Euro Area stock markets integration: Empirical evidence after the end of 2010 debt crisis

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Abstract

The Euro Area faces plenty of financial and economic asymmetries on account of the dissimilar economies' participation in the union. The long-term financial integration of the EA member-states constitutes a significant task for the EU policy makers in business and economic terms. This letter investigates the degree of stock markets integration in the Eurozone after the end of 2010 debt-crisis. The results reveal that the stock market integration be strong between Germany and EA core member-states but disparate for the EA periphery. In contrast, there are only indications regarding the EA Eastern Mediterranean and Baltic stock markets integration with DAX-30.

Keywords: realized volatility-dynamics, Euro Area stock markets, stock markets integration, market risk analysis, financial integration

JEL: C13, C58, G15, G17, F36

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1. Introduction

Since the creation of the Euro Area (EA), the European financial markets have experienced three different and contrasting events; the introduction of euro in 2002, the global financial crisis of 2008 and the 2010 sovereign debt crisis in the PIIGS[3] countries. The circulation of euro accelerated and facilitated the stock markets integration in the monetary union through a variety of channels. The common currency repealed the exchange rate barriers and offered direct access to the investors in the Eurozone (EZ) stock markets which stemmed from different countries. Additionally, the presence of a common central bank (ECB) assisted the member-countries to enjoy low inflation and stable interest rates. This could be translated as such; that investors faced higher similarity regarding the discounted rates of their future cash flows. As a consequence, deeper and stronger financial integration occurred at the stock markets in the monetary union (Mylonidis and Kollias, 2010). In the meantime, the financial institutions exploited the trading opportunities in the EZ peripheral stock markets by investing in stocks from a variety of different industries.

Consequently, the 2008 financial crisis and the 2010 debt crisis unveiled the weaknesses, the inefficiencies, and the asymmetries of the Eurozone. The core member-states[4] stock markets of the union recovered quite accessibly. On the other hand, the peripheral stock markets (PIIGS group) faced a significant reduction of their values due to the problematic resuscitation of their economies. These double crises decelerated the EZ stock markets integration by creating two distinct groups (core and periphery) (Dias and Ramos, 2013). Furthermore, investors become more skeptical concerning their stock market investments inside the monetary union. The EA core stock markets offer more secure stocks investment choices instead of those of the EA peripherical ones. The shock of these double financial crises (2008, 2010) led to a financial disintegration in the Eurozone (Caruso et al. 2019) and especially to a desynchronization of the bond and stock markets cycle among the member-states (Hoffman et al. 2020, Vacha et al. 2019).

Abiding by that, the main purpose of this letter is to explore the degree of financial integration in the EA stock markets after the end of the debt crisis in the monetary union. Since the end of the sovereign debt crisis[5] in the Eurozone, a resurgence of interest has emerged regarding the sustainability and the degree of financial integration in the monetary union.

Recent literature has mainly focused on measuring the extent of the financial integration driven by macroeconomic factors (Apergis et al. 2019), business cycle and banking (Asimakopoulos et al. 2018, Casu et al. 2016) and monetary terms (Nikas et al. 2019). Other researchers discussed the positive impact of the euro circulation (Kim et al., 2005; Bley, 2009; Lee and

[3] Acronym PIIGS refers to most vulnerable economies in the Eurozone, Portugal, Ireland, Italy, Greece, and Spain.
[4] EZ core usually contains Austria, Belgium, Finland, France, Germany, Luxemburg, and the Netherlands.
[5]The EA debt crisis terminated in July 2015 after the 3rd rescue package to Greece (Baldwin and Giavazzi, 2015).

Kim, 2020) and the European Single Market (Nitoi and Pochea, 2019) on the EA stock markets integration. A highly academic interest occurred regarding the stock markets and business synchronization in the monetary union, where most of the researchers suggested that the financial integration in the Eurozone continued despite the 2010 sovereign debt crisis (Buttner and Hayo, 2011; Walti, 2011; Bentes, 2015).

