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Evaluation Of The Macroeconomic Stability Of Central And Eastern European Countries With A View Toward Their Membership In The European Union. Multidimensional Risk Analysis

Abstract

The economies of European countries have been undergoing constant turbulence for several years. This is the consequence of a range of factors, in particular: the 2007 crisis; violations of the convergence criteria and fiscal discipline; problems with the liquidity of international financial markets; depreciation of the euro currency; increasing unemployment in European Union Member States; the slow increase in productivity in the majority of EU economies; growing indebtedness of public finance sectors; problems with retirement schemes – in particular with correlation between their effectiveness and unemployment and low rate of natural increase.

Thus, the author posits that it is important to analyse the key aspects related to these economic parameters which may affect this process in a significant way and decide the risk of its occurrence. This is the assumed aim of this work.

The work shows the results of the author's own study, carried out with the use of different methods, such as the macroeconomic stabilisation pentagon, the Scoreboard, and Spearman's rank correlation coefficient. The variety of test methods employed results on one hand from the problem's complexity, and on the other from a profound analysis of all dependencies and risks resulting from this complexity.

The conducted study shows that there is a significant correlation between the Scoreboard parameter imbalances and the intensity of crisis phenomena in case of violations of the acceptable thresholds in terms of current account

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balance, net international investment position, export market shares, nominal unit labour costs, real house prices, private sector debt, government debt, and the unemployment rate. The imbalances of these eight indicators may form an adverse macroeconomic environment favouring the occurrence of intense crisis phenomena, which means that they should be subject to special monitoring.

The shapes of the macroeconomic stabilisation pentagon for CEEC economies in 2014 shows that none of the analysed countries is characterised by total filling of the pentagon. This means that the economic situation in these countries is not stable and requires constant monitoring. The figures related to all analysed indicators, apart from GDP, are characterised by a flattened shape, which is characteristic for such a situation.

Keywords: *stability, risk, imbalance, destabilisation, divergence*

1. Introduction

The economies of European countries have been undergoing constant turbulence for several years. This is the consequence of a range of factors, in particular: the 2007 crisis; violations of the convergence criteria and fiscal discipline; problems with the liquidity of international financial markets; depreciation of the euro currency; increasing unemployment in European Union Member States; the slow increase in productivity in the majority of EU economies; growing indebtedness of public finance sectors; problems with retirement schemes – in particular with correlation between their effectiveness and unemployment and low rate of natural increase.

Moreover, recently strong divergence tendencies can be observed, both of the eurozone and of the remaining EU Member States, which results in the problems related to Grexit or the PIIGGS-Exit.[1]

All this affects the economies of the Central and Eastern European (CEE) countries which are members of the EU. There is a real threat that one of these countries may face the problem of having to exit the EU structures in the future. Thus, I believe it is important to analyse the key aspects related to these economic parameters that may affect this process in a significant way and determine the risk of its occurrence. This is the assumed aim of this work.

[1] **PIIGS**, **PIIGGS,** previously **PIGS** – a term used to describe countries with a poor budgetary situation. The acronym **PIGS** originally referred to ***P****ortugal,* ***I****taly,* ***G****reece,* ***S****pain*. Due to the economic situation in 2010 another **I** (for ***I****reland),* was included, thus creating the expanded version: **PIIGS**. The version **PIIGGS**, with an additional **G** standing for ***G****reat Britain* is also sometimes used.

All the CEE countries which are currently members of the EU have been subjected to the analysis: Bulgaria, the Czech Republic, Croatia, Estonia, Lithuania, Latvia, Poland, Romania, Slovakia, Slovenia and Hungary. The period of 2007–2015 has been analysed. As has been mentioned, all the economic parameters that can have a significant influence on these countries' economic stability have been analysed. The work shows the results of analyses carried out using different methods, such as the macroeconomic stabilisation pentagon, the *Scoreboard*, and Spearman's rank correlation coefficient. The variety of employed test methods results on one hand from the problem's complexity, and on the other from the profound analysis of all dependencies and risk resulting from this complexity.

The aim has been accomplished on the basis of the description of the inner balance status in the CEE countries' economies, based on the *Scoreboard* and crisis phenomena correlation.

2. The issue of macroeconomic balance within the EU

Economic balance may be considered in its internal or external aspect. It is assumed that an economy is internally balanced when its actual production corresponds to the full use of production factors. Thus, the unemployment rate corresponds to natural unemployment and inflation is low and stable. Internal balance also refers to the balance of public finances, hence budgetary balance and public debt are also subject to assessment.

External balance is mainly related to import and export, which is reflected in the balance of payments and a stable currency exchange rate (Pluciński 2004, p. 39).

A long-term imbalance of an economy results in a high risk of outbreak of a crisis, and in case of the EU this poses a danger to the stability of its entire whole structure, which was proven by the events of the years 2007–2015 (Puig 2010), (Global Development Finance 2012, p. 2). This is why it is crucial to monitor the EU Member States' economic balance (Smaga 2014), (Sporek 2010, p.102).

The sources and course of the crisis have shown the weak points of the existing model of the EU's functioning (Reinhart, Rogoff 2009, p. 43). One of the main causes of the crisis is believed to be the lack of Member States' sufficient fiscal discipline (Wysokińska 2014, pp. 85–89). The inability to provide countercyclical fiscal policy was mainly caused by the inefficiency of fiscal rules defined in the Maastricht Treaty and in the Stability and Growth Pact that was to complement it. Nevertheless, an unstable fiscal policy is not the basic source of crisis, but rather its consequence in many cases (Tchorek 2013, p. 2). The causes of macroeconomic problems lie in deep structural differences between the EU Member States.

As a consequence of these processes, significant imbalances, both internal and external, have occurred ever since the eurozone was created. They are reflected in differences related to inflation and unit labour costs, as well as in the indicators of current account deficit and investment position. As a result of the financial crisis and sudden stop and reversals, the imbalances that accumulated in the real economies of the Member States in the form of excessive private debt have, when faced with the risk of financial institutions' bankruptcy, been transferred to public sector, which led to a surge in public debt (Global Financial Stability Report, 2015).

A number of actions have been undertaken since 2010 as a reaction to the crisis within the EU, aimed at reducing its effect on the one hand and at reducing the risk of it being repeated in the future on the other (Council Regulation EU, 2010). One such action was the adoption of the Excessive Imbalance Procedure (Sławiński 2009, p. 56).

