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Vectors of economic growth in the eastern area of the EU

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Abstract. *In this paper, the author analyzes the most recent trends in the evolution of the Gross Domestic Product for a panel of EU countries from the Eastern Europe, including Romania. The study pursues the evolution of the main indicator of the national economies, the dynamics of GDP per capita, and the components of the Gross Domestic Product, grouped according to the expenses method, all these factors seen as vectors of economic growth. The influence of the factors is also evaluated by multiple regressions. The situation of each country is discusses, together with cross-border comparisons.*

Keywords: Gross Domestic Product, consumption, foreign trade, expenses.

JEL Classification: E01, E60.

1. Introduction. Literature review

The Gross Domestic Product is one of the main indicators from the national accounts. It measures the results of economic activity developed within the borders of a country and is also suitable for cross-border comparisons.

One of the methods used to calculate the Gross Domestic Product is the expenses method, which allows, for subsequent studies, the analysis of the contribution of each factor considered by the method to the structure and evolution of the GDP. The method is based on a sum of factors, thus the dynamic and structural analysis of factor's influences follows the balance method: the absolute modification of the main indicator is influenced by the modifications of its factors.

Anghelache, Soare and Popovici (2015) describe the influence of final consumption on the Gross Domestic Product of Romania, they conclude, following an analysis on annual data for 2003 to 2013, that there is a strong influence of final consumption on the evolution of Romanian GDP (Anghelache et al., 2015, p. 51). Anghelache, Diaconu, Marinescu, and Popovici (2016) realize a comparative analysis on the main indicator of the Romanian economy for the period 2001-2016. Georgescu (2016) presents some issues on the Gross Domestic Product, he outlines the new approaches determined by the introduction of the ESA 2010 system. Păunică (2014) develops on the economic benefits of investments in social infrastructure.

Ioniţă (2015) develops on the stabilization, at macroeconomic level, for the Romanian, Czech and Hungarian economies, he analyzes, among other indicators, the growth rate. Pawlas (2015) presents some selected aspects on the initial members of the Visegrad Group, the analysis includes a discussion on the GDP of those countries.

Pipień and Roszkowska (2015) approach the statistical estimation of the Polish Gross Domestic Product. Matkowski, Rapacki, and Prochniak (2016) evaluate, in a comparative manner, the economy of Poland. Todorov (2016) presents some engines of growth for the Bulgarian economy, while Rădulescu (2016) realizes an evaluation of the Romanian and Bulgarian economies. Vlatka, Sanja, and Mile (2015) examine the role of foreign trade in the Croatian economic system.

2. Research methodology and data

We shall analyze the data regarding a panel of countries from the Eastern Europe, which are members of the European Union: Romania, Bulgaria, Hungary, Czech Republic, Croatia, Poland. The common characteristics on which these countries were selected consider the fact that they are members of the EU, belonged to the area subjected to communism political/economical system, and were not part of the Soviet Union. As measure of economic growth, we have selected the principal indicator of any national economy, namely the Gross Domestic Product. As specified by Eurostat, *"Gross domestic product (GDP) is a measure for the economic activity. It is defined as the value of all goods and services produced less the value of any goods or services used in their creation.* (http://ec.europa.eu/eurostat/web/products-datasets/-/tec00114)

The data were drawn from the Eurostat online database, quarterly datasets, for both the Gross Domestic Product, GDP per capita and components of total GDP. The data source is specified for each graphic. The base of our analysis is the expenses-based method for the computation of the Gross Domestic Product, as presented by Anghelache, Mitruţ and Voineagu (2013). According to this method, the formation and evolution of the Gross Domestic Product are influenced by the following factors:

- effective final consumption, which in turn is composed of the final consumption associated with households and the final consumption related to public administration activities;
- the gross formation of capital;
- net exports of goods and services.

The analysis is based on the philosophy of the balance method, as the factors relate to the main indicator through an additive formula. In this respect, we shall emphasize the weight of each factor in the value of the Gross Domestic Product for each country.

