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## PROCYCLICALITY OF STOCK MARKET INDICES IN SOUTH-EASTERN EUROPEAN COUNTRIES: EVIDENCE FROM GARCH TESTS

*We tested the hypothesis of procyclicality for economic activity and the stock exchanges of South-eastern European countries relative to the main world stock exchange centers, in order to demonstrate the dependence of small financial markets on larger ones. Our estimates based on the GARCH methodology support the hypothesis of increase in stock exchange indices in the period of transition of South-eastern countries due to the opening of market economy followed by large capital inflows, industrial production and trade due to further financial integration to the EU. The results also proved that stock indices in the SEE countries are negatively correlated with exchange rates, interest rates and government debt.*

*Keyword: GARCH; stock exchange; South-East Europe; financial integration; EU accession.*

*JEL Classification: E44, F36, F43, G15.*

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## ПРОЦИКЛІЧНІСТЬ ІНДЕКСІВ РИНКУ ЦІННИХ ПАПЕРІВ У КРАЇНАХ ПІВДЕННО-СХІДНОЇ ЄВРОПИ: РЕЗУЛЬТАТИ GARCH-ТЕСТІВ

*У статті перевірено гіпотезу проциклічності для економічної активності і фондових бірж країн Південно-Східної Європи відносно основних світових центрів торгівлі цінними паперами, з метою продемонструвати залежність малих фінансових ринків від великих. Розрахунки на основі методології GARCH підтвердили гіпотезу підвищення індексів на фондовій біржі в період трансформації економіки країн Південно-Східної Європи завдяки відкриттю ринкової економіки, що супроводжувалося значним припливом капіталу, зростанням промислового виробництва і торгівлі завдяки подальшій фінансовій інтеграції в ЄС. Результати також доводять, що біржові індекси в країнах Південно-Східної Європи негативно корелюють з валютним курсом, розміром процентної ставки і державним боргом.*

*Ключові слова: GARCH, фондова біржа, Південно-Східна Європа, фінансова інтеграція, вступ до ЄС.*

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## ПРОЦИКЛИЧНОСТЬ ИНДЕКСОВ РЫНКА ЦЕННЫХ БУМАГ В СТРАНАХ ЮГО-ВОСТОЧНОЙ ЕВРОПЫ: РЕЗУЛЬТАТЫ GARCH-ТЕСТОВ

*В статье проверена гипотеза проциклічності для экономической активности и фондовых бирж стран Юго-Восточной Европы относительно основных мировых центров торговли ценными бумагами, с целью продемонстрировать зависимость малых финансовых рынков от крупных. Расчеты на основе методологии GARCH подтвердили гипотезу повышения индексов на фондовой бирже в период трансформации экономики стран Юго-Восточной Европы из-за открытия рыночной экономики, что сопровождалось значительным притоком капитала, ростом промышленного производства и торговли*

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благодаря дальнейшей финансовой интеграции в ЕС. Результаты также доказывают, что биржевые индексы в странах Юго-Восточной Европы отрицательно коррелируют с валютным курсом, размером процентной ставки и государственным долгом.

**Ключевые слова:** GARCH, фондовая биржа, Юго-Восточная Европа, финансовая интеграция, вступление в ЕС.

**1. Introduction.** Over the past several years, economic science has intensively dealt with financial market integration. There is a great deal of empirical literature on the procyclicality of the stock market as a sign of financial integration and it covers the countries of Central and South-Eastern Europe as well as Asia and the Americas. Research into the matter intensified with the development of the European Union and its enlargement into an ever-widening circle of countries. Existing literature on this topic includes research into the stock markets of transition countries that have already joined, or are joining, the European Union, in order to examine the level of financial integration in the EU. Trade links between Central and South-Eastern European countries and the EU gradually became stronger, leading to further economic integration by the time of formal accession.

After the collapse of socialist regimes at the beginning of the 1990s, a number of CEE economies established capital markets as a part of their transition process for adopting the mechanisms of market economy (Kim et al., 2005). Some authors found a strong correlation between transition countries and developed financial markets but a weak correlation between themselves and some others, *au contraire*.

Drawing upon the methods used by authors who have dealt with the correlation of stock market indices, we researched and analyzed the correlation of stock market indices in transition countries, relative to the stock market centers of Europe and the world in order to demonstrate the dependence of small financial markets on large ones. This was performed by the GARCH methodology, which offers an efficient tool for analyzing lock-step shifts and the volatility of the spillover of financial factors improved by the empirical evidence.

