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TESTING THE "EU ANNOUNCEMENT EFFECT" ON STOCK MARKET INDICES AND MACROECONOMIC VARIABLES IN CROATIA BETWEEN 2000 AND 2010

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Abstract:

We tested the hypothesis of procyclicality against the economic activity and stock exchange of Croatia - as a country preparing for EU accession - in order to investigate the spillover effect, *i.e.*, the degree and pace of integration into larger financial markets such as the EU. The empirical findings obtained in application of OLS methodology for the 2000-2010 period provided evidence that EU accession is a trigger for a closer financial integration of a candidate country as Croatia; and a trigger for a rise in stock prices and economic revival, was reflected in by an increase in GDP and large FDI.

Keywords: procyclicality, EU integration, stock exchange, financial integration, regression.

JEL Clasiffication: E44, F36, F43, F47, G15

1. Introduction

Over the past several years economic science has extensively dealt with financial market integration. There is vast empirical literature on the procyclicality of the stock market as a sign of financial integration. 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 (Babetskii *et al.*, 2007; Onay, 2007; Christiansen and Ranaldo, 2008). The trade links between Central and Southeastern European countries and the EU gradually became stronger, leading to further economic integration at the time of formal accession.

After the collapse of communist and socialist regimes in the early 1990s, a number of Central and Eastern European (CEE) economies established capital markets as part of their transition process of adopting market economy mechanisms (Kim *et al.*, 2005).

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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 CEECs during the transition period (Égert and Kočenda, 2007).

With the re-intensified process of monetary integration in the European monetary union, theories of cyclical movement in financial markets multiplied. The discussion was further fanned by recent financial crises that spread beyond national borders, creating a 'contagion effect'. 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 Croatia (as a country preparing for EU accession) in order to investigate the spillover effect, that is to say, the degree and pace of integration of 'new' financial markets into larger markets. This was done with the aid of OLS (Ordinary Least Square) regression.

We examined the procyclicality of the Croatian stock market over a ten year transitional period - from January 2000 to December 2010 - on monthly bases. The local stock price indices (closing prices) - CROBEX (Croatia) - is in the focus of our research.

The following chapters are structured as follows: Chapter 2 presents the theoretical background of the empirical analysis and an empirical literature on assessing financial integration in the EU. The macro-economic environment and stock exchange development in Croatia are described in Chapter 3. An explanation of the methodology and data underpinning the empirical analysis is given in Chapter 4, as are the findings and discussion. The implications of the empirical analysis are revisited in the conclusion in Chapter 5.

2. The Theoretical Background of Empirical Analysis and Empirical Literature Concerning Financial Integration in the EU

Baltzer *et al*. (2008) considered three broad categories of financial integration in the measures proposed by Adam *et al*. (2002) and Baele *et al*. (2004). The market is considered fully integrated if all economic agents with similarly relevant characteristics acting in a market face a single set of rules, have equal access and are treated equally. This serves as an imaginary state of perfect integration which is not often seen in practice but provides a useful benchmark for measuring the degree of financial integration.

Adam *et al*. (2002) adopted the law of one price to assess the degree of financial integration. According to the law of one price, the financial market is integrated if the 'law of one price' holds. This, however, cannot be measured when different stock exchange indices are involved as it would require a different methodology of calculation. According to the ‚law of one price', assets with identical risks and return characteristics should have the same price regardless of where they are traded.[1]

1 However, there are cases where the law of one price is not directly applicable. For more details see: Baltzer *et al*. (2008).

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Additionally, the law of one price does not necessarily hold true in the presence of market frictions. Nevertheless, while the law of one price represents a rather long-term phenomenon, an alternative argument for why we could expect the equalization of stock market returns in the long to medium run is based on the Walras law of markets, as applied to the financial system: if *n*–1 (financial) markets are in equilibrium (*i.e*. the exchange rate, money and bond markets), then the stock exchange market cannot be in disequilibrium.

Adam *et al.* (2002) also divided indicators for measuring financial integration into four categories: 1) indicators of credit and bond market integration; 2) indicators of stock market integration; 3) indicators of integration based on the economic decisions of households and firms, and 4) indicators of institutional differences that may induce financial market segmentation. Indicators of European stock market integration generally suggest an increasing degree of stock market integration in the euro area.

With regard to the indicators of stock market integration, Adam *et al.* (2002) proposed the correlation of stock market returns as an alternative indicator especially because of its consistency. This is in contrast to a price-based indicator which relies on the asset pricing model and it is difficult to estimate as it requires longer time series to provide reliable estimates. Baltzer *et al.* (2008) also suggest more sophisticated measures of comovements (see also: Gerard *et al.*, 2003).

Therefore, Baele *et al.* (2004) agree that the alternative measures proposed by Adam *et al*. (2002) and based on stocks and the flow of assets - quantity-based measures[2] and news-based measures - may complement price-based measures.

News-based measures, which were applied in this empirical research, analyze the impact that common factors have on the return process of an asset. The prediction is that the degree of systematic risk is identical across assets in different countries. They are designed to distinguish the information effects from other frictions and barriers. In a financially integrated area one would expect news of a regional character to have little impact on prices, whereas global news should be relatively more significant.

