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EU BALKAN MEMBER STATES BETWEEN ECONOMIC PERIPHERY AND COHESION. TO A NEW REGIONAL LEADER IN AN EU OF CONTRADICTIONS?

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Biographical note

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Abstract

The paper deals to the idea that the EU Balkan region would become a growth pole even that the present regional development disparities are high. This is why the "new EU" has to create new opportunities for the EU Balkan Member States.

The analysis in the paper is focused on the following indicators: GDP, private consumption, public consumption, gross fixed capital formation, exports and imports. In order to quantify the regional disparities between the Member States in this region, the analysis is built on the following algorithm: the correlation analysis, regression analysis and cluster analysis. In order to point out the

economic trend in the region, forecasting procedures are used for the 2019-2021 period. The mathematic analysis is supported by IBM-SPSS software.
The main conclusion of the paper is that the Balkan economies will continue to develop under a divergent way and the regional disparities will increase, at least on short and medium terms.
Keywords: regional disparities; regional leader; Balkan economies; economic performances.
JEL Classification: R10, R11, R12.

1. Introduction

The Balkans represent a great challenge for all specialists from historic, economic, social, political or cultural points of view. Even that the region covers only more than 60 million inhabitants, its great disparities are unique for all kind of approaches.

From the geographic point of view, 11 independent states belong to the region. Some of them have the whole surface included in the region: Albania, Bosnia and Herzegovina, Bulgaria, Greece, Montenegro and FYR of Macedonia. This delimitation is very important for each analysis (Danforth and Crampton, 2015). The rest of the countries are partially counted as Balkan region: Serbia, Croatia, Slovenia, Romania and Turkey (Columbia Encyclopaedia, 2015).

In order to conclude, the delimitation of the Balkan economies covers the area from the east of Serbia to the Black Sea at the east of Bulgaria (Gray and Sloan, 2013).

A fast review of these data leads to the conclusion that there are great disparities between the Balkan countries. The present analysis is focused only on the EU Balkan Member States: Bulgaria, Croatia, Greece, Romania and Slovenia.

These last five countries had to face the global economic crisis' impact. One of them, Greece, was close to a Grexit, but succeeded in starting a painful economic reform in order to achieve economic recovery. The impact of the crisis on the Greek banking system was great, even that is was predictable (Provopoulos, 2014).

The traditional economic development across the Balkan region was based on industry and exports and started in the 1950s. Other traditional economic characteristic is the importance of the public sector (Réti, 2010), which continued to have a great contribution to the GDP till now.

The recession has had strong effects on the Balkan economies. The economic contraction in these countries in 2009 (-5.2%) was followed by recession at least during 2010-2012. The recession was greater in Greece and put into new light the Romanian economy as the largest Balkan economy (Laza, 2012).

Some specialists pointed out the crisis' impact on specific areas from Balkans. The analysis uses specific economic indicators as the following: GDP, employment, inflation rate, budget deficit

and trade relation related to the Western part of the region. These indicators are analysed using comparison between their values before and after crisis' generalisation. It is no doubt that the economic growth across the Balkan region had a positive trend during 1950-2008. At that moment, the crisis destroyed this economic performance. Moreover, the economic recovery process started in 2012 is not fast enough to achieve the past economic performances. (Pere and Hashorva, 2012).

On the other hand, the crisis' impact was different on different Balkan Member States. Bulgaria faced to important decrease of the FDI flows, while Greece faced to a collapse of its banking system which is not 100% recovered till now (Klein, 2012).

The FDI flows are analysed in the volume, sectorial structure and timing, in order to point out the disparities between the Balkan countries. In order to realise this, two different research methods were used: a comparative analysis and a gravitational model. The main premise of this research is pessimistic: the Balkan economies received less FDI than the Central East European countries. The effect of this deficit in FDI consists in low economic development at least on short and medium terms (Estrin and Uvalic, 2013).

