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Comovements in international stock markets

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Abstract

In the paper monthly realized moments for stock market returns for the US, the UK, Germany and Japan are employed to assess the linkages holding across moments and markets over the period 1973–2004. In the light of the theoretical framework proposed in the paper, the results point to a progressive integration of the four stock markets, leading to increasing comovements in prices, returns, volatilities and correlations. Evidence of a positive and non spurious linkage between volatility and correlation, and a trend increase in correlation coefficients over time, is also found. All the above mentioned linkages seem to be particularly strong for the US and Europe, while the persistent stagnation of the economy and the weak fundamentals over the 1990s may have been the cause of the more idiosyncratic behavior of the Japanese stock market.

JEL classification: G1; G15; C32

Keywords: Realized volatility; Realized correlation; Stock markets; Financial integration; Economic integration

1. Introduction

This paper is an empirical assessment of various aspects regarding interconnections among the largest world stock markets, that is the United States, the United Kingdom, Japan and Germany. Many papers have contributed to the debate on the interdependence across international stock markets, considering issues such as volatility spillovers, correlation breakdowns, trends in correlation patterns.

This debate is important under different points of view. Firstly, the gains and motivations of international diversification rely on low correlations across international stock markets. Financial

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markets integration could have eroded much of the gains from international diversification by making market to comove more closely and enhancing spillovers. Secondly, strong comovements in extreme market realizations may increase the risk of global financial instability, with local market disruptions quickly spreading across countries, independently of fundamental dynamics.

Among the many interesting elements, two deserve particular attention, that is the association between correlation and volatility and the existence of an increasing trend among correlation coefficients. Longin and Solnik (1995), among others, for instance, have found evidence of instability in the correlation patterns characterizing international stock markets, with both volatility and correlation increasing in correspondence of the October 1987 stock market crash, and correlation remaining higher afterwards, also when volatility reverted to precrash levels. A positive linkage between correlation and volatility has also been documented, among others, by King et al. (1994), Ramchand and Susmel (1998) and Morana and Beltratti (2002). The results of these studies are not affected by the upward sample selection bias affecting the computation of the correlation coefficient pointed out by Forbes and Rigobon (1999), pointing to a non spurious positive association between stock market volatility and correlation.

Longin and Solnik (1995) have also documented the presence of an increasing trend in the correlation coefficients for international stock markets over the period 1958–1985, which, according to Bekaert et al. (2005), after 1995 might have stabilized at higher levels for European markets, and decreased for pairs including the US and Japanese markets. Hence, albeit international stock markets would have undergone a progressive integration, the evidence would still favour the existence of three regional groups, i.e. the US, Europe and Pacific Basin, rather than a single world market (Engle and Susmel, 1993; Groenen and Franses, 2000).

In this paper the empirical evidence on the linkages across international stock markets has been further assessed following a different approach from the one previously employed in the literature. The original contributions of the paper are as follows. Firstly, monthly realized variance and correlation processes for the four major international stock market indices, namely the US, the UK, Japan and Germany, are employed. The use of realized moments allows a more precise measurement of the features under investigation. Secondly, a unified assessment of the linkages across moments and countries is carried out by means of a common factor model, granting that the linkages uncovered are not spurious. Moreover, not only the existence of common factors across countries and realized moments has been assessed, but also how the importance of these factors has changed over time. In addition, by using a larger sample than the one employed in previous studies, up to date evidence concerning trend comovements in prices, returns and volatility, comovements and trend dynamics in correlation processes, and comovements in volatility and correlation processes, is provided, also concerning the last decade of data, which has not been explored so far. Finally, a theoretical framework has been introduced to explain the effects of markets integration on first and higher return moments. It is shown that market integration leads to an increase in return correlations and in the comovement of return correlations, to a positive linkage between volatility and return correlation, and to an increase in the comovement in volatilities.

After this introduction the paper is organized as follows. In section two the theoretical model is introduced, while in section three the data and the construction of the realized processes are discussed. Then, in section four the econometric methodology employed in the paper is presented, while in section five the the empirical results are discussed. Finally, in section five conclusions are drawn.