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INTEGRATION OF MACEDONIAN, BULGARIAN AND CROATIAN STOCK MARKETS – VECM APROACH

At the end of March 2016, regional platform CEE link was established by three Balkan bourses from Macedonia, Bulgaria and Croatia. This platform provides investors from these countries possibility to buy and sell securities listed on the three bourses. The purpose of this paper is to investigate the linkages between Macedonian, Bulgarian and Croatian stock market indices. If they move together or there is common trend, then investors cannot gain portfolio diversification on this regional platform. Using Johansen Vector Error Correction Model (VECM) on data sample from January 3rd, 2005 to December 30th, 2015 the existence of long and short term relationships between the Macedonian and the Bulgarian and Croatian stock markets are detected. These findings can be limit to the benefits of equity portfolio diversification for Macedonian investors. Bilateral Co-integration test between Croatian and Bulgarian stock markets did not detect common trend that links these two stock markets. So investors from Macedonia cannot make diversification buying stocks on the Croatian and Bulgarian stock markets and vice versa, while Croatian and Bulgarian investors can diversify their portfolios by trading stocks listed on the Bulgarian and Croatian Stock Exchanges. The results are of particular interest for investors, portfolio managers and policymakers.
JEL: G15, F36, C32

Introduction

There is strong evidence on interaction among international stock markets and due to tendency of integration, investors are incapable to earn extra returns for long term investments. For investors, cross border diversification presents remarkable opportunity to maximise profits as well as minimise risks. Even though Macedonia, Croatia and Bulgaria shared common trends and passed through transition with similar characteristics, they had different timeline because of the inequality in the economic growth. Bulgaria and Croatia went through the process of transition faster and become EU members. Macedonian Stock Exchange is small and youngest among the Balkan countries. The real development of the Macedonian Stock Exchange started after 2005 when Croatian and Slovenian investors

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found opportunity to invest in the companies listed at the Macedonian Stock Exchange, due to their previous experience in their countries. Also funds from Croatia came to invest in Macedonia, so the stock prices were up producing the bubble that busted very soon. The domestic investors started to buy stocks, following the trend of raising stock prices produced mostly by foreign investors. In the following period after the crisis the foreigners become most sellers of the Macedonian shares contributing to fall of the stock prices. The index was down reaching the minimum in March 2009, maybe reflecting the world recession, and political situation in Macedonia. Croatian individual investors and funds are dominant foreign investors in Macedonia while Bulgarian investors have some modest trading.

The common platform linking the Bulgarian, Croatian and Macedonian stock exchanges, SEE Link was established on March 29, 2016. The goal of this platform is to increase liquidity and improve access for investors and local brokers, by creating a regional infrastructure for trading securities listed on the three bourses. The platform is of special interest to Macedonian investors as they will have an opportunity to trade stocks abroad through this platform. The Croatian and Bulgarian investors will have an easier way via their local brokers to trade in these countries. This put a question whether the investors from these countries can really gain diversification benefits of this infrastructure facilitating multilateral trading. Johansen's vector error-correction model (VECM) is used to formulate the relationship of the daily stock levels of the Macedonian, Bulgarian and Croatian stock markets. A set of time-series variables are said to be co-integrated if they are integrated of the same order and a linear combination of them is stationary. Such linear combinations would then point to the existence of a long-term relationship among the variables (Johansen and Juselius, 1990). An advantage of co-integration analysis is that through building an error-correction model, the dynamic co-movement among variables and the adjustment process toward long-term equilibrium may be examined.

This paper tests the hypothesis of equity market multilateral integration using a co-integration approach analysing multilateral integration between Macedonian, Bulgarian and Croatian equity market and as well bilateral co-integration between each of them.

The remainder of the paper is organized as follow. After reviewing some of the literature on international stock market integration in Section 1, Section 2 presents the methodology used. Section 3 provides description of data and analyses with the results regarding existence, level, degree and the speed of financial integration are reported in Section 4. The last section offers concluding remarks.