Other researchers predominantly concentrated on the financial integration of the EA Balkan and Baltic stock markets manifesting low integrated level with the EA founding member-states (Horvath and Petrovski, 2013; Kenourgios and Samitas 2011). Seghal et al. (2017) and Lindman et al. (2020) indicated a distinct level of stock market increased correlation between the periphery and the core in the union while Mensi et al. (2018) focused on the interconnection inside the PIIGS stock markets through financial contagion effects.

Nevertheless, no research addresses the level of EZ stock markets integration after the end of the sovereign crisis in financial terms by aiming attention at the degree of the German stock market interrelationships and volatility responses with the rest of the EA stock markets. To fill the lacuna in the finance literature, this manuscript reveals fresh evidence about the next stage of the integration/unification in the Eurozone by shifting its form from monetary to financial. Moreover, it presents significant findings concerning the EA stock markets increased correlation from 2015 to 2020. Simultaneously, it indicates possible first thoughts concerning the establishment of a Pan-European common stock market.

This letter relies on the theory of integration in financial markets (Baele et al. 2004) in order to examine the degree of stock markets increased correlation in the Eurozone. The empirical evidence of this research unveils that the stock market integration is strong between core member-states but disparate for the periphery.

2. Methodology

2.1 Fractionally Cointegrated Vector Autoregression (FCVAR)

The Fractionally Cointegrated Vector Autoregression (FCVAR) model is proposed by Johansen (2008), and it is empirically utilized by Johansen and Nielsen (2010; 2012; 2016) for the first time; its advantages are highlighted by Caporin *et al.* (2013). The FCVAR model permits long memory (fractional integration) in the equilibrium errors, (Figuerola-Ferretti and Gonzalo, 2010). Moreover, it enables the presence of long-run backwardation or contango in the equilibrium as well, i.e. a non-unit cointegration coefficient. The following formula describes the FCVAR model of this research.

$$\Delta^{d} \boldsymbol{EA_t} = \boldsymbol{\alpha\beta' L_b \Delta^{d-b} DAX_t} + \sum_{\boldsymbol{i=1}}^{\boldsymbol{k}} \boldsymbol{\gamma_i} \Delta^{\boldsymbol{b}} \boldsymbol{L_b^i EA_t} + \boldsymbol{\varepsilon_t} \ \ (\mathbf{1})$$

Where, EA_t is the dependent variable (stock market index of an EA country- excludes Germany), DAX_t represents the stock market index of Germany, γ is the coefficient of short-term dynamics, $\beta'$is the coefficient of long-term dynamics and α represents the speed of adjustment towards the equilibrium for each of the variables in response to shocks.

2.2 The Exponential Realized GARCH model (R-EGARCH)

According to Hansen and Huang (2012), an exponential realized GARCH is more structurally improved in opposition to the realized GARCH (Hansen *et al.* 2012). In specific, the R-EGARCH shares the simple structure of GARCH, while it maintains the important features (leverage effect, skewness and kurtosis) of the stochastic volatility (SV) models. Additionally, this model improves the empirical fit of data and provides better forecasting performance in comparison with the other GARCH models. Lastly, the R-EGARCH empowers the observation insights on the properties (accuracy, bias, variance) of different realized measures.

A realized EGARCH with K realized measures is given by the following equations:

$$\boldsymbol{\log(h_t) = \omega + \varphi \log(h_{t-1}) + r(z_{t-1}) + \zeta u_{t-1}} \; \textbf{(2)}$$

$$\boldsymbol{\log(x_{k,t}) = \xi_k + \psi \log(h_t) + \delta_k(z_t) + u_{k,t}}, \quad k = 1, \ldots, K \;\; \textbf{(3)}$$

Where, φ is the persistence parameter, $\delta(z_t)$ is the leverage effect and $r(z_{t-1}) + \zeta u_{t-1}$ captures the volatility shock (volatility sensitivity). ψ parameter has the restriction to be close to unity (Hansen and Huang, 2012).