The Excessive Imbalance Procedure was included into EU law in 2011 (European Commission 2011). Its authors' intention was to prevent the accumulation of internal and external economic imbalances within the EU Member States, which had occurred before the outbreak of 2008 financial crisis and would intensify the later course of the eurozone crisis. Previously, no mechanisms of monitoring and control of macroeconomic imbalance existed within the EU and/or the eurozone.

The Procedure includes a preventive arm and a corrective arm. The preventive arm consists of two stages (www.mf.gov.pl):

1. An alarm mechanism – a yearly evaluation of the set of indicators, carried out by the European Commission (EC), which compares them with safety thresholds, aimed at identifying those countries at a significant risk. To this end, the EC has developed the so-called Scoreboard Headline Indicators, a list of 11 macroeconomic indicators and their acceptable thresholds.
2. A detailed economic analysis of these countries is done with the use of a broad range of indicators, methods, and documents. It may lead to the conclusion of: lack of imbalances, imbalances. and excessive imbalances (Janicka 2014, p. 678).

In the latter case, the corrective arm may be employed – the state is obliged to provide a corrective plan to the EC, and the EC and EU Council may either accept it or find it insufficient. The states are obliged to update these plans every six months and implement their provisions in due course. The penalty for failing to fulfil this obligation is lodging an interest-bearing deposit amounting to 0.1% of GDP, which may be transformed into a yearly financial penalty should the situation repeat itself (Kuziemska 2010, p. 92).

Even though the EU has adopted the Excessive Imbalance Procedure, the risk of instability remains very large. The most severe example of such imbalances was the loss of competitiveness by Southern European producers, reflected in the faster

increase of their products' prices and labour costs when compared to the remaining eurozone states, a trade deficit in relation to foreign countries, growing external debt, and the loss of shares in export markets (www.mf.gov.pl).

Currently the EC has indicated 12 countries whose macroeconomic situation must be thoroughly analysed, as there is a great risk of destabilisation in their economic balance. They are: Belgium, Bulgaria, Cyprus, Denmark, Finland, France, Italy, Hungary, Slovenia, Spain, Sweden and Great Britain. Such countries as Greece, Ireland, Portugal and Romania are not included in this list because they have their own corrective plans, and Latvia is already being monitored under the program (http://www.stefczyk.info).

In the case of Spain the EC will analyse the structural causes of high unemployment and the results of the mortgage boom; in the case of Italy – its high public debt and low potential for growth; and in the case of Cyprus – the high debt of companies and households as well as its decrease in exports.

The EC will investigate the causes of the loss of export market shares and the consequences of debt in the cases of Belgium, France and Great Britain, whereas in the case of Bulgaria it will analyse labour costs and its productivity. In Slovenia, the EC will look into company debt and the real estate market. This market and the increasing debt will be analysed in the cases of Denmark and Sweden, whereas in Finland its deteriorating external trade will also be analysed (http://www.stefczyk.info).

3. Evaluation of the inner balance of the CEE countries' economies[2]

When undertaking the evaluation of CEE countries' macroeconomic stability, it should first be assessed whether, and how, they fulfil the convergence criteria accepted in the Maastricht Treaty. This is a certain "barometer" of the evaluation of these countries' stability in relation to the rules defined by the EU.

Table 1 shows the fulfilment of these criteria by individual countries as of the end of 2014.

[2] Analysis and own calculations, based on: Trading Economics 2015, Eurostat 2015, OECD 2015.

Table 1. Status of CEE countries' fulfilment of the Maastricht Treaty convergence criteria in 2014

Country	The inflation criterion	The budget deficit criterion	The exchange rate criterion	The criterion of public debt	The interest rate criterion
Bulgaria [BG]	+	+	-	+	+
Croatia [HR]	+	-	-	-	+
Czech Republic [CZ]	+	+	-	+	+
Estonia [EST]	+	+	+	+	+
Latvia [LV]	+	+	+	-	+
Lithuania [LT]	+	-	+	+	+
Poland [PL]	+	+	-	+	+
Romania [RO]	+	-	-	+	+
Slovakia [SK]	+	-	+	+	+
Slovenia [SLO]	-	-	+	+	+
Hungary [HU]	+	+	-	-	+

Source: Trading Economics 2015, Eurostat 2015, OECD 2015.

Nine violations of the accepted convergence criteria were reported in 2014. The majority were reported in relation to the criterion of budget deficit (five) and of public debt (three). In addition, an alarming level of inflation was reported for Slovenia.

These criteria divergences in the cases of Croatia, Latvia, Lithuania, Romania, Slovakia, Slovenia and Hungary may. in the long perspective, pose a major risk for these economies' stability. The risk can be compared to the variations that were experienced by peripheral Member States (Greece, Spain, Ireland and Portugal) during the first decade of the eurozone's existence.

Table 2 complements the evaluation of the aforementioned data. It includes the basic economic indicators that characterise individual CEEC economies. The following were reported in the years 2007–2012: 51 violations in relation to the reference criteria in terms of inflation. These violations refer to all analysed countries. The loss of domestic money's purchasing power at the end of 2012 was the largest in Hungary: 5.0%, Romania: 4.95% and Bulgaria: 4.20%.

In the subsequent analysed years the inflation decreased significantly in all analysed countries, which reflects the effectiveness of national policies implemented in the individual countries in that regard. It is also the consequence of the EU's policy activity in terms of inflation in relation to these countries. The prognoses for 2015 are optimistic and it is expected that the referential tendency will be maintained. Hence it can be clearly stated that there is no risk of imbalance in this area with respect to all CEE countries' economies.

The highest unemployment at the end of the analysed period was reported in Croatia (16.10%), Slovenia (12.30%), and Slovakia (11.60%). In other CEE countries' economies the level of this indicator was acceptable or low. There are no blatant imbalances within this area as well, so it can be considered safe.

As far as trade flow balance is concerned, 73 cases of this parameter's value being negative were reported in the analysed period. The countries where trade balance remains negative are: Bulgaria, Croatia, Estonia, Latvia, Lithuania and Romania. In other countries the level of trade balance fluctuates around zero. Undoubtedly the level of this factor affects the stability of the discussed countries and can reflect problems in their domestic production.

In the long term trade balance may be the factor that will decide about the destabilisation of countries' macroeconomic balance.

As far as the current account deficit is concerned, violations occurred in 37 cases. The country which almost constantly maintains a deficit is Latvia, and unfortunately this situation is not expected to change. In this case, a clear imbalance is visible, which may lead to a situation similar to Greece's unless a deeper analysis is done and corrective measures are taken.