Some specialists tried to support the idea of better business in Balkans (especially in the Western Balkans). They pointed out at least five opportunities for the foreign investors in the region: the EU adhering perspective, the high degree of macroeconomic stability, the geographic proximity and tariff-free access to EU markets, the economic diversity of the region, the taxes and labour costs' levels (Sanfey, Milatovic and Kresic, 2016).

There are pessimistic approaches too. One of these is that the Balkans region will face to low economic growth rates at least for the next four decades (Gligorov, 2016).

The economic researches and studies on Balkan region are doubled by studies focused on specific national economies. One of them is Greece, which had to face to deeper and more destroying economic effects from the recent global crisis. These negative effects were supported by Greece's high debt level, high budget deficit, low competitive power and unstable political structure (Ozturka and Sozdemirb, 2015).

Croatia has to face other challenges. The economy succeeded to achieve high annual growth rates for the past three years and the forecasts are positive for the next few years (about 3%). The problem is if these growth rates will be able to recovery the economy after a long-lasting and deep recession. Moreover, the personal consumption remains the main contributor to growth (Dalić, 2017).

International organisations' studies on Slovenia pointed out the advantages and the challenges for this little economy. A little economy can be easily adapted to an economic positive

trend. On the other hand, Slovenia was not avoided by the global crisis' negative effects (OECD, 2017).

Even that their economic performances are better or not, the idea of economic reform in the Balkans region is more than recommended. Under the hypothesis of adopting reform simultaneously across the EU Balkan Member States, the results will be not the same. A recent research was focused on the reform process' implications of different companies. The analysis is based on a tractable general equilibrium (GE) model. The model points out that larger firms will grow faster than smaller firms after the reform. The different distribution of the diverse companies across a Member State leads to the conclusion that identical reforms may produce a variety of growth outcomes across countries (Stankova and Vasilev, 2018).

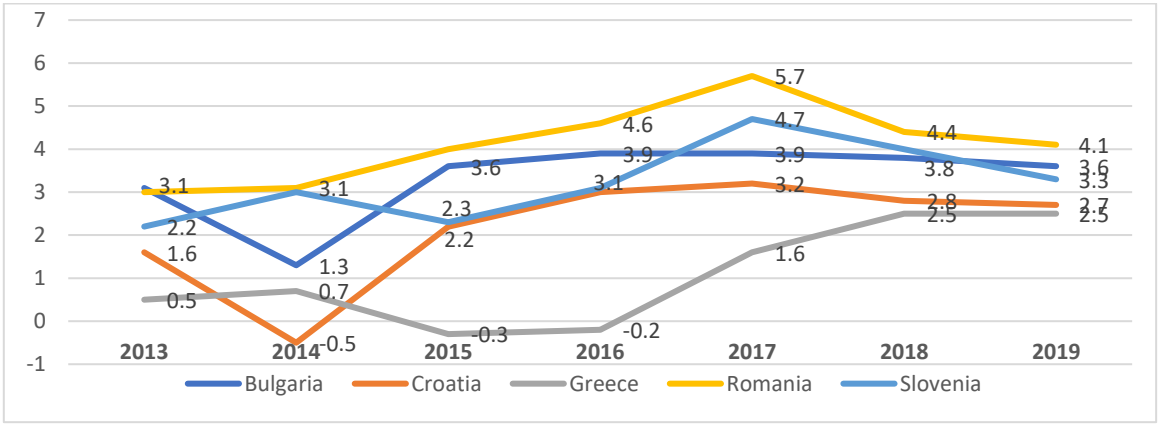
The main idea in this paper is that the "new EU27" can create new opportunities for the EU Balkan Member States. The optimal solution would be to transform these countries into a sustainable growth pole able to generate economic stability and sustainable development.

The problem of defining regional political and economic leaders can be interesting. These leaders can be selected only from a very rigorous economic analysis.