The aim of this study is to research the stock markets of Bulgaria, Bosnia and Herzegovina, Croatia, Montenegro, Serbia, Slovenia and Romania as a representative group of the SEE countries and compare them to the stock exchange centers of developed countries such as the United Kingdom and the United States. We test the hypothesis of spillover (the movement of stock exchange indices' prices) in stock-trading financial centers (the US and the UK) to smaller financial markets of South-East Europe (SEE) that we will observe individually – comprising the countries of the European Union (Bulgaria, Romania and Slovenia), the EU candidate countries (Croatia and Montenegro) as well as some of the less developed transition countries of the Southeastern Europe as potential EU candidate countries (Bosnia and Herzegovina and Serbia).

The following chapters are structured as follow: stock markets in the SEE are presented in Chapter 2, Chapter 3 contains the overview of existing empirical literature, data specifications, methodology and empirical results and the implication of the empirical analysis is revisited in the conclusion (Chapter 4).

**2. Stock markets in the SEE.** Emerging capital markets in the transition countries of the Southeastern Europe are becoming increasingly important for both insti-

tutional and individual investors. Southeastern transition countries slowly started opening up to the world market at the end of 1980's and the beginning of the 1990's, and established a local exchange as part of their transition process towards adopting the mechanisms of a market economy. The stock markets of the SEE have tried to adapt their standards to international, by improving the disclosure practices of firms, order execution, ownership rights, and by bringing down limitations to international capital flows (Syllignakis and Kouretas, 2006). However, they still remain small, fragmented and underdeveloped in comparison with capital markets of developed countries.

Following the removal of restrictions on capital flows, the opening up to foreign investors, the creation of appropriate corporate governance structures and the establishment of ownership rights, both market capitalization and daily trading volumes increased rapidly in the SEE during transition. However, since the equity markets in these countries are still relatively small when compared with developed ones, they tend to exhibit higher volatility, possibly because of their sensitivity to even relatively small portfolio adjustments (Egert and Kocenda, 2007).

Stock markets in the SEE received massive FDI during 2004, which boosted stock indices in almost all these countries. The dramatic increase in stock prices in the EU accession countries following the announcement of the EU enlargement was the result of market integration and the subsequent repricing of systematic risk (Dvorak and Podpiera, 2006) before the financial crisis.

### **3. Empirical analysis: empirical literature overview, data specifications, methodology, empirical results and discussion:**

*1. Empirical literature overview.* Our model is based on large amount of empirical evidence of Adam et al. (2002), Baele et al. (2004), Baltzer et al. (2008) and others who pointed out that transition from centrally planned to market economies has led to rapid financial developments boosted by a strong, foreign, primarily EU banking presence.

A number of studies have analyzed how stock market integration affects stock market returns and investigated if stock market returns become more correlated in a more integrated market. Baele et al. (2004) investigated the comovements between the stock markets in the new EU member states from previous Communist states of the Central and Eastern Europe in the period from 2000 to 2007 and found empirical evidence that the stock markets of the entrant countries in the EU area were more exposed to adverse comovements, volatility, and persistence after their accession. This result suggests that the flip side of financial-market integration is stronger cross-country shock propagation.

Baltzer et al. (2008) found that financial markets in the new member states are significantly less integrated than those of the EU financial market and that they are more susceptible to the euro market shocks after the accession. Nevertheless, there is strong evidence that the process of integration is well under way and has accelerated since accession to the EU.

Baele et al. (2004) investigated to what extent globalization and regional integration led to increasing equity market interdependence in the case of Western Europe, as the region faced a unique period of economic, financial and monetary integration. He measured volatility spillovers (by the regime-switching model) from

the EU and US markets to 13 local European equity markets and proved that increased trade integration, equity market development and low inflation contributed to an increase in the EU shock spillover intensity and that there was evidence for a contagion from the US market to a number of local European equity markets during periods of high world market volatility.

Horobet and Ilie (2007) pointed out that the theoretical links between exchange rates and stock prices are microeconomic and may be observed in both the short and the long run. The paper examines the interactions between the exchange rates and stock prices in Romania after 1997, taking into account the change in the monetary regime that occurred in 2005, when there was a shift towards inflation targeting.

The process of integration should increase cross-border investments among countries, which have joined the EU and are in the process of joining the European and Economic Monetary Union (De Santis and Gerard, 2006). The current diversity in the degree of financial development across the EU can be a great opportunity, at a time where these areas have become increasingly financially integrated.

Horska (2005) found that the correlation among the Czech, US and European stock markets has increased over time, leaving less room for portfolio diversification. Another finding regards the macroeconomic consequences of stock-price development, undermined by the assumption of the positive wealth effect of rising stocks. In relation to GDP growth, the prediction power of the stock index has proven itself rather limited. The Czech stock market can also function as an instrument of portfolio diversification, at least in relative terms, since the correlation to the Czech bond market was weak.