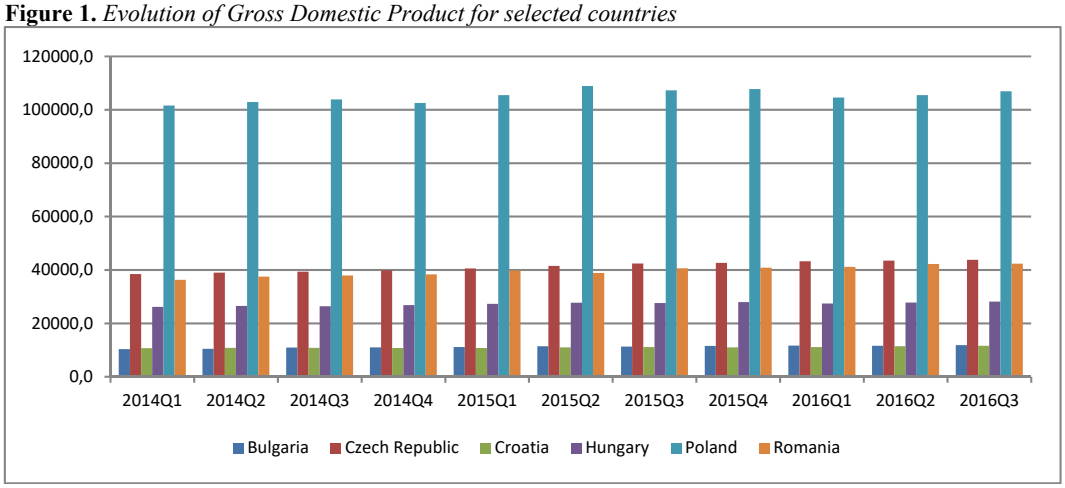
Then, the analysis was substantiated by an econometric analysis on the same set of factors, measuring the influences of the independent variables on the Gross Domestic Product. We have estimated a multiple regression model for each country and have discussed on the parameters and characteristics of the individual models.

3. Results and discussions

Analysis of the Gross Domestic Product evolution

In this section, we shall pursue, at first, the analysis of the Gross Domestic Product, from multiple viewpoints. First, we will consider a comparative approach and outline the trend of the indicator, measured as total value, across the time interval considered, for selected countries.

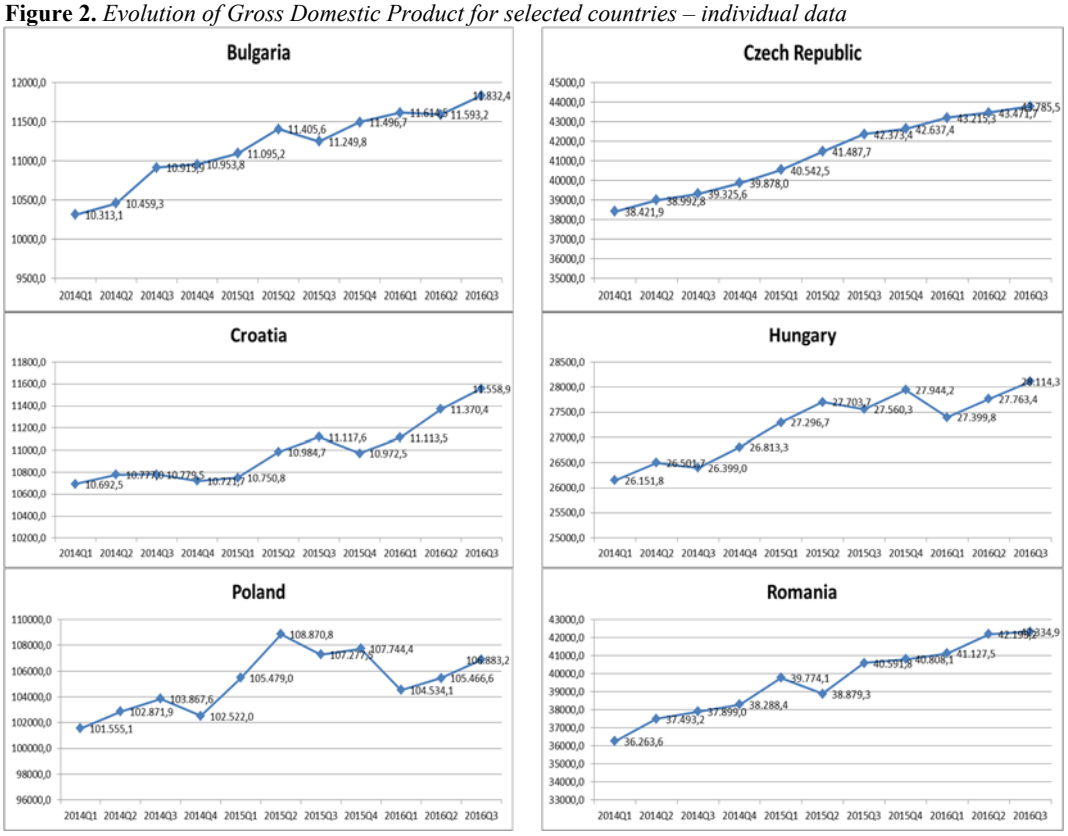
Figure 1. *Evolution of Gross Domestic Product for selected countries*



Source: Eurostat, http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=teina010, accessed 5 February 2017, graphical representation by the author.