2. Theoretical background

There are great economic disparities between the EU Balkan Member States. During the analysed period, Romania succeeded in achieving the greatest GDP growth rates. The peak of the indicator was achieved in 2017, excepting Greece. On the other hand, 2015 brought the greatest disparities between the analysed economies related to the GDP. (Figure 1)

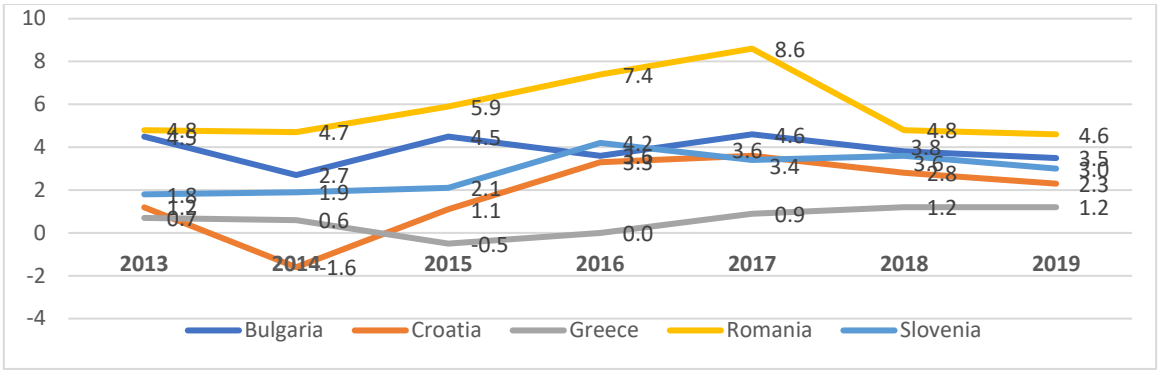
Figure 1. GDP growth rates' trend (%)



The analysis of the private consumption leads to almost the same conclusions. Romania realised the greatest private consumption rates during 2013-2019. The greatest disparities in private

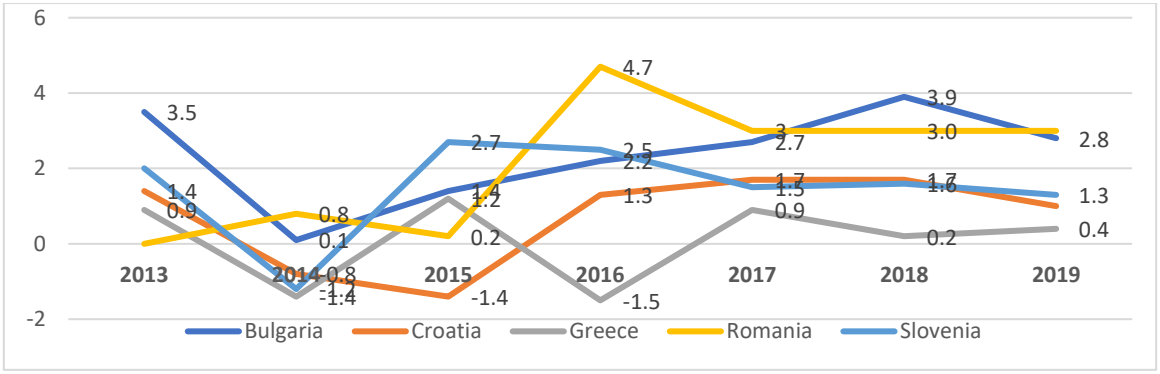
consumption were registered in 2016. The positive trend in private consumption, especially in Romania, was supported by this indicator's main contribution to the GDP growth. (Figure 2)

Figure 2. Private consumption rates' trend (%)