1. Literature Review

Conducting an assessment of the financial integration of the stock markets of two or more countries is important to policy makers, investment professionals as well as academics. The interest is partly based on prudence caused by possible spill over effects in case of integrated financial markets. There is vast literature on the issue of the relationship and integration of the stock markets. The co-movement among the world stock markets has long been under investigation. Even though the issue is actual for more than 40 years it

came to be more investigated after 90's. The methodologies that are used by the researchers to find out if there is relationship between stock markets of two or more countries before 90's are: factor analysis (Ripley, 1973), cluster analysis (Panton et al., 1976), unit root tests (Dwyer and Hafer, 1988), vector autoregression (Eun and Shim, 1989). Eun and Shim (1989) came to the conclusion that markets of various countries are indeed related. Based on univariate and multivariate approaches Jeon and Chiang (1991) suggested the existence of a common stochastic trend in the system of stock prices in the New York, London, Tokyo, and Frankfurt exchanges or they found that the four largest stock markets in the world share one long-run equilibrium relationship. Kasa (1992) also investigated more established stock markets—the U.S., Japan, England, Germany, and Canada and confirmed the existence of a single common stochastic trend that lies behind the long-run co-movement of these equity markets. These findings imply that the gains from international diversification for long holding period's investments have probably been overstated in the literature. The findings of Arshanapalli and Doukas (1993) are that before the stock market crash of October 1997 with the exception of the Nikkei index, France, Germany, and United Kingdom stock markets were not related to the U.S. stock market. However they agreed that the three European markets are indeed strongly co-integrated with the U.S. stock market for the post-crash period. The findings further showed that while the U.S. has a strong impact on the French, German, and United Kingdom markets, the opposite is not true and that Japanese stock market is unrelated to the performance of the major European stock markets. That the Japanese stock market is not fully integrated with other world stock markets was detected as well by Harvey (1991). Chan et al. (1992) examined the relationship among stock markets in Hong Kong, South Korea, Singapore, Taiwan, Japan, and the United States and found no evidence of co-integration, so they imply that international diversification among the markets is effective, as had been previously suggested by Grubel (1968) and Levy and Sarnat (1970). The daily co-movement of the U.S. market and various Asian markets that support the link between the well-developed stock markets and the Asian markets was observed by Aggarwal and Rivoli (1989) and Cheung and Mak (1992). The linkage between stock markets of developed countries and emerging markets of Asia and South America have been studied in e.g. DeFusco, Geppert and Tsetsekos (1996).

The financial integration within the European markets context was examined by many researchers. The long-run linkages among the Eastern European markets (Poland, Hungary, Czech Republic, Slovak Republic and Russia) and a group of developed markets (Germany, UK, France, Italy, Switzerland, US and Japan) was probably firstly examined by Linne (1988). Gilmore and McManus (2003) using the Johansen co-integration procedure found that there is no long-term relationship between the German and Central European markets, either individually or as a group. ChelleySteeley (2005) and Kearney and Poti (2006) examined the links among the various equity markets in the European markets. The linkage between Central and East European countries were under investigation also in Scheicher (2001) and Voronkova (2004). Vizek and Dadic (2006) using Johansen co-integration procedure and daily data for the 1997-2005 period found the existence of multilateral integration among equity markets of Central and Eastern Europe economies, and also found evidence of multilateral equity market integration between the entire group of CEE countries and German equity market. If there are any diversification possibilities for

investors, or integration between German and Bosnian equity markets was under research by Zaimovic and Arnaut-Berilo (2014). Papavassilou (2014) found the existence of long-term balance between the markets of Montenegro, the European countries and the USA. Syriopoulos and Roumpis (2009) had revealed the relationship between the financial markets of the Balkan countries, but their correlation with developed countries was even higher. The interaction between the Balkan country stock exchanges (such as Bosnia Herzegovina, Bulgaria, Croatia, Macedonia, Romania, Serbia and Slovenia) with Austria's stock exchange was investigated and it is found that there is a long-term and mutually positive interactive relationship between the stock exchanges of the above-mentioned countries; however, they are more sensitive to Austria's Stock exchange (Stoica and Diaconaşu, 2011). By using the multi-variate GARCH models, Horvath and Petrovski, (2012) found that the integration degree of the stock markets of the central European countries was much higher than the Balkan countries. On the other hand, the integration degree and correlation of the Serbian and Macedonian stock exchanges with the developed countries were at almost a zero level, while, the Croatian Exchange integration and correlation level with the developed countries markets was much higher than the Macedonian and Serbian stock markets (Horvath and Petrovski, 2012). Gradojević and Dobardžić (2013). also examined the regional stock market causalities and stock markets relationships of Serbian, Croatian, Slovenian, Hungarian and Germany stock markets and it was identified that the Serbian stock market had a partial impact on the Hungarian and Croatian stock markets, whereas the Serbian and Slovenian markets had mutual two-way causation. Samitas, Kenourgios and Paltalidis (2008) using Johansen Co-integration tests indicated that there was a meaningful and positive direction towards a strong relationship between the Greek-Romanian, Bulgarian and Serbian-Macedonian stock markets, whereas there was a strong and positive relationship observed between the German and the Croatian-Turkish stock markets with Albania. Also using Johansen Co-integration methodology Karagöz and Ergun (2010) concluded that there is a two-way relationship between the stock markets of the Balkan countries or the Turkish stock exchange had the lowest interaction and the British stock exchange being the most developed, had the highest effect on these stock markets. Angelovska (2016) using Johansen Co-integration analysis investigates the bilateral relationship between young and small Macedonian stock exchange and three Yugoslav Republics (Slovenia, Croatia and Serbia), and three world stock exchanges (USA, Germany and UK) for the time period covering January 3nd, 2005, through December 1th, 2009. The only evidence of co-movement of Macedonian stock indices before the 2007 is found for Croatian and Slovenian indices. Evidence of co-movement in stock indices is found for all included indices, expect for Slovenia after the outbreak of the Financial Crisis. This suggests that the integration between Macedonia and these economies has been intensified after the crisis (Angelovska, 2016). The existence of the long-run relationship between the emerging European stock markets and the mature markets of Europe and the US has been investigated in the existing literature and leads to conflicting evidence. This research will give contribution to the existing literature with regard to the existence of the long-run and short-run relationship of stock markets for the former Yugoslav countries Croatia and Macedonia and Bulgaria. The research is motivated by the latest establishment of CEE link platform. For the moment there are just tree countries included, but there is announcement that almost all Balkan countries to be

