

# Dynamic linkages between emerging European and developed stock markets: Has the EMU any impact?

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## Abstract

This paper investigates the short- and long-run behavior of major emerging Central European (Poland, Czech Republic, Hungary, Slovakia), and developed (Germany, US) stock markets and assesses the impact of the EMU on stock market linkages. Evidence of one cointegration vector in both a pre- and a post-EMU sub-period indicates market comovements towards a stationary long-run equilibrium path. Central European markets tend to display stronger linkages with their mature counterparts, whereas the US market holds a world leading influential role. No dramatic post-EMU shock is detected in stock market dynamics. The empirical findings have important implications for the effectiveness of domestic policy decisions, as the emerging Central European states have recently joined the EU and local stock markets may become less immunized to external shocks.

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## 1. Introduction

Major Central European (CE) states, including Poland, the Czech Republic, Hungary, and Slovakia, have recently joined the European Union, EU (May 2004). This EU enlargement creates a dynamic financial landscape, unique at a world scale. The efficient financial integration of the CE markets with the developed European markets has crucial implications not only for the smooth accession of the CE economies but for the long-term growth

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prospects of Euroland as well. The short- and long-run stock market comovements in particular can have considerable repercussions for equity market risk, asset valuation, and portfolio allocation. Assets associated with similar levels of risk in different markets are anticipated to have similar levels of return, and this has an impact on efficient portfolio diversification decisions.

The issue of integration between international equity markets has attracted increasing empirical research recently. Various aspects of equity market relationships have been investigated, including volatility spillovers across markets, market correlation structures, and financial crises contagion (e.g. Claessens & Forbes, 2001; Koedijk, Campbell, & Kofman, 2002; Ng, 2000). Furthermore, following the seminal work of Engle and Granger (1987) and Johansen (1988), the cointegration methodology has been employed to study comovements between stock markets. Stock markets that are cointegrated exhibit stable long-run behavior, and shocks to the stock prices are temporary rather than permanent. In the short-run, stock prices across markets may deviate from each other, but market forces, investors' tastes, and preferences, and government regulations will bring stock prices back to their long-run equilibrium. The majority of past studies in stock market comovements have concentrated mainly on mature stock markets, whereas the behavior of emerging stock markets has been neglected. A large body of research has focused on European stock markets (e.g. Corhay, Rad, & Urbain, 1993; Dickinson, 2000; Fratzscher, 2001; Yang, Kolari, & Min, 2003; Yang, Min, & Li, 2003); on Asian, and Pacific stock markets (e.g. Dekker, Sen, & Young, 2001; Sharma & Wongbangpo, 2002; Yang, Kolari et al., 2003; Yang, Min et al., 2003); on Latin American stock markets (e.g. Chen, Firth, & Rui, 2002); and on cross-regional stock market relations (e.g. Bessler & Yang, 2003; Chaudhuri & Wu, 2003; Masih & Masih, 1997; Ratanapakorn & Sharma, 2002). Although cointegration was statistically supported in most cases, the empirical findings have not been always consistent. Absence of cointegration was concluded in some studies (e.g. Choudhry, 1994; Gerrits & Yuce, 1999; Huang, Yang, & Hu, 2000; Kwan, Sim, & Cotsomitis, 1995; Pynnonen & Knif, 1998).

Despite the growing importance of the emerging CE stock markets, the relevant body of research remains surprisingly limited. Furthermore, the empirical findings on this topic appear rather ambiguous and contradictory. Linne (1998), for instance, reports some evidence in favor of cointegration between the CE markets; however, no cointegration between the CE and the mature markets was detected. Jochum, Kirchgasser, and Platek (1999) assess the impact of the 1997–1998 Russian crisis on the long-run relationships between Vyshegrad countries (Poland, Czech Republic, Hungary), Russia, and the US. Bivariate cointegration relationships in the sample for the pre-crisis period cease for all but two pairs of markets after the crisis. This was attributed to the predominance of the short-run over the long-run dynamics in the post-crisis period, resulting to a change in the long-run relationship. Verchenko (2000) provides an empirical analysis of potential portfolio diversification across Eastern European and former Soviet Union stock markets. Absence of cointegration and independence of stock market movements were detected; hence, profitable diversification opportunities were concluded. Scheicher (2001) documents the pivotal influence of global factors on the Hungarian stock market, due to the high share of active international investors in this market. MacDonald (2001) studies the CE stock market indices as a group against each of three developed markets (US, Germany, UK), and concludes significant long-run comovements for each of the groupings. Gilmore and McManus (2002), however, find no long-term links between the three major CE markets (Poland, Czech Republic, Hungary), and the US; the relations of the CE stock markets with major European counterparts were not considered, though. Voronkova (2004) investigates the long-run relationships between CE stock markets (Poland, Czech Republic, Hungary),

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