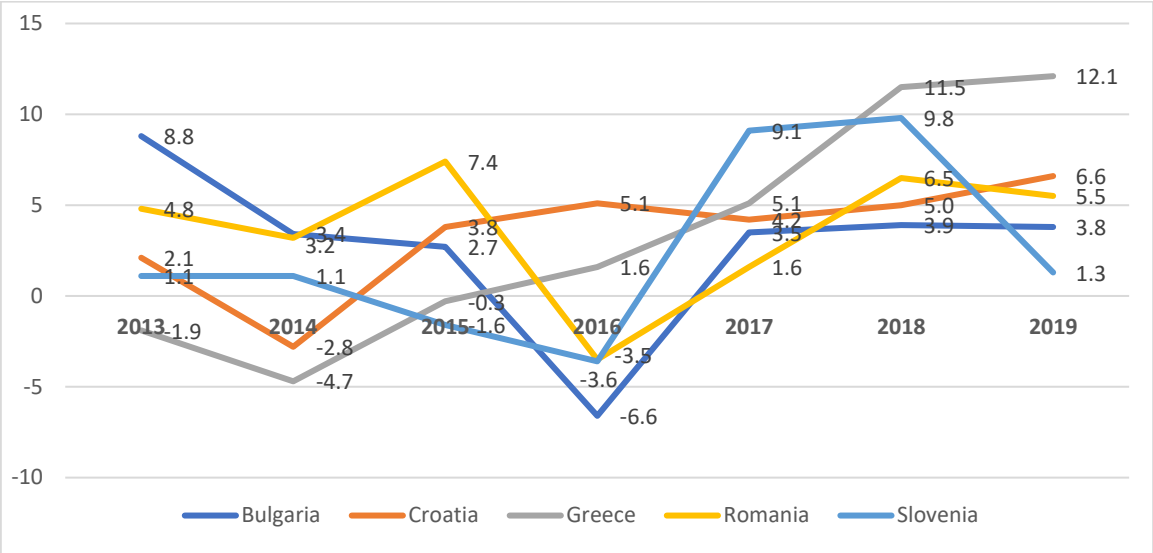
As a result of the global economic crisis, the public consumption would decrease constantly. Greece, for example, had to respect all restrictions from the European Commission and the international financial organisations. Moreover, the public consumption decreased dramatically in 2016 in Greece and will maintain minimum growth rates during 2017-2019. On the other hand, Romania will maintain the value of the public consumption growth rates during 2017-2019, while the other three analysed states will succeed in achieving lower public consumption rates in 2019. (Figure 3)

Figure 3. Public consumption rates' trend (%)



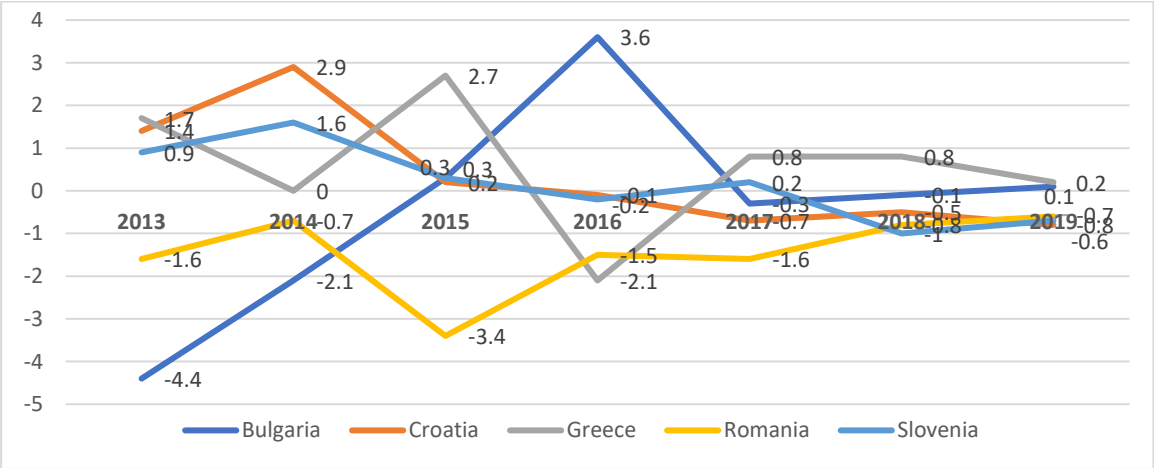
It is no doubt that Bulgaria, Slovenia and Romania faced to the bottom gross fixed capital formation's rates (negative rates) in 2016. Greece started a big gross fixed capital formation process which covers 2015-2019, Croatia maintained relative high rates during the same period. (Figure 4)