included. Specifically the research will be useful for the investors who will use the possibilities offered by the new infrastructure.

2. Methodology

A great many economic variables are, or at least appear to be, I(1). Variables that is all individually I(1), and hence divergent, can in a certain sense converge together. Formally, it is possible for some linear combinations of a set of I(1) variables to be I(0). If that is the case, the variables are said to be co-integrated. When variables are co-integrated, they satisfy one or more long-run relationships, although they may diverge substantially from these relationships in the short run. For a long time it was common practice to estimate equations involving nonstationary variables in macroeconomic models by straightforward linear regression. It was not well understood that testing hypotheses about the coefficients using standard statistical inference might lead to completely spurious results. In an influential paper, Granger and Newbold (1974) pointed out that tests of such a regression may often suggest a statistically significant relationship between variables where none in fact exists. However, if economic relationships are specified in first differences instead of levels, the statistical difficulties due to nonstationary variables can be avoided because the differenced variables are usually stationary even if the original variables are not. An alternative approach would involve removing a linear time trend from the variables and specifying the empirical relationship between them using de-trended variables. Removing (separate) time trends assumes, however, that the variables follow separate deterministic trends, which does not appear realistic, given the awkward long-run implications. Dynamic econometric models based on linearly de-trended variables may, thus, be able to characterize short-term dynamics of economic variables but not their long-run relationships. The same is true for models based solely on first differences.

The principle behind these models is that there often exists a long-run equilibrium relationship between two or more variables. In the short run, however, there may be disequilibrium. With the error correction mechanism, a proportion of the disequilibrium in one period is corrected in the next period. The error correction process is thus a means to reconcile short-run and long-run behavior. It relates the change in y to the change in x and the past period's disequilibria.

The most common tests to determine the number of co-integrating relationships among the series in a VAR/VEC are due to Johansen (1995). If we have n I (1) variables that are modelled jointly in a dynamic system, there can be up to $n - 1$ co-integrating relationships linking them. Stock and Watson (2011) think of each co-integrating relationship as a common trend linking some or all of the series in the system. Engle and Granger (1987) consider the problem of testing the null hypothesis of no co-integration between a set of I(1) variables. They estimate the coefficients of a static relationship between these variables by ordinary least squares and apply well-known unit root tests to the residuals. Rejecting the null hypothesis of a unit root is evidence in favour of co-integration. In other words, the nonstationary time series in Yt are co-integrated if there is a linear combination of them that is stationary or I(0).

If two $I(1)$ series x and y are co-integrated, then there is unique α_0 and α_1 such that $ut \equiv yt - \alpha_0 - \alpha_1\ xt$ is $I(0)$. In the single-equation model of co-integration where y is the dependent variable and x is an exogenous regressor, the error-correction model in Equation (1) is an appropriate specification.

$$\Delta yt = \beta_0 + \beta_1 \Delta x_t + \lambda u_{t-1} + \varepsilon t = \beta_0 + \beta_1 \Delta x_t + \lambda\ (y_{t-1} - \alpha_0 - \alpha_1\ x_{t-1}) + \varepsilon_t \quad (1)$$

All terms in equation (1) are $I(0)$ as long as the α coefficients (the "co-integrating vector") are known or at least consistently estimated. The term u_{t-1} is the magnitude by which y was above or below its long-run equilibrium value in the previous period. The coefficient λ (which is expected to be negative) represents the amount of "correction" of this period-(t – 1) disequilibrium that happens in period t.