3. Data

The current research uses the natural logarithmic value of stock market indices in eighteen Eurozone countries[6] as dependent variables. The natural logarithmic price of the German DAX-30 index is applied as an independent variable in order to examine its realized dynamic impacts and volatility responses on the stock indices of the rest EA member-states in the short- and long-run. The selection of DAX-30 as an independent variable takes place because it contains the largest market capitalization of the stock markets in the EZ. Additionally, this research uses the natural logarithmic value of US S&P500 as a control variable with the purpose of investigating the potential cause of the stock markets integration in the monetary union. The control variable is selected on the basis of the stock market correlations having risen as the international capital markets become more integrated. For instance, Goetzmann, et al. (2005) show that the international correlations tend to be higher during periods of higher economic

[6] (Austria, Belgium, Luxemburg, Greece, Finland, Cyprus, Malta, France, the Netherlands, Portugal, Spain, Italy, Ireland, Latvia, Lithuania, Estonia, Slovenia and Slovakia)

and financial integration. The dataset intraday frequency is equal to 60 minutes from 00:00 GMT 01 August 2015 to 23:00 GMT 28 February 2020. We exclude dates where the trading activity is low (official bank holidays and weekends - Friday 21:00:01 GMT until Sunday 20:59:59 GMT). The dataset is adjusted according to DAX-30 operating hours (08.00 GMT to 16.30 GMT). No more recent data are included due to the outbreak of Covid-19 pandemic crisis in the beginning of March 2020. Covid-19 pandemic created higher instability and uncertainty at the stock markets. Therefore, more recent data would deform the validity of the results. The specific dataset has been extracted from the Bloomberg Database.

4. Empirical Results

Three different groups were created considering similar characteristics about the EZ member-states. The first group[7] (core) includes the strongest economies of the monetary union. The second group[8] (periphery) contains the peripheral EA countries which are more vulnerable in terms of their economy. Finally, the third group[9] consists of the EA Eastern and Balkan countries because of their common communistic past.

The fractional unit root test of Chang and Perron (2017), the fractionally cointegrated Vector Autoregression (FCVAR) of Johansen (2008) and the realized EGARCH of Hansen and Huang (2012) are used as the foremost research tools. By applying the FCVAR, we identify short-term and long-term realized dynamic relationships among the independent and dependent variables and their equilibria. Finally, the use of the realized EGARCH looks into the level of realized long-term volatility as well as the degree of leverage among the variables.

4.1 Preliminary results

In the beginning, we explore the potential cause of the co-integration between the S&P500 and DAX-30. According to Eun et al. (2008), returns on large-cap stocks are substantially driven by common global factors. Building on that, we firstly test the causality effect and secondly, the degree of integration between the biggest EZ stock index (DAX 30) and the US stock market (S&P500).

Causality (also referred to as cause and effect) is the rational relationship between two processes, the first of which (the cause) is partially or totally responsible for the second, while the second is partially or totally dependent on the first one (Mantalos and Shukur, 2010). According to Granger causality test (Granger, 1969) (Table 1: appendix), price fluctuations of the S&P500 index cause the DAX-30 value reactions at a=0.05. On the other hand, there is no causality effect of the German stock index on the S&P500.

[7] (France, Austria, Belgium, Finland, the Netherlands and Luxembourg)
[8] (Cyprus, Greece, Ireland, Italy, Malta, Portugal and Spain)
[9] (Slovenia, Slovakia, Estonia, Lithuania and Latvia)

Table 2 (appendix) unveils the null hypothesis of rank 0 against rank r=2. In terms of the selection of ranks, a series of likelihood ratio (LR) tests were conducted. The results of cointegration rank test (Johansen and Nielsen, 2010) support that there are zero (0) cointegrated vectors for a level of significance a=0.05.
Overall, it is estimated that the movements of S&P500 cause the movements of DAX-30 but, a co-integration relationship between these two stock market indices does not exist.

Furthermore, a robustness test to non-normality is conducted on data. The Jarque-Bera normality test is the most applicable one (Brys et al. 2004). The results are presented at the table 3 (appendix). It is revealed that the time-series data follows the normal distribution at a=0.05.
Afterwards, the results of Chang and Perron unit root test (2017) show that the time series of the variables are non-stationary and are also integrated at order one according to the cointegration rank test of Nielsen and Johansen (2010) (statistically significance a=0.05) (see Table 3 and 4: appendix).