It can be seen that, for the select panel of countries, the biggest value of GDP is associated with Poland, roughly ten times bigger than the lowest country in the group – Bulgaria. This observation is valid for the entire set of data. Romania is placed on the third place, below Czech Republic, but ahead of her neighbors – Bulgaria and Hungary. As this analysis alone does not provide significant conclusions on the comparisons between countries, we shall focus then on the analysis of the evolution of GDP for each country. The results, in a visual format, are presented in the figure below:

Figure 2. *Evolution of Gross Domestic Product for selected countries – individual data*

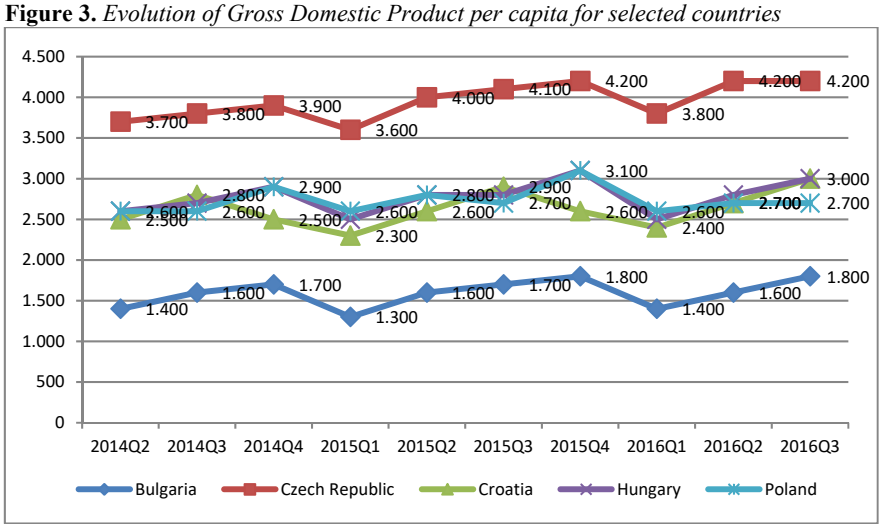


Source: Eurostat, http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=teina010, accessed 5 February 2017, graphical representations by the author.

The evaluation of individual data series reveals significant information on each country. There can be observed the steady increase of the analyzed indicator, across the entire interval, with the exception of Poland, for which the last measured value is below the maximum one; however the recovery trend is present and visible. The Czech Republic was the least affected by sinuous trends in the dynamics of the Gross Domestic Product, as the dataset shows the most convincing upward trends of all six countries. Bulgaria, Croatia, Hungary, Poland and Romania experienced, at given moments, sudden drops in the GDP level, drops that can be explained, from a low-granularity perspective, through the components' contributions, as delimited by the expense method.

Next, we will take into account the level of the GDP/capita, which offers a higher degree of comparability among the national economies included in our study. The graphical representation of the dataset is presented in the figure below:

Figure 3. *Evolution of Gross Domestic Product per capita for selected countries*



Source: Eurostat, *Main GDP aggregates per capita [namq_10_pc]*, accessed 5 February 2017, graphical representation by the author. The source indicated does not include data for Romania.

The comparative analysis via the GDP per capita is more suggestive than the study based on the total value of the Gross Domestic Product. Thus, we can see that the highest value of the indicator is associated with Czech Republic, for the entire interval considered. The second, third and fourth positions are held by Croatia, Hungary and Poland. Bulgaria has the lowest value of GDP per capita. Also, to be noted that the level of the indicator does not have a straight-line trend and its evolution is marked by up- and downturns, for all countries. The last two values for the Czech economy are identical to the maximum measure, the same comparison is valid for the last value of the Bulgarian GDP per capita. The last values for Poland and Hungary are smaller than the peak level.