The debt of the analysed group of countries is major. Its increase is reported for all CEE countries' economies in the analysed period, which is a very alarming situation. It reflects the poor condition of these countries' finances and is the main cause of the problems they have with paying debt, which in consequence may lead to difficulties with paying it off at all. Thus, this parameter should be monitored with special attention in the upcoming years (compare: Kowanda 2012, p. 46).

Table 2. A. CEEC economies stability level in the years 2007–2015 – chosen indicators

Country	GDP in 2014 (USD Mld)	GDP in 2015* (USD Mld)	Indicator	Period								
				2007	2008	2009	2010	2011	2012	2013	2014	2015*
Bulgaria (BG)	55.73	55.70	I	12.5	7.80	0.60	4.50	2.80	4.20	-1.60	-0.90	-0.20
			U	6.91	6.31	7.59	9.47	10.4	11.45	11.76	10.69	9.40
Croatia (HR)	57.22	57.02	**I**							0.28	-0.46	-0.40
			U							21.60	19.60	16.10
Czech Republic (CZ)	208.8	205.52	**I**	5.40	3.60	1.00	2.30	2.40	2.40	1.40	0.10	0.50
			U	4.49	4.51	7.12	7.40	6.77	7.37	8.17	7.46	6.30
Estonia (EST)	24.88	25.9	**I**	9.57	6.98	-1.71	5.72	3.70	3.50	1.40	-0.50	-0.30
			U	4.20	7.70	15.70	13.60	11.40	9.30	8.70	6.30	6.50
Latvia (LV)	0.5	1.2	**I**	14.00	10.40	-1.40	2.40	4.00	1.60	-0.40	0.20	0.00
			U	5.40	10.10	20.10	17.20	15.00	13.90	11.30	10.20	9.80
Lithuania (LT)	0.6	0.6	**I**	8.10	8.50	1.30	3.80	3.40	2.80	0.40	-0.30	-0.50
			U	4.10	9.00	16.60	17.40	14.10	12.70	11.40	10.00	8.50
Poland (PL)	548.00	548.00	**I**	4.00	3.30	3.50	3.10	4.60	2.40	0.70	-1.00	-0.70
			U	11.20	9.50	11.90	12.30	12.50	13.40	13.40	11.50	10.30
Romania (RO)	199.04	190.00	**I**	6.60	6.30	4.80	8.00	3.14	4.95	1.60	0.80	-1.70
			U	6.10	5.80	7.50	7.30	7.00	6.70	7.00	6.60	7.00
Slovakia (SK)	99.79	97.71	**I**	3.40	4.40	0.50	1.30	4.40	3.20	0.40	-0.10	-0.20
			U	10.30	8.70	13.90	13.90	13.60	14.40	13.50	12.29	11.60
Slovenia (SLO)	49.42	47.99	**I**	5.60	2.10	1.80	1.90	2.00	2.70	0.70	0.20	-0.40
			U	7.30	7.00	10.30	11.80	12.10	13.00	13.50	13.00	12.30
Hungary (HU)	137.00	134.00	**I**	7.40	3.50	5.60	4.70	4.10	5.00	0.40	-0.90	0.40
			U	7,70	8,00	10,50	10,80	10,70	10,70	9,10	7,10	6,90

Legend: *-prognosis. I – Inflation in percent; U – Unemployment in percent.

Source: Trading Economics 2015, OECD 2015, Eurostat 2015, Commodity Trade Statistics Database 2014.

Table 2. B. CEEC economies' stability level in the years 2007–2015 – chosen indicators

		Period								
		2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015***
BG	**TB**	-3098	-2457	-1457	-1433	-1237	-1235	-1382	-1565	-488
	BD	-25.20	-23.10	-8.90	-1.50	0.10	-1.10	1.00	0.0680	0.00
	ED	29016	37246	37816	37026	37611	37713	36924	39765	38176
HR	**TB**							-24023	-21107	-33669
	BD							0.80	0.7000	0.70
	ED							45958	46663	49782
CZ	**TB**	-104	-336	99	2.3	266	201	339	756	1778
	BD	-4.30	-1.90	-2.30	-3.60	-2.10	-1.60	-0.50	0.6000	0.60
	ED	76192	84231	89244	94217	93913	101859	111338	112850	112851
EST	**TB**	-291	-195	-95	1.2	-61	-239	-143	-190	-145
	BD	-15.00	-8.70	2.60	1.80	1.40	-2.50	-1.10	-0.10	-0.10
	ED	17405	19025	17271	16492	16720	17965	17514	18901	19063
LV	**TB**	-403	-321	-125	-283	-224	-193	-183	-268	-230
	BD	-20.70	-12.30	8.10	2.30	-2.80	-3.20	-2.30	-3.10	-3.10
	ED	26834	29762	29228	30119	29603	30253	30501	33358	35259
LT	**TB**	-420	-355	-33	-165	-133	-25	-166	-192	-272
	BD	-14.40	-12.90	3.70	0.10	-3.70	-0.20	1.60	0.10	0.10
	ED	20476	23633	23339	24015	25040	25921	24394	25374	29337
PL	**TB**	-1841	-2066	-628	-1290	-1338	-1239	-150	-792	56
	BD	-6.20	-6.50	-3.90	-5.40	-5.20	-3.50	-1.30	-1.40	-1.40
	ED	233604	245016	280491	318550	323436	366717	382087	352024	328552
RO	**TB**	-2219	-1569	-912	-844	-1069	-877	-495	-746	-720
	BD	-13.50	-11.50	-4.50	-4.60	-4.60	-4.50	-0.80	-0.50	-0.5
	ED	38711	51762	65616	72909	75928	78741	76951	94302	90792
SK	**TB**	-423	-367	-61	-200	-56	80	-69	-13	459
	BD	-5.30	-6.30	-3.50	-4.70	-5.00	0.90	1.50	0.10	0.10
	ED	40	39	50	52	53	55	60	68	69
SLO	**TB**	-307	-320	-181	-227	-212	-191	-104	40	167
	BD	-4.20	-5.40	-0.60	-0.10	0.20	2.70	5.60	5.80	5.80
	ED	2511	2469	2044	1530	1067	2764	7233	10027	10025
HU	**TB**	-108	-80	274	366	289	130	215	339	812
	BD	-7.20	-7.00	-0.80	0.30	0.80	1.80	4.00	4.10	4.10
	ED	103988	123454	137119	138227	131943	124004	116413	118426	125872

Legend: *-prognosis. Data at the end of the year: ED- foreign debt in billion USD; BD- Budget deficit in % of GDP, TB- trade balance in million EUR (EUR exchange rate of 15/08/15)

Source: Trading Economics 2015, OECD 2015, Eurostat 2015, Molendowski, Stanek 2012, p. 274.

4. Evaluation of economic balance of the CEE countries' on the basis of the Scoreboard and crisis phenomena correlation[3]

Prevention in terms of the Excessive Imbalance Procedure (described above in section 3) is done on the basis of referential measuring instruments that constitute the *Scoreboard* of economic, financial, and structural indicators (Table 3).

Table 3. Excessive Imbalance Procedure – a set of indicators for alarm mechanism monitoring

Imbalance	Indicator	Thresholds
External	**1**.[CAB] current account balance (3-year average, as % of GDP)	-4% to 6%
	2.[NIIP] net international investment position (as % of GDP)	>-35%
	3.[REER] real effective exchange rates (3-year change, HICP deflated, 35 trade partners)	+/-5% for EUR +/-11% outside EUR
	4.[EMS] export market shares (5-year change)	>-6%
	5.[NULC] nominal unit labour costs (3-year change)	<9% for EUR <12% outside EUR
Internal	**6**.[RHP] real house prices (YoY change)	<+6%
	7.[PSCF] private sector credit flow (as % of GDP)	<+15%
	8.[PSD] private sector debt (as % of GDP)	<160%
	9.[GD] government debt (as % of GDP)	<60%
	10.[UR] unemployment rate (3-year average)	<10%
	11.[TFSL] total financial sector liabilities (YoY change)	<16.5%

Source: European Commission 2011.

The table of indicators is the basis for making a yearly *Alert Mechanism Report* (European Commission 2012) for the European Commission, which is designed to enable early identification of macroeconomic imbalances within the EU Member States (Wajda 2013, pp. 318–322). Table 4 shows how the indicators that form the *Scoreboard* for the CEE countries' economies have looked since the Excessive Imbalance Procedure was created (i.e. 2011).

[3] Analysis and own calculations based on: Trading Economics 2015, Statistical Annex of Alert Mechanism Report 2014 and www.stat.gov.pl.

Table 4. The *Scoreboard* for the CEE countries' economies in the years 2011–2014

	CAB	NIIP	REER	EMS	NULC	RHP	PSCF	PSD	GD	UR	TSFL
2011											
BG	-3.4	-85.9	1.9	16.6	21.3	-9.7	1.8	133.4	15.7	9.5	-10.1
HR											
CZE	-3.0	-47.5	-0.6	6.4	2.3	-0.4	2.7	71.9	41.0	6.9	5.4
EST	-4.3	-91.4	-2.6	-8.6	-1.3	-9.9	-4.6	206.5	69.2	19.7	3.7
LV	0.0	-73.0	-2.5	23.0	-16.2	4.8	-4.0	82.6	42.7	17.7	-4.5
LT	3.1	-52.3	1.7	24.5	-7.7	2.3	-0.7	66.2	37.3	15.7	8.9
PL	-4.7	-64.0	-11.6	12.2	4.9	-5.4	7.1	76.4	54.8	9.2	4.3
RO	-4.3	-65.4	-3.3	22.8	-6.6	-17.7	2.3	73.9	34.2	6.9	4.4
SLO	-0.1	-40.8	-1.1	-7.0	8.3	1.0	0.4	115.7	46.2	7.1	-1.3
SK	-3.4	-65.5	3.4	21.1	5.6	-5.2	2.6	73.2	43.5	13.4	1.2
HU	0.1	-107.4	-4.2	-3.9	4.6	-7.4	7.5	147.6	81.0	10.7	-2.7
2012											
BG	-0.7	-78.2	-4.0	4.7	12.7	-6.9	2.5	130.9	18.0	11.3	10.1
HR											
CZE	-2.6	-48.8	0.3	-3.4	3.4	-4.0	0.6	72.4	45.5	7.0	5.4
EST	0.9	-92.8	-5.3	-15.2	-5.6	-16.9	-10.4	195.3	84.4	22.0	3.5
LV	-1.3	-66.1	-8.6	12.1	-5.8	-0.6	-0.7	64.4	40.9	16.9	4.1
LT	-0.6	-52.8	-6.8	29.0	-4.6	-3.2	-0.3	62.5	39.9	15.5	-0.3
PL	-4.6	-66.5	1.2	1.1	4.2	-5.9	3.4	74.6	54.4	9.8	9.6
RO	-4.4	-67.5	-2.0	5.7	-5.2	-10.0	0.9	73.0	37.3	7.0	5.3
SLO	1.1	-45.8	-4.5	-20.4	0.4	-8.4	-3.0	114.1	53.4	8.1	-0.7
SK	-1.8	-64.1	-3.2	3.2	0.9	-5.9	3.2	73.1	52.1	14.1	2.6
HU	0.5	-103.2	-1.1	-17.9	4.2	-9.2	-6.0	131.4	78.5	11.0	-8.2
2013											
BG	0.4	-76.2	-1.0	5.7	12.7	-0.3	2.0	133.7	18.3	12.2	12.0
HR	0.1	-88.7	-4.0	-27.3	0.9	-18.1	-1.1	130.1	75.7	15.8	0.9
CZE	-1.8	-45.6	-3.2	-7.4	3.7	-1.3	0.3	79.9	45.7	6.9	6.9
EST	-1.4	-98.2	-0.4	-7.1	-5.5	-10.4	-9.1	190.2	92.1	24.1	13.5
LV	-0.8	-65.0	-1.7	11.4	8.4	6.4	-1.2	60.1	38.2	14.4	4.9
LT	-1.8	-45.7	-0.7	20.8	6.6	0.1	-0.3	61.4	39.0	13.5	-0.5
PL	-3.4	-69.3	-4.4	-0.4	4.0	-4.2	2.1	76.4	55.7	10.0	10.0
RO	-3.3	-62.3	0.3	10.5	-0.5	-4.5	2.9	74.9	37.9	7.0	5.9
SLO	3.1	-38.7	-0.7	-16.6	-0.8	-6.1	-3.3	100.7	70.4	9.1	-10.4
SK	0.2	-65.1	2.0	-2.2	0.9	-0.4	2.2	70.0	54.6	14.0	3.1
HU	1.4	-92.6	-4.0	-19.0	9.0	-4.1	-5.0	120.9	77.3	7.9	3.5