The VEC model extends this single-equation error-correction model to allow y and x to evolve jointly over time as in a VAR system. In the two-variable case, there can be only one co-integrating relationship and the y equation of the VEC system is similar to (1), except that we mirror the VAR specification by putting lagged differences of y and x on the right-hand side. With only one lagged difference (there can be more) the bivariate VEC can be written

$$\Delta yt = \beta y_0 + \beta y_{y1} \Delta y_t\text{-}1 + \beta y_{x1} \Delta x_{t-1} + \lambda y\ (y_{t-1} - \alpha_0 - \alpha_1 x_{t-1}) + v_t^y \quad (2)$$

$$\Delta xt = \beta x_0 + \beta xy_1 \Delta y_{t-1} + \beta xx_1 \Delta x_{t-1} + \lambda x\ (y_{t-1} - \alpha_0 - \alpha_1 x_{t-1}) + v^x{}_t \quad (3)$$

As in (1), all of the terms in both equations of (2 and 3) are $I(0)$ if the variables are co-integrated with co-integrating vector (1, $-\alpha_0$, $-\alpha_1$), in other words, if $y_t, -\alpha_0, -\alpha_1 x_t$ is stationary. The λ coefficients are again the error-correction coefficients, measuring the response of each variable to the degree of deviation from long-run equilibrium in the previous period. We expect $\lambda y < 0$ for the same reason as above: if y_{t-1} is above its long-run value in relation to x_{t-1} then the error-correction term in parentheses is positive and this should lead, other things constant, to downward movement in y in period t. The expected sign of $\lambda\ x$ depends on the sign of α_1. We expect $-\partial \Delta x_t / \partial \Delta x_{t-1} = -\ \lambda x\ \ \alpha_1 < 0$ for the same reason that we expect $-\partial \Delta y_t / \partial \Delta y_{t-1} = -\lambda y < 0$: if x_{t-1} is above its long-run relation to y, then we expect Δx_t to be negative, other things constant.

3. Data

The data used in this study consist of the daily closing prices of Macedonian, Bulgarian and Croatian stock markets. These three Stock Market Exchanges established the SEE Link Balkan Stock Exchange platform that will give access to members of the single market to those out by other countries participating in the project. The new platform is of particular interest for the Macedonian investors, because by the Law on foreign exchange operations in Macedonia, the residents, other than authorized banks, may not purchase securities abroad. This platform will give them access and opportunity to spread their investment scope to Croatian and Bulgarian stocks. Bulgarian and especially Croatian investors were trading on the Macedonian stock market, but with the platform they will be able to deal on these stock markets shares through their local brokers. As a Balkan countries Bulgaria, Croatia and Macedonia shared common trends and several economic characteristics: they

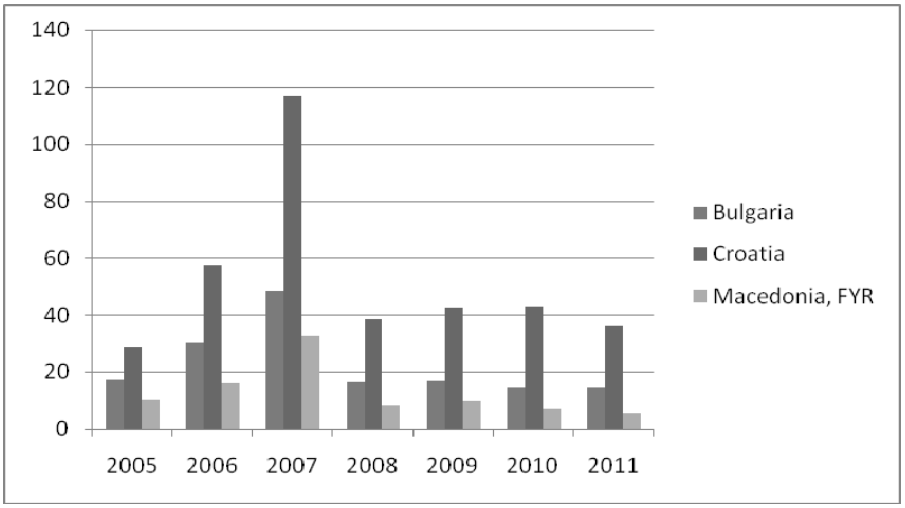
are small-open economies (their evolution is highly dependent on the global and European business climate and the sentiment on the international financial markets), underdeveloped, with a very high dependence on external financing and a poor functioning of labour markets (Radulescu, 2012). The financial system and institutions, especially capital markets development is a key component of transition from planned to market economy in transitional countries. The establishment of the stock exchanges in these countries in the process of privatization have been imposed by formation of more joint stock companies which made as necessity creating the market infrastructure for the transfer of newly created securities. As a result, a number of stock markets have been established in the region. Since then they displayed considerable growth in size and degree of sophistication. Even though these countries shared common trends and similar economic characteristics, they passed through transition with different timeline because of the inequality in the economic growth. Bulgaria went through the process of transition faster and become EU member. Bulgaria joined European Union in 2007 and Croatia in 2013, while Macedonia is still candidate member. The evolution of these stock exchanges is dependent mainly on the foreign capital flows. Macedonian Stock Exchange is very small and youngest among the Balkan countries. The development of the Macedonian Stock Exchange is connected with the foreign investors. After 2005, mostly Croatian and Slovenian investors found opportunity to invest in the companies listed at the Macedonian Stock Exchange, due to their previous experience trading shares in their countries. Beside the individual investors from Slovenia, Croatia and Bulgaria, investment funds from these countries came to invest in Macedonia, so the stock prices were up producing the bubble that busted very soon. The market capitalization of the listed companies as a per cent from the GDP is shown in Figure 1 presenting the similar tendency in the deep decline of market capitalization of listed companies in the region during 2008. The market capitalization as a per cent of GDP is still far away from the developed countries. The biggest stock market is Croatian, than Bulgarian and the smallest is the Macedonian stock market.

