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Journal of International Money and Finance 24 (2005) 818–831

Journal of International Money and Finance

www.elsevier.com/locate/econbase

Modeling equity market integration using smooth transition analysis: A study of Eastern European stock markets

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Abstract

This paper assesses the extent to which the equity markets of Hungary, Poland the Czech Republic and Russia have become less segmented. Using a variety of tests it is shown there has been a consistent increase in the co-movement of some Eastern European markets and developed markets. Using the variance decompositions from a vector autoregressive representation of returns it is shown that for Poland and Hungary global factors are having an increasing influence on equity returns, suggestive of increased equity market integration. In this paper we model a system of bivariate equity market correlations as a smooth transition logistic trend model in order to establish how rapidly the countries of Eastern Europe are moving away from market segmentation. We find that Hungary is the country which is becoming integrated the most quickly.
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JEL classification: G14

Keywords: International diversification; Equity market integration; Logistic trend function

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doi:10.1016/j.jimonfin.2005.04.007

1. Introduction

It is now well documented that there has been a decline in the potential benefits which arise from international diversification because of the increasing degree of co-movement between national equity markets, see for example Taylor and Tonks (1989), Campbell and Hamao (1992) or Eun and Shim (1989). However, as shown by Bekaert and Harvey (1995), Harvey (1995) and Korajczyk (1996), a feature of emerging markets is that they appear to exhibit relatively low correlations with developed equity markets and can therefore provide diversification opportunities which may be unavailable in developed markets.

Partly as a consequence of diminishing diversification benefits in established markets, investors have appeared to focus to a greater extent on previously under-utilized or emerging markets. A consequence of such interest has been that many emerging markets have grown from tiny markets with little volume to become important sources of capital with a high return record. This is shown by Goetzmann and Jorion (1999) who find that returns in a sample of emerging markets are three times higher than for a sample of developed markets.

In order to assess the extent of equity market integration in four Eastern European countries we isolate the importance that domestic and foreign factors exert on the variation of a countries equity returns. This is achieved by analyzing the variance decompositions obtained from a vector autoregressive representation of market-wide equity returns. Since a market that is segmented from the rest of the world is not influenced by global factors, if the Eastern European markets are segmented the variance decompositions will indicate that their return variation is almost exclusively caused by domestic factors.

We also apply a smooth transition logistic trend function to a system of bivariate monthly return correlations to identify the speed of market integration in each country. This is the first time that such models have been applied as a test of market integration. The advantage of logistic trend models is that they can indicate the speed at which a market is becoming integrated, information which cannot be reliably attained from more conventional tests of market integration such as correlation analysis or variance decomposition analysis. An assumption of the smooth transition trend function is that it assumes market integration takes place as a gradual process, which in reality is likely to be the case even for countries that adopt dramatic liberalization policies.

We find that in the cases of Poland and Hungary, a significant movement towards market integration has been achieved by the end of our sample period. However, it is Hungary that is becoming integrated the most rapidly. Some reduction in market segmentation is experienced by the Czech Republic but very little movement away from segmentation is exhibited by the Russian equity market overall, although it does appear to experience short bursts of increased integration.

The remainder of this paper is set out as follows. Section 2 discusses previous work which has studied equity market integration. Section 3 examines the data and looks at the changing level of integration in Eastern Europe. Section 4 estimates the smooth transition model. Section 5 provides a summary and conclusions to the paper.

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