Regional financial integration should increase the supply of finance in the less financially developed countries of the integrating area. Baale *et al*. (2004) maintain that when markets are fully integrated, bond yields should react only to news that is common to all observed markets. There is no clear evidence that full integration of financial markets is the result of monetary integration. The level of integration depends on the debt levels of the financial sector, and the economy abroad, as well as on the structure of the financial sector and its abilities to repay its loans abroad (current events inside the euro area are proof of this).

The Fratzscher (2002) and Cappiello's *et al*. (2006) findings indicated that, although new EU Member States experienced rapid development in their financial markets, they

2 Quantity-based measures that aim to quantify the effects of friction on the demand for, and supply of, securities by using variables such as money, bonds, shares and loans through the statistic of cross-border activities and listings.

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exhibited differing degrees of integration and different speeds of convergence with the Eurozone. While global trends significantly increased index movements, regional characteristics nevertheless remained the most significant determinants of integration. Authors conclude that European equity markets have become mutually more integrated and have gained in importance in world financial markets since 1996, with exchange rate variability having been reduced in the meantime. The convergence of interest rates is suggested to be the driving force behind these outcomes and there has been an increased correlation between stock returns within the euro since the announcement of new Eurozone Members in May 1998.

The world capital markets, definitely, have become more and more integrated in the last 30 years, although some exceptions and some dispersion across the countries and sectors need to be acknowledged (see: Carrieri *et al*., 2007). 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. Integrated stock markets generate better opportunities for international investors by eliminating country-specific risks and allowing them to diversify their portfolios across countries. A larger pool of funds, other than limited local financing, is available for corporations. Integrated stock markets decrease the cost of capital. In an economic environment where better risk-sharing opportunities exist, households will be able to smooth their consumption more efficiently. Moreover, interdependent stock markets are subject to spillovers resulting from shocks.

Many authors dealing with financial integration have tested the procyclicality of stock exchange indices of whom we will single out those who have tested equity market integration in the EU.

Financial markets of New Member States are significantly less integrated than those of the EU financial market and more susceptible to euro market shocks after EU accession. The process of financial integration of New EU Member States is probably driven by factors different from those in the euro area. Nevertheless, there is strong evidence that their process of integration is well under way and has accelerated since accession to the EU. The transition from centrally planned to market economies has led to rapid financial developments boosted by a strong foreign, primarily EU banking, presence (Baltzer *et al.*, 2008).[3]

Baele *et al,* (2004) investigated comovements between the stock markets in New EU Member States from former communist states of Central and Eastern Europe in the period from 2000 to 2007. They found empirical evidence that the stock markets of entrant countries in the euro 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.

3 The percentage of asset shares of foreign-owned banks (relative to total bank sector assets) increased from 30% in 1997 to cca 75% in 2005 (Baltzer *et al*., 2008).

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Horská (2005) found that the correlation among the Czech, US and European stock markets has increased over time, leaving less room for portfolio diversification. Syllignakis and Kouretas (2006) used Granger's (1995) methodology to identify, estimate and test a number of common trends among a group of examined stock markets. Author also applied the Markov Switching ARCH-L (SWARCH-L) model applied by Hamilton (1994) to study the structural breaks in volatility of the examined markets during the relevant period.

Savva and Aslanidis (2007) used the STCC-GARCH methodology to investigate the degree of stock market correlation among five New EU Members and the Eurozone and demonstrated that the correlation between the Czech and Polish markets and the Eurozone has been increasing over the past years, although the phenomenon cannot be said to be widely present in all the transition countries. They have also shown that New EU Members have closer ties with the Eurozone market than with the US market.

Onay (2007) used the Engle-Granger (1987) causality test to present evidence of a causal flow from European and US equity markets to the Croatian stock market, and from the Turkish to the Bulgarian stock market. The long-term stock market interdependence indicated no long-term relationship between the second-round countries and the EU and US stock markets.

Christiansen and Ranaldo (2008) used a multinomial logit model to investigate stock market integration in ten New EU Member States. They demonstrated a higher degree of mutual relationship and dependence on the European stock market, especially after EU enlargement in 2004. The new EU markets have become more integrated with old EU markets and more related to the euro.

Vizek and Dadić (2006) used the Johansen cointegration test for measuring equity markets in CEE. The findings indicate multilateral integration between the equity markets of analyzed CEE economies. Latković (2002) and Levaj *et al*. (2005) used the main Croatian stock market index (Podravka company's stock data) and a few company indices to estimate a GARCH model and illustrate how this model can be used in volatility forecasting. Žiković (2006) applied a VaR (Value-at-Risk) methodology and historical simulation of the Croatian stock market indices in an effort to measure VaR, calendar effects, and their impact on conditional volatility.

Transitional SEE markets in the scope of our interest became, over time, responsive to information flows from the developed EU stock markets and significant spillover effects are obvious. Hanousek *et al.* (2009) estimated the impact of macroeconomic news on composite stock returns in three emerging European Union financial markets (the Budapest BUX, Prague PX-50, and Warsaw WIG-20), using intraday data and macroeconomic announcements. They found that all three new EU stock markets are subject to significant spillovers directly through the composite index returns from the EU, the U.S. and neighboring markets; Budapest exhibits the strongest spillover effect, followed by Warsaw and Prague. The Czech and Hungarian markets are also subject to spillovers indirectly through the transmission of macroeconomic news. The impact of EU-wide

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announcements is evidenced more in the case of Hungary, while the Czech market is more impacted by U.S. news. The Polish market is marginally affected by EU news.