4. Contribution of GDP components to the economic development

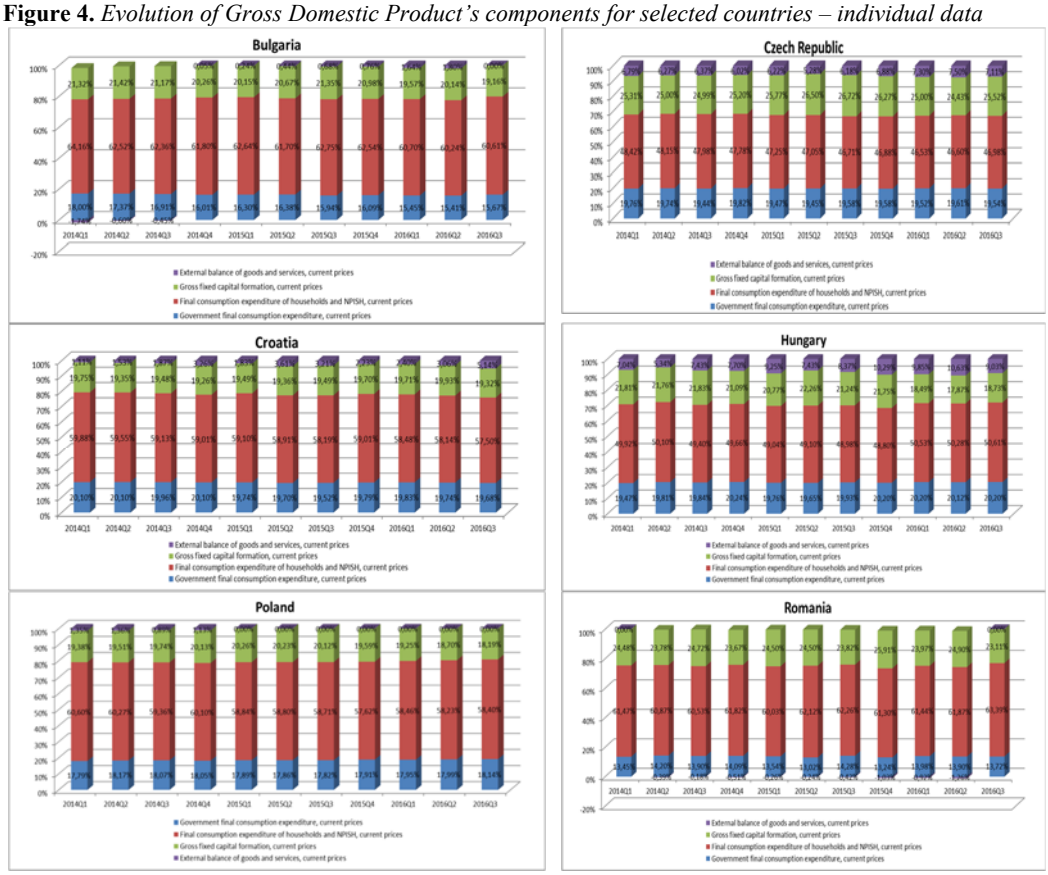
For the scope of our analysis, the following components were taken into consideration:

- Government final consumption expenditure, measured in current prices;
- Final consumption expenditure of households and NPISH, also measured in current prices;
- Gross fixed capital formation, current prices;
- External balance of goods and services, current prices.

We have analyzed the contribution of these factors to the evolution of the Gross Domestic Product in the countries included in the panel and thus we outlined the mode in which the evolution of each component has influenced the evolution of the main indicator.

The results are presented, in a graphical format, in the figure below:

Figure 4. *Evolution of Gross Domestic Product's components for selected countries – individual data*



Source: Eurostat, calculations made by the author, data from tables at:
http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=teina010
http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=teina030
http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=teina020
http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=teina040
http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=teina050
accessed 7 February 2017.

For the Bulgarian economy, the data reveal the major impact of the component "*Final consumption expenditure of households and NPISH*", whose percentage in the formation of GDP is greater than 60% for the entire interval subjected to analysis. The "*Gross fixed capital formation"* covers some 19-21%, and „*Government final consumption expenditure*" accounts for weights around 15-17%.

To be noted that the external balance records a positive evolution, from a starting level below 0 in Q1 2014, to a positive, greater as absolute value at the end of the interval, but the contribution of this component is below 2% and has a descending trend.

For the Czech Republic, we can outline the greater contribution of the external balance, which accounts for 5.28-7.50% (the minimum and maximum weights measured across

the dataset). The „*Government final consumption expenditure*" records a contribution between 19-20%, the "*Gross fixed capital formation"* has a weight around 24-26%. The most significant factor of the Czech GDP is the same that in the case of Bulgaria, the "*Final consumption expenditure of households and NPISH*", with a less major impact on the main indicator, with values around 47-48%.

The structure and evolution of the Croatian GDP is mainly attributed to the "*Final consumption expenditure of households and NPISH*", whose contribution ranges, across the time interval for which data were collected, from 57% to 59%. This weight is close to the levels recorded for Bulgaria. The factors "*Gross fixed capital formation"* and „*Government final consumption expenditure*" participate with similar quotas, that is between 19% and 20%. The foreign trade has a less visible contribution, but we can notice the growth trend at the end for the last quarters.

In Hungary, the trend of the Gross Domestic Product can be explained through the significant quota of the "*Final consumption expenditure of households and NPISH*", which is close to 50% during the period analyzed. The following places in the hierarchy are held by the "*Gross fixed capital formation"* and „*Government final consumption expenditure*", accounting for some 20%. There can be seen a reverse of those two indicators' impact, as the percentage associated with the first factor decreased following a peak in Q2 2015. The contribution of the export/import balance presents an upward tendency, and maintains in the last four quarters around the level of 10%.

The analysis of the Polish GDP and components emphasizes the major share associated to the factor "*Final consumption expenditure of households and NPISH*", with values close to 58-60%. The formation of gross fixed capital records values between 18% and 21%, while the public consumption is placed between 17-18.14%. The impact of these two factors has almost the same value in the last quarter. The foreign trade indicator has a very low value (for the final part of the time interval, there are no data available).