4.2 Main empirical results

Table 5 (appendix) displays the results of FCVAR (mean equation) and realized EGARCH (conditional variance equation) by using no constant ω term at the model according to the Akaike criterion.
The error correction term (ECT) represents the adjustment speed back to equilibrium and it is negative for every country indicating the presence of a co-integrated relationship among the variables of the model. For instance, the ECT is equal to -0.0212 for the Slovenian stock market index and then the -2,12% of a deviation from the error correction mechanism is corrected within 1 trading hour due to the DAX-30 movements. The short-term coefficient (γ) reveals positive realized dynamics mainly for the strict EA core and especially for Austria (0.447). Similar results were displayed for the Greek and Irish stock market. The long-term realized dynamics express a significant positive relationship among every EA stock market index and DAX-30. The Italian stock market index appears to have the largest impact (1.061) due to the movements of DAX-30 in the long-run.
The empirical findings of the realized EGARCH demonstrate the realized volatility sensitivity, volatility persistence and leverage effect. The realized logarithmic return of an EA member stock market index is utilized as a dependent variable and the realized logarithmic return of DAX-30 is used as an independent variable. The results project that the φ coefficient value is high and close to unity for all the EA stock market indices (except Cyprus, Greece and Baltic

countries) indicating high volatility persistence against the shocks of DAX-30. On the contrary, the Cypriot, Greek and Baltic stock market indices seem to be more vulnerable against the shocks of DAX-30.
The size effect (θ) measures volatility sensitivity which is positive in the most EA stock market indices. This signifies that, once the asymmetric impact of innovations is accounted for, the absolute size of the innovation becomes also important. The leverage effect is positive for every EA stock market index (except for the Baltic countries) implying that negative shocks suggest a higher next period conditional variance in comparison to the positive shocks of the same sign. For instance, the bad news of DAX-30 shows an approximation of 24,5% greater impact in comparison with the good news of the Greek stock index. The restriction parameter is close to unity for every country pointing out that a realized EGARCH is applicable.

In summary, the positive long-term dynamics between the German and the rest of the EA stock markets reveal a significantly influential role of the DAX-30 in the EZ stock markets. This is quite reasonable since DAX-30 is the most stable stock market in the EA in volatility terms. Therefore, when investors believe that their investments are not efficient in the DAX-30, they principally reduce their exposure on the periphery and post-communist countries regarding the other EA stock markets. The short-term impact of DAX essentially takes place on the EA core stock markets. This could occur due to the higher financial integration in the first group. More specifically, not only do these countries share common borders, but also their stock markets are steadier than those at the periphery. The presence of Euronext[10] stock exchange also plays an important role. Consequently, investors reasonably invest on the German one as well as on the rest of EA core stock markets. Moreover, the evidence of the realized EGARCH proves that the Baltic, Greek and Cypriot stock markets are more vulnerable against the volatility shocks of DAX-30. This may occur since investors repatriate their funds from the weakest EA stock markets to hedge or eliminate the risk which is related to the excess volatility and prices instability. Lastly, S&P500 causes the movements of DAX-30 but, they are not cointegrated. This may possibly happen since the EA suffered significantly from the 2010-2015 sovereign debt crisis. This crisis combined with the fiscal tightening and no significant monetary easing led to a much weaker growth in Europe than in the US, where the Fed immediately embarked on an extensive QE program. Thus, we could assume that the S&P500 boosted DAX-30 financially during the period of 2015-2020, but these stock indices could not have had the sufficient time to become integrated.

[10] Euronext N.V. (short for European New Exchange Technology) is the largest stock exchange in Europe, operating markets in Amsterdam, Brussels, Dublin, Lisbon, London, Oslo and Paris.