In other case, Egert and Kočenda (2007) examined intraday comovements among three developed (France, Germany, and the United Kingdom) and three emerging (the Czech Republic, Hungary and Poland) European stock markets. They applied a Dynamic Conditional Correlation GARCH model to five-minute tick intraday stock price data (2003–2006) and found a strong correlation between the German and French markets and also between these two markets and the UK stock market. However, very little systematic positive correlation during a trading day can be detected between the developed and emerging stock markets, or within the emerging group itself. Hungary exhibits higher correlation with the developing markets and the emerging markets, and its dynamics show a rising trend.

Intraday data were also in the focus of Černý and Koblas (2008) who studied stock market integration and the speed of information transmission on intraday data or even less frequent observations. They also studied the effect of macroeconomic releases (market returns, volatility and trading volumes) from different countries on different markets through high-frequency index data from markets in the U.S. and London. The authors suggest that the speed of information transmission on stock markets is very high and that in most cases it is within one hour that a reaction to stock prices occurs. With integrated stock markets, information originating from one market should be important to other markets. They found out that stock markets in Warsaw and Krakow depend on the movements of the Frankfurt Stock Exchange, but not vice versa. The three small Eastern European markets in Warsaw, Prague and Budapest react to information revealed in the market in Frankfurt – usually within 40 minutes to an hour. The U.S. market seems to be an important source of information for the markets in London and Frankfurt which react to such information within approximately 30 to 40 minutes, with the strongest reaction in the first ten minutes. The markets in London, Frankfurt and Paris react to information within one hour, while the strongest reaction is detected after 20 minutes. They found that the strongest reaction is in the FTSE index.

Dvorák and Podpiera (2006) applied the beta-convergence method and observed an increase in stock prices in candidate countries once EU enlargement was announced. They investigated the hypothesis that the rise in stock prices was the result of the reprising of systematic risk due to the integration of accession countries into the world market. They found that firm-level stock price changes were positively related to the difference between a firm's local and world market betas. The evidence suggests that at least part of the stock price increase can be explained by the difference between stocks' local and world betas. Stocks that had a high local beta but a low world beta experienced a higher price increase than other stocks.

Égert and Koubaa (2004) investigated the conditional variance patterns in the daily return series of stock market indices in the G-7 and six selected economies of Central and Eastern Europe. The stock markets in the transition economies exhibit much more asymmetry because negative shocks hitting these markets offset the positive news.

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3. The Macroeconomic Environment and Stock Exchange Development in Croatia

Croatia's EU accession negotiations were concluded in June 2011. The signing of the Accession Treaty and the referendum on EU accession took place in January 2012, with the full accession anticipated in mid 2013.

Croatia signed the Stabilization and Association Agreement (SAA) with the EU in 2001 and submitted a formal application for EU membership in 2003. The European Commission recommended opening accession negotiations and the European Council granted Croatia the status of an official candidate for EU membership in 2004. In 2005, accession negotiations were opened between the Republic of Croatia and EU. Although Croatia signed the SAA in 2001, EU Member States postponed the start of negotiations to March 2005 because they deemed Croatia's cooperation with the International Criminal Tribunal for the Former Yugoslavia insufficient.

Recently, the Croatian government and other state agencies have, just as other countries of the SEE region, started implementing demanding reforms which have resulted in a record-breaking inflow of foreign investments and improved entrepreneurial climate until the global crisis started in 2008 The stock markets of SEE (including the Croatian stock market) have moved to align their standards with international ones by improving corporate disclosure practices, order execution, ownership rights, and by bringing down limitations to international capital flows (Syllignakis and Kouretas 2006). During EU accession negotiations, stock markets in Croatia received massive foreign investment inflows (32% of equity investment), just as was the case with other EU candidate countries such as Bulgaria, Romania and Slovenia.

Less encouraging is the fact that those investments are directed more to the real estate and financial services, which means that they are less likely to generate exports revenue than if investments flowed into production. Stock exchanges in Croatia declined in the similar was as world stock exchanges due tu crisis.

The EU has adopted a financial package of EUR 3.7 billion for the first two years of Croatia's membership which will be available through cohesion and structural funds.

Afther the initial stages of the global crisis Croatia has shown slower recovery than other SEE countries but the currency is strong and inflation is low thanks to the strict monetary policy of the Croatian National Bank. The main problem lies in the growing trade deficit and huge unemployment rate. In the course of 12 months unemployment has risen by around 20%.

The Zagreb Stock Exchange in Croatia was founded in 1991 as a profit-making corporation with HRK 2.7 million in registered capital, with the main stock indices CROBEX which were launched on 1 September 1997 with an initial value of 1000 points. While the capital market in Croatia remains small, fragmented and underdeveloped compared to the capital markets of developed countries, the Zagreb Stock Exchange has the highest market capitalization and volume of trade (25 companies) in the region.

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Since July 2007, the Vienna Exchange has been calculating the index of Croatian shares, the CROX (Croatian Traded Index), which covers the Croatian capital market.

The CROX is the fourth index of the Vienna Exchange covering Southeast Europe, after the Romanian ROTX, the Serbian SRX and the SETX, which covers Bulgaria, Croatia, Romania, Serbia and Slovenia.

