An analysis of returns and volatility spillovers and their determinants in emerging Asian and Middle Eastern countries ☆

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ABSTRACT

This study investigates the *return spillovers* and *volatility spillovers* from developed markets (e.g., Europe, Japan and the US) into the financial markets of selected emerging countries in Asia and the Middle East and North Africa (MENA) region. Based on constant and trend spillover models, we find evidence of significant spillover effects from developed markets to emerging markets. The results from variance ratios indicate the dominance of US shocks across all emerging markets, though the effect varies widely among countries. New to these literature, we conduct an empirical analysis quantifying the underlying determinants affecting the extent of shock spillovers. The results show that bilateral factors such as trade volume, portfolio investment and distance are significant in explaining the spillover effects.

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1. Introduction

The global economy today is characterized by the expanding internationalization of national capital markets. Since the early 1980s, a combination of market-oriented policies such as deregulation of interest and exchange rates as well as reductions in the barriers to foreign investments (Bekaert & Harvey, 1997, 2000) has contributed to a spectacular integration of capital markets across the developed countries and, lately, between the financial markets of developed and emerging countries. The process of increased financial integration has been accompanied by a rising trend of international and regional trade agreements among countries. Although the process and the progress of financial and trade integration have not been symmetric across countries, with some countries or regions showing more dynamism than others, the global financial crisis (**GFC**) of 2008–09 established the point that countries are more integrated today (both in terms of trade and financial integration) than they were in the 1980s and the 1990s.

Although financial globalization and trade integration have enabled emerging countries to attain risk-sharing through better allocations of capital and thereby higher economic development, they also produced unwanted side-effects, including increased financial

fragility and unstable long-term growth (Bekaert, Harvey, & Lundblad, 2005; Levine & Zervos, 1998; Stiglitz, 2002). As emerging markets develop further and exhibit higher co-movement with the mature markets, they automatically become more responsive to the volatility of stock markets elsewhere in the world. A detailed assessment of the level and the nature of financial integration between developed and emerging markets is thus necessary. Such analysis can shed light not only on the sources of shock spillover (an indicator of market integration) across markets but also on the underlying determinants that characterize this integration.

The literature on equity market integration has evolved over time. Prior literature documents a slow degree of co-movement across markets in the period before the 1990s (Hilliard, 1979). Recent literature, however, has documented a notable increase in international co-movement of equity returns since the mid-1990s. Various explanations have been offered for this increased market integration, including the increase in international market co-movement linked to growing global industry factors (Baca, Garbe, & Weiss, 2000; Cavaglia, Brightman, & Aked, 2000; Balli and Balli(2011)), high market correlation after the stock market bubble in the late 1990s (Brooks & Del Negro, 2004), a general increase in market integration in the 1990s and the 2000s (Ayuso & Blanco, 2001) and an increase in international bilateral trade flows (Pretorius, 2002).

The increasing interconnectedness and flows of trade, investment and finance between the emerging and developed countries have led to a number of empirical studies investigating this phenomenon. Over the past few decades, various studies have provided a general understanding on the integration of emerging markets. Bekaert and Harvey (1997, 2000), Bekaert et al. (2005) and Carrieri, Errunza, and Hogan (2007) studied the implications of increasing integration with global markets for local returns, volatility and cross-country correlations, covering a diverse set of emerging markets in Asia, Eastern and Central Europe, Latin America and the Mediterranean area. A number of studies focused upon specific regions, including Neaime (2006, 2012) and Floros (2008) on the integration of stock markets in the Middle East and Ng (2000), Tay and Zhu (2000), Worthington and Higgs (2004), Caporale, Cipollini, and Spagnolo (2005); Caporale, Pittis, and Spagnolo (2006), Engle, Gallo, and Velucchi (2012), Balli et al.(2014), and Yilmaz (2010) on the dynamics of stock market integration in emerging Asia.

However, these studies remain silent on the topic of return and volatility spillovers – let alone their determinants – between emerging and developed countries, which is the main focus of this analysis. In the context of emerging countries, Chen and Zhang (1997) found that cross-country stock return correlations are related to trade. Although own-country volatility is important in explaining cross-sectional returns, (bilateral) trade appears to be a major determinant in explaining (between 5% and 40%) cross-country stock return correlations. Bracker, Docking, and Koch (1999) used a two-step procedure to investigate, first, how the degree of co-movement for a given pair of markets varies over time and, second, why this interdependence varies over time. They found that the degree of interdependence is positively correlated with market volatility and trend but negatively correlated with exchange rate volatility, real interest rate differentials, the return on the world index and the term structure differentials.

A clear message emerging from the literature is that these stock markets are broadly interdependent and driven by certain economic factors, where the emerging stock markets also exhibit similar characteristics. However, what remains unexplored is whether the factors that drive the co-movement among developed markets are also relevant for emerging markets and to what degree. An open question that remains to be analysed is whether integration among emerging markets is driven by similar factors or whether it is driven by completely different factors that are specific to the emerging markets' nature, given the still underdeveloped financial markets of the latter in comparison with the developed world markets (Bekaert & Harvey, 1997). Factors that have been shown to influence the extent of integration among developed stock markets significantly include bilateral trade, exchange rate volatility, real interest rate differentials, physical distance, regional effects, market volatility and capitalization differentials (see, among others, Pretorius (2002), Lucey and Zhang (2010) and Graham, Kiviaho, and Nikkinen (2012)).

The existing studies have generally pointed to increasing links among emerging stock markets as well as links between emerging and mature markets. However, these results are difficult to reconcile because of the differences in econometric methodologies as well as the data frequencies and periods considered. In this paper, we quantify the extent of return and volatility spillovers from major developed countries/regions to selected Asian and Middle Eastern countries. Furthermore, we investigate the possible underlying determinants of the shock spillovers using a variety of bilateral and gravity variables commonly used in the literature. To the best of our knowledge, this analysis has not been conducted for Asian and Middle Eastern countries.

More specifically, our empirical approach comprises the following steps. First, we use a standard GARCH (1,1) process to model return and volatility for each market, which provides the extent of the spillovers of global shocks on the volatilities of the emerging markets. Return and volatility spillovers are calculated using the methods proposed by Bekaert and Harvey (1997), Ng (2000) and Bekaert et al. (2005). The estimation of shock spillovers is carried out in two ways: a constant spillover model and a trend spillover model. The constant spillover model assumes that the degree of spillover effects remains constant over time, which offers a general picture of the shock spillover effects. On the other hand, the trend spillover model allows us to obtain the time-varying aspect of integration between markets. Furthermore, we make use of variance ratios to determine how the extent of shocks from different origins is compared vis-à-vis an individual market's own shocks. Second, new to this literature, we employ a cross-section model to estimate the possible underlying determinants of shock spillovers from developed to emerging markets. This will allow us to understand the characteristics of the shock spillovers more analytically. Overall, this paper provides a general picture of how the degree of co-movement between emerging and developed markets is governed by certain macroeconomic factors and thus contributes to the ongoing literature and research on equity market integration in emerging markets.

The rest of the paper is organized as follows. Section 2 describes the data and presents some descriptive analyses. Section 3 outlines the econometric methodologies concerning the return and volatility spillover effects. Section 4 reports the empirical results and discusses the findings in detail. Section 5 concludes the paper.