



International diversification with frontier markets[☆]

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ABSTRACT

We provide an analysis of frontier market equities with respect to world market integration and diversification. Principal component results reveal that frontier markets exhibit low levels of integration. In contrast with developed and emerging markets, frontier markets offer no indication of increasing integration through time. Furthermore, individual frontier market countries do not exhibit consistent rates of changing integration. Structural break tests identify breakpoints in integration, as well as integration dynamics across countries. We show that frontier markets have low integration with the world market and thereby offer significant diversification benefits.

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1. Introduction

We study the potential diversification benefits of frontier markets by measuring integration dynamics, as well as analyzing frontier market exchange-traded funds (ETFs). Frontier markets are smaller, less accessible, yet still investable countries in the developing world; the median market capitalization of frontier markets within our sample reached US\$12.89 billion at the end of 2009. When their capital and liquidity increase, frontier markets may be reclassified as emerging markets. This designation originated in the 1990s, when Standard and Poor's (S&P) started to track a representative index of frontier markets, then became prominent in 2007 when S&P launched its Select and Extended Frontier Indexes.¹ To reflect growing

investor interest in these markets, MSCI also launched a Frontier Markets Index late in 2007. Recently, frontier market mutual funds and ETFs also have emerged.²

Despite the significant attention to frontier markets among the investment community, very little research includes them. Frontier markets may offer promising diversification benefits; for example, Speidell and Krohne (2007) document low correlations between frontier and developed market equities. Jayasuriya and Shambora (2009) study diversification benefits across market classifications and consider optimal portfolios of developed, emerging, and frontier markets. They find improved portfolio risk and returns when investors diversify their portfolio into six frontier markets. Cheng, Jahan-Parvar, and Rothman (2009) use variations of the CAPM to

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¹ According to Kim (2010), MSCI has returns for frontier markets that go back to May 2002, while S&P's Frontier Index (which excludes the Gulf countries) extends back to 1996.

² On March 17, 2008, Barclays Global Investors (BGI) launched the BGI Frontier Markets Fund, which invests in 16 frontier markets and benchmarks against the MSCI Frontier Markets Index. Franklin Templeton Investments introduced its Templeton Frontier Markets Fund, the first actively managed, US-registered frontier market fund, on December 9, 2008. Deutsche Bank launched the first frontier market ETF in Europe in early 2008. The Bank of New York Mellon created its frontier market ETF in June 2008.

study nine emerging and frontier equity markets within the Middle East and North African region. They find that most markets within their sample exhibit low levels of integration, but they also find that both global and local risks are priced.

To enhance understanding of frontier markets, we conduct several analyses across frontier market countries, as well as across broad frontier market indexes that include up to 25 frontier market countries. Constructing these broad frontier market indexes strengthens our results by providing a lengthy sample period and minimizing country-specific noise. This analysis therefore details the relations among small and illiquid markets worldwide.

In contrast to our study, most research on international market integration and diversification focuses on developed and emerging market asset classes. For example, Solnik (1974) argues that international diversification is beneficial on the basis of cross-market correlations. Odier and Solnik (1993) find that despite increasing informational integration across markets and greater correlation during volatile periods, overall international correlations remain low, so international diversification is still beneficial. In their study of diversification benefits, Driessen and Laeven (2007) consider developed and emerging markets and emphasize diversification benefits for local investors. They find that international diversification is most beneficial for emerging market investors. However, focusing on downside risk and allowing for conditional correlations, You and Daigler (2010) find little evidence of international diversification benefits. Recently, Rua and Nunes (2009) use wavelets to study cross-market correlations within developed markets and find that the US and UK stock markets exhibit the highest comovement across time while the Japanese market shows a low degree of comovement with other major stock markets.

From an asset-allocation perspective, cross-market correlations are clearly informational, but Carrieri, Errunza, and Hogan (2007) argue that they do not provide a complete and accurate measure of diversification benefits or overall integration. They provide the example of Zimbabwe, in which a high correlation between the worldwide price of copper and the national market does not indicate a highly integrated capital market. Pukthuanthong and Roll (2009) also consider cross-market correlations inadequate as measures of integration. Varying market sensitivities to international factors can lead to low correlations, despite high levels of integration. Furthermore, integration varies through time, and tends to increase for many countries, though some specific countries become less integrated over time (Pukthuanthong and Roll, 2009). Bekaert et al. (2007) propose the use of global growth opportunities to measure market integration with price-to-earnings ratio comparisons, as an alternative to correlation-based measures.

We apply Pukthuanthong and Roll's (2009) measure of integration to broad market classification indexes and find that developed and emerging markets exhibit significant exposure to the world market factor. However, there is little evidence of integration between frontier market indexes and this factor. For developed and emerging market indexes, levels of integration increase significantly through time; the broad frontier market indexes in contrast offer no evidence of increasing integration. We also extend Pukthuanthong and

Roll's (2009) approach that measures integration through time. Specifically, we allow for structural breaks in a time-trend model and apply our proposed method to a sample of frontier market countries. For any given country, breakpoint tests indicate the calendar month in which the level of integration shifts or the rate of integration changes. Therefore, this approach can measure integration dynamics, both before and after the breakpoint. For example, Romania joined the European Union (EU) in January 2007; the breakpoint results indicate a significant increase in integration in February 2007. Whereas few frontier markets exhibit a significant and constant rate of changing integration, when we allow for structural breakpoints, we discover significant integration dynamics (both increasing and decreasing), before or after an identified breakpoint, that vary across countries. The overall results suggest that frontier markets exhibit low levels of world market integration, even after allowing for structural breaks. Thus, frontier market risk may be largely diversifiable.

In a mean-variance analysis across market classification indexes, we find strong diversification benefits exist from including frontier market equities, especially in the form of significant risk reduction. This result is robust both with and without short-selling constraints, indicating that investors likely can achieve similar levels of expected return with lower risk by including frontier market equities. Out-of-sample performance tests and the analysis of ETFs further confirm these diversification benefits.

This study offers three main contributions. First, the results provide empirical evidence about the level of integration and diversification benefits for a complete set of frontier markets, unlike existing studies that focus on a subset (e.g., Cheng, Jahan-Parvar, and Rothman, 2009; Jayasuriya and Shambora, 2009). Although Speidell and Krohne (2007) examine all potential frontier markets, their analysis is limited to cross-market correlations. Because this measure may not be the best indicator of integration, their results are far from conclusive. Second, structural breakpoint models identify calendar dates that correspond to shifts in the integration process and thus extend Pukthuanthong and Roll's (2009) regressions of world market integration. Third, analyzing frontier markets provides insights into international diversification with respect to country factors and geographical diversification, which are relevant topics in recent literature. For example, Bekaert, Hodrick, and Zhang (2009) find that country factors dominate industry factors in international diversification, and Baele and Inghelbrecht (2009) show that geographical diversification continues to offer results superior to those obtained through industry diversification.

The remainder of this paper is organized as follows. In the next section, we detail the data and sample. Section 3 presents the market integration analysis and Section 4 analyzes the diversification benefits of frontier markets. We conclude in Section 5.

2. Data

Our study presents an analysis across market classifications: namely, developed, emerging, and frontier. We utilize daily data for the MSCI All Country World Index, which

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