The index covers seven shares listed on the Zagreb Stock Exchange with the biggest turnover and highest capitalization, namely shares for INA, Privredna Banka Zagreb, Ericsson Nikola Tesla, Adris Grupa, Podravka, Končar Elektroindustrija and Dalekovod. For index members, there is a value limit of 25% of the total index capitalization. The parameters for calculating the index are checked quarterly and the index content is revised and, if needed, adjusted two times a year, in March and in September. The CROX is a price index that the Vienna Exchange calculates and publishes in real time in Croatian kunas, euros and dollars. Since 4 June 2009 Crobex has been a part of the Dow Jones cumulative index for Southeastern Europe (Dow Jones FEAS South East Europe).

In cooperation with the Federation of Euro-Asian Stock Exchanges, Dow Jones will follow European and Asian Exchanges with the help of three new indices including the Dow Jones FEAS South East Europe, which incorporates shares listed on the Zagreb Stock Exchange.

4. Methodology and Data

4.1 Data specification

Based on the studies investigating the correlation of stock market indices and macro economic variables in empirical literature, we constructed a data set of explanatory variables that are usually included in models: capital inflow expressed as percentage points of GDP; the exchange rate expressed as the price of one unit of foreign currency in units of domestic currency; GDP expressed in annual percentage change; government debt expressed as percentage points of GDP; the industrial production index; interest rates (*p.a.*); the consumer price index; trade balance expressed as percentage points of GDP, and the unemployment rate expressed as a percentage of the total labour force. We relied on the database of the European Commission (2010)[4], and on the databases of the national statistical bureau.

We examined ten-year transitional period of research – a monthly time series from January 2000 to December 2010. For CROBEX, we also used the monthly average indices from January 2000 to December 2010.

4 Source:http://ec.europa.eu/economy_finance/db_indicators/cpaceq/index_en.htm (2010).

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4.2 Methodology

The individual Ordinary Least Square (OLS) method was used to uncover empirical evidence of a relationship between stock return indices and economic variables of Croatia. An OLS estimation was applied for the procyclicality of Croatian stock markets through the ten year period of historical data (main economic indicators and CROBEX stock price (closing)), on monthly bases from January 2000 to December 2010, in order to find the structural break when the analyzed cycles started to accelerate by using a Chow stability test (Andrews, 1993 and Hansen, 1997). The period from 2000 to 2010 was divided into two sub-periods. The first period between January 2000 and September 2005 was the period of screening. The second period from October 2005 to December 2010 was the period of EU accession negotiations. We included the structural break in October 2005 which marks the beginning of Croatia's EU accession negotiations. Before applying linear regression methods, we eliminated the overly correlated explanatory variables (Appendix, Table A). We also collected variables such as exports and imports of goods and services, as well as trade balance and GDP, but we eliminated them in further analysis as expected (due to the obtained results with other variables included that have been insignificant). Trade variables are known to be highly correlated and GDP is connected to a whole range of macroeconomic activities (Aizenman and Noy, 2005).

All variables were seasonally adjusted through the seasonal adjustment method (Eviews 7) on the basis of 2000-2010 monthly data of Croatia's regression.

We used the Augmented Dickey-Fuller (1979) test to examine a series for the presence of a unit root. According to test results, all variables are stationary in the form dlog (x) *i.e.* variables were integrated of order 1 (Table 1) (Dickey and Fuller, 1979; Esaka, 2003).

Table 1
The Stacionarity (Augmented Dickey-Fuller)

Variable	Level	dlog(x)
Capital inflow	-2.131935 (0.2327)	-11.32293 (0.0000)
Exchange rate	-2.348284 (0.1587)	-10.77217 (0.0000)
GDP	-1.004668 (0.7504)	-11.34030 (0.0000)
Government debt	-1.735485 (0.4111)	-11.31480 (0.0000)
Industrial production index	-1.973849 (0.2981)	-5.576846 (0.0000)
Interest rate	-2.323513 (0.1662)	-10.20734 (0.0000)
CPI	-1.794180 (0.3821)	-11.39157 (0.0000)
Trade balance	-3.524468 (0.0088)	-11.37155 (0.0000)
Unemployment	-0.846595 (0.8020)	-11.42784 (0.0000)

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

For testing serial correlation we used the *Q*-statistic and the Breusch-Godfrey LM test (Appendix: Table B). 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 (Appendix: Tables C, D, E).The results indicated that residuals are not serially correlated and, therefore, suitable for analysis.

4.3 Results and discussion

As expected, we found a correlation among the main economic indicators and stock exchange indices of Croatia. We can confirm the positive influence of capital inflow and inflation on stock exchange indices (CROBEX) (see: Table 2). We also confirmed that exchange rate (depreciation), interest rate, unemployment and government debt have a negative impact on stock exchange indices.

The rising stock prices in Croatia pertinent to our study provide evidence of economic growth in the region owing to the financial integration process in general, and the EU integration process in particular.

The increase in stock prices usually goes hand in hand with large foreign direct investment as well as the implementation of reforms related to EU integration. European financial markets (see: Erdogan, 2008) have faced crucial structural and institutional adjustments with the aim of accelerating financial integration in the money, credit, bond, and equity markets. 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 (more in, De Santis and Gerard, 2006; Dvorák and Podpiera, 2006; Christiansen and Ranaldo, 2008).

