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Global and regional spillovers in emerging stock markets: A multivariate GARCH-in-mean analysis[☆]

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ABSTRACT

This paper examines global (mature market) and regional (emerging market) spillovers in local emerging stock markets. Tri-variate VAR-GARCH(1,1)-in-mean models are estimated for 41 emerging market economies (EMEs) in Asia, Europe, Latin America, and the Middle East. The models capture a range of possible transmission channels: spillovers in mean returns, volatility, and cross-market GARCH-in-mean effects. Hypotheses about the importance of different channels are tested. The results suggest that spillovers from regional and global markets are present in the vast majority of EMEs. However, the nature of cross-market linkages varies across countries and regions. While spillovers in mean returns dominate in emerging Asia and Latin America, spillovers in variance appear to play a key role in emerging Europe. There is also some evidence of cross-market GARCH-in-mean effects. The relative importance of regional and global spillovers varies too, with global spillovers dominating in Asia, and regional spillovers in Latin America and the Middle East.

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1. Introduction

The empirical finance literature abounds with studies of cross-border links in stock market returns. This is not surprising. Empirical modelling of such links is relevant for trading and hedging strategies and

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provides insights into the transmission of shocks (news) across markets. Informed by standard asset pricing models and supported by advances in the econometric modelling of volatility, research in the past two decades has focused on interdependencies in terms of both first and second moments of return distributions.

Early studies of spillovers across national stock markets primarily covered advanced countries. Prompted by the October 1987 stock market crash in the US, [Hamao et al. \(1990\)](#), [King and Wadhvani \(1990\)](#) and [Schwert \(1990\)](#) examined spillovers across major markets before and after the crash. Subsequent research refined and expanded the analysis of advanced market links by examining spillovers in high frequency (e.g., hourly) data ([Susmel and Engle, 1990](#)); asymmetry in the transmission of positive and negative shocks ([Bae and Karolyi, 1994](#); [Koutmos and Booth, 1995](#)); differences in the transmission of global and local shocks ([Lin et al., 1994](#)), and interactions among larger sets of advanced markets ([Theodossiou and Lee, 1993](#); [Fratzcher, 2002](#)).

Research into cross-border links in emerging stock markets was boosted by the growth and increasing openness of these markets, as well as the speed and virulence with which past financial crises in emerging market economies (EMEs) spread to other countries. [Bekaert and Harvey \(1995, 1997, 2000\)](#) and [Bekaert et al. \(2005\)](#) analyse the implications of growing integration with global markets for local returns, volatility, and cross-country correlations, covering a diverse set of EMEs in Africa, Asia, Latin America, and the Mediterranean. Most other studies of EME stock markets focus on specific regions. [Scheicher \(2001\)](#), [Chelley-Steely \(2005\)](#), and [Yang et al. \(2006\)](#) examine extent and effects of stock market integration in Central and Eastern Europe, both within the region and with advanced markets, while [Chen et al. \(2002\)](#) look at evidence of regional linkages among Latin American stock markets. [Floros \(2008\)](#) focuses on the Middle East, while [Ng \(2000\)](#), [Tay and Zhu \(2000\)](#), [Worthington and Higgs \(2004\)](#), [Caporale et al. \(2005, 2006\)](#), [Engle et al. \(2008\)](#), and [Li and Rose \(2008\)](#) examine stock markets in emerging Asia.

These studies generally point to increasing links among emerging stock markets, and between these markets and mature markets. However, results are difficult to compare across countries because they are based on different methodologies, time periods, and data frequencies. This paper seeks to remedy this problem by applying a uniform specification to a large set of EMEs – 41 in all – spanning four regions: Asia, emerging Europe, the Middle East and North Africa, and Latin America. A downside of this approach is that, given the large number of countries in each region, we cannot model simultaneously the links among all local markets, and between these markets and major mature markets. We focus on links between local emerging markets and aggregate global and regional markets as we are interested in the impact of the latter on the former.

The paper relies on a broad model framework that encompasses several channels through which news in global and regional markets may influence local emerging markets. More specifically, we apply a tri-variate VAR-GARCH-in-mean framework with the BEKK representation proposed by [Engle and Kroner \(1995\)](#) to model and test for cross-market spillovers in means and variances of stock returns as well as own and cross-market spillovers from second to first moments (GARCH-in-mean effects). This approach builds upon and expands existing studies such as [Hamao et al. \(1990\)](#), [Ng \(2000\)](#), [Bekaert et al. \(2005\)](#), and [Beirne et al. \(2009\)](#). The use of a GARCH-in-mean specification enables us to estimate cross-market spillovers from second to first moments. This is a key contribution of the present study, which differentiates it from the earlier one by [Beirne et al. \(2009\)](#) and other related papers. The global market in each tri-variate model is a GDP-weighted average of the US, Japan, and Europe (Germany, France, Italy, and the UK),² and the regional market is a weighted average of all emerging markets in the region included in our country sample, except for the model's local market.³ Our analysis is based on weekly stock returns in local currency. Time series end in mid-March 2008 and start in 1993 for emerging Asia, and in 1996 for Latin America, most markets in emerging Europe, South Africa, the Middle East and North Africa.

We use Wald tests to examine several hypotheses about spillovers in means and variances, as well as GARCH-in-mean effects, from global and regional markets to local markets. The results suggest that spillovers from regional and global markets are present in the vast majority of EMEs. However, the nature

² We used GDP weights because time series on market capitalisation were not available for all emerging markets in our sample.

³ [Bekaert et al. \(2005\)](#) adopt a similar approach.

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