictability of stock returns [13]. The research was based on advanced econometric models and machine learning techniques to examine market patterns, particularly concentrated on identifying persistent abnormalities that could be exploited for profit. The study found that, despite inherent inefficiencies and transaction costs, frontier markets offered substantial profit potential through strategies that yielded positive returns. Additionally, via the rigorous back-testing of quantitative models, the study demonstrated that the markets yielded consistently positive risk-adjusted returns. It provided evidence from out-of-sample long portfolios which can generate statistically significant positive returns. Furthermore, Narayan and Rehman (2018) analysed the portfolio diversification opportunities from investing in the frontier markets of a sample of ten Asian countries [7]. In particular, their research analysed comprehensive financial data from 2003 to 2013, including multiple market cycles and global financial crises. Through the use of sophisticated portfolio optimisation techniques and dynamic correlation analysis, the authors demonstrated that including these

Asian frontier markets into global portfolios improved the risk-return profile significantly. The study employed both mean-variance optimisation and conditional value-at-risk frameworks to quantify the diversification benefits. It illustrated that optimal allocations to frontier markets ranged between 8 – 15 per cent in general, it depended on the risk tolerance of investors. This analysis highlighted significant opportunities in these Asian markets, and emphasised that these opportunities improve even after hedging for exchange rate movements. The authors argued that these opportunities stemmed from a low level of integration with global equity markets (an average correlation coefficient of 0.32 with the MSCI World Index), a young population, and structural economic reforms.

4.3. Frontier Markets in Europe

European frontier markets include Croatia, Romania, and Estonia. Research has shown that they have a tendency to move in alignment with developed markets. This integration has been driven by structural reforms, EU membership aspirations, and cross-border capital flows, which are aimed at promoting these regions as buffer strips between emerging and developed economies. Pătări et al. (2019) noted that frontier markets are now aligned more with developed markets, with European markets showing pronounced convergence after the global financial crisis [4]. Specifically, the adoption of EU financial regulatory policies and the expansion of multinational corporations into these markets accelerated the trend of integration; it reduced the volatility disparities by over 30 per cent since the 2008/09 Global Financial Crisis (World Bank, 2021) [15]. By analysing data from June 2002 to December 2016, the authors found that the increased integration of Asian and African frontier markets limited their diversification benefits because of the rising return correlations (Pătări et al., 2019) [4]. For instance, before the crisis, European frontier markets showed that correlation coefficients with developed markets increased from 0.45 to 0.68, but Asian countries like Vietnam and Bangladesh stagnated at 0.5 (IMF, 2021) [16].

5. Challenges and Limitations of Frontier Markets

5.1. Political Instability and Regulatory Risks

Poor political governance is a major impediment in most frontier markets, particularly in Africa and Asia. Empirical evidence has illustrated that weak institutional framework, a lack of transparency, and frequent policy reversals, had a negative effect on both foreign direct investment and foreign portfolio inflows. In terms of Africa, Kenya, Nigeria, and Ghana in particular, have been negatively affected by political risk, including changes in government, corruption, and social instabilities. These factors have reduced investor confidence in long-term investment. Similarly, political volatility in Asian frontier markets like Sri Lanka and Pakistan means they vary with the tactical transitions in the countries (Thomas et al., 2017) [17]. Specifically, Sri Lanka's 2022 economic crisis was driven by political mismanagement and unsustainable national debt; it triggered widespread protests and a serious loss in investor confidence. Similarly, Pakistan's frequent leadership changes and the influence of the military have also created an unpredictable business environment (IMF, 2021) [16]. This challenge underscores the importance of a national governance structure with high stability in supporting sustainable economic growth and attracting long-term investments in frontier markets.

5.2. High Transaction Costs

High transaction costs are a significant factor that should be considered in frontier markets, especially in Africa; they lead to an increase in the risk premium, which makes diversification challenging for investors (Guney et al., 2017; Marshall et al., 2013) [3] [5]. Similarly, in Asian markets, the expensive cost of trading also limits investment in these markets (Marshall et al.,

2013) [5]. In Europe, even though the costs of transactions are cheaper, the integration with developed markets has eroded diversification advantages.

5.3. Lack of Transparency

Guney et al. (2017) argued that most frontier markets lack transparency [3]. In Africa, low transparency and a high degree of herdlike behaviour had led to an asymmetry of information, which makes it difficult for investors to accurately assess and measure the risks involved. In Asian markets, the weakening legal framework and disclosure system has led to a deterioration in credibility, and it has led to increased uncertainty and instability for investment (Ferreira et al., 2021) [6]. Even though European frontier markets provide relatively more stable regulatory systems, there are limited diversification benefits because of increased correlations with developed markets.

5.4. Regulatory and Market Inefficiencies

Frontier markets are weaker in stability when compared with developed markets; hence, challenges in the regulatory climate of such countries are one of the key challenges for global investors. For instance, regulatory risk in African frontier markets is characterized by high levels of transaction costs, political instability, and low levels of financial disclosure (Marshall et al., 2013) [5]. Furthermore, regulatory constraints have reduced the acceptance of foreign investors in Asian frontier markets (Ferreira et al., 2021) [6].