The positive influence of capital inflow - which is obvious in the findings concerning Croatia's regression - reinforces the theory that foreign direct investments in developing economies have grown rapidly following financial and political transformations (see: Berben and Jansen, 2005; Horobet and Ilie, 2007). The dramatic increase in stock prices in EU accession countries clearly followed the announcement of EU enlargement (for Bulgaria, Romania and Slovenia, and subsequently Croatia and Montenegro). Croatia's FDI inflows increased by up to EUR 1 billion, especially in 2005 (after the announcement of its EU candidate status). The most part of FDI inflow in Croatia was through the acquisition of existing companies (mostly through privatization of services sector, telecommunications and financial services).

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Croatia, as an EU candidate (negotiations ended in June 2011 and the Treaty was signed in December 2011), proved to be a suitable case study for the empirical research of procyclicality with reference to EU examined on a monthly basis from January 2000 to December 2010. The structural break was presumed to have occurred in October 2005, when the process of EU accession negotiations began. In light of that prediction, the transition period in Croatia was divided into a first sub-period (from January 2000 to September 2005) as a period of screening while the second one stretched from October 2005 to December 2010, as a sub-period of EU accession negotiations. The results of the stability test confirmed the hypothesis of the structural break in the early days of Croatia's accession negotiations (probability 0.46) (Cappiello *et al*., 2006; Dvorák and Podpiera, 2006).

The announcement of EU enlargement was obviously a trigger for a rise in stock prices in EU candidate countries, as confirmed in the case of Croatia, and was also followed by a significant capital inflow, stronger currency and low inflation. Arguably the most important factors driving the acceleration of financial integration are related to the policy measures undertaken by "New" Member States in order to meet European financial standards, including the liberalization of capital accounts, as well as legal and institutional reforms (see: Poghosian, 2008).

The reforms in Croatia started in 2005 with the opening of official negotiations (Mohammad and Abdelhak, 2009; Glazar and Striekolwski, 2010). Reforms implementation - including cuts in government spending (see high negative coefficient of government debt (-2.6 in the ten years Croatian period in Table 2) - was a requirement for EU accession and a strong incentive for SEE countries on their way to EU membership. In the second sub-period of our analysis the goverment debt in Croatia (-1.0 coefficient of government debt in the 2nd sub-period) slightly decreased and evidenced a positive impact of EU integration on Croatia's budgetary discipline.

Just as other EU candidate countries in the process of EU accession, Croatia had to implement reforms aimed at spending cuts (for instance in the pension and welfare systems), while maintaining budgetary discipline and restructuring the public sector due to high deficits in the balance of payments and overspending (Vizek and Dadić, 2006; Dolenc and Laporšek, 2010).

The positive environment that accompanied EU accession 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 (Andrei *et al*.; 2009).

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Table 2
OLS – Croatia

Dependent variable: dlog(x) (01m 2000 to 12m 2010)			
Variable	**(from January 2000 to December 2010)**	**(from January 2000 to September 2005)**	**(from October 2005 to December 2010)**
dlog (CAP) (-8)	0.164917 (0.0208)**	0.045143 (0.0169)**	0.157429 (0.0270)**
dlog (EXR) (-12)	-2.655832 (0.0231)**	-1.505255 (0.0175)**	-5.177245 (0,0506)*
dlog (GVD) (-11)	-2.506156 (0.0015)***	-0.987251 (0.0005)***	-1.066249 (0.0039)**
dlog (INT) (-4)	-0.127834 (0.0798)*	-0.088861 (0.0292)**	-0.588357 (0.0003)***
dlog (CPI) (-12)	0.083220 (0.0333)**	0.051318 (0.0424)*	0.219021 (0.0029)***
dlog (UNE) (-3)	-0.718921 (0.0076)***	-0.441931 (0.0304)**	-0.780576 (0.0200)**
	Weighted statistic	Weighted statistic	Weighted statistic
R-squared	0.395416	0.479626	0.694946
Adjusted R-squared	0.348910	0.409305	0.640472
S.E. of regression	0.064862	0.027688	0.065795
Durbin-Watson stat.	2.078646	1.692555	1.896192
S.D. dependent. Var	0.080384	0.036026	0.109731
Stability test (Chow Breakpoint Test)[i]	(0.4649)	-	-

Variables:
CAP: capital inflow expressed in percentage of GDP; EXR: exchange rate expressed as the price of one unit of foreign currency in units of domestic currency; GVD: government debt expressed in percentage of GDP; INT - interest rate p.a.; CPI: consumer price index; UNE: unemployment expressed in percentage of the total labour force.