Figure 4. Gross fixed capital formation's trend (%)



Romania faced to negative growth rates for its net goods and services exports during 2013-2017. The same negative trend will be for the next two years. On the other hand, only Bulgaria and Greece will achieve positive net exports' growth rates in 2019. (Figure 5)

Figure 5. Net exports' trend (%)



The above analysis points out the idea that 2017 was the last year with greater disparities between Balkan economies. The official short time forecasts are optimistically and these disparities seem to decrease until 2019.

3. Research design and methodology

In order to realise a realistic analysis, a statistical database has to be built. The database is based on the latest official statistics (European Commission, 2017). It covers the following indicators: GDP, private consumption, public consumption, gross fixed capital formation, exports and imports.

The comparability is ensured using the official exchange rates for the Balkan states which do not belong to Euro area and the inflation rates and covers the 2012-2019 period.

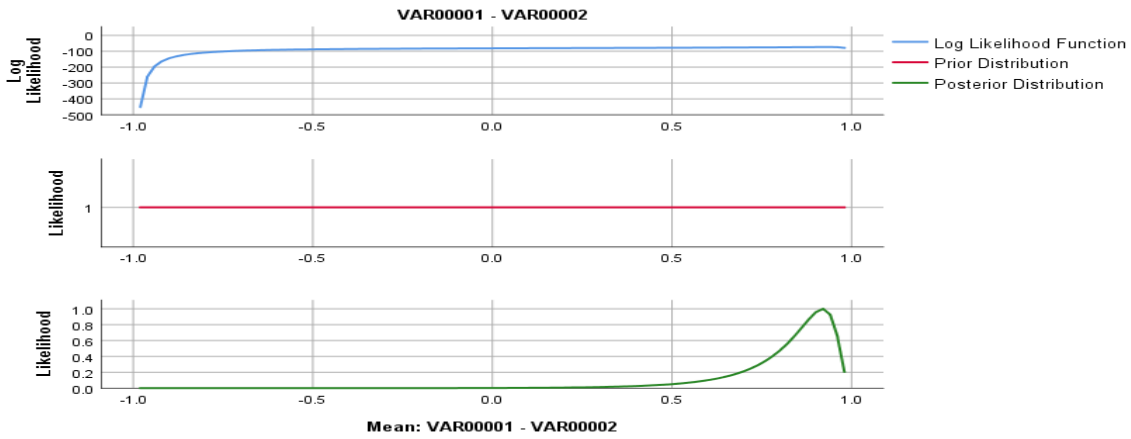
The Balkan Member States have to be connected to the EU28. In order to quantify the connection between each Member State and the EU28, the correlation analysis is useful.

The data regarding GDP are calculated under Bayesian correlation (see Annex 1). The data are quantified under Pearson correlation, where the Test variables cover the GDP growth rates from all Balkan Member States and EU28 during 2013-2019. The maximum number of plots is 10 and the analysis was realised under 95% credible interval.

The lag between lower and upper bounds varies form a Member State to another. It achieves 0.360 for Bulgaria, 0.303 for Croatia, 0.980 for Greece, 0.198 for Romania and 0.086 for Slovenia. At the first sight, Slovenia is better correlated to the EU28 economy, while Greece faces to the worst position.