The stock market indices of interest are MBI10 of Macedonia, SOFIX of Bulgaria and CROBEX of Croatia. They are consisted of the most liquid shares so called blue chips stocks.

The high frequency data incorporated here include information on short-run market interactions that may be absent in lower frequency data. The sample covers a period from January 3rd 2005 till December 30th 2015, totalling 2868 observations each. January 3rd 2005 is the first day trading with the index MBI10.The data were obtained from DataStream database, meaning that indices are adjusted to the same trading days and can be used for performing the co-integration tests. The indices' movements are presented in Figure 2. The graph of the log indices shows that the movement of the three stock markets is in the similar way in timeline. Therefore it is interesting to investigate the hypotheses if they are co-integrated.

Figure 1

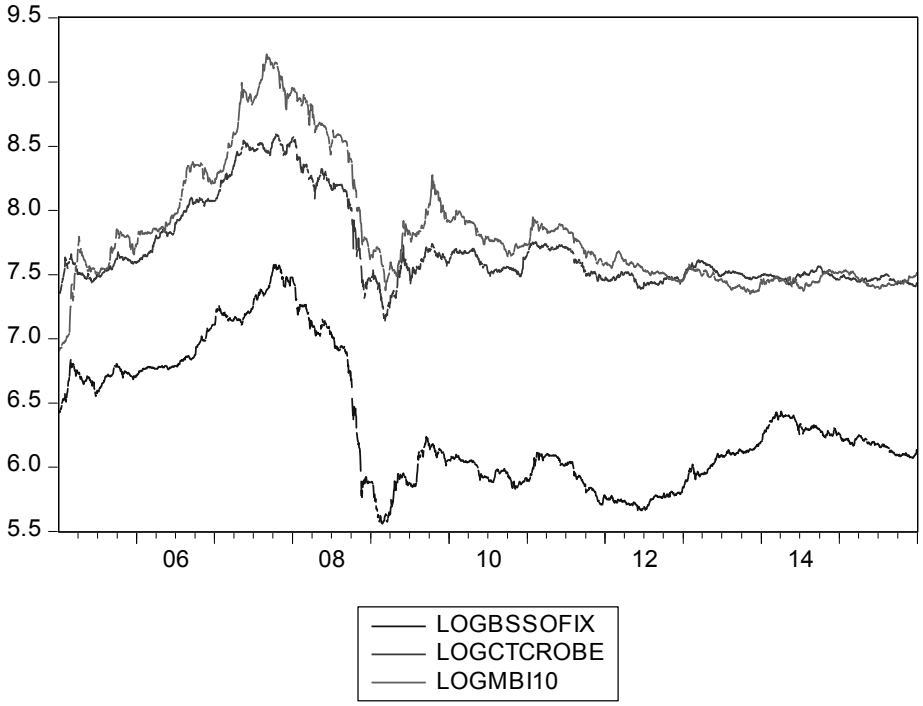
Market capitalization of listed domestic companies (% of GDP)



Source: World Bank.

Figure 2

Equity market developments



Source: Authors' calculations.

