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International stock market interdependence: Are developing markets the same as developed markets?

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ABSTRACT

This paper uses a dynamic panel-data gravity model to explain the correlations between 40 markets from 1996 to 2010 using four types of market linkages: information capacity, financial integration, economic integration, and similarity in industrial structure. The mechanism of interdependence of developed markets and that of developing markets are heterogeneous: (1) information capacity and industrial structure similarity have significant impact on the correlations of a developed market with other markets; (2) economic integration drives the correlations of a developing market with other markets; (3) financial integration is important for interdependence among developed markets and that among developing markets, but not for that between developed and developing markets. The EMU has a significant positive impact on stock market integration from 1996 to 2002. This impact increases after the inauguration of the EMU in 1999 but does not increase further after the monetary transition being accomplished in 2002.

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1. Introduction

Global stock markets are undergoing ever-increasing integration. It is essential for investors who pursue international diversification strategies to understand the driving forces behind stock market interdependence in order to evaluate the potential benefits and risks of diversification. This is also important for policy makers that aim at stabilizing financial system and reducing financial contagion.

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There is an important literature documenting stock market synchronization being driven by linkages between economies, but there is hardly a consensus among economists over the importance of these linkages. For instance, [Wälti \(2011\)](#) finds that monetary integration leads to stronger stock market synchronization, but [Roll \(1992\)](#) finds similarity in industrial structure to be the most important driving factor. [Forbes and Chinn \(2004\)](#) find bilateral trade to be the primary channel through which the largest financial markets affect other markets, while [Flavin et al. \(2002\)](#) argue for the impact of geographic location. The diversity of these conclusions, as stated by [Beine and Candelon \(2011\)](#), may be attributable to the heterogeneous characteristics of the markets.

The present paper studies the impact of several bilateral market linkages on the pairwise correlations between the returns of 40 national stock market indexes. It pays attention to the overall magnitudes of the impacts, as well as to their heterogeneity across markets. The investigated linkages are information capacity, economic integration, financial integration, and industrial similarity. Specifically, it classifies the pairwise market correlations into three groups: *among developed markets*, *among developing markets*, and *between developing and developed markets*. And thereby one can distinguish the impacts of the linkages on different groups of stock market correlations. The present paper attempts to answer three questions. First, which linkages drive stock market comovement? Second, how do the mechanisms of interdependence (i.e., the effects of market linkages on stock market correlations) differ in different groups of markets? For example, does economic integration drive the correlations among developed markets to the same extent as it drives the correlations among developing markets? Third, when the selected bilateral linkages are taken into account, does the implementation of the European Economic and Monetary Union (EMU) still matter for stock market integration?

This paper relies on the gravity model with a dynamic panel specification. The gravity model in economics, mimicking the gravitational interaction in Newton's law of gravity, explains the relationship between two economies based on their masses and the distance (or closeness) between them. The gravity model is widely used in the empirical study of international trade, and has become popular in the study of capital market synchronization (see [Flavin et al., 2002](#); [Beine et al., 2010](#); [Beine and Candelon, 2011](#) for example). In our study, the relationship between two economies is the correlation between their primary national stock markets, while the sizes of the markets are regarded as the masses, and the cross-market linkages, as the distances. One merit of the gravity model approach, particularly for our study, is its flexibility in describing cross-market heterogeneity.

This paper differs from the existing literature in several respects. First, it provides a comprehensive view of a large sample of national stock markets while distinguishing the impact of the linkages with respect to specific types of markets. There exist studies of the interdependence of developing or developed markets only (see for example [Pretorius, 2002](#); [Beine and Candelon, 2011](#)), while others investigate a combination of developed and developing countries without allowing for potential heterogeneity. However, it is implausible that the stock markets in developed economies are linked via the same mechanism as are developing markets. Therefore, investors should implement different strategies of diversification in developing markets from those in developed markets. The present paper provides new insight for understanding stock market interdependence.

Second, this paper addresses the important role of information capacity in explaining stock market comovement. According to [Sims \(2006\)](#), the information capacity of a country includes its wiring capacity and internal human capacity. Wiring capacity refers to the availability of communication technologies that allow investors to access information, whereas internal human capacity refers to investor's capability and efficiency of using the information. Stock market correlations are expected to increase as information capacity increases, since a large information capacity implies easier access to information, which in turn reduces information asymmetries and fosters cross-country investment in equities. Moreover, a market with a large information capacity may have a fast information diffusion process, and therefore may respond faster to external shocks, whereas a market with a very small information capacity tends to be isolated from other markets.

Third, this paper adds to the literature that studies the EMU effect on stock market integration. The existing literature (e.g., [Yang et al., 2003](#)) finds that the EMU has significantly strengthened stock market integration among its member countries; however, the increase in integration may also be attributable to other factors such as larger volumes of bilateral trade and faster information transmission. The present paper examines whether joint EMU participation matters after controlling for the

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