**II. Data specification.** Based on the studies investigating the correlation of stock market indices and macroeconomic variables in the empirical literature, we constructed a data set of explanatory variables that are usually included in models: capital inflow as % of GDP; the exchange rate as the price of one unit of foreign currency in units of domestic currency; GDP expressed in annual percentage change; government debt expressed as % to GDP; the industrial production index; interest rates (p.a.); the consumer price index and trade balance expressed as % of GDP. We relied on the internal database of the CCEQ (2010) and on the databases of the national statistical bureaus of individual countries.

A monthly time series was used for the period from January 2004 to December of 2010.

The local stock price indices (closing prices) were used for each of the examined stock markets: CROBEX (Croatia), SBI20 (Slovenia), SASX-10 (Bosnia and Herzegovina), BELEX15 (Serbia), MONEX20 (Montenegro), BG40 (Bulgaria), BET10 (Romania), FTSE100 (UK) and DOW JONES (US). Stock indices' data (closing) were collected on national stock exchanges and adapted to monthly average indices from January 2004 to December 2010.

**III. Methodology.** In different estimations for the empirical evidence of a relationship between stock-exchange indices and main (macro) economic indicators, we used methods such as correlations and cross-country regressions. To uncover empirical evidence for a relationship between stock return indices and economic variables of the SEE countries, we applied a general autoregressive conditional heteroscedasticity (GARCH) method. Numerous studies have shown that the GARCH specifica-

tion is most suited for analyzing financial time series such as stock prices, inflation rates and exchange rates. The GARCH model implies that the conditional distribution of returns is normal, i.e. standardized residuals of this model should be normal (Glosten et al., 1989; Rabemananjara and Zakoian, 1993).

We used the simplest GARCH (1,1) originally proposed by Bollerslev (1986) which says that the conditional variance of  $u$  at time  $t$  depends not only on the squared error term in the previous time period, but also on its conditional variance in the previous time period. Before applying linear regression methods, we eliminated the overly correlated explanatory variables for every country. All variables were seasonally adjusted (Eviews 7) on the basis of monthly data from 2004 to 2010.

We used the augmented Dickey-Fuller (1979) test to test a series for the presence of a unit root. According to the test results given in the Appendix, all the variables are stationary in the form  $dlog(x)$  i.e. integrated of order 1. The logarithmic approximation is accurate in certain cases such as when the rates of change in variables are reasonably small (Frances and Koop, 1998; Lutkepohl and Xu, 2009).

To determine the lag length, we used Schwarz information criterion because the Schwarz criterion and its parsimonious model perform better over a longer period of research (Ashgar and Abid, 2007), and also Akaike and Hannan-Quinn information criterion (Akaike, 1987). A maximum of 12 lags was considered for each variable when determining the lag length.

In the estimations of regressions we used  $dlog(x)$  (variables are integrated of order 1) (Dickey and Fuller, 1979; Esaka, 2003).

Tests known for serial correlation are the Q-statistics and the Breusch-Godfrey LM test. Q-statistics were estimated to check autocorrelation in the residuals (Iwaisako, 2004) by a test statistic for the null hypothesis that there is no autocorrelation of residuals with high probabilities and low Q-statistics. The results indicated that residuals are not serially correlated and, therefore, suitable for analysis.

**IV. Results and Discussion.** The stock exchanges in the SEE transition countries reacted in similar ways to significant capital inflows and the opening of markets in the observed period, despite differences among the individual countries.

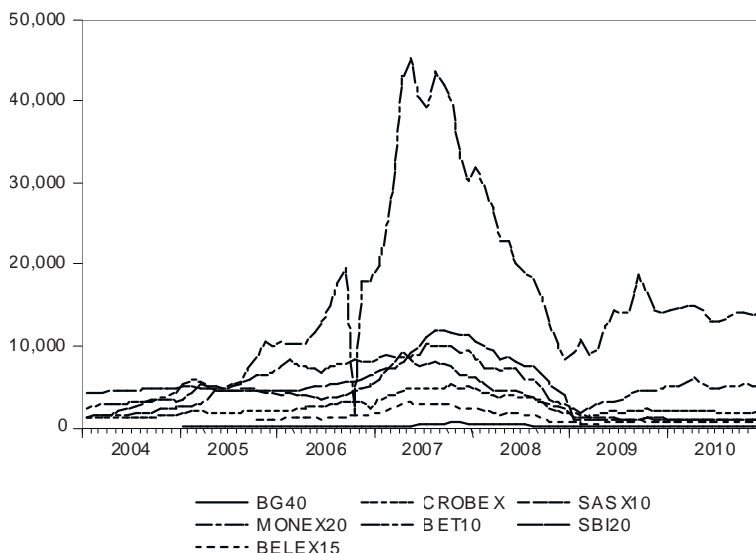
The obtained results confirmed the significant influence of the chosen explanatory variables on the stock exchange indices. As expected, we found a correlation among the main economic indicators and stock exchange indices of the SEE countries. We can confirm the positive influence of capital inflow, GDP, inflation, industrial production and trade balance on stock exchange indices. We also confirmed that exchange rate, interest rate and government debt have negative impact to stock exchange indices.