5. Conclusion

Despite the sovereign debt crisis of 2010, the financial integration in the monetary union has been continuing among the member-states. An ECB's report suggested that EZ presents a satisfactory level of financial integration and synchronization which has continuously been more improved and unified during the last five years (ECB, 2020). This letter attempts to investigate whether the EA stock markets have increasingly correlated (integrated). The empirical evidence suggests that the stock market integration be strong among the core member-states but divergent at the periphery notwithstanding. The findings of this letter are aligned with the results of other researchers, such as those of Horvath and Petrovski (2013), Seghal et al. (2017) and Lindman et al. (2020). Essentially, this research demonstrates that the distinctive integration level among the EZ stock market indices. Moreover, it has been discovered that the most recent members-states of the monetary union (Baltic countries) did not achieve to become financially integrated in stock market terms. Lastly, some EA eastern countries, which have a weak economy and a low market capitalization (Cyprus and Greece), possibly are not integrated in stock market terms. Overall, we propose that the EA stock markets be conditionally integrated after the end of the 2010 sovereign debt crisis.

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Appendix

Table 1: Granger Causality Test between S&P500 and DAX-30		
Null Hypothesis:	**F-Statistic**	**Prob.***
S&P500 does not Granger Cause DAX-30	3.32174	0.0361
DAX-30 does not Granger Cause S&P500	0.03160	0.9688

Note:*statistically significant at a=0.05

Table 2: Cointegration rank determination by Johansen and Nielsen (2010) between S&P500 and DAX-30				
Rank	**d**	**b**	**LR statistic**	**P-value***
0	1.068	0.331	58.17	0.000
1	1.047	0.269	17.41	0.406
2	1.012	0.294	8.88	0.771

Note: Number of Lags =2. We cannot reject the null hypothesis that Rank = according to the Likelihood Ratio (LR). Hence, we cannot argue with this test that there may be a cointegrating relationship between these series. Level of significance, a=0.05.

Table 3: Jarque-Bera (1987) normality test and Chang and Perron (2017) fractional unit root test for EZ				
Countries	**Variables Acronym**	**JB statistic***	**Order of integration (d)**	**t-statistic****
Austria	ATX	2.991	1.033	31.11
Belgium	BEL20	1.892	1.021	30.42
Luxemburg	LUxX	1.411	0.969	28.77
France	CAC40	0.927	1.002	30.07
Italy	FTSE-MIB	1.685	0.951	27.93
Spain	IBEX35	2.477	1.025	30.56
Greece	ATHEX20	4.682	0.888	25.77
Cyprus	CYPRUS-MAIN	5.342	0.873	24.98
Finland	OMX25	3.179	1.009	30.21
Malta	MSE	4.102	0.977	29.14
Slovakia	SAX	2.056	0.999	30.01
Slovenia	SBITOP	2.908	1.019	30.33
Portugal	PSI20	2.724	0.928	32.35
Netherlands	AEX25	4.729	1.005	30.13
Ireland	ISEQ	1.968	1.044	31.98
Latvia	DJ LATVIA	1.689	1.018	30.36
Lithuania	DJ LITHUANIA	2.561	0.953	28.02
Germany	DAX30	0.677	1.004	30.13
Estonia	DJ ESTONIA	1.897	0.964	28.68

Note: *level of significance a=0.05; **statistically significant at a=0.05 (test critical value t_c = 3.97)