Table 1 reports descriptive statistics for the stock market returns that are of prime interest to international portfolio investors. All three stock return series show leptokurtosis and there is evidence of negative skewness in Macedonian and Bulgarian indices. Skewness is a particular feature of returns in Balkan emerging markets. Significant kurtosis and skewness (long left or right tail) indicate rejection of normality in stock return distributions. The mean of the returns is highest, but followed by highest volatility for the Macedonian stock market index. The Bulgarian stock market index is with negative mean of returns, while Croatian small positive. These two indices have similar volatility expressed in standard deviation of 1.23 and 1.21. The maximum return of 14.8 is reached on the Croatian Stock Exchange, than 8.1 and 7.3 on the Macedonian and Bulgarian Stok Exchanges. The returns time series of the Macedonian, Croatian and Bulgarian stock market indices are with high kurtosis.

Table 1
Descriptive statistics of the Macedonian, Croatian and Bulgarian stock returns in the period January 2005-December 2015

	MBI10	CROBEX	SOFIX
Mean	0.021133	0.002385	-0.010537
Median	0.000000	0.000000	0.000000
Maximum	8.089667	14.77896	7.292433
Minimum	-10.28315	-10.76363	-11.35999
Std. Dev.	1.319643	1.210376	1.233.284
Skewness	-0.125543	0.050701	-0.928028
Kurtosis	12.72241	21.36349	13.65912
Jarque-Bera	11303.31	40298.74	13993.77
Probability	0.000000	0.000000	0.000000
Observations	2868	2868	2868

Source: Authors' calculation.

4. Empirical Results

A vector error correction (VEC) model is a restricted VAR that has co-integration restrictions built into the specification, so that it is designed for use with nonstationary series that are known to be co-integrated. The VEC specification restricts the long-run behavior of the endogenous variables to converge to their co-integrating relationships while allowing a wide range of short-run dynamics. As the VEC specification only applies to co-integrated series, first the Johansen co-integration test must be performed prior to VEC specification. This allows confirmation that the variables-stock market indices are co-integrated.

Co-integration requires the variables to be integrated of the same order. So, as a first step the variables are tested for unit roots to verify their non-stationarity. The results from Augmented Dickey-Fuller (ADF) and the Phillips Peron (PP) unit root tests are shown in Table 2. The results of the ADF tests indicate that the null hypothesis of a unit root in the log levels cannot be rejected for the three time series of Macedonian, Croatian and Bulgarian stock market indices. At the same time a unit root in the first differences of the

three stock market indices is rejected at the 1% significance level. This means that the stock market indices in log levels are not stationary or they follow a process integrated of order one, while their returns are stationary. The Phillips Peron (PP) test results shown in Table 2 support the findings of the previous ADR test.

Table 2

ADF and PP unit root tests

	ADF test		PP test*	
	Level	Return	Level	Return
Macedonia-MBI10	-1.84	-31.32	-1.91	-35.01
Croatia-CROBEX	-1.25	-27.66	-1.41	-50.49
Bulgaria=SOFIX	-0.99	-15.51	-1.36	-51.53

Note: ADF - Augmented Dickey-Fuller test; MacKinnon critical values for rejection of hypothesis: 1%Critical value -3,436749, 5%Ceritical value -2,864254, 10% Critical value -2,568267
*MacKinnon (1996) one-sided p-values.

As the variables showed non-stationarity in their level forms, and stationarity in first difference, the co-integration test (Trace and Maximum Eigenvalue) between the three indices is performed and the results are shown in Table 3. The null hypothesis of no co-integration vectors is rejected in 1 co-integration relation, indicating that there is co-integration between the three indices.

Table 3

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.015145	56.36562	29.79707	43.72148	21.13162	0.0000
At most 1	0.003426	12.64414	15.49471	9.831127	14.26460	0.1969
At most 2	0.000981	2.813012	3.841466	2.813012	3.841466	0.1540

Trace test and Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

As co-integration between MBI10, SOFIX and CROBEX is found as precondition to VEC, the model can be developed. The co-integration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. The co-integrating vector based on the largest eigenvalue is: $ut \equiv (1, 2.81, -1.4, 0.01)$ and this gives the co-integrating relation shown in Equation (4).

$$LM_t = 1.4*LC_t - 0.01*LS_t - 2.81 \quad (4)$$

The term u_{t-1} is the magnitude by which y was above or below its long-run equilibrium value in the previous period. Table 4 reports the coefficients of the equation 2 and 3.

Table 4

Vector Error Correction Estimates

Error Correction:	D(LOGMBI10)	D(LOGCTCROBE)	D(LOGBSSOFIX)
λ	-0.009960	-0.002400	-0.004542
	(0.00155)	(0.00157)	(0.00157)
	[-6.41015]	[-1.52816]	[-2.89368]
D(LOGMBI10(-1))	0.371121	0.025885	-0.048468
	(0.01888)	(0.01908)	(0.01907)
	[19.6568]	[1.35658]	[-2.54094]
D(LOGMBI10(-2))	-0.071841	0.042274	0.066609
	(0.01848)	(0.01867)	(0.01867)
	[-3.88795]	[2.26373]	[3.56799]
D(LOGCTCROBE(-1))	0.173188	0.101417	0.177341
	(0.01937)	(0.01958)	(0.01957)
	[8.93921]	[5.17960]	[9.06006]
D(LOGCTCROBE(-2))	0.022107	-0.091904	-0.077867
	(0.01977)	(0.01998)	(0.01998)
	[1.11812]	[-4.59946]	[-3.89814]
D(LOGBSSOFIX(-1))	-0.024336	-0.038445	0.096704
	(0.01917)	(0.01937)	(0.01937)
	[-1.26962]	[-1.98460]	[4.99366]
D(LOGBSSOFIX(-2))	0.062192	0.108056	0.093673
	(0.01893)	(0.01913)	(0.01912)
	[3.28545]	[5.64824]	[4.89794]
C	0.000143	1.76E-05	-8.84E-05
	(0.00022)	(0.00022)	(0.00022)
	[0.64959]	[0.07905]	[-0.39623]

Note: Standard errors in ( ) & t-statistics in [ ]
Source: Author'calculations.

The coefficient λ (which we expect to be negative) represents the amount of "correction" of this period-(t – 1) disequilibrium that happens in period t. In our case λ is –0.01, and it means that 0.01 of the gap between $LMBI10_{t-1}$ and its equilibrium value would tend (all else equal) to be reversed (because the sign is negative) in period t. The signs of the coefficient of LC*t (*LOGCROBEX) and *LSt* (LOGSOFIX) in the detected common trend show the direction of the Macedonian stock market dependence of the Croatian and Bulgarian stock market. So the coefficients in Equation (4) infer that the Macedonian stock market has a positive long-term relation with the Croatian and negative with the Bulgarian stock market. The validity of this model is supported by the significance of LMt (LOGMBI10) in the co-integrating relation [t= -11.3550], and insignificant [0.08297] of the LS_t (LOGSOFIX). We may also observe that the stock market of the Croatia has a significant effect in the co-integrating relation (4) in comparison with the Bulgarian stock market. Moreover, the fact that λ is small and insignificant in the cases of Croatia and

Bulgaria (Table 4) may further suggest that Croatia and Bulgaria are exogenous to changes in Macedonia. A significant λ in the case of MBI10 means that the Macedonian stock market responds quickly to changes in the both markets. As a conclusion of this result lead us to believe that the Macedonian stock market tends to follow the directions taken by the Croatian stock market and that their impact on Macedonian market is highly significant.

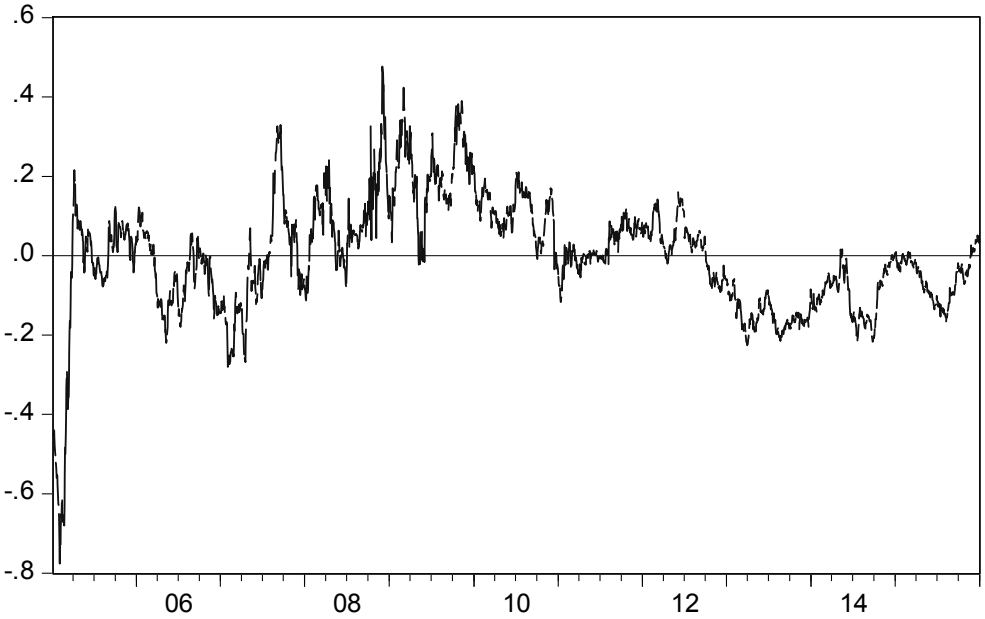
After elimination of the non-significant coefficients we substitute the coefficients (Equation 2) in the Equation (5). The short run adjustments of Macedonian stock market are mostly dependent of the Macedonian market trading in day (-1) and (-2), day (-1) trading on the Croatian stock market and the day (-2) on the Bulgarian stock market.