2014											
BG	0.8	-72.1	-1.0	6.1	12.2	-1.3	2.8	143.1	20.1	10.1	11.0
HR	0.7	-81.1	-4.0	-26.1	0.7	-19.1	-1.1	135.0	76.7	16.1	1.9
CZE	-1.9	-49.6	-3.2	-7.9	3.0	-1.1	1.0	89.0	44.1	6.0	7.5
EST	-1.9	-88.1	-0.4	-7.7	-5.0	-9.4	-8.3	181.1	98.7	25.9	15.5
LV	-1.8	-61.0	-1.7	12.1	7.4	6.1	-0.5	69.0	39.5	16.3	2.9
LT	-1.5	-40.2	-0.7	21.8	6.0	0.6	-0.5	62.6	38.7	15.4	-0.9
PL	-3.9	-78.3	-4.4	-0.9	3.4	-3.2	3.1	79.5	53.9	11.1	9.0
RO	-3.9	-82.1	0.3	12.1	-0.4	-4.5	0.8	76.8	39.6	8.9	5.9
SLO	3.9	-36.1	-0.7	-17.2	-0.7	-5.9	-2.0	109.1	74.3	10.1	-9.4
SK	0.9	-72.1	2.0	-2.9	0.8	-0.1	2.9	79.2	55.1	15.2	3.0
HU	1.8	-99.1	-4.0	-18.0	8.0	-4.0	-5.6	124.8	76.3	9.1	3.0

Source: Own study on the basis of: www.stat.gov.pl; Trading Economics 2015, World Economic Outlook. (2014).

In the years 2011–2014, 28 CEE countries' economies reported a CAB deficit, whereas in 3 of them, the relation of CAB to GDP exceeded the accepted level: –4%. An unfavourable situation occurred in Poland: –4.7%, Romania: –4.4% and Estonia: –4.3%. A CAB surplus in relation to GDP was noted in 16 CEEC economies. None of the countries reported an excess of the threshold value of 6%.

In the years 2011–2014, NIIP among CEEC economies varied from 107.4% of GDP in case of Hungary to –36.1% for Slovenia.

The biggest net debtors were: Hungary, Estonia and Bulgaria.

In the years 2011–2014 none of the analysed countries exceeded the alarm threshold with regard to REER.

Negative values of the indicator reflecting the maintenance of price competitiveness were achieved in 35 cases. The most favourable indicator was reported for Poland (–11.6%).

In the analysed period, 9 countries lost price competitiveness, especially Slovakia (3.4%), Bulgaria (1.9%) and Lithuania (1.7%).

In the period of 2007–2014, EMS was exceeded in 15 cases. The biggest decrease in this regard was reported for Croatia (27.3%), Slovakia (20.4%), and Hungary (19.0%).

An improvement in export market share in 2014 was reported for Lithuania (21.8%), and Latvia and Romania (12.1%).

The biggest decrease in NULC in the period of 2011–2014 was reported in Latvia (16.2%).

Among the CEE countries' economies, the biggest increase of NULC was reported for Bulgaria (21.3%), which is 0.4% in excess of the accepted limit.

All CEEC economies apart from Latvia reported a decrease in house prices during the period of 2011–2014. The biggest decrease was reported for Croatia and Romania, 19.1% and 17.7% respectively. A threshold increase in house prices was reported in 1 country – Latvia, where real estate prices increased by 6.4% annually. Thus Latvia exceeded the prudence threshold determined for the yearly increase in real estate prices.

In the period of 2011–2014 none of CEE countries' economies exceeded the prudence threshold of PSCF in relation to GDP. Hungary had the biggest relation (7.5%, while the greatest decrease occurred in Estonia (10.4%).

In one CEE country's economy the acceptable limit of PSD in the analysed period was exceeded, in 2011 by 206.5%, in 2012 by 195.3%, in 2013 by 190.2%, and in 2014 by 181.1%.

According to Eurostat fiscal notification, GD higher than the referential value was recorded in 10 cases in 2014. The biggest relation of GD to GDP was observed in Estonia (84.4%), Hungary (81.0%), and Croatia (76.7%). The most favourable situation was observed in Bulgaria (15.7%).

In case of UR, in 27 cases an unemployment indicator above this value were reported among the CEE countries in 2014, the highest being in Estonia (25.9%) and Latvia (17.7%). Croatia also had a high unemployment rate (16.1%).

In 2014, there were 29 cases whereby financial sector liabilities increased in relation to 2011 among the CEE countries' economies. They decreased in 11 cases. Estonia was closest to the threshold value in 2014 (15.5%), followed by Bulgaria (12.0%). The greatest decrease in liabilities in the 2011–2014 period was reported in Estonia (10.4%), Bulgaria (10.1%) and Slovenia (9.4%).

In the years 2011–2014, among the CEE countries' economies there were 178 cases of violations of the acceptable thresholds of the *Scoreboard* referential indicators. The greatest number of those cases was reported for RHP (40), NULC (38), NIIP (36) and UR (28). The smallest number of such cases was reported for TFSL (4) and CAB (5).

Table 5 shows the total *Scoreboard* violations in the years 2011–2014 for CEE countries' economies.

Table 5. *Scoreboard* violations for CEE countries' economies in the years 2011–2014

	CAB	NIIP	REER	EMS	NULC	RHP	PSCF	PSD	GD	UR	TSFL
2011–2014											
BG	0	4	0	0	0	4	0	0	0	3	0
HR	0	2	0	2	2	2	0	0	2	4	0
CZE	0	4	0	2	4	4	0	0	0	0	0
EST	1	4	0	4	4	4	0	4	4	4	0
LV	0	4	0	0	4	2	0	0	0	4	0
LT	0	4	0	0	4	4	0	0	0	4	0
PL	2	2	0	0	4	4	0	0	0	2	0
RO	2	4	0	0	4	4	0	0	0	0	0
SLO	0	0	0	4	4	4	0	0	2	1	0
SK	0	4	0	0	4	4	0	0	0	4	0
HU	0	4	0	3	4	4	0	0	4	2	0
Total	**5**	**36**	**0**	**15**	**38**	**40**	**0**	**4**	**12**	**28**	**0**

Source: Own study on the basis of: Statistical Annex of Alert Mechanism Report (2014).

According to the *Scoreboard* logic and the methodology assumed as part of the Excessive Imbalance Procedure, there is a direct relationship between indicator acceptable threshold violations triggering imbalances and crisis phenomena. Hence on may ask: what is the correlation between the violations and crisis phenomena?; and in particular, to what extent do the individual macroeconomic imbalances overlap and what is the intensity of crisis phenomena?

The basic method of study was the analysis of Spearman's rank correlation coefficient (rho) (Graj 2014)[4]. This coefficient is the measuring instrument that describes the correlation strength of two features. It proves useful with small samples (n <30) – so it was suitable for the conducted analysis, where the subject of study were the 11 CEE countries' economies.