Table 4: Cointegration rank test by Johansen and Nielsen (2010) for EA countries										
Variables	**Rank=0**				**Rank=1**				**Rank=2**	
	d	**b**	**LR**	**$CV_{5\%}$**	**d**	**b**	**LR**	**$CV_{5\%}$**	**d**	**b**
ATX	0.681	0.372	23.82	9.49	**1.033**	**0.522**	0.06	3.84	1.00	0.292
BEL20	0.719	0.329	24.50	9.49	**1.021**	**0.379**	1.68	3.84	1.03	0.231
LUxX	0.623	0.416	22.35	9.49	**0.969**	**0.386**	2.34	3.84	0.952	0.386
CAC40	0.561	0.524	22.79	9.36	**1.002**	**0.412**	0.33	3.84	1.05	0.472
FTSE-MIB	0.513	0.513	19.82	9.36	**0.951**	**0.371**	0.01	3.59	1.02	0.629
IBEX35	0.708	0.371	17.66	9.49	**1.025**	**0.318**	1.09	3.84	0.975	0.541
ATHEX20	0.532	0.532	16.39	9.36	**0.888**	**0.354**	0.35	3.84	0.977	0.663
CYPRUS-MAIN	0.497	0.497	22.60	9.49	**0.873**	**0.458**	2.37	3.84	0.962	0.425
OMX25	0.638	0.405	21.45	9.49	**1.009**	**0.339**	0.25	3.64	0.958	0.366
MSE	0.511	0.511	21.52	9.37	**0.977**	**0.304**	1.34	3.84	1.01	0.452
SAX	0.667	0.361	20.91	9.49	**0.999**	**0.297**	2.51	3.84	1.00	0.415
SBITOP	0.609	0.439	18.57	9.49	**1.019**	**0.325**	3.81	3.84	0.968	0.405
PSI20	0.591	0.476	19.41	9.49	**0.928**	**0.402**	1.09	3.84	0.995	0.508
AEX25	0.606	0.469	20.36	9.49	**1.005**	**0.309**	2.18	3.84	0.988	0.335
ISEQ	0.685	0.318	19.42	9.49	**1.044**	**0.333**	0.41	3.84	1.022	0.407
DJ LATVIA	0.725	0.296	21.11	9.37	**1.018**	**0.458**	1.23	3.64	1.017	0.653
DJ LITHUANIA	0.505	0.505	22.01	9.49	**0.953**	**0.343**	0.71	3.84	0.979	0.561
DAX30	0.551	0.479	18.80	9.49	**1.004**	**0.423**	1.40	3.84	0.998	0.439
DJ ESTONIA	0.582	0.486	20.07	9.49	**0.964**	**0.388**	0.07	3.84	0.985	0.497

Note: maximum k is set at 3 and this gives the order of the error correction mechanism in the FCVAR system. The LR is the Likelihood Ratio statistics, computed for rank r = 0 and 1. This is not available for rank 2 since we are not rejecting any more rank.

Table 5: Fractionally Co-integrated VAR and Realized EGARCH (no ω constant) estimation results for Euro Area											
Group	**Parameters**	**d**	**b**	**Long-term dynamics (б)**	**Short-term dynamics (γ)**	**ECT (α)**	**Constant (ξ)**	**Realized Sensitivity effect (r+ζ)**	**Persistence parameter (φ)**	**Restriction parameter (ψ)**	**Leverage effect (δ)**
	Austria	1.033 (31.11)*	0.522 (7.77)*	0.883 (103.65)*	0.447 (16.15)*	-0.0049 (-2.57)*	-0.254 (-128.43)*	0.003 (0.18)	0.855 (50.11)*	0.861 (5.81)*	0.211 (7.81)*
	Belgium	1.021 (30.42)*	0.379 (8.12)*	0.875 (189.04)*	0.056 (2.16)*	-0.0078 (-2.44)*	-0.158 (-145.09)*	0.023 (1.53)	0.845 (44.39)*	0.868 (5.73)*	0.199 (7.78)*
	Finland	1.009	0.339	0.880	0.027	-0.0055	-0.151	0.052	0.844	0.896	0.158

