News and correlations of CEEC-3 financial markets

David Büttner, Bernd Hayo *

Philipps-University Marburg, Germany

ARTICLE INFO

ABSTRACT

We employ DCC-MGARCH models to investigate conditional correlations between six CEEC-3 financial markets. In general, the highest correlations exist between Hungary and Poland in foreign exchange and stock markets. Short-term money markets are somewhat isolated from each other. We find that the associations of CEEC-3 exchange rates versus euro are weaker than those versus the US dollar. The persistence of the effect of shocks on the time-varying correlations is strongest for foreign exchange and stock markets, indicating a tendency toward contagion. In searching for the origins of financial market volatility in the CEEC-3, we uncover some evidence of Granger-causality on the foreign exchange markets. Finally, using a pool model, we investigate the impact of euro area, US, and CEEC-3 news on the correlations. Apart from ECB monetary policy news, we observe no broad effects of international news on correlations; instead, local news exerts an influence, which suggests a dominance of country- or market-specific circumstances.

© 2010 Elsevier B.V. All rights reserved.

1. Introduction

In today's world of integrated financial markets, local news seldom has a merely local effect but often also causes financial market reactions in neighbouring countries. This is even more likely to be the case when the countries in question share some key characteristics, as do the CEEC-3 (Czech Republic, Hungary, and Poland), which are all emerging transition economies. If, when making investment decisions, economic agents do not distinguish between individual countries but treat them as a homogenous region, contagion could result. The question of whether there is contagion among interrelated financial markets is of great concern to financial investors, as its existence can mean that in the case of a shock, diversification becomes ineffective.

We investigate the CEEC-3 financial markets for several reasons. First, they represent some of the largest financial markets in the region in terms of liquidity and market capitalisation.[1] Second, the three economies are closely interrelated in terms of trade relations and geographic proximity. Third, as emerging economies, they are particularly prone to financial crisis, as witnessed during the 1990s. Finally, they are in the process of integrating into the European Union. To establish whether the CEEC-3 exhibit signs of contagion, we use a DCC-MGARCH (dynamic conditional correlation multivariate generalised autoregressive conditional heteroscedasticity) model to estimate the cross-country conditional correlations of returns of six financial markets. We then test the reaction of these correlations to local (political and macroeconomic) news and EU as well as US macroeconomic news. If these events result in a strengthening of financial market interdependence, we interpret it as evidence of contagion.

Even though our study does not cover a period of crisis, it is closely related to the literature examining financial market contagion. This branch of research flourished after the financial market crises of the 1990s (such as the Mexican, Asian, Russian, Argentine, and Brazilian financial market crises). However, despite the popularity of the term, 'contagion' has no unanimous definition, nor has a common measure of detecting it been established.

We use the definition of contagion proposed by Forbes and Rigobon (2001): 'a significant increase in cross-market linkages after a shock to an individual country (or group of countries)'.[2] Thus, a comovement of markets (which some authors define as contagion) or merely a high interdependence of two markets is not sufficient, under

---

* Corresponding author. Faculty of Business Administration and Economics, Philipps-University Marburg Universitätsstr. 24 35032 Marburg, Germany. Tel.: +49 64 21 28 23 091; fax: +49 64 21 28 23 088.

E-mail address: hayo@wiwi.uni-marburg.de (B. Hayo).

[1] For cross-country data on financial market developments, see the EBRD country database.

[2] Forbes and Rigobon (2001) call this kind of contagion 'shift-contagion'.

our definition, to constitute contagion.[3] Contagion has also been defined as an increase in the probability of a crisis in one country given a crisis in another country (Eichengreen et al., 1996).

To empirically detect instances of contagion, two main approaches are employed. The first approach is related to the Eichengreen et al.'s (1996) definition and consists of investigating whether the likelihood of a crisis in one country depends on local fundamentals, events in another country, or some common factors shared by these countries (e.g., Haile and Pozo, 2008; Fazio, 2007; Eichengreen et al., 1996).

The second approach is based on the Forbes and Rigobon (2001) definition of contagion and empirically examines the developments of cross-country correlation coefficients between financial markets. The studies in this branch of the literature examine cross-country correlation coefficients during periods of crisis and/or they estimate the impact of a specific type of event (not necessarily during a time of crisis) on their development (e.g., Chiang et al., 2007).

There are several channels through which contagion can occur but, again, no consensus as to what these channels are.[4] Three of the most important (and agreed upon) channels are the following (see also Didier et al., 2008; Fazio, 2007). First, a financial crisis can be transmitted via trade (Glick and Rose, 1999). Thus, increased trade integration makes countries vulnerable to contagion. Second, contagion can be caused by financial markets themselves. This might arise when international investors ('common creditors') withdraw their investments from several financial markets (Fazio, 2007; Pesenti and Tille, 2000).[5] Another important aspect of this channel for emerging markets is that financial investors might treat seemingly similar countries as equal due to a lack of information (Didier et al., 2008).[6] Third, similar macroeconomic weaknesses in different countries may imply that all countries will be treated the same if one of them faces a crisis (Fazio, 2007).

We examine the impact of specific local (political and macroeconomic) and international macroeconomic news (shocks) on CEEC-3 conditional correlations between six financial markets. Time-varying correlation coefficients are estimated by DCC-MGARCH models for each financial market, an approach that overcomes the problem noted by Forbes and Rigobon (2001, 2002) of a bias toward finding that contagion exists when using unconditional correlations, as these increase during crises as a result of higher volatility. The DCC-MGARCH model addresses this problem and thus eliminates this potential bias.[7] By analysing the influence of local news, we can test whether it is real linkages between the CEEC-3 or, instead, a lack of information that cause investors to treat them equally and thus create contagion. International news can be viewed as a common shock to all three economies and is expected to increase cross-country correlations.

Our specific research questions are: (i) How can we characterise the cross-country correlations and, in particular, study whether there are differences between financial markets and/or among countries? (ii) Is there a clear direction of (Granger-) causality of volatility from one country to another and can we identify one of the CEEC-3 as the principal source of volatility? (iii) Does news originating from the CEEC-3, the European Union, and the United States affect the time-varying correlations and can we identify categories of news that might be important sources of contagion?

The paper proceeds as follows. In Section 2, we provide a brief overview of the existing literature on news and financial markets with a focus on contagion. In Section 3, we describe the construction of the news events and the data sources. Section 4 introduces the econometric methodology. We present our results in Section 5 and conclude in Section 6.

2. Literature overview

Only a few recent studies examine the connection between certain events and market interactions, and those that do usually concentrate on a period of financial turmoil. Chiang et al. (2007) investigate the cross-country correlations of nine Asian stock markets' daily returns by means of a DCC-MGARCH model. Within the time span of 1990–2003, they identify a period of contagion (defined as an increase in correlation) and a period of herding (defined as continued high correlation). The authors find that rating agency decisions as to the creditworthiness of one of the sample countries have a statistically significant impact on the time-varying correlations between all the countries.

Filleti et al. (2008) study financial crisis contagion among several emerging markets using alternative estimation methods, including DCC-MGARCH. The authors identify six crises during the observation period 1995–2004: Asia, Russia, Brazil, NASDAQ, 11 September, and Argentina. In general, conditional correlations among the emerging markets increased during the crises. Interestingly, no contagion effects between Argentina and Brazil were detected during their respective crises. The authors argue that this finding might be because both crises were somewhat expected.[8] Alternatively, one can interpret these crises as evidence that contagion does not necessarily have to occur because financial markets perceived these shocks to be country-specific.

Albuquerque and Vega (2008) study the effect of news about economic fundamentals (macroeconomic and earning news) on the correlation of US and Portuguese stock markets using a GARCH model. They find that US news and Portuguese earning news have no effect on the cross-country stock market return correlation, but that Portuguese macroeconomic news tends to lower it. This indicates a 'common shock' effect of news released in a large economy versus idiosyncratic shocks originating from a small economy.

Regarding our sample countries, Serwa and Bohl (2005) study the reaction of European stock markets to big financial shocks using heteroscedasticity-adjusted correlation coefficients and find that Eastern European countries are not more vulnerable to contagion than Western European markets. Using high frequency data, Égert and Kočenda (2007a) investigate the degree of comovement between European stock markets. In this context, Hanousek et al. (2009) analyse the impact of macroeconomic news and discover significant spillovers from EU, US, and neighbouring countries. Finally, Kóbor and Székely (2004) focus on cross-country correlations of exchange rates and find notable changes for the correlations between Hungarian forint–Polish zloty and the Czech crown–Slovak crown during times of high volatility.

Our study contributes to this literature as one focus is on how financial markets react to CEEC-3 macroeconomic and political news compared to how they react to macroeconomic news about the euro area and the United States. The latter type of news can be considered as global shocks, which might have positive effects on the CEEC-3 cross-country correlations, whereas the former, more local-type, of news could initiate asymmetric developments. Our approach is unique in several aspects. (i) We examine a broad number of financial

---

[3] In contrast, Didier et al. (2008) define contagion as a price movement in one market resulting from a shock in another market.

[4] For instance, Masson (1998) discusses monsoonal effects, spillovers, and pure contagion effects.

[5] See Caramazza et al. (2000) for some empirical evidence.

[6] Bikhchandani and Sharma (2000) show that information deficiencies can lead to herding behaviour.

[7] Other solutions were proposed, inter alia, by Bonfiglioli and Favero (2005) and Corsetti et al. (2005), who also provide a more comprehensive review of other approaches.

[8] In regard to the Argentinean crisis, Didier et al. (2008) make a similar argument.