The intensity of crisis phenomena has been calculated using the indicator:

$$\Delta X_i = (ARIX_{i\,2011} - RIX_{i\,2014})*100 \quad (1)$$

where:

ΔX_i – the indicator of crisis phenomena intensity in country I,

$ARIX_{i\,2011}$ – 3-year average of referential indicator X in 2011 in country I,

$RIX_{i\,2014}$ – referential indicator X in 2014 in country i.

[4] The inspiration for this study was the model developed by D. Graj. For the purposes of this paper, the logic of this model has been changed and adapted for the analysis.

The study has been conducted on the basis of the calculation of:

1) violations of acceptable thresholds of the *Scoreboard* indicators in the years 2011–2014 – (Table 5).
2) intensity of crisis phenomena in 2014 with ΔX_i indicator – (Table 6).
3) correlation of violations and crisis phenomena – (Table 7).

Table 6. Intensity of crisis phenomena with ΔXi indicator in 2014

	ΔX_i
BG	132.4
HR	69.9
CZE	65.8
EST	175.2
LV	120.3
LT	193.1
PL	-1.0
RO	122.0
SL	78.3
SK	29.4
HU	48.5

Source: Own study.

When considering the intensity of crisis phenomena through the prism of the relation between violations of acceptable indicator thresholds in the *Scoreboard*, it is clearly visible that the CEE countries' economies can be divided into:

- countries resistant to crisis phenomena (negative indicator): Poland;
- countries with a moderate resistance to crisis phenomena (positive indicator): Czech Republic, Estonia, Hungary, Croatia, Slovenia, Slovakia;
- countries with a low resistance to crisis phenomena (positive indicator): Bulgaria, Lithuania, Latvia and Romania.

The indicators of correlations between violations and crisis phenomena shown in Table 7 enable us to determine the extent to which the studied features are related to one another. The strength of correlations has been determined according to Stanisz's scale (Stanisz 1998, p. 55):

$r_{xy} = 0$ variables are not correlated,

$0 < r_{xy} \leq 0.1$ slight correlation – barely significant indicator,

$0.1 < r_{xy} \leq 0.3$ weak correlation – clear, yet weak indicator,

$0.3 < r_{xy} \leq 0.5$ average correlation – real indicator,

$0.5 < r_{xy} \leq 0.7$ high correlation – significant indicator,

$0.7 < r_{xy} \leq 0.9$ very high correlation – considerable indicator,

$0.9 < r_{xy} \leq 1$ almost certain correlation – certain indicator.

Table 7. Correlation of the rho of violations and crisis phenomena ΔX_i in 2014

	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	∑	ΔX_i
1	1.00												
2	0.74	1.00											
3	0.91	0.92	1.00										
4	0.79	0.99	0.91	1.00									
5	0.83	0.97	0.72	0.89	1.00								
6	0.77	0.85	0.78	0.98	0.97	1.00							
7	0.88	0.78	0.75	0.78	0.88	-0.27	1.00						
8	0.86	0.79	0.70	0.88	0.99	0.01	0.88	1.00					
9	0.79	0.77	0.73	0.70	0.95	0.26	0.70	0.30	1.00				
10	0.70	0.79	0.79	0.71	0.74	0.24	0.90	0.23	-0.11	1.00			
11	0.90	0.81	0.76	0.76	0.87	-0.12	0.71	0.01	-0.23	0.78	1.00		
∑	0.39	0.50	0.43	0.44	0.12	-0.37	0.43	0.12	-0.17	0.45	0.42	1.00	
ΔX_i	0.56	0.23	0.21	0.54	0.34	-0.32	0.44	0.08	-0.19	0.21	0.32	0.47	1.00

Source: Own study.

The conducted study shows that there is a significant correlation between the *Scoreboard* parameter imbalances and the intensity of crisis phenomena in case of the violations of the acceptable thresholds in terms of CAB, NIIP, EMS, NULC, RHP, PSD, GD and UR. The imbalances of these eight indicators may create an adverse macroeconomic environment favouring the occurrence of intense crisis phenomena, which means that they should be subject to special monitoring. The remaining three indicators – REER, PSCF and TFSL – remained stable and did not have a significant influence on the occurrence of crisis phenomena.

5. Evaluation of CEE countries' economies balance on the basis of the macroeconomic stabilisation pentagon[5]

The macroeconomic stabilisation pentagon (MSP) is a method which enables one to look at several of the main economic indicators of a given country at the same time (Misala, Siek 2006, pp. 113–114). MSP provides a description of the economic condition of a country in a given year on the basis of socio-economic indicators, such as (Babińska 2004, p. 2):

[5] Analysis and own calculations based on: Trading Economics 2015.

- GDP growth rate,
- rate of unemployment,
- inflation rate,
- ratio of the state budget balance to GDP,
- ratio of the current account balance to GDP.

Each of these values is described on a separate pentagon axis.

The total area of SMP is as follows:

$$MSP = [(\Delta GDP \times U) + (U \times CPI) + (CPI \times G) + (CA + \Delta GDP)] \times k \quad (2)$$

where:

$k = ½ \sin 72°$

$\Delta GDP = GDP1 : GDP1\text{- }t$

$U = Urt : Upt$

$CPI = CPIt : CPIt\text{-}1$

$G = Gt : GDPt$

$CA = CAt : GDPt$

The MSP area changes automatically whenever any triangle's area changes. Generally, as G. Kołodko states, (Kołodko 1993, p. 45) – the SMP's area enlargement indicates an improvement of economic situation, and vice-versa – its reduction indicates an economy's deterioration.

Table 8. Partial MSP indicators for CEEC in 2014

Period/Country/Indicator	A	b	c	d	e
Bulgaria					
2014	0.1000	0.1069	-0.0900	0.0680	0.0010
Croatia					
2014	0.1200	0.1960	-0.0460	0.0070	0.0060
Czech Republic					
2014	0.4500	0.7400	0.0010	0.0060	0.0060
Estonia					
2014	0.0140	0.0630	-0.0050	-0.0010	-0.0010
Latvia					
2014	0.0450	0.1020	0.0020	-0.0310	0.0210
Lithuania					
2014	0.0060	0.1000	-0.0030	0.0010	0.0010
Poland					
2014	0.5480	0.1060	-0.0100	-0.0140	0.0010

Romania					
2014	0.0500	0.0660	0.0800	-0.0500	0.0050
Slovakia					
2014	0.0470	0.1290	-0.0100	0.0100	0.0010
Slovenia					
2014	0.1000	0.1300	0.0020	0.0580	0.0200
Hungary					
2014	0.1300	0.0710	-0.0090	0.0410	0.0410

Source: Own study.