Notes:
The time lag of the variables is given in subscript; (probabilities)*** are in parentheses below. Significance levels are denoted as: *** significant at 1%; ** significant at 5%; * significant at 10%.
[i] Probability of the Chi-Square distribution (0.4427)

The findings also confirmed the exchange rate as an important explanatory variable that has a significant impact on CROBEX. The depreciation of exchange rates has adverse effects on exporters and importers alike. Exporters have an advantage over those in other countries as their sales increase and their stock prices go up (Berben and

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Jansen, 2005; Yau and Nieh, 2006 and Horobet and Ilie, 2007; Adjasi *et al.* 2008; Knif *et al*., 2008). While Croatia imports goods and services rather than export them, the depreciation of exchange rates has a negative impact on the stock exchange rate. Like many other countries in the early phases of transition, Croatia relied mainly on exchange rate anchors to lower inflation. However, in the early 1990s most Southeastern and Central European countries pegged their currencies to the dollar or currency baskets, which contained both the dollar and European currencies, exchange rate strategies have been gradually redirected towards the euro (Schnabl, 2004). Increased financial integration implies that the benefits from adopting the euro will increase over time. The Croatian kuna has gradually appreciated (see higher coeff. of exchange rate (-5.17) in the second sub-period of research in Table 2) 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 the Croatian economy partly depends on services such as tourism. Every year the exchange rate of the kuna *vis-à-vis* the euro appreciates before the summer and depreciates by some 2.7% between August and October. Due to strong foreign exchange inflows in the high tourist season, the Croatian real exchange rate is under constant pressure to appreciate (Holzner, 2005). Copeland (1991) showed that appreciation of the real exchange rate is a significant mechanism allowing tourism to benefit the economy (Dajčman *et al*., 2013 in print).

A negative interest rate 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 available credit supply. The transition from planned to market economies in the SEE region has led to rapid financial developments. A strong presence of foreign banks (in the case of Croatia, Italian and Austrian banks feature the most) in those countries in the last decade did not seriously help in reducing interest rates, but it widened the supply of different financial products and services to the government, companies and households. Together with improved access to foreign loans provided by new private banks, this has helped to fuel a boom in lending in Croatia (Poghossian, 2008 and Festić *et al*., 2009).

Inflation and the stock exchange in Croatia are positively correlated in our research, confirming the Fisher hypothesis[5] about positive correlation between inflation and stock exchange volatility (Muradoglu *et al*, . 2001; Maysami *et al.* 2004; Knif *et al.*, . 2008; Adam and Tweneboah, 2009). Croatia faced the highest inflation rate in 2009 but the national currency, the kuna, is stable. In an environment of ample liquidity and depressed economic activity, the Croatian National bank did not change its accommodative monetary policy stance in 2010.

5 The Fisher hypothesis (1930) is that the market rate of interest comprises the expected real rate of interest and expected inflation. This hypothesis, when applied to stock markets, postulates a positive one-to-one relation between stock returns and inflation.

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In 2011, the alarming unemployment rate in Croatia stood at nearly 20% and this remains one of the main problems of the Croatian economy, together with a growing trade deficit, uneven regional development, a strained state budget and an over-reliance on tourism revenue.

5. Conclusion

Since its formal application for EU membership in 2001, Croatia has faced different political and economic problems such as the delayed start of accession negotiations over its deficient cooperation with the International Criminal Tribunal, significant cases of corruption, effects of global recession, lack of institutional reforms, growing budget deficit and high unemployment.

Despite these problems, Croatia has over the past decade also seen some positive trends such as strong foreign direct investment followed by the establishment of a capital market, as part of its opening up to market economy. Capital inflow in Croatia (expecially high following the start of EU accession negotiations in 2005) boosted stock exchanges and occasioned a rise in GDP, industrial production and trade relations, especially with the EU. The results of measuring the procyclicality of the Croatian stock market from January 2000 to December 2010 also implies that the start of Croatia's EU accession negotiations in October 2005 was a trigger for a rise in stock prices and economic revival, was reflected in an increase in GDP, large FDI and trade liberalization.

The findings of empirical analysis also proved that stock indices in Croatia are negatively correlated to exchange rates, interest rates, unemployment rates and government debt. Real exchange rates are symptomatically procyclical in Croatia, as was the case with other countries in transition, because Croatia relied mainly on exchange rate anchors to keep inflation in check.

The significant negative coefficient of government debts led us to conclude that economic and social reforms were necessary in Croatia on its way to the EU and that these reforms should not be abandoned after EU accession. Economic and social reforms will be a challenge to the newly elected government (in December 2011), as will unemployment in Croatia.

A negative correlation was also confirmed for the interest rates due to a strong presence of foreign banks in Croatia and a different range of financial products they offer. High interest rates in Croatia, especially after the 2008 global recession, caused a decline in consumption and private and public sector lending.

Croatia has closed its EU accession negotiations in June 2011 and the anticipated full accession in mid 2013 is expected to boost capital investments and make EU structural funds available.

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Appendix

Table A:

Correlation of the Explanatory Variables
(Sample: 2000:1 - 2010:12)