EURO AREA CORE		(30.21)*	(9.43)*	(134.24)*	(2.04)*	(-7.96)*	(-143.43)*	(3.03)*	(41.00)*	(4.43)*	(5.18)*
	France	1.002 (30.07)*	0.412 (9.03)*	0.911 (46.51)*	0.051 (2.86)*	-0.0192 (-2.55)*	-0.174 (-209.58)*	0.024 (2.02)*	0.843 (57.56)*	0.865 (6.49)*	0.233 (8.52)*
	Luxembourg	0.969 (28.77)*	0.386 (8.77)*	0.784 (49.11)*	0.049 (2.57)*	-0.0044 (-4.23)*	-0.087 (-101.26)*	0.002 (0.22)	0.917 (82.28)*	0.919 (5.99)*	0.113 (7.47)*
	Netherlands	1.005 (30.13)*	0.309 (8.01)*	0.669 (195.28)*	0.035 (2.44)*	-0.0104 (-2.83)*	-0.032 (-105.09)*	0.008 (0.62)	0.843 (48.39)*	0.851 (5.83)*	0.202 (8.12)*
EURO AREA PERIPHERY (MED + IR)	**Cyprus**	0.873 (24.98)*	0.458 (7.99)*	0.382 (12.74)*	0.018 (0.67)	-0.0023 (-3.01)*	-0.231 (-195.73)*	0.151 (6.16)*	0.710 (21.30)*	0.861 (5.63)*	0.013 (0.53)
	Greece	0.888 (25.77)*	0.354 (10.10)*	0.701 (200.16)*	0.171 (4.50)*	-0.0151 (-3.41)*	-0.012 (-4.70)*	0.054 (2.49)*	0.784 (37.14)*	0.838 (7.75)*	0.245 (7.19)*
	Ireland	1.044 (31.98)*	0.333 (9.06)*	0.935 (293.55)*	0.062 (2.24)*	-0.0119 (-2.45)*	-0.114 (-13.26)*	0.046 (4.27)*	0.865 (59.82)*	0.911 (4.92)*	0.116 (5.61)*
	Italy	0.951 (27.93)*	0.371 (11.04)*	1.061 (46.28)*	0.022 (0.73)	-0.0018 (-2.82)*	-0.091 (-51.34)*	0.019 (1.59)	0.887 (55.34)*	0.906 (4.35)*	0.141 (5.78)*
	Malta	0.977 (29.14)*	0.304 (7.97)*	0.889 (47.69)*	-0.008 (-0.65)	-0.0011 (-2.75)*	-0.141 (-12.04)*	-0.001 (-0.56)	0.921 (66.48)*	0.922 (4.63)*	0.081 (6.02)*
	Portugal	0.928 (32.35)*	0.402 (9.99)*	0.906 (101.41)*	0.034 (1.43)	-0.0041 (-2.14)*	-0.093 (-139.88)*	0.051 (2.78)*	0.811 (35.62)*	0.862 (6.50)*	0.169 (5.59)*
	Spain	1.025 (30.56)*	0.318 (6.69)*	0.957 (24.87)*	0.0209 (0.73)	-0.0017 (-3.55)*	-0.079 (-129.29)*	0.063 (4.62)*	0.853 (49.17)*	0.916 (5.22)*	0.117 (5.05)*
EURO AREA EAST (BALTIC + SK, SLO)	**Latvia**	1.018 (30.36)*	0.458 (9.95)*	0.793 (9.71)*	-0.058 (-1.53)	-0.0027 (-2.59)*	-0.085 (-25.71)*	-0.001 (-0.87)	0.763 (56.18)*	0.854 (4.78)*	-0.119 (-1.58)
	Lithuania	0.953 (28.02)*	0.343 (7.65)*	0.623 (2.92)*	-0.018 (-1.31)	-0.0006 (-3.29)*	-0.046 (-87.61)*	0.046 (0.92)	0.555 (11.52)*	0.871 (9.19)*	-0.014 (-0.22)
	Estonia	0.964 (28.68)*	0.388 (9.09)*	0.795 (11.19)*	-0.021 (-1.11)	-0.0025 (-2.99)*	-0.082 (-10.67)*	0.113 (3.38)*	0.637 (71.96)*	0.879 (2.75)*	-0.054 (-0.13)
	Slovakia	0.999 (30.01)*	0.297 (5.47)*	0.626 (10.12)*	-0.026 (-1.67)	-0.0173 (-4.13)*	-0.067 (-12.39)*	0.074 (6.81)*	0.925 (94.34)*	0.999 (5.79)*	0.049 (4.50)*
	Slovenia	1.019 (30.33)*	0.325 (8.58)*	0.715 (18.02)*	0.0038 (0.29)	-0.0212 (-5.66)*	-0.059 (-55.58)*	0.001 (0.38)	0.886 (59.35)*	0.889 (6.77)*	0.091 (6.52)*

Note:*statistically significant at a=0.05