$$D(LM)=-0.01*u_{t-1}+0.37*D(LM(-1))-0.07*D(LM(-2))+0.17*D(LC(-1))+0.06*D(LS(-2)) \quad (5)$$

The graph in Figure 2 shows the co-integration relation of the Macedonian, Bulgarian and Croatian stock markets. It was less than the long run level during 2006 and 2007 and after 2012. So, during periods of financial turbulences these Balkan stock markets tend to become more integrated. But the long-run relationship exist even though during the period of investigation shown on the graph there are periods with the relationship less than the long run. The end of 2015 the graph shows again long-run level. From a perspective of Macedonian investors, this means that there are no possibilities to gain diversification benefits of investing in the Croatian or Bulgarian stock market. Long and short-run relationship of Macedonian stock markets is considerably influenced by the Croatian stock market and less by the Bulgarian market.

Figure 2

Co-integration relation: $LM_t = 1.4*LC_t - 2.94$



When testing bilateral relationship among the three stock markets it seems that Macedonian market is linking the Bulgarian and Croatian markets and there is bilateral co-integration between Macedonian and Croatian market and as well Macedonian and Bulgarian market. But bilateral relationship between the Croatian and Bulgarian stock market does not exist. Table 5 shows the co-integrating test (Trace and Maximum Eigenvalue) between the Croatian and Bulgarian stock market indices.

Table 5

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.003566	11.79811	15.49471	10.23627	14.26460	0.1969
At most 1	0.000545	1.561833	3.841466	1.561.833	3.841466	0.2114

Trace test and Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

So investors from Macedonia cannot gain diversification buying stocks on the Croatian and Bulgarian stock markets and vice versa, while Croatian and Bulgarian investors can diversify their portfolios by trading stocks from Bulgarian and Croatian Stock Exchanges.

Conclusion

To minimize the risk, stock portfolios can be diversified internationally because unsystematic risk across countries can be reduced. But co-movements do exist among the stock markets and this can eliminate the opportunity of diversification. The establishment of the new common platform SEE link will improve the access of the investors and local brokers between the three countries: Macedonia, Bulgaria and Croatia. The investors from Bulgaria and Croatia already traded on these markets and will get an easier access, but for the Macedonian investors this is an opportunity to spread their portfolio scope. Will this mean that the investors from these countries will have an opportunity to maximize their profit and minimize the risk? Investigation of the integration of the stock markets are of particular interest for investors, portfolio managers and policymakers. Using a Johansen's vector error-correction model (VECM) the relationship of the daily stock indices of the Macedonian, Bulgarian and Croatian stock markets was identified. There is common trend that links these three markets or they are co-integrated. Long and short-run relationship of the Macedonian stock market is considerably influenced by the Croatian stock market and less from Bulgarian. In particular, Macedonian stock market has a positive long-run equilibrium relation with the Croatian market and negative with the Bulgarian market. The Macedonian stock market responds quickly to changes in the both markets. Analysis showed that the Croatian stock market has a significant effect in the integration relation with the Macedonian stock market and comparison the Bulgarian stock market influence is statistically insignificant. This suggests that changes in the Croatian stock market has a

significant effect on the stock market in Macedonia. The interpretation of the results of the performed VECM model are that Macedonian stock market responds quickly to changes in the Croatian market or the Macedonian stock market tends to follow the directions taken by the Croatian stock market and that the impact on Macedonian market is highly significant. These results are expected. The economic background behind these results are connected with the presence of individual investors and institutional funds from Croatia on the Macedonian Stock Exchange. The presence of the Bulgarian investors as a players on the Macedonian stock market is less significant. They are trading on the Macedonian Stock Exchange since 2005. The findings of this research about detected common trends can be limit to the benefits of equity portfolio diversification for Macedonian investors or they cannot make diversification benefits of investing in the Bulgarian or Croatian stock market and vice versa. Bilateral Co-integration test showed that there is no common trend that links these two stock markets, so Croatian and Bulgarian investors can use this opportunity and diversify their portfolios by trading the stocks on Bulgarian or Croatian Stock Exchange.

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