The complete results provide evidence of the higher volatility of macroeconomic factors such as exchange rate and government debt. These factors are obviously important explanatory variables that increase the volatility of stock exchange indices (more in Poghossian, 2008; Muradoglu, 2009; Lin, 2009).

Rising stock prices in the SEE countries in the scope of our interest provide evidence about economic growth in the region in the light of the financial integration process in general and in light of the EU integration process in particular. Stock prices increase usually go together with large FDI as well as the implementation of reforms regarding the EU integration. European financial markets (Erdogan, 2008) have

faced crucial structural and institutional adjustments, with the aim of accelerating financial integration in the money, credit, bond, and equity markets. These processes are also pushing the whole SEE region towards further international financial integration because almost all the SEE countries are trying to follow European financial markets.

The efforts of transition countries with respect to changing to market economy, have resulted in massive FDI, especially in 2004, which boosted stock indices in almost all the countries (Figure 1). The dramatic increase in stock prices in the EU accession countries clearly followed the announcement of the EU enlargement (for Bulgaria, Romania and Slovenia and subsequently Croatia and Montenegro) and obviously was the result of market integration and the subsequent repricing of systematic risk.



Symbols: CROBEX (Croatia), SBI20 (Slovenia), SASX-10 (Bosnia and Herzegovina), BELEX15 (Serbia), MONEX20 (Montenegro), BG40 (Bulgaria), BET10 (Romania).

Figure 1. Indices of the SEE countries (01.2004–12.2010)

As we can see in Table 2, *Croatia and Montenegro*, as the EU candidate countries, have seen strong capital inflows in the last decade connected with the announcement of the EU membership (Berben and Jansen, 2005; Horobet and Ilie, 2007).

Cumulative FDI from 2003 to 2007 has been greater in *Montenegro* than in all other transition countries and remained surprisingly high despite the actual global slowdown of economic activities (with the coefficient of 0.32), partly due to the privatization of the local power company and aluminum industry as well. But ongoing negotiations with *Croatia and Montenegro* have not yet resulted in the complete financial integration of these markets with the European Union (Onay, 2007).

Economic performance in *Serbia and Bosnia and Herzegovina* is still well below the EU standards with respect to the lack of local reforms and unstable fiscal policy. Regardless, these countries are also on the way to the EU (potential EU candidates) which is obvious through the strong capital inflow and their privatization efforts (telecommunication sector) and trade liberalization. *Serbia* has also attracted foreign



Table 1. Macroeconomic environment SEE (2004/2005/2006/2007/2008/2009/2010)

	GDP real (annual % change)	Unemployment (LFS, in % of workforce)	FDI inflow (% of GDP)	Industrial production real change (Annual %)	Gross foreign debt (% of GDP)
Bosnia and Herzegovina	6.3/3.9/6.1/6.2/5.7/-2.9/-1	44.1/44.7/44.2/42.9/40.6/42.7/43.2	4.9/5.6/6.2/13.5/5.0/1.5/0.1	12.1/10.6/11.6/6.7/10.8/-1.2/-4.7	57.9/57.1/58.4/59.7/61.2/49
Bulgaria	6.2/6.2/6.3/6.2/6.0/-3.5/0	12.2/10.1/9.0/6.9/5.6/6.4/7.5	14.2/16.4/15.0/28.7/17.5/9.6/3.9	6.7/6.7/5.9/9.2/0.8/-17.6/-3	69.0/78.4/81.0/86.0/89.5/107.9/105.6
Croatia	4.3/4.3/4.7/5.5/2.4/-5.8/-1.8	18.0/17.9/16.6/14.8/13.2/15.4/15.0	4.6/8.3/6.6/8.1/6.7/2.6/0.2/???	5.1/5.1/4.5/5.6/1.6/3.6/-9.3/1.0	82.4/85.3/86.2/86.3/86.2/85.8/85.8
Montenegro	4.4/4.2/8.6/10.7/6.9/-5.7/2.0	27.7/30.3/29.6/19.3/17.2/19/20	3.0/21.0/21.7/19.9/17.9/30.6/21.0	13.8/4.9/1.0/0.1/-2.0/-32.3/41.7	29.3/28.3/23.5/27.5/29/38.3/43.5
Romania	4.1/4.2/7.9/6.2/7.1/8.2/-6.2/0	5.8/5.4/4.3/4.2/4.2/6.3/8.5	6.6/9.3/5.0/5.8/6.6/4.2/3.0	8.4/2.0/7.1/5.4/6.4/-13.0/3	31.0/39.4/40.4/31.3/37.8/56.6/62.5
Serbia	8.3/5.6/5.2/6.9/5.5/-3.1/2.7	20.8/21.8/21.6/18.8/14.7/17.4/19.5	3.9/5.9/13.8/6.3/6.0/4.7/2.0	7.1/0.8/4.4/3.3/0.9/-12.2/5.8	63.8/50.3/36.2/61.8/65.3/74.6/79.9
Slovenia	4.1/4.4/5.9/6.9/3.7/-8.1/1.2	6/6.5/6.0/4.8/4.4/7/7.5	0.9/-0.2/-1.0/-0.6/1.0/-1.5/0.7	4.4/3.3/6.2/6.1/6.2/-1.5/-10/2	58.5/71.0/96.5/100.5/104.5/113.4/116.4

