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Correlation dynamics in equity markets: evidence from India

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ABSTRACT

This study is aimed at understanding the correlation dynamics of the equity markets from a developing country perspective using daily data from July 1997 to August 2006. A simple unconditional correlation estimate and dynamic time varying correlation estimate from a DCC-MVGARCH of Engle and Sheppard (2001) are derived for S&P CNX Nifty and other 10 world indices that includes four developed and six Asian country indices. The results show low correlation across S&P CNX Nifty with both Asian and developed nations. In addition a Logistic Smooth Transition Regression (LSTR) model is implemented and finds that the S&P CNX Nifty index is moving towards a better integration with other world markets but not at a very noteworthy phase. The low correlation provides space for the global funds to diversify risk in Indian markets.

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1. Introduction

Equity market integration has a very significant role to play in shaping the fortunes of any developing nation. The foreseeable benefits apply not only to the realm of financial markets but also for economic growth and development itself: first, in a fully integrated capital market all risk factors trade at the same price and the law of one price will prevail. This should have a positive effect on the functioning of financial markets and indirectly on the performance of investments. Second, greater integration would mean a free or relatively freer access to foreign financial markets. This provides an opportunity to many firms a broader source for raising capital. Third, more internationally diversified stock and bond portfolios should as a consequence shift the frontier of efficient portfolios upwards

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and therefore for each given risk the average portfolio return should increase (Schroder, 2003). It would create enormous opportunities for domestic and international investors to diversify their portfolios across the globe. Fourth, equity market integration is of considerable significance to issuers and investors as it plays a critical role in channeling funds. Stock markets tend to be very efficient in the allocation of capital to its highest-value users. Such integrated markets could also help to increase savings and investment, which are essential for economic development. An equity market, by allowing diversification across a variety of assets, helps reduce the risk the investors must bear, thus reducing the cost of capital, which in turn spurs investment and economic growth.

A high degree of integration is not without its limitations. However one constant argument is that these limitations of integration do not have an impact until very high rates of integration is achieved. Issues such as vulnerability to foreign price fluctuations, drain of domestic funds and the argument that excessive integration could be self-defeating are valid only when the degree of correlation between markets is very high. Consequently the obvious advantages are what most emerging economies focus on in their drive towards greater integration.

In the literature market integration has been measured broadly through three ways (Kearney and Lucey, 2004). First, relating any equity market with other world markets through the international CAPM. It typically assumes that all the world's capital markets are perfectly integrated and therefore the asset risk can be related purely with the covariance of the local returns with the world market portfolio. Second, number of studies has examined the integration through increasing correlations and cointegration in their returns over time. Third, time varying estimates rectifies the weakness in the above-mentioned methods that misses the important element of time variation in equity risk premia. This study is an attempt to analyze the correlation structure and to test the equity market integration between the Indian equity market with some of the major world markets including the Asian markets.

The main contribution of this study over some of the previous studies is in twofold. First, this study uses DCC-MVGARCH model to estimate the dynamic correlation among the equity market of a developing country (India) with the world and Asian markets along with simple unconditional correlation. Second, a Logistic Smooth Transition Regression (LSTR) method is used to estimate not only the extent of correlation between returns but also the pace of integration. The advantage of logistic trend models is that they can indicate the speed at which markets are getting integrated, information that cannot be attained through conventional correlation analysis. This paper is organized as follows. Section 2 gives a brief overview of the literature on equity market integration. Section 3 narrates the methodology to estimate the unconditional correlation, conditional correlation through DCC-MVGARCH model and explains the Logistic Smooth Transition Regression. Section 4 discusses the results and the final section concludes with a summary.

2. Literature

One of the most striking features of financial integration is the extent of the literature that exists on the topic. The body of the literature can be classified based on the approach adopted by the author both in terms of econometric method as well as theoretical underpinning of the transmission mechanism. Since the seminal work of Grubel (1968), which expounded the benefits of international portfolio diversification, the relationship among national stock markets has been analyzed in a series of studies such as Granger and Morgenstern (1970), Ripley (1973), Lessard (1974,1976) and Panton et al. (1976) among others.

Other work in the field includes VAR models to measure transmission of stock movements. Using a VAR framework, Eun and Shim (1989) provided evidence of co-movements between the US market and other world equity markets. Koutmos and Booth (1995) studied the asymmetric volatility transmissions in international stock markets using an exponential GARCH model. In recent times Chelley-Steeley (2005) used a bivariate model along with Logistic Smooth Transition Regression to establish how rapidly the countries of Eastern Europe are moving away from market segmentation. Kearney and Poti (2006) examined the correlation dynamics for European equity markets using an asymmetric DCC-MVGARCH specification and found evidence in favor of structural break at the beginning of the process of monetary integration in Euro-zone.

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