The Gross Domestic Product of Romania is mainly influenced by the "*Final consumption expenditure of households and NPISH*", recording a contribution of more than 60%, reaching a peak of 63.39% in the last quarter of the interval analyzed. The formation of fixed capital amounts for percentages between 23-26%, with the balance of foreign trade having a negative influence. To be noted, during the last four quarters for which data were taken, the absolute value of the indicator is very low and also records a major downturn from previous values which, although negative, had measure order below 200 million euros.

5. Analysis of the Gross Domestic Product evolution under the influence of components – econometric approach

A more complex approach, based on linear regression, will reveal the impact of the influence factors considered on the Gross Domestic Product. We shall use the same dataset and draw a multiple regression model for each country.

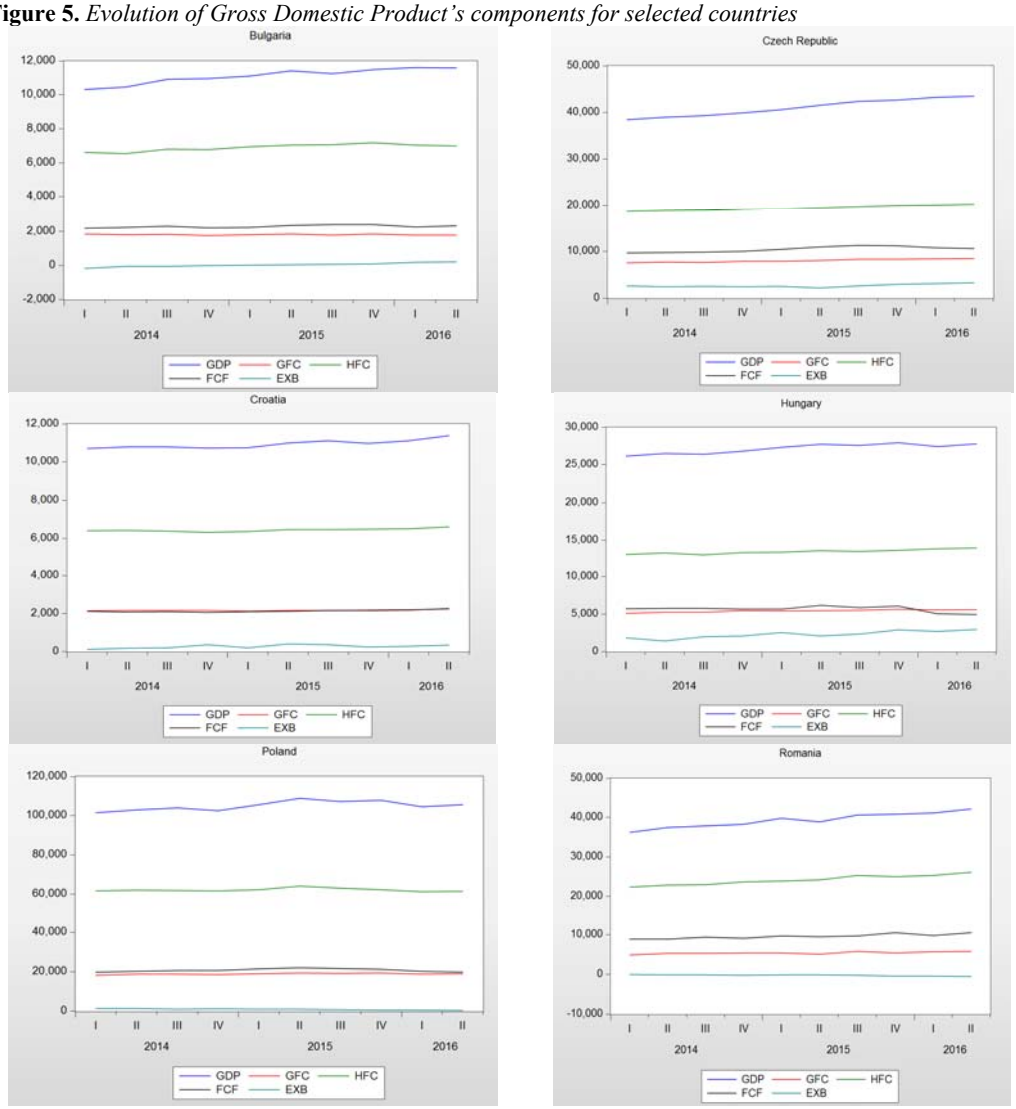
The foundation of the multiple regression model is to outline the influence of several factors on an indicator that is assumed as principal. We will approach, first, the

comparative graphical analysis of the indicators' evolution, for each country taken individually. Thus, for each country, the following variables were defined:

- GDP: Gross Domestic Product;
- GFC: Government final consumption;
- HFC: Final consumption of households;
- FCF: Gross fixed capital formation;
- EXB: External balance of goods and services.