According to Figure 6, the correlation between EU average and Bulgaria's GDP values presents variations which are represented by the log likelihood function's positive trend. Even that, the top value of the function is negative (-100).

Figure 6. Modelling the GDP correlation (EU28 vs Bulgaria)



The comparison between prior and posterior distributions points out an inflexion during 0.5-1.0 range of values (for value 0.2). Under the same approach, the correlation between EU28's GDP and

Croatia's GDP is closed to that between EU28 and Bulgaria. The single difference is that related to the inflexion point's position, which is closer to value 1.0 (for 0.3).

In the same way is analysed the GDP correlation between EU28 and the other Balkan Member States (see Annex 2).

The global economic crisis had great impact on the Greek economy. The economic recovery in Greece was slowly and difficult. As a result, the log likelihood function presents a decrease on the value interval 0.5-1.0 and covers only negative values. Moreover, the posterior distribution faces to the inflexion point close to 0.6 and achieves the bottom near 1.0 point. This evolution describes more difficulties in realising better and stronger correlation between Greek and EU28 economies.

The Romanian economy presents the same log likelihood function as Bulgaria and Croatia. The major difference is connected to the posterior distribution. It is constant (0) during -1.0 – 0.6 interval, presents an inflexion point (in 0.9) and decrease to 0.7 at the end of the interval. This is the best posterior distribution till now.

Finally, Slovenia presents the same negative values for its log likelihood function as the other Balkan economies, excepting Greece. On the other hand, this little economy is more correlated to the EU28 economy. As a result, its posterior distribution is constant (0.0) and achieve the peak (1.0) at the end of the values interval.

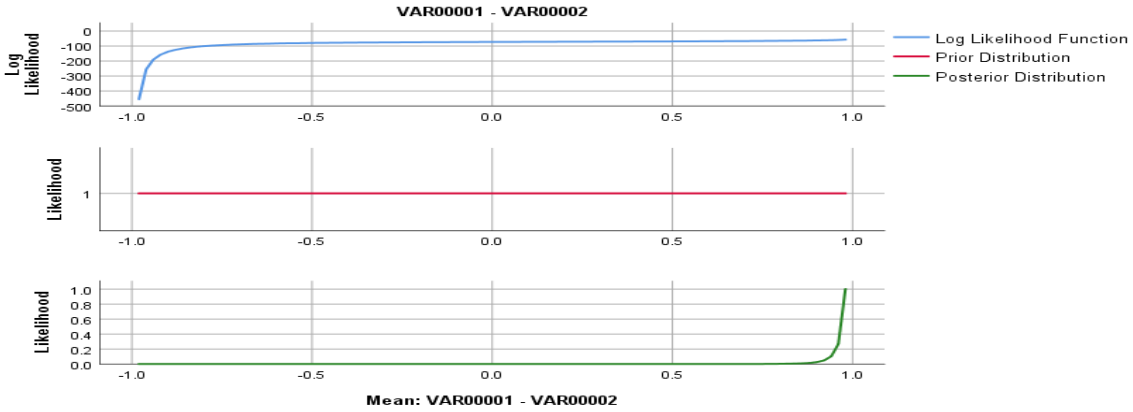
The first intermediate conclusion is that the Balkan Member States present different correlation degrees to the EU28 under the GDP. Slovenia has the best position under this indicator, while Greece faces to the worst one.

The analysis of the private consumption leads to other conclusions (see Annex 1). Under the same credible interval (95%) the lag between upper and lower bounds varies from 0.011 in Romania to 1.108 in Croatia. The other three Balkan Member States achieved 0.038 (Bulgaria), 0.421 (Greece) and 0.144 (Slovenia). The situation in Romania was supported by forcing the private consumption level using large consumption credits.

Under the same credible interval of 95%, the lag between the upper and lower bounds varies more between countries. The minimum difference is 0.001(for Romania), while the maximum was achieved in Greece (1.108). It is for the second time when Greece faces to the worst position.

The correlation between EