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Research in International Business and Finance

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Equity market integration in emerging Balkan markets

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ARTICLE INFO

Article history:

Received 4 November 2008

Received in revised form 18 February 2011

Accepted 23 February 2011

Available online 4 March 2011

JEL classification:

C22

G15

Keywords:

Emerging Balkan stock markets

Cointegration

Regime switching

Dynamic conditional correlations

ABSTRACT

This paper examines long-run relationships among five Balkan emerging stock markets (Turkey, Romania, Bulgaria, Croatia, Serbia), the United States and three developed European markets (UK, Germany, Greece), during the period 2000–2009. Conventional, regime-switching cointegration tests and Monte Carlo simulation provide evidence in favour of a long-run cointegrating relationship between the Balkan emerging markets within the region and globally. Moreover, we apply the Asymmetric Generalized Dynamic Conditional Correlation (AG-DCC) multivariate GARCH model of Cappiello et al. (2006), in order to capture the impact of the 2007–2009 financial crisis on the time-varying correlation dynamics among the developed and the Balkan stock markets. Results show that stock market dependence is heightened, supporting the herding behaviour during the 2008 stock market crash period. Our findings have important implications for international portfolio diversification and the effectiveness of domestic policies, as these emerging markets are exposed to external shocks.

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1. Introduction

Recent developments in international financial markets and the consequent globalization have attracted a number of studies focusing on international stock markets convergence. The literature on emerging stock markets supports that they became less segmented from the world markets elevating

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the benefits of economic growth created via improvements in allocational efficiency and reductions in macroeconomic volatility (e.g., Baele et al., 2004).

Cointegration methodology developed by Engle and Granger (1987) and Johansen (1988) has been adopted in a numerous studies investigating the long-run relationships between international stock markets. These studies have traditionally focused on European and US mature equity markets, Asian and Latin American emerging markets and to a lesser extent on Central European stock markets, providing evidence on long-run interrelationships.¹

However, the long-run stable equilibrium relationships conjectured by these techniques are not suitable for modeling the dynamic process of stock market integration as it is incomplete and continues to exhibit strong variations over time.² Campos et al. (1996) and Gregory and Hansen (1996) find that the time-varying relations along with some structural breaks are possible to deteriorate the power of cointegration tests, rejecting the null hypothesis of cointegration. Hence, their methodology takes into account the possibility of instability in short-run relations. Furthermore, their research based on Monte Carlo simulation technique verifies that when a shift in parameters takes place, standard test for cointegration lose power and provides false signals.

Despite the extensive use of Johansen and Gregory–Hansen cointegration tests on the examination of international equity market integration, scholars have been also using generalized autoregressive conditional heteroskedasticity (GARCH) family models to avoid the restriction of constant volatility implied by the aforementioned methodologies. A large body of literature applies several variants of GARCH models to accommodate the possibilities of non-normalities and asymmetries in the variance of returns (e.g., Bekaert et al., 2002; Baele, 2005). However, most of the GARCH family models assume that correlation coefficients are constant over the sample period, while their multivariate variants suffer from the curse of dimensionality. Recently, two more advanced GARCH models have been developed. Engle (2002) develops a dynamic conditional correlation (DCC) GARCH model, which allows conditional asymmetries in both volatilities and correlations in a time-varying framework. Furthermore, Cappiello et al. (2006) extend the original model of Engle (2002) and use the asymmetric generalized dynamic conditional correlation (AG-DCC) model to investigate asymmetries in conditional variances and correlation dynamics.

This paper examines the interrelationships among five Balkan emerging stock markets (Romania, Bulgaria, Serbia, Turkey and Croatia), the US and three developed European markets (UK, Germany, and Greece), during the period 2000–2009. Romania and Bulgaria have recently joined EU, while Turkey and Croatia remain EU accession candidates, and Serbia struggles to emerge from isolation and start negotiations for future EU enrolment. Following the existing literature, we initially employ a conventional empirical analysis to test the equity market integration hypothesis (Johansen and Gregory–Hansen residual-based cointegration tests and Monte Carlo simulation technique to test sensitivity of the cointegration estimation). However, to avoid the limitations of this analysis and provide more robust results, we also apply the AG-DCC model developed by Cappiello et al. (2006). We estimate time-varying asymmetric conditional correlations between each developed market and all other Balkan markets during stable and crisis periods in order to examine the impact that the 2007–2009 financial crisis had on the integration of Balkan emerging equity markets. This multivariate process allows for series-specific news impact and smoothing parameters, permits conditional asymmetries in correlation dynamics and accounts for heteroskedasticity directly by estimating correlation coefficients using standardized residuals. Moreover, this specification is well suited to investigate the presence of asymmetric responses in conditional variances and correlations during periods of negative shocks.

¹ See, for example, Francis and Leachman (1998), Phylaktis (1999), Manning (2002), Chen et al. (2002), Chaudhuri and Wu (2003), Voronkova (2004), Syriopoulos (2006), and Samitas and Kenourgios (2007).

² Masih and Masih (2002) provide evidence that the Johansen procedure is heavily dependent on time series that exhibit few outlying observations. Voronkova (2004) adopts the Gregory and Hansen test and finds several equilibrium relations omitted by the conventional cointegration testing procedures, showing that long-run relations do not cease after a structural change has occurred. Kim et al. (2005) support that only the existence of an equilibrating process and not the driving forces behind the long-run equilibrium are investigated in standard cointegration analyses.

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