The graphical representation of the regression model parameters is drawn in the figure below:

Figure 5. *Evolution of Gross Domestic Product's components for selected countries*



Note: data not available for the Polish EXB variable were estimated by the authors.

The above figure reveals the quasi-linear link between the main indicator of our study and its influence factors. We observe, also, the major contribution posed by the HFC variable – the final consumption of the households. Also, the dynamics of the relative contributions of all factors can be observed, in relation with the trend of the Gross Domestic Product.

This conclusion allows us to focus next on the estimation of the multiple regression, following the principle of an individual model for each country. The general structure of the proposed models is the following:

$$GDP = c(1) + c(2) \times GFC + c(3) \times HFC + c(4) \times FCF + c(5) \times EXB$$

where:
c(1): the free term;
c(2)…c(5): the quotients of the influence factors included in the model.

To estimate the regression models, we have used a specialized software, and the results are presented in Figure 6.

Figure 6. *Regression models describing the influences of Gross Domestic Product's components for selected countries*

Bulgaria

Dependent Variable: GDP
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/14/17 Time: 16:10
Sample: 2014Q1 2016Q2
Included observations: 10
GDP=C(1)+C(2)*GFC+C(3)*HFC+C(4)*FCF+C(5)*EXB

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	2880.895	1756.428	1.640201	0.1619
C(2)	1.141881	1.124703	1.015273	0.3566
C(3)	0.985269	0.308893	3.189672	0.0243
C(4)	-0.319886	0.643641	-0.496994	0.6403
C(5)	2.558144	0.525940	4.863944	0.0046

R-squared	0.979536	Mean dependent var	11109.71
Adjusted R-squared	0.963165	S.D. dependent var	455.2428
S.E. of regression	87.37212	Akaike info criterion	12.08508
Sum squared resid	38169.43	Schwarz criterion	12.23637
Log likelihood	-55.42541	Hannan-Quinn criter.	11.91911
F-statistic	59.83338	Durbin-Watson stat	2.259945
Prob(F-statistic)	0.000207		

Czech Republic

Dependent Variable: GDP
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/14/17 Time: 16:05
Sample: 2014Q1 2016Q2
Included observations: 10
GDP=C(1)+C(2)*GFC+C(3)*HFC+C(4)*FCF+C(5)*EXB

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-18120.61	5344.834	-3.390304	0.0195
C(2)	0.044923	1.347252	0.033344	0.9747
C(3)	2.949216	0.829788	3.554180	0.0163
C(4)	0.186727	0.246481	0.757572	0.4829
C(5)	-0.155338	0.350500	-0.443190	0.6761

R-squared	0.995555	Mean dependent var	41034.63
Adjusted R-squared	0.991999	S.D. dependent var	1848.641
S.E. of regression	165.3569	Akaike info criterion	13.36094
Sum squared resid	136714.5	Schwarz criterion	13.51223
Log likelihood	-61.80471	Hannan-Quinn criter.	13.19497
F-statistic	279.9682	Durbin-Watson stat	2.778205
Prob(F-statistic)	0.000005		

Croatia

Dependent Variable: GDP
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/14/17 Time: 16:14
Sample: 2014Q1 2016Q2
Included observations: 10
GDP=C(1)+C(2)*GFC+C(3)*HFC+C(4)*FCF+C(5)*EXB

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1798.095	2273.221	0.790990	0.4648
C(2)	0.087548	1.075214	0.081424	0.9383
C(3)	0.599609	0.645585	0.928784	0.3956
C(4)	2.297311	0.824229	2.787225	0.0386
C(5)	0.640975	0.177222	3.616783	0.0153

R-squared	0.976890	Mean dependent var	10928.02
Adjusted R-squared	0.958403	S.D. dependent var	222.4970
S.E. of regression	45.37919	Akaike info criterion	10.77484
Sum squared resid	10296.36	Schwarz criterion	10.92613
Log likelihood	-48.87419	Hannan-Quinn criter.	10.60887
F-statistic	52.84005	Durbin-Watson stat	2.748043
Prob(F-statistic)	0.000279		

Hungary

Dependent Variable: GDP
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/14/17 Time: 16:21
Sample: 2014Q1 2016Q2
Included observations: 10
GDP=C(1)+C(2)*GFC+C(3)*HFC+C(4)*FCF+C(5)*EXB

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-703.5835	3431.648	-0.205028	0.8456
C(2)	0.556675	0.795893	0.699435	0.5155
C(3)	1.455836	0.394280	3.692394	0.0141
C(4)	0.762468	0.175413	4.346695	0.0074
C(5)	0.407460	0.187733	2.170428	0.0821