Source: European Commission, EU Candidate and Pre-Accession Countries Economic Quarterly (2010) and UniCredit CEE Quarterly (2010).

Table 2. GARCH (1, 1) models

Variable	Dependent variable: dlog(x) (01m 2004 to 12m 2010)									
	BIH	BUG	CRO	MN	ROM	SLO	SER	UK	US	
C	-	-	-	-0.051198 (-5.819785) (0.0000)***	-	-	-	-	0.004488 -8702434 (0.0000)***	
dlog(CAP)	0.136738 (/)	0.052664 (-1) -1911040 (0.0560)*	0.359473 (-11) -9126916 (0.0000)***	0.321874 (-8) -5780412 (0.0000)***	0.096267 (-11) (3.949294) (0.0001)***	-	0.200741 (-12) -8106457 (0.0000)***	0.239144 (-4) -4950975 (0.0000)***	0.005003 (-7) -9029894 (0.0000)***	
dlog(EXR)	-1837072 (-8) (-2.165039) (0.0304)**	-4601634 (-8) (-4.164247) (0.0000)***	-4086524 (-12) (-1.979519) (0.0478)**	-	-0.925078 (-2) (-2.693734) (0.0071)***	-	-1032017 (-2) (-1.832210) (0.0669)*	-	-	
dlog(GDP)	0.164163 (-7) -3479148 (0.0005)***	0.087123 (-3) -1969830 (0.0489)**	0.078908 (-8) -3033692 (0.0024)***	-	0.133182 (-1) -5240316 (0.0000)***	-	0.259786 (-12) -3541450 (0.0004)***	-	0.015715 (-12) -5256944 (0.0000)***	

The end of Table 2

Variable	BIH	BUG	CRO	MN	ROM	SLO	SER	UK	US
dlog(GVD)	-0.619305 (-5) (-6.697729) (0.0000)***	-	-3072211 ( (-5.227902) (0.0000)***	-	-0.271813 (-6) (-1.539833) (0.1236)*	-2602766 (-12) (-2.660621) (0.0078)***	-0.324456 (-3) (-1.805578) (0.0710)*	-0.591878 (-9) (-2.049496) (0.0404)**	-1790655 (-10) (-5.636630) (0.0000)***
dlog(IND)	-	-	-	0.185264 (-6) (-6.237757) (0.0000)***	0.045817 (-2) (-2.060272) (0.0394)**	0.105039 (-12) (-3.548206) (0.0004)***	-	-	0.039872 (-12) (-4.438737) (0.0000)***
dlog(INT)	-0.570486 (-4) (-3.622772) (0.0003)***	-0.401587 (-9) (-3.697638) (0.0002)***	-0.368912 (-12) (-2.387979) (0.0169)**	-0.202402 (-4) (-20.84552) (0.0000)**	-0.318602 (-9) (-12.08223) (0.0000)***	-0.840482 (-12) (-4.210526) (0.0000)***	-	-0.348002 (-1) (-1.778554) (0.0753)*	-
dlog(CPI)	0.024218 (-12)	0.165596 (-12)	0.195607 (-3)	0.087803 (-9)	0.461919 (-12)	0.043224 (-9)	0.153131 (-11)	0.086687 (-8)	0.040473 (-8)
dlog(TRB)	-2125279 (0.0005)***	-2832857 (0.0046)***	-2625541 (0.0087)***	-1983832 (0.0473)**	-5001303 (0.0000)***	-4480008 (0.0000)***	-3485304 (0.0000)***	-2633782 (0.0084)***	-4438737 (0.0000)***
R-squared	0.540797	0.271281	0.722968 (-12)	0.267588 (-7)	0.477068 (-6)	-	0.375208 (-1)	0.100874 (-12)	0.396802 (-12)
Adjusted R-squared	0.368596	0.198091	0.619082	0.183273	0.217624	0.597567	0.179123	0.157296	0.195754
S.E. of regression	0.073451	0.074002	0.070993	0.446274	0.056791	0.031207	0.123426	0.040773	0.018865
Sum squared resid.	0.129442	0.139961	0.121082	0.116543	0.080631	0.02997	0.198041	0.044654	0.007473
Durbin-Watson stat.	1860156	1820909	1845780	2723888	1795590	1420417	1393155	2491487	2169204
S.D. dependent. Var	0.092437	0.075453	0.115028	0.044416	0.493814	0.064206	0.049193	0.136228	0.021036

