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Emerging markets and portfolio foreign exchange risk: An empirical investigation using a value-at-risk decomposition technique

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A B S T R A C T

The correlation between a portfolio's equity and foreign exchange components plays a role in reducing foreign exchange exposure. Investors must account for this correlation when determining the extent of foreign exchange risk in emerging market equity portfolio investments. This study employs a VaR risk factor mapping technique, under the variance–covariance VaR approach, to decompose portfolio risk in Argentina, Brazil, China, India, Mexico and Russia. For comparison purposes, the same technique is used to decompose portfolio risk in the US. The study is conducted from the perspective of a European equity investor with a portfolio of equities in each country. By employing the VaR decomposition technique, the correlation between a portfolio's equity and foreign exchange components is taken into account and portfolio foreign exchange risk is extracted from portfolio systematic risk. Our results uniquely demonstrate significant variation in foreign exchange risk in emerging markets.

1. Introduction

Emerging markets have been widely acclaimed for offering strong potential for growth and providing investors with higher expected returns than developed markets. In 2012, real GDP growth is forecast to be 4% higher in emerging markets (IMF, 2011). Furthermore, they offer diversification benefits due to low

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correlations with developed markets. However, the benefits of emerging market investments are tempered by additional risks that are generally not as prominent in developed markets.

For international investors, foreign exchange risk is the risk in which the value of an investment will change due to fluctuations in the foreign exchange rate. Emerging markets in particular have been characterised by periods of high inflation which in turn heightens the risk of currency depreciations. Moreover, political risks in emerging markets can result in investors losing confidence in the economic strength of a country and disposing of those assets denominated in the country's currency. This phenomenon is known as capital flight and it reduces the demand for the currency of the affected country.

While it is widely recognised that emerging market investments incur a high degree of foreign exchange risk, a gap exists in the literature in relation to the foreign exchange risk of equity portfolios. This paper makes a unique contribution to existing literature on foreign exchange risk in emerging markets by measuring the extent of such risk in the context of equity portfolio investments and providing a comparative analysis among a number of emerging market economies. Furthermore, our approach considers the correlation between a portfolio's equity and foreign exchange components from a risk management perspective.

We employ a VaR risk factor mapping technique that allows us to decompose portfolio VaR into its constituent risks. This process involves mapping the portfolio to its different types of risk factors and calculating the corresponding VaRs. We apply the risk decomposition technique to isolate foreign exchange risk of portfolios constructed using equities from the following emerging markets: Argentina, Brazil, China, India, Mexico and Russia. For comparison purposes, the same technique is applied to a portfolio of US equities. This allows for an investigation into portfolio foreign exchange risk in each country and an assessment of whether such risk is greater in emerging or developed markets.

2. Literature review

2.1. International portfolio diversification

Since the pioneering work of Markowitz (1959), the benefits of international diversification have been well documented in financial literature. By diversifying across countries that are not in the same business cycle as the domestic market, an investor can reduce portfolio risk due to lower or even negative correlations between equities in the domestic and foreign markets.

In recent years, the effects of globalisation and deregulation have increased linkages across economies. Despite this, low correlations were present in the late 1990s as studies highlight that diversification opportunities still existed through international diversification (Solnik, 1995; McManus and Tezel, 1998). More recently, Chiang and Leonhard (2007) explore the benefits of international diversification across different regions. Their findings indicate a decline in the effectiveness of regional diversification within the EU over a 25-year period up to 2005. However, they reveal that international investors can still avail of greater diversification benefits by overcoming their bias towards familiar locations and investing in different regions. Paradoxically, it is often the additional risks of international investments that deter investors from investing overseas. In this regard, Fidora et al. (2007) conduct a study in which exchange rate volatility accounts for 20% of the equity home bias.

2.1.1. Portfolio diversification and foreign exchange risk

Much literature suggests that emerging markets provide investors with greater opportunities for diversification. For instance, Kohers et al. (1998) conduct a study to determine the extent to which such markets improve the risk-return performance of international portfolios and establish whether or not investors should avoid these markets in favour of developed markets. By constructing various portfolios that comprise of different combinations of emerging and developed market equities, it is shown that the inclusion of just a small number of emerging market equities allows an investor to achieve the benefits of diversification. The low correlations between emerging and developed markets are highlighted as the reason for enhanced portfolio performance. Similarly, Naranjo and Porter (2007) find that adding emerging market equities to an international portfolio results in larger diversification benefits when compared to adding developed market equities. Gupta and Donleavy (2008) also show that emerging markets offer diversification benefits; however, they are careful to point out that the