R-squared	0.974379	Mean dependent var	27153.39
Adjusted R-squared	0.953883	S.D. dependent var	637.6879
S.E. of regression	136.9426	Akaike info criterion	12.98385
Sum squared resid	93766.40	Schwarz criterion	13.13515
Log likelihood	-59.91927	Hannan-Quinn criter.	12.81789
F-statistic	47.53897	Durbin-Watson stat	2.080137
Prob(F-statistic)	0.000361		

Poland

Dependent Variable: GDP
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/14/17 Time: 16:28
Sample: 2014Q1 2016Q2
Included observations: 10
GDP=C(1)+C(2)*GFC+C(3)*HFC+C(4)*FCF+C(5)*EXB

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-4609.341	18156.32	-0.253870	0.8097
C(2)	2.402782	1.181978	2.032848	0.0978
C(3)	0.924610	0.477597	1.935964	0.1106
C(4)	0.446351	0.445845	1.001136	0.3627
C(5)	-2.564047	0.985217	-2.602520	0.0481

R-squared	0.972548	Mean dependent var	105018.9
Adjusted R-squared	0.950586	S.D. dependent var	2407.891
S.E. of regression	535.2580	Akaike info criterion	15.71023
Sum squared resid	1432506.	Schwarz criterion	15.86152
Log likelihood	-73.55114	Hannan-Quinn criter.	15.54426
F-statistic	44.28336	Durbin-Watson stat	1.892565
Prob(F-statistic)	0.000428		

Romania

Dependent Variable: GDP
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 02/14/17 Time: 16:48
Sample: 2014Q1 2016Q2
Included observations: 10
GDP=C(1)+C(2)*GFC+C(3)*HFC+C(4)*FCF+C(5)*EXB

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	1229.844	3632.760	0.338543	0.7487
C(2)	1.640899	0.649972	2.524567	0.0529
C(3)	0.717545	0.237935	3.015715	0.0296
C(4)	1.260221	0.389112	3.238707	0.0230
C(5)	1.012434	1.183160	0.855704	0.4312

R-squared	0.986527	Mean dependent var	39331.82
Adjusted R-squared	0.975749	S.D. dependent var	1871.289
S.E. of regression	291.4125	Akaike info criterion	14.49421
Sum squared resid	424606.3	Schwarz criterion	14.64550
Log likelihood	-67.47105	Hannan-Quinn criter.	14.32824
F-statistic	91.52858	Durbin-Watson stat	2.093852
Prob(F-statistic)	0.000073		

Note: data not available for the EXB variable were estimated by the authors.

The estimations have generated the following results:

For Bulgaria, the most significant influence is given by the EXB factor, showing the importance of the foreign trade in the economy of this country. For an increase by unit of the EXB, the GDP of Bulgaria is supposed to grow by almost 2.56 units, which is a very favorable influence. Next, in descending order, are the public consumption, the household-related consumption, and the formation of fixed capital. To be noted that this last factor has a negative influence on the Gross Domestic Product. The values for R-squared and Adjusted R-Squared are situated above 0.96, thus it can be considered that the model estimated provides a very accurate description of the interaction between the macroeconomic indicators. The free term is very high, compared to the quotients of the independent variables.

The evolution of the Gross Domestic Product in the case of Czech Republic is determined, in the highest measure, by the final consumption of the households. The growth by unit of this factor will conduct to almost 2.95 units to be added to the GDP. The influences of the other factors are very low compared to the top one, and we outline the negative sign of the quotient for net exports, providing incentive that a better position of the foreign trade might contribute to a more sizable growth of the Czech economy. The values of the tests R-squared and Adjusted R-Squared are significant, so the evolution for the Gross Domestic Product can be explained in a significant manner on the basis of the estimated model. The free term reaches a very low level, as it is negative, but its absolute value is far greater than the parameters that measure the influence of the factors.

Croatia is characterized by the major impact of the investments variable on the evolution of the Gross Domestic Product. An increase by one monetary unit of this factor will generate a growth of the main indicator by more than 2.29 units. All the influences of the other factors are favorable, the least important factor in this context is the public final consumption. To be observed, the high level of the free term some 600 times greater than the biggest quotient of the independent variables. The model is reliable enough, with the two reference parameters having values over 0.95.

In Hungary, the determinants of the model are similar to the values recorded for Croatia. The most important factor which impacts the evolution of the Gross Domestic Product is the expenses of the population, made for final consumption. It determines, for a unit

increase, the modification in the same way of the Gross Domestic Product by more than 1.4 units. All other factors are characterized by positive influence, but their regression quotients are below the unit level.

The regression model for the Polish GDP outlines a considerable influence of the public consumption indicator, with a regression quotient of over 2.4. Less significant influences are posed by the consumption of the households and investments, respectively. The model explains in a sufficient proportion the evolution of the main indicator for the time period considered, as R-squared is greater than 0.97 and Adjusted R-squared is slightly higher than 0.95. The free term, negative, has a very low value compared to the regression parameters.

