



The influence of foreign portfolio investment on informational efficiency: Empirical evidence from Central and Eastern European stock markets

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ABSTRACT

This paper presents empirical evidence suggesting that foreign portfolio investment had a positive and significant influence on the informational efficiency of eleven Central and Eastern European stock markets during the period 1999–2010, regardless of the type of dependence – short or long run – taken into account when determining the measure of the degree of informational efficiency. Furthermore, considering the asymmetric effects of the portfolio flows, we have generally found a direct and strong relation between the net positive flows and the degree of informational efficiency. Our panel results also show that market capitalization represents a significant explanatory factor for the presence of short run dependence, while liquidity is associated with the presence of long run dependence. After isolating the common shocks in time, market volatility seems to have an even greater impact on efficiency.

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1. Introduction

Based on the argument that a financial market cannot be informationally perfectly efficient, Campbell et al. (1997) introduced the concept of relative efficiency, that is the efficiency of one market measured against another. The main feature of most studies regarding absolute efficiency is represented by the fact that conclusions are drawn from the entire studied sample, without taking into account the possible alternation of efficiency with inefficiency subperiods. Identifying subperiods of efficiency/inefficiency and ranking the relative market efficiency are most often accomplished by using the time-varying or rolling window approach. Thus, Cajueiro and Tabak (2004, 2005) estimate Hurst exponents in each window to test for long run dependence and use the median as a statistical measure when ranking the markets. Lim and Brooks (2009, 2010) used the rolling bivariate correlation test statistic that focuses on nonlinear dependence, arguing that a more appropriate indicator for relative efficiency would be the percentage of time windows in which the market exhibits significant nonlinear dependence. Zunino et al. (2009) proposed a stock market inefficiency ranking by considering the multifractality degree as a measure of inefficiency.

We can identify several interdependent channels through which the presence of foreign investors in Central and Eastern European (CEE) stock markets should lead to an increase in their degree of informational efficiency. First, foreign portfolio investment raises the liquidity in these markets, which stimulates the arbitrage activity

(Chordia et al., 2008), and thus, there should be a faster capitalization of information into stock prices and smaller departures from a random walk benchmark. Second, according to Bae et al. (2006), foreign investors require transparency and stricter disclosure rules and these, in their turn, improve the information environment in emerging stock markets. Third, according to the theoretical model of Albuquerque et al. (2009), local investors underreact to global news because they do not have immediate access to them or do not have enough analysis capacity. In contrast, foreign investors obtain information faster and have superior capacity to incorporate global news in security prices (Bae et al., 2012). Finally, foreign investors' need to manage risks will lead to the development of derivative markets with stabilizing effect on spot markets. Lien and Zhang (2008) reviewed the literature on the price discovery function of derivative markets and show that a financial derivative market stimulates the capital inflows into emerging markets. At the same time, the use of financial derivatives leads to higher volatility and accelerated outflows.

The empirical results of the few studies in the literature are contradictory. For instance, Tabak (2003), using an error-correction model, shows that foreign portfolio inflows are mainly responsible for the increased efficiency in the Brazilian stock market. Li et al. (2004) showed on a sample of 17 emerging stock markets that higher firm-specific variation is significantly correlated with greater capital market openness, especially in the economies with sound institutions. On the other hand, Lagoarde-Segot (2009) identifies in the case of 29 emerging markets a negative impact of international portfolio equity flows on market efficiency. Such a result can be best accounted for by the foreign investors' preference for technical rather than fundamental analysis. A similar result is obtained by Lim and

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Kim (2011) in a study of 23 emerging markets. A possible explanation is that on emerging markets positive autocorrelations of returns are generated by foreign investors engaged in positive feedback trading strategies, according to the theoretical model developed by De Long et al. (1990). Bariviera (2011) fails to identify a significant relation between the presence of foreign investors and efficiency in the case of the Thai stock market. Recently, Bae et al. (2012) have shown on a sample of 4840 stocks in 21 countries that greater investibility reduces price delay to global market information leading to an increase of the degree of efficiency.

The objective of this paper is to empirically investigate the relation between stock market efficiency and foreign portfolio investment in CEE. From the beginning, we must underline that a sensitive issue is how the informational efficiency of a stock market is measured. According to Lim and Kim (2011), in most studies, the deviation from random walk is perceived as a deviation from efficiency, deviation due to the presence of short and/or long run dependence. Unlike the vast majority of studies that focus on one type of dependence only, this paper brings a first important contribution by investigating both types of dependences through the Generalized Spectral (GS) test and the Generalized Hurst Exponent (GHE) test. Our second contribution consists in studying the relation between stock market efficiency and foreign portfolio investment by using different panel regressions in which we include a set of control variables that captures the features of the investigated markets and in which we allow for the effects of asymmetric portfolio flows. Finally, given the contradictory results in literature, this paper highlights the findings regarding the relation between efficiency and foreign portfolio investment in the case of CEE stock markets.

The paper is organized as follows: Section 2 describes the two tests used to measure the efficiency. Section 3 presents the data and the methodology. Section 4 reports the empirical results. The final section summarizes the conclusions.

2. Measuring the degree of stock market efficiency

This section addresses two issues related to weak-form stock market efficiency. First, we present arguments according to which the presence of short and long run dependence in stock returns indicates market inefficiency. Second, we describe the tests chosen to detect these correlations.

2.1. Short and long run dependence and stock market inefficiency

In informationally efficient markets stock prices are in permanent equilibrium; they fluctuate only in response to the arrival of new information to the market. A quick incorporation of information in stock prices would determine a random movement given by the random nature of this information, which implies the impossibility to predict the stock price and to obtain systematic profits due to the absence of short and long run dependence in return series. On the contrary, a mis-reaction to information will lead to the emergence of linear and nonlinear dependence in returns and, implicitly, to a potential predictability.

A series of behavioral models proposed by Barberis et al. (1998) or Hong and Stein (1999) explains how phenomena like over- and under-reaction can generate linear dependence in returns. De Long et al. (1990) developed a theoretical model which demonstrates that investors' over-reaction could lead to positive autocorrelations of returns. In the case of stock indices, Froot and Perold (1995) showed that positive autocorrelations of returns can be generated by the slow dissemination of market-wide information.

In the literature there are various theoretical developments which justify the presence of nonlinear dependence in stock return series. First, Cootner (1962) explains the nonlinear dynamics through the interaction between noise traders and arbitrage traders in the presence

of transaction costs. A series of arbitrage models developed later by Dumas (1992) or Sercu et al. (1995) strengthens Cootner's arguments. Second, the slow market response to unexpected shocks, caused by the financial crises (Lazar et al., 2012; Lim et al., 2008a) or by several economic and political events (Lim et al., 2008b), leads to stock price deviations from equilibrium, thus generating nonserial dependence. Third, the recent 'behavioral finance' literature has developed a series of nonlinear behavioral models of the interactions between heterogeneous agents even in the absence of transaction costs. Thus, McMillan (2005) considers that the cognitive movements and the limited ability of investors to perform arbitrage operations lead to deviations from the fundamental value, generating nonlinear dynamics. Fourth, in the case of emerging stock markets, Schatzberg and Reiber (1992) believe that certain characteristics and imperfections, such as high transaction costs and low liquidity, delay the incorporation of new information into prices, generating nonlinearities in returns.

Another strand of the literature has brought attention to the predictability due to long run correlations in return series, easily exploitable for substantial profits. This feature is generated especially by the heterogeneity of market participants. There are many ways to describe this heterogeneity, but the most promising approach is the one that considers time dimensions. It is known that stock markets include various investors with very different investment horizons ranging from several seconds (noise traders, market makers) to several years (pension funds). Thus, the information set that is most relevant differs according to the investment horizon. Short-term investors focus primarily on market sentiment and technical information; long-term investors base their decisions on movements in fundamentals (Kristoufek, 2012). Contrary to the common assumption, there is no privileged investment horizon in the market. The interaction of investors with different time scales generates various effects, such as volatility cluster and trend persistence.¹

2.2. Brief description of the tests

2.2.1. Generalized spectral test

This test proposed by Escanciano and Velasco (2006) has been recently used to investigate the efficiency of stock markets (Kim et al., 2011; Lim and Luo, 2012), of currency markets (Escanciano and Lobato, 2009a) and carbon emission allowance market (Charles et al., 2011a).

Let $\{Y_t\}_{t=1}^n$ be the stationary time series of returns. Escanciano and Velasco (2006) propose to test the null hypothesis $H_0: E(Y_t | Y_{t-1}, Y_{t-2}, \dots) = \mu$, where μ is a real number, using a pairwise approach. That is, $H_0: m_j(y) = 0$, $j \geq 1$ almost surely, where $m_j(y) = E[Y_t - \mu | Y_{t-j} = y]$ and μ is the mean, against the alternative $H_1: P(m_j(Y_{t-j}) \neq 0) > 0$ for some $j \geq 1$. A nonlinear measure of dependence is considered $\gamma_j(x) = E[(Y_t - \mu)e^{ixY_{t-j}}]$ where x is a real number, this exponential weighting function being used to measure the conditional mean dependence in a nonlinear time series framework. The above null hypothesis is consistent with the following $\gamma_j(x) = 0 \forall j \geq 1$, almost everywhere.

The authors use the generalized spectral distribution function:

$$H(\lambda, x) = \gamma_0(x)\lambda + 2 \sum_{j=1}^{\infty} \gamma_j(x) [\sin(j\pi\lambda)/j\pi] \quad \lambda \in [0, 1]$$

with the sample estimate as follows: $\hat{H}(\lambda, x) = \hat{\gamma}_0(x)\lambda + 2 \sum_{j=1}^{n-1} (1-j/n)^{1/2} \hat{\gamma}_j(x) \sin(j\pi\lambda)/j\pi$, where $(1-j/n)^{1/2}$ is a finite sample correction factor, $\hat{\gamma}_j(x) = (n-j)^{-1} \sum_{t=1+j}^n (Y_t - \bar{Y}_{n-j}) e^{ixY_{t-j}}$ and $\bar{Y}_{n-j} =$

¹ Dacorogna et al. (2001) refer to these features as 'characteristically relativistic effects' – the dynamic interaction between different market components relative to each other, rather than relative to the news that has impacted the market.

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