Symbols: BIH – Bosnia and Herzegovina, BUG – Bulgaria, CRO – Croatia, MN – Montenegro, ROM – Romania, SLO – Slovenia, SER – Serbia, UK – United Kingdom, US – United States

Variables: CAP: capital inflow expressed in % to GDP; EXR: exchange rate expressed as the price of one unit of foreign currency in units of domestic currency; GDP: expressed in annual percentage change; GVD: government debt expressed in % to GDP; IND: industrial production index; INT – interest rate p.a.; CPI: consumer price index; TRB: trade balance expressed in percentage of GDP.

Notes: The time lag of the variables is given in brackets; (t-statistics) are in brackets below and (probabilities)\*\*\* are in brackets below (t-statistics). Significance levels are denoted as: \*\*\* significant at 1%; \*\* significant at 5%; \* significant at 10%.



investments through a favorable tax regime and *Bosnia and Herzegovina* (especially Republika Srpska in contrast to another entity – Federacija BiH) has got significant industry production but rather slow privatization progress. FDI in *Serbia* increased from 27% in 2000 to 700% in 2003 due to privatization and the interest of foreign investors (attracted by low taxes).

The empirical evidence also shows significant negative coefficients of government debt in Croatia and Slovenia due to the global recession that started at the end of 2008 (Muradoglu, 2009). It provides us with evidence that the accession of the SEE countries (such as Croatia) in the EU required the implementation of reforms that lead to further economic expansion.

Implementing reforms that include cutting government spending is a pre-condition for the EU accession, and was a strong motivation factor for the SEE countries on their way to the EU membership. Most reforms in *Slovenia* were done from 1996 to 2004 and in *Bulgaria* and *Romania* from 2001 to 2004, when they were motivated to join the EU. The reforms in Croatia started in 2005 when the official negotiation process began (Mohammad and Abdelhak, 2009). Probably the most important factors driving the acceleration of financial integration are related to the policy measures undertaken by the "new" member states in order to meet European financial standards, including the liberalization of capital accounts, as well as legal and institutional reforms (Capiello, 2006; Aslanidis, 2007; Christiansen and Rinaldo, 2008; Poghossian, 2008).

The positive environment that accompanied the EU accession of Croatia started reversing at the end of 2008, with the global recession and inner political instabilities (significant cases of corruption followed by many court trials) as well as lower consumer spending and lower industrial output. In the process of the EU accession, Croatia, just as other EU candidate countries, had to implement reforms in light of cut expenditures (such as in the pension and social system), while maintaining budgetary discipline and the reconstruction of the public sector due to high deficits in the balance of payment and living beyond realistic possibilities (Vizek and Dacic, 2006).

The government debt of Slovenia, as current EU members, provides us with clear evidence that reforms affecting budgetary discipline do not end after the EU accession. In June 2010 Slovenian government introduced a supplementary budget (reducing the government budget deficit) with plans to increase taxes and cut spending (reforming the pension and healthcare system). The flexibility of fiscal policy in much of the SEE countries could be improved by lowering the high share of nondiscretionary expenditures in total and also the high level of public spending.

The strong GDP growth in the SEE countries in the period from 2004 to 2010, together with a growth in capital inflow, trade balances and industrial production as well, significantly influenced the stock exchange dynamics.

Our results also confirmed the exchange rate as an important explanatory variable that has a significant impact on stock exchange indices. The evidence of negative exchange rates impact is followed by negative interest rates on the stock market returns in observed SEE countries. Similar results were proved also by other authors (Berben and Jansen, 2005; Horobet and Ilie, 2007; Knif et al., 2008).

Strong negative exchange rates impact the stock exchange indices (*Romania*, *Bosnia and Herzegovina*, *Croatia* and *Serbia*) strengthens the theory that stock price

movements may influence, or be influenced by, exchange rate movements and a depreciating currency that has a negative impact on stock market returns – especially in the long run. The depreciation of exchange rates has adverse effects on exporters and importers. Exporters have an advantage over other countries' exporters and increase their sales and their stock prices go higher (Baele et al., 2004; Horobet and Ilie, 2007; Stavarek, 2010).