	CAP	TRB	UNE	EXR	EXP	GDP	GVD	IMP	IND	INT	CPI
CAP	1.000.000	0.003511	0.043680	0.012357	0.514823	0.452548	-0.106356	0.434740	0.432739	0.085679	0.518381
TRB	0.003511	1.000.000	-0.113803	-0.119712	-0.226223	-0.256263	0.074185	-0.279519	-0.337782	-0.021739	0.055024
UNE	0.043680	-0.113803	1.000.000	0.745778	0.597196	0.542614	0.458736	0.521231	0.495822	0.136531	0.170105
EXR	0.012357	-0.119712	0.745778	1.000.000	0.451580	0.290383	0.559301	0.323404	0.221763	0.305138	0.147167
EXP	0.514823	-0.226223	0.597196	0.451580	1.000.000	0.869853	0.384562	0.951836	0.799298	0.073810	0.409818
GDP	0.452548	-0.256263	0.542614	0.290383	0.869853	1.000.000	0.407826	0.863553	0.960156	-0.278168	0.181720
GVD	-0.106356	0.074185	0.458736	0.559301	0.384562	0.407826	1.000.000	0.234757	0.443608	-0.211195	-0.028560
IMP	0.434740	-0.279519	0.521231	0.323404	0.951836	0.863553	0.234757	1.000.000	0.775605	-0.004955	0.308503
IND	0.432739	-0.337782	0.495822	0.221763	0.799298	0.960156	0.443608	0.775605	1.000.000	-0.357753	0.134937
INT	0.085679	-0.021739	0.136531	0.305138	0.073810	-0.278168	-0.211195	-0.004955	-0.357753	1.000.000	0.622729
CPI	0.518381	0.055024	0.170105	0.147167	0.409818	0.181720	-0.028560	0.308503	0.134937	0.622729	1.000.000

Symbols: CAP: capital inflow expressed as percentage of GDP; TRB: trade balance expressed as percentage of GDP; UNE: unemployment expressed in percentage of the total labour force; EXR: exchange rate expressed as the price of one unit of foreign currency in units of domestic currency; EXP: export of goods and services expressed as percentage of GDP; GDP: expressed in annual percentage change; GVD: government debt expressed as percentage of GDP; IMP: import of goods and services expressed as percentage of GDP; IND: industrial production index; INT - interest rate p.a.; CPI: consumer price index.

Table B: Serial Correlation

(Sample: 2000:1 - 2010:12)

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.330717	Prob. F(2,76)	0.7194
Obs*R-squared	0.704497	Prob. Chi-Square(2)	0.7031

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Table C1:

Autocorrelation of the Residuals OLS (Sample: 2000:1 2010:12)

Date: 11/05/11 Time: 20:29
Sample: 2002M12 2009M12
Included observations: 85
Q-statistic probabilities adjusted for 1 ARMA term(s)

Autocorrelation	Partial Correlation		Q-Stat	Prob
		1	0.1491	
		2	0.5928	0.441
		3	0.6998	0.705
		4	2.5409	0.468
		5	2.9805	0.561
		6	3.7582	0.585
		7	4.0397	0.671
		8	5.8483	0.558
		9	5.8914	0.659
		10	6.6519	0.673
		11	6.8707	0.738
		12	7.4626	0.760
		13	11.473	0.489
		14	15.706	0.265
		15	17.259	0.243
		16	18.605	0.232
		17	18.856	0.276
		18	18.959	0.331
		19	21.689	0.246
		20	21.698	0.300
		21	21.719	0.356
		22	21.853	0.408
		23	22.556	0.427
		24	22.557	0.487
		25	24.340	0.442
		26	27.806	0.317
		27	29.346	0.296
		28	29.434	0.340
		29	29.434	0.391
		30	29.492	0.440
		31	30.816	0.424
		32	32.290	0.403
		33	34.048	0.369
		34	34.169	0.411
		35	34.291	0.454
		36	35.400	0.449

Table C2:

Correlation of the squared Residuals OLS (Sample: 2000:1 2010:12)

Date: 11/05/11 Time: 20:18
Sample: 2002M12 2009M12
Included observations: 85
Q-statistic probabilities adjusted for 1 ARMA term(s)

Autocorrelation	Partial Correlation		Q-Stat	Prob
		1	5.1103	
		2	5.1694	0.023
		3	5.2290	0.073
		4	5.3123	0.150
		5	7.6574	0.105
		6	9.8486	0.080
		7	9.9727	0.126
		8	10.069	0.185
		9	12.398	0.134
		10	12.513	0.186
		11	12.610	0.246
		12	15.923	0.144
		13	16.043	0.189
		14	16.044	0.247
		15	16.073	0.309
		16	16.579	0.345
		17	18.298	0.307
		18	19.026	0.327
		19	19.456	0.364
		20	19.464	0.427
		21	20.827	0.407
		22	21.488	0.429
		23	21.764	0.474
		24	21.769	0.534
		25	21.925	0.584
		26	22.652	0.598
		27	23.057	0.630
		28	23.397	0.664
		29	24.200	0.671
		30	24.408	0.709
		31	24.433	0.752
		32	24.470	0.791
		33	27.156	0.710
		34	28.366	0.697
		35	29.284	0.698
		36	29.344	0.737

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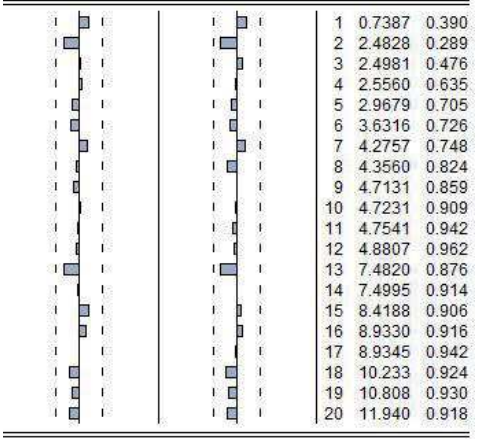
Table D1:

Autocorrelation of the Residuals OLS (Sample: 2000:1 2005:09)