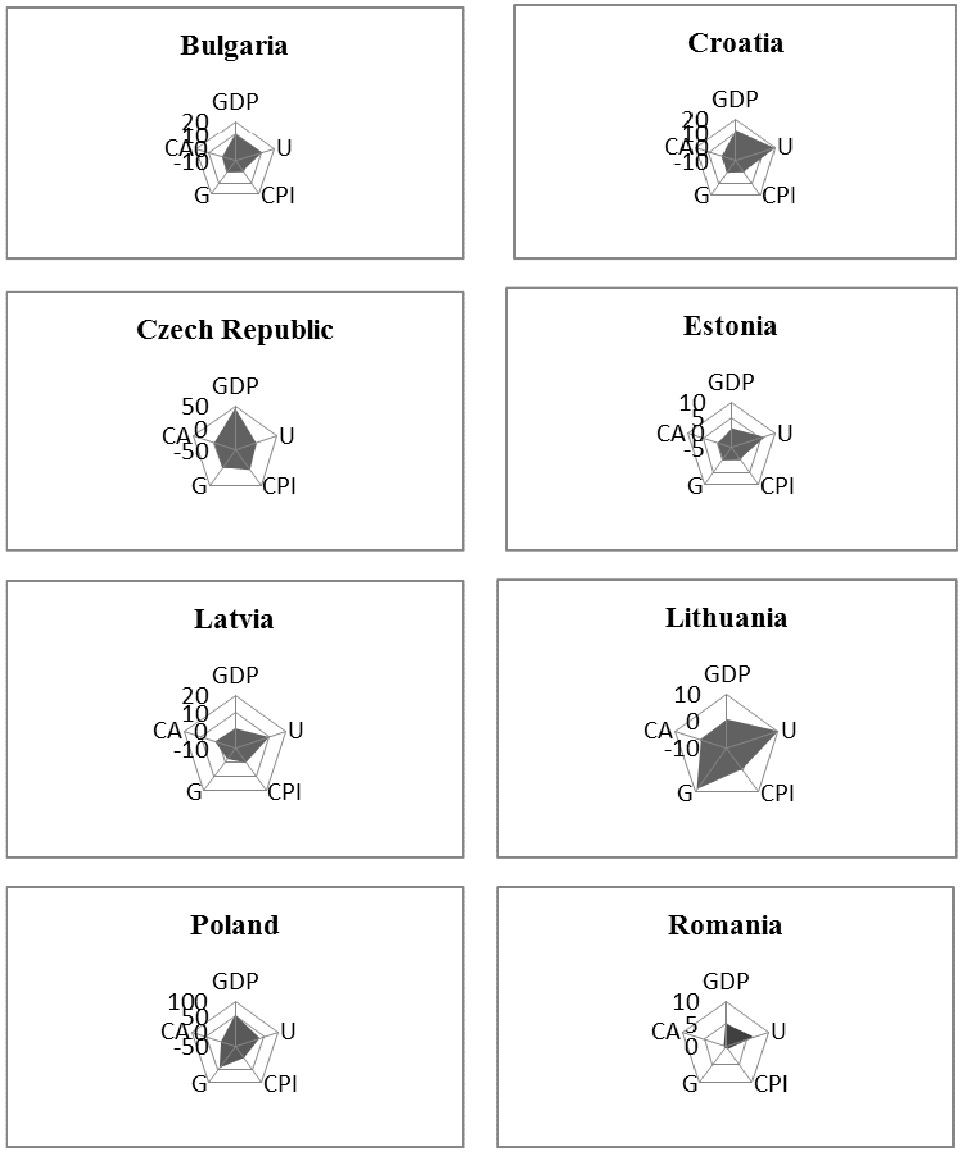
Figure 1 and Table 8 show MSP for the CEE countries' economies in 2014. None of the analysed countries is characterised by a total filling of the pentagon. This means that the economic situation in these countries is not stable and requires constant monitoring. The figures related to all analysed indicators, apart from GDP, are characterised by a flattened shape, which is characteristic for such a situation.

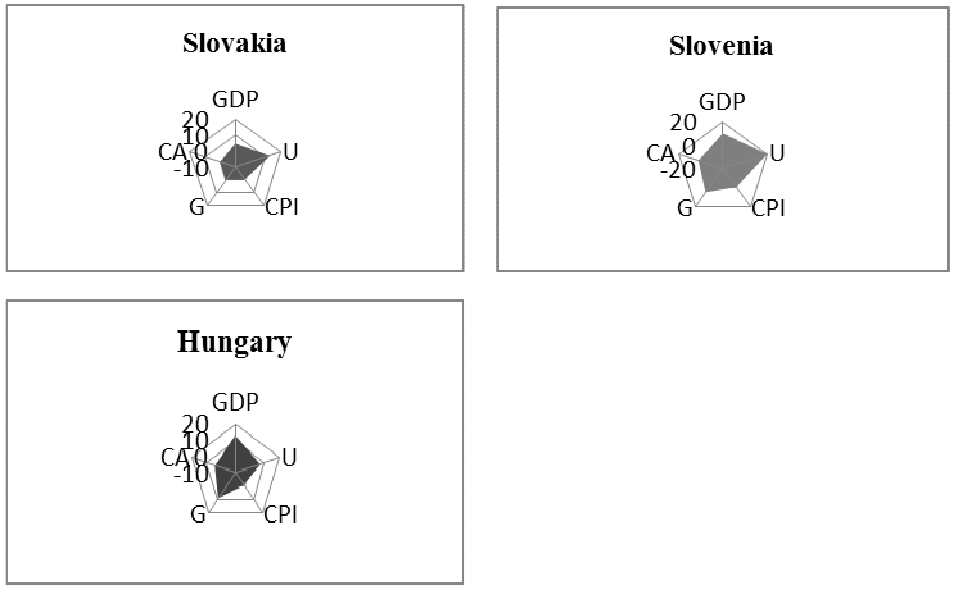
MSP clearly separates the analysed economies into those where there is:

- a high level of unemployment: Bulgaria, Croatia, Latvia, Lithuania, Poland, Slovakia and Slovenia,
- a negative balance in the state budget: Lithuania, Poland, Slovenia and Hungary.

CA and CPI are at a similar and low level in these countries. The worst situation, as far as MSP is concerned, is in Romania, where four out of five factors are at an unfavourable level. A U level, although with a clearly marked shape, is not favourable in this case as well, because it shows the relatively high unemployment in this country. The situation is favourable in Poland, the Czech Republic, and Hungary. The prognoses for the studied countries for 2015 remains similar or the same as for 2014.