In the case of Romania, the estimated model emphasizes the influence of public consumption, with a quotient of 1.64, followed by the investments (1.26), net export (1.01) and household consumption (0.71). The determinants have values over 0.97, which provides evidence on the reliability of the model and outline the intensity of the correlation between the independent variables and the Gross Domestic Product, and the value of the free term, almost 750 times greater than the biggest regression parameter, shows the influence of additional factors, not taken into consideration at the construction of the model.

6. Conclusions

The main factor that contributes to the formation of the Gross Domestic Product, for all economies taken into consideration, is the "*Final consumption expenditure of households and NPISH".* The least significant share in the GDP is associated, for all countries, to the foreign trade balance, while the two other factors included in our study take the middle position in the hierarchy. As all economies depend in a great manner on the final consumption, the highest influences are observed in Bulgaria, Poland, Croatia and Romania. Significant contribution of the foreign trade activity results affect the evolution of the GDP in the Czech Republic. The greatest value of Gross Domestic Product, within the dataset considered, is associated with Poland. While analyzing the GDP per capita, the best performances correspond to the Czech economy.

Upon the econometric analysis of the Gross Domestic Product evolution, an overall observation of the six models indicates that the R-squared and Adjusted R-Squared have significant values for all equations, which represents a good reliability of each model and the possibility to use this kind of models for future analyses, given the strength of the correlation GDP – independent variables drawn from the expenses method. Also, the values of the free term are elevated enough to recommend further research, but the integration of the factors we proposed in a multiple regression model is justified by the principle of the expenses method, therefore additional analyses must take into consideration another principle according to which the factors should be selected. Not in the last row, the final consumption's impact, measured by the sum of quotients c(2) and c(3), is the "engine" of GDP evolution in the case of four countries – Czech Republic, Hungary, Poland and Romania.

As all countries analyzed share a common historical background in the last 50 years, at least from the political and economic viewpoint, the large share of the main influence factor previously outlined calls for measures that are adequate to encourage the increase of the investments, as a factor with a more sustainable impact on the future development of the national economies.

References

Anghelache, C., Mitruţ, C. and Voineagu, V., 2013. *Statistică macroeconomică. Sistemul Conturilor Naţionale*, Bucharest: Economică

Anghelache, C., Soare, D.V. and Popovici, M., 2015. Analysis of Gross Domestic Product Evolution under the Influence of the Final Consumption, *Theoretical and Applied Economics*, 22(4), pp. 45-52.

Anghelache, C., Diaconu, A., Marinescu, A.I. and Popovici, M., 2016. Comparative study of the evolution of the Gross Domestic Product indicator, *Romanian Statistical Review Supplement*, 64(12), pp. 165-172.

Georgescu, G., 2016. The Gross Domestic Product. History, relevance and limitations in its interpretation, University Library of Munich, Germany in its series *MPRA Paper* with number 73644, available at https://mpra.ub.uni-muenchen.de/73644/1/MPRA_paper_73644.PDF, accessed 7 February 2017.

Ioniţă, O.A., 2015. The Evolution Of The Macroeconomic Stabilisation Pentagon In Romania, Czech Republic And Hungary, *The Journal of the Faculty of Economics – Economic*, 1(1), pp. 733-741.

Pawlas, I., 2015. The Visegrad Countries and European Union membership - selected Issues, *18th International Academic Conference,* 25 August 2015, London, United Kingdom.

Pipień, M. and Roszkowska, S., 2015. Quarterly estimates of regional GDP in Poland – application of statistical inference of functions of parameters, National Bank of Poland, Economic Institute in its series *National Bank of Poland Working Papers* with number 219, available at http://www.nbp.pl/publikacje/materialy_i_studia/219_en.pdf

Matkowski, Z., Rapacki, R. and Prochniak, M., 2016. Comparative Economic Performance: Poland and the European Union, *EconStor Open Access Articles*, 2016, pp. 11-35.

Păunică, M. (2014). Economic benefits of the infrastructure projects implemented in the Reservation of the Danube Delta Biosphere. *Theoretical and Applied Economics*, Vol. 18, No. 11, pp. 95-104.

Rădulescu, A., 2016. Romania and Bulgaria after one decade in EU – An assessment of the economic performance, *International Scientific Publications: Economy & Business*, 10(1), pp. 537-545.

Todorov, I., 2016. Supply-Side Factors of Economic Growth in Bulgaria, *Economic Alternatives*, 2016(2), pp. 159-174.

Vlatka, B., Sanja, F., Mile, B., 2015. Examining the Export-led Growth Hypothesis: The case of Croatia, *Naše gospodarstvo/Our economy*, 61(3), pp. 22-31.

http://ec.europa.eu/eurostat, accessed 7 february 2017.