Date: 11/12/11 Time: 22:41
Sample: 2001M02 2004M08
Included observations: 43

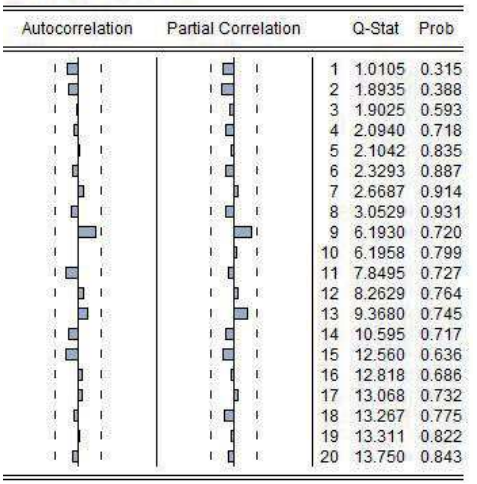


	Autocorrelation	Partial Correlation		Q-Stat	Prob
1			0.7387	0.390
2			2.4828	0.289
3			2.4981	0.476
4			2.5560	0.635
5			2.9679	0.705
6			3.6316	0.726
7			4.2757	0.748
8			4.3560	0.824
9			4.7131	0.859
10			4.7231	0.909
11			4.7541	0.942
12			4.8807	0.962
13			7.4820	0.876
14			7.4995	0.914
15			8.4188	0.906
16			8.9330	0.916
17			8.9345	0.942
18			10.233	0.924
19			10.808	0.930
20			11.940	0.918

Table D2:

Correlation of the Squared Residuals OLS (Sample: 2000:1 2005:09)

Date: 11/12/11 Time: 22:42
Sample: 2001M02 2004M08
Included observations: 43

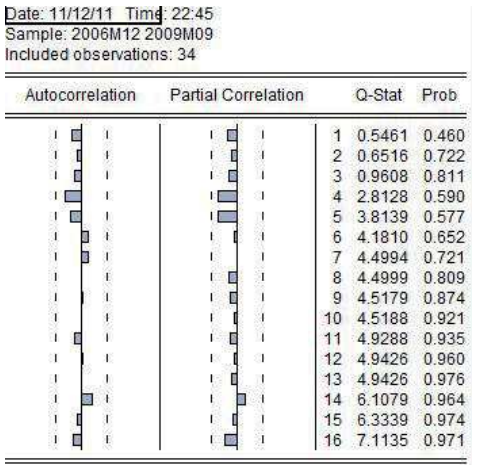


	Autocorrelation	Partial Correlation		Q-Stat	Prob
1			1.0105	0.315
2			1.8935	0.388
3			1.9025	0.593
4			2.0940	0.718
5			2.1042	0.835
6			2.3293	0.887
7			2.6687	0.914
8			3.0529	0.931
9			6.1930	0.720
10			6.1958	0.799
11			7.8495	0.727
12			8.2629	0.764
13			9.3680	0.745
14			10.595	0.717
15			12.560	0.636
16			12.818	0.686
17			13.068	0.732
18			13.267	0.775
19			13.311	0.822
20			13.750	0.843

Table E1:

Autocorrelation of the Residuals OLS (Sample: 2005:10 2010:12)

Date: 11/12/11 Time: 22:45
Sample: 2006M12 2009M09
Included observations: 34

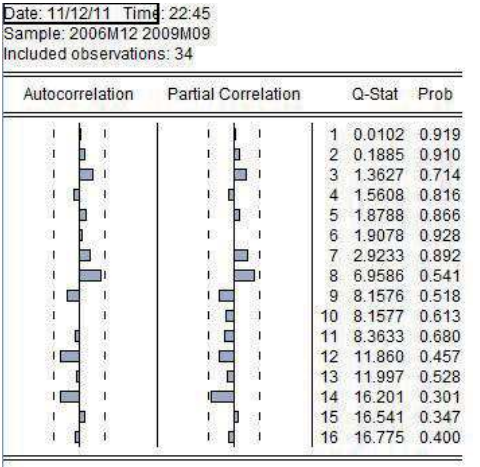


	Autocorrelation	Partial Correlation		Q-Stat	Prob
1			0.5461	0.460
2			0.6516	0.722
3			0.9608	0.811
4			2.8128	0.590
5			3.8139	0.577
6			4.1810	0.652
7			4.4994	0.721
8			4.4999	0.809
9			4.5179	0.874
10			4.5188	0.921
11			4.9288	0.935
12			4.9426	0.960
13			4.9426	0.976
14			6.1079	0.964
15			6.3339	0.974
16			7.1135	0.971

Table E2:

Correlation of the Squared Residuals OLS (Sample: 2005:10 2010:12)

Date: 11/12/11 Time: 22:45
Sample: 2006M12 2009M09
Included observations: 34



	Autocorrelation	Partial Correlation		Q-Stat	Prob
1			0.0102	0.919
2			0.1885	0.910
3			1.3627	0.714
4			1.5608	0.816
5			1.8788	0.866
6			1.9078	0.928
7			2.9233	0.892
8			6.9586	0.541
9			8.1576	0.518
10			8.1577	0.613
11			8.3633	0.680
12			11.860	0.457
13			11.997	0.528
14			16.201	0.301
15			16.541	0.347
16			16.775	0.400

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