Figure. 1. The macroeconomic stabilisation pentagon for the CEE countries' economies in 2014





Legend: GDP – increase rate of GDP in %; U – unemployment rate in % of workforce; CPI – inflation rate in %; G – state budget balance % of GDP; CA – current account balance in % of GDP.

Source: Own study.

6. Conclusions

As the result of the analysis, the CEE countries' macroeconomic security should be considered diverse, not guaranteeing the full macroeconomic safety of any of the studied countries. For this reason, it should be constantly monitored as part of the control mechanisms available in the EU (i.e., the Excessive Imbalance Procedure). Lack of such monitoring may lead to the occurrence of a local destabilisation, as in the case of Greece but this time within the CEE countries.

In terms fulfilling the convergence criteria of Maastricht, in the CEE countries 9 cases of such violations were reported among the analysed group of countries in 2014. Alarming violations occurred with reference to the budget deficit (Croatia, Lithuania, Romania, Slovenia, Slovakia) and public debt (Croatia, Latvia, Hungary). This proves that there are fiscal problems in these countries. Unfortunately, the reported levels of these violations may, in the near future, threaten the inner stability of these countries, significantly increasing their foreign debts, and in consequence may result in the region's destabilisation.

The prognoses concerning inflation for 2015 are optimistic and it is expected that that the tendency will be low, in accordance with the referential level. Hence, it can be clearly stated that there is no risk of imbalance in this area in any of the CEE countries.

There are no blatant imbalances within the area of unemployment rate as well, so it can be considered safe.

The countries where trade balance remains negative are: Bulgaria, Croatia, Estonia, Latvia, Lithuania and Romania. Undoubtedly the level of this factor affects the stability of the discussed countries and reflects their problems with domestic production. In the long term this may be the factor that will decide about the destabilisation of their macroeconomic balance.

In case of budget deficits in the analysed period, Latvia is the country where a deficit has been maintained for almost for the entire period. Unfortunately, it is expected that this situation will not change in this country. In this case, a clear imbalance is visible, which may lead to a situation similar to Greece's, unless a deeper analysis is done and corrective measures are undertaken.

The debt of the analysed group of countries is a major issue, and it increased in all the CEE countries in the analysed period. In this case, a clear imbalance is visible. This parameter should be particularly monitored by the EU institutions, because in case of the CEE countries there is a real danger of their insolvency.

The conducted study shows that there is a significant correlation between the *Scoreboard* parameter imbalances and the intensity of crisis phenomena in cases of violations of the acceptable thresholds in terms of CAB, NIIP, EMS, NULC, RHP, PSD, GD and UR. The imbalances in these eight indicators may form an adverse macroeconomic environment, prompting the occurrence of intense crisis phenomena, which means that they should be subject to special monitoring.

The remaining three indicators: REER, PSCF and TFSL remained stable and did not have a significant influence on the occurrence of crisis phenomena.

The shapes of MSP for the CEE countries' economies in 2014 shows that none of the analysed countries is characterised by a total filling of the pentagon. This means that the economic situation in these countries is not stable and requires constant monitoring. The figures related to all analysed indicators, apart from GDP, are characterised by a flattened shape, which is characteristic for such a situation.

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Streszczenie

OCENA POZIOMU STABILNOŚCI MAKROEKONOMICZNEJ KRAJÓW EUROPY ŚRODKOWO-WSCHODNIEJ W SYTUACJI ICH CZŁONKOSTWA W UNII EUROPEJSKIEJ WIELOWYMIAROWA ANALIZA RYZYKA

Gospodarka krajów Unii Europejskiej od kilku lat podlega ciągłym turbulencjom. Są one konsekwencją szeregu implikacji a w szczególności: kryzysu z 2007 roku, naruszania kryteriów konwergencji oraz dyscypliny fiskalnej, problemów w płynności międzynarodowych rynków finansowych, osłabienia waluty euro, rosnącego bezrobocia w krajach członkowskich Unii Europejskiej, niskiego wzrostu produktywności większości gospodarek unijnych,

rosnącego zadłużenia sfery finansów publicznych, problemów z systemami emerytalnymi – a w szczególności: ich korelacji między ich efektywnością a bezrobociem i niskim przyrostem naturalnym.

Dlatego zdaniem autora ważnym jest przeanalizowanie kluczowych aspektów związanych z tymi parametrami gospodarczymi, które w istotny sposób mogą rzutować na ten proces i które mogą stanowić o ryzyku jego wystąpienia. I taki jest przyjęty cel opracowania.

W opracowaniu zaprezentowano wyniki badań własnych w tym zakresie z użyciem różnych metod takich jak: pięciokąta stabilizacji makroekonomicznej, tabeli Scoreboard i współczynnika korelacji rang Spearmana. Różnorodność przyjętych metod badawczych wynika z jednej strony ze złożoności problemu; z drugiej zaś – dogłębnego przeanalizowania wszystkich zależności i ryzyka wynikającego z tej złożoności.

Z przeprowadzonego badania wynika, że istotna zależność korelacyjna między występowaniem zakłóceń równowagi parametrów tabeli Scoreboard, a intensywnością zjawisk kryzysowych wystąpiła w przypadku naruszeń dopuszczalnych progów w zakresie: salda rachunku obrotów bieżących, międzynarodowej pozycja inwestycyjna netto, udziału w rynkach eksportowych, nominalnych jednostkowych kosztów pracy, realnych cen nieruchomości, długu sektora prywatnego, długu sektora instytucji rządowych i samorządowych i stopy bezrobocia. Zakłócenia równowagi tych ośmiu wskaźników mogą tworzyć niekorzystne środowisko makroekonomiczne sprzyjające występowaniu intensywnych zjawisk kryzysowych a to oznacza, że powinny one podlegać szczególnemu monitoringowi.

Kształtowanie się pięciokąta stabilizacji makroekonomicznej dla gospodarek krajów Europy Środkowo-Wschodniej w 2014 roku, pokazuje, że żaden z analizowanych krajów nie charakteryzuje się pełnym wypełnieniem pięciokąta. Oznacza to, że sytuacja gospodarcza w tych krajach nie jest stabilna i wymaga ciągłego monitorowania. W zakresie wszystkich analizowanych mierników – poza PKB – figury charakteryzują się typowym dla takiej sytuacji spłaszczonym kształtem.

Słowa kluczowe: *stabilność, ryzyko, nierównowaga, destabilizacja, dywergencja*