The consequences of weak regulatory would course to the appearance of bureaucracy and market challenges like information asymmetry, which could increase challenges to investors. Sardouk and Dorant (2015) hypothesized that frontier markets find it difficult to attract foreign investment due to political instability, restrictions in economic and financial freedom, corruption, and cultural factors [18]. Investment limitations on overseas investors, tedious bureaucratic processes, and variable enforcement of policies, as well as laws, create these inefficiencies. Moreover, European frontier markets are also weighed down by operations and structure relative to other frontier markets (Kaboneka et al., 2014), which has restricted the investors' ability to tap the diversification benefits available [19].

5.5. Economic Dependence on Larger Economies

Abidi et al. (2019) argued that most Asian frontier markets depend on larger markets, which increases their exposure to regional economic fluctuations. This fact, in turn, affects investor returns [20]. While European frontier markets may possess more established regulatory frameworks, their appeal is reduced as increased integration with developed markets has eroded the diversification benefits on offer.

5.6. Increasing Return Correlations with Developed Markets

The bifurcation of the risk-return characteristics of these markets has reduced after the 2008/09 Global Financial Crisis through increasing financial integration between frontier and developed European countries (Pätäri et al, 2019) [4]. However, African and Asian frontier markets are less correlated with global markets. Table 1 highlights the similarities and differences between African, Asian, and European frontier markets.

One area where frontier markets really stand out from emerging markets is in terms of market liquidity. Frontier markets in Africa (Kenya, Nigeria, Ghana) (Guney et al., 2017), Asia (Vietnam) (Nguyen, 2023), and Europe (Croatia, Romania Estonia) (Pätäri et al., 2019) exhibit low liquidity [21] [4]. This low liquidity creates more risk for investors.

Frontier markets, especially in Africa and Asia, provide good diversification benefits since they are not well linked with international financial markets (Guney et al., 2017; Thomas et al., 2017) [3] [17]. This characteristic makes them suitable for investors with risk diversification goals, as

highlighted in Table 1. Thus, currently, diversification prospects are greater in African and Asian frontier markets as compared to their European counterparts (Pätäri et al, 2019) [4].

Table 1. Comparative analysis of frontier markets by continent

Criteria	African Frontier Markets	Asian Frontier Markets	European Frontier Markets
Liquidity	Lower liquidity compared to emerging markets	Lower liquidity, similar to emerging markets	Moderate liquidity increasingly similar to emerging markets
Risk Level	Higher risks due to political instability and transparency issues	High volatility, but less political instability than African markets	Balanced risk-return profile, though risks are closer to those of emerging markets since the 2008 crisis
Correlation with Global Markets	Low Correlation providing unique diversification opportunities during global downturns	Low correlation, beneficial for diversification especially during global market fluctuations	Increasing correlation reducing the distinct diversification benefits previously seen
Isolation from Global Trends	High isolation, limiting integration with global markets	Relatively isolated from global financial systems	Increasingly aligned with global markets, diminishing traditional isolation
Diversification Benefits	Strong diversification benefits due to low correlation with major economies	Offers valuable diversification benefits especially for international portfolios	Historically high, but declining as correlation with global markets increases
Appeal to Investors	Attractive to risk-averse investors seeking diversification; higher returns during global Down-tums possible	Attractive for investors focused on diversification due to isolation and low correlation with global trends	Attractiveness for diversification is diminishing as these markets align more closely with developed markets
Challenges	High transaction costs political instability, and transparency issues	Regulatory inconsistencies and policy changes affecting stability and capital inflows	Increasing integration with global markets and regulatory constraints limit portfolio flexibility
Distinct Features	Acts as a buffer during global downturns (Guney ct al.,2017; Abidi gt al, 2016) [3] [20]	Remain isolated from most Asia-Pacific markets supporting unique diversification benefits (Thomas et al.,2017) [17]	Historically low correlation with global markets, though this benefit has eroded in recent years

Source: Author's own

6. Conclusion

Overall, African, Asian, and European frontier markets have advantages of diversification to global portfolio investors. African frontier markets provide opportunities such as stability during market downturns. Previously attractive for diversification purposes, European frontier markets have become more similar to developed markets, which has resulted in the degradation of their investment potential. This trend has increased due to the increasing integration of European frontier markets with developed economies, promoted by regulatory harmonization and cross-border capital flows, that reduce their diversification benefits.. Additionally, African and Asian frontier markets offer substantial diversification benefits due to their lower integration with the global financial system. Despite facing challenges political instability and regulatory inefficiencies, these markets have remained attractive because of their low return correlations with developed markets, particularly during global economic

downturns. Similarly, Asian frontier markets, which include Vietnam and Bangladesh, have provided opportunities for diversification, which are supported by structural economic reforms and sustainable growing populations.

However, more factors in systemic and un-systematic risk need to be considered, because their political volatility and economic dependence on larger regional economies all pose a significant challenge for beneficial long-term investment. The evolving investment volume and opportunities in frontier markets underscores the importance of portfolio diversification. While European frontier markets may no longer offer the same degree of diversification benefits, they once provided, African and Asian markets remain viable choices for investors who are seeking to mitigate risk and enhance returns. However, investors should balance the risks associated with these regions, including political instability, regulatory risk like embezzlement and high transaction costs, which could erode their potential gains.

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