While the SEE countries are importers rather than exporters, the depreciation of exchange rates has a negative impact on the stock exchange rate. Like many other countries at the early phases of transition, the SEE countries relied mainly on the exchange rate anchors to lower inflation. However, in the early 1990s most South-Eastern and Central European countries pegged their currencies to dollar or currency baskets, which contained both the dollar and European currencies, exchange rate strategies have been gradually redirected towards the euro<sup>3</sup> (Schnabl, 2004).

The international competitiveness of *Bulgarian* economy has been boosted by productivity gains and real exchange-rate appreciation (Samita et al., 2006; Onay, 2007). *Croatian* kuna has gradually appreciated since the beginning of 2005 and exchange rate movements in Croatia are characterized by the usual seasonal pattern reflecting tourism. Evidence of a strong relationship between stock prices and exchange rates in the case of Croatia can also be explained by the fact that Croatian economy partly depends on services such as tourism. Croatia faced the highest inflation rate in 2009 but the national currency, kuna, is stable. Monetary policy in *Bosnia and Herzegovina* is the cornerstone of economic stability – Bosnian currency is pegged to euro, and in *Serbia* was pressure on the foreign exchange market and depreciation of dinar against euro.

Inflation and the stock exchange in all of the observed SEE countries are positively correlated in our research, confirming the Fisher hypothesis about positive correlation between inflation and stock exchange volatility.

Negative interest rates impact in individual countries is in line with the theory that stock market returns are usually negatively correlated to interest rates. A rather high interest rate is typical for transition countries due to insufficient national accumulation and credit supply potential. The transition from planned to market economies in the SEE region has led to rapid financial developments, which were further boosted by a strong, mainly EU, banking presence (Baltzer et al., 2008; Festic et al., 2009).

**4. Conclusion.** In this study, we demonstrated that all the analyzed transition countries are, regardless of their current status (the European Union members or otherwise), to a certain extent already dependent on the EU financial market. The empirical research demonstrated that the opening of the transition economies go hand in hand with massive FDI, which boosted stock indices, followed by GDP growth, and an increase in industrial production and trade. The result also proved that stock indices in the transitional SEE countries are negatively correlated with exchange rates, interest rates and government debt.

It is confirmed that the financial system of the South-Eastern transition countries (Croatia, Bulgaria, Bosnia and Herzegovina, Montenegro, Romania, Slovenia

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<sup>3</sup> Slovenia introduced Euro in 2007, Romania and Bulgaria have plans to introduce Euro in 2013–2014 and Montenegro adopted Euro as an official currency in 2002, without entering the eurozone, and by rejecting their old currency – dinar.

and Serbia) is related to European and world financial systems, as seen through the main stock indices centers in the world (i.e., the UK and the US). The results also imply that the observed transition countries of the SEE were, in the last decade, exposed to large FDI inflows, boosted by the integration processes of the EU association (but were also exposed to the global financial crisis that started in 2008), which is reflected in the empirical evidence on the procyclicality of government debts in almost all of the observed countries, including developed ones such as the UK and the US. It provides us with the evidence that recent financial crises are slowly overflowing, creating a contagion effect and, with the EU enlargement, into an ever-widening circle of countries.

### References:

- Adam, K., Japelli, T., Menichini, A., Padula, M., Pagano, M.* (2002). Analyse, Compare, and Apply Alternative Indicators and Monitoring Methodologies to Measure the Evolution of Capital Market Integration in the European Union. European Commission: 1–95.
- Akaike, H.* (1987). Factor Analysis and AIC. *Psychometrika*, 52(3): 317–332.
- Ashgar, Z., Abid, I.* (2007). Performance of Lang Lenth Selection Criteria in Three Different Situations. Accessed in September 2009: [Interstatinterstat.statjournals.net/YEAR/2007/ articles/0704001.pdf](http://Interstatinterstat.statjournals.net/YEAR/2007/articles/0704001.pdf).
- Baele, L., Ferrando, A., Hordahl, P., Krylova, E., Monnet, C.* (2004). Measuring Financial Integration in the Euro Area. European Central Bank, Occasional Paper Series, 14: 1–93.
- Baltzer, M., Cappiello, L., De Santis, R., Manganelli, S.* (2008). Measuring financial integration in the New EU Member States. European Central Bank, Occasional Paper Series, No. 81.
- Berben, R.P., Jansen, W.J.* (2005). Comovement in international equity markets: A sectoral view. *Journal of International Money and Finance*, 24: 832–857.
- Bollerslev, T.* (1986). Generalised autoregressive conditional heteroscedasticity. *Journal of Econometrics*, 31: 307–327.
- CEE Quarterly, Bank Austria Group, 2010. Accessed January 2011: <http://www.bankaustria.at/en/5295.html>.
- Christiansen, C., Ranaldo, A.* (2008). Extreme coexceedances in New EU Member States' stock markets. Swiss National Bank, Working Paper 2008/10.
- Dickey, D.A., Fuller, W.A.* (1979). Distribution of the Estimators for Autoregressive Time Series with a Unit Root. *Journal of the American Statistical Association*, 74: 427–431.
- Dvorak, T., Podpiera, R.* (2006). European Union enlargement and equity markets in accession countries. *Emerging Markets Review*, 7(2): 129–146.
- Egert, B., Kocenda, E.* (2007). Interdependence between Eastern and Western European Stock Markets: Evidence from intraday data. *Economic Systems*, 31(2): 184–203.
- Engle, R.F., Granger, C.W.* (1987). Co-integration and Error Correction: Representation. Estimation and Testing, *Econometrica* 55: 251–276.
- Erdogan, B.* (2008). Financial Integration in the European Stock Markets. Working paper D. 1.1.a., Finess, European Commission.
- Esaka, T.* (2003). Panel Unit Root Tests of Purchasing Power Parity Between Japanese Cities, 1960–1998: disaggregated price data. *Japan and the World Economy*, 15(2): 233–244
- CCEQ (2010). EU Candidate and Pre-Accession Countries Economic Quarterly. European Commission 2010: [http://ec.europa.eu/economy\\_finance/db\\_indicators/cpaceq/index\\_en.htm](http://ec.europa.eu/economy_finance/db_indicators/cpaceq/index_en.htm).
- Festic, M., Repina, S., Kavkler, A.* (2009). The Overheating of Five EU New Member States and Cyclicity of Systemic Risk in the Banking Sector. *Journal of business economics and management*. Vilnius: Technika, 10(3): 219–232.
- Fisher, I.* (1930). *The theory of interest*. Macmillan, New York.
- Frances, P.H., Koop, G.* (1998). On the sensitivity of unit root to non-linear data transformation. *Economic letters*, 59(4): 7–15.
- Glosten, L., Jagannathan, R., Runkle, D.* (1989). On the relationship between the expected value and the volatility of the nominal excess return on stocks. *Journal of Finance*, 48: 1779–1801.
- Horobet, A., Ilie, L.* (2007). On the Dynamic Link Between Stock Prices and Exchange Rates: Evidence from Romania. Munich Personal RePEc Archive MPRA Paper 6429.

- Horska, H.* (2005). Cesky Akciovy Trh – Jeho Efektivnost a Makroekonomicke Souvislosti. Finance a uvr-The Czech Journal of Economics and Finance, 55(5–6): 283–301.
- Iwaisako, T.* (2004). Stock Index Autocorrelation and Cross-Autocorrelation of Size Sorted Portfolios in the Japanese market. Journal of Financial Economics, 3: 283–301.
- Kim, S.J., Lucey, B.M., Wu, E.* (2005). Dynamics of Bond Market Integration between Existing And Accession EU Countries. The Institute for International Integration Studies Discussion Paper Series.
- Knif, J., Kolari, J., Pynnonen, S.* (2008). Stock Market Reaction to Good and Bad Inflation News. Journal of Financial Research, 31(2): 141–166.
- Lin, S.C.* (2009). Inflation and Real Stock Return Revisited. Economic Inquiry, 47: 783–795.
- Mohammad, B., Abdelhak, B.* (2009). The relationship between money and prices in the Maghreb countries: a cointegration analysis. MPRA paper 12741.
- Muradoglu, G.* (2009). The UK Crisis of 2008. What is Real and What is Behavioural?: <http://ssrn.com/abstract=1373025>.
- Onay, C.* (2007). Integration of Bulgaria and Romania to the European Union. The Business Review. Cambridge, 1: 119–126
- Poghossian, T.* (2008). Are "New" and "Old" EU Members Becoming More Financially Integrated? A Threshold Cointegration Analysis. International Economics and Economic Policy, 6(3): 259–281.
- Rabemananjara, R., Zakoian, J.M.* (1993). Threshold Arch Models and Asymmetries in Volatility. Journal of Applied Econometrics, 8: 31–49.
- Schnabl, G.* (2004). De Jure Versus De Facto Exchange Rate Stabilization in Central and Eastern Europe. Aussenwirtschaft, 59(2): 171–90.
- Syllignakis, M., Kouretas, G.* (2006). Long and Short-Run Linkages in CEE Stock Markets: Implications for Portfolio Diversification and Stock Market Integration. William Davidson Institute Working Papers Series 832.
- Stavarek, D.* (2010). Exchange Market Pressure and De Facto Exchange Rate Regime in the Euro-Candidates. Romanian Journal of Economic Forecasting, 13(2):119–139
- Vizek, M., Dacic, T.* (2006). Integration of Croatian, CEE and EU Equity Markets: Cointegration Approach. Ekonomski pregled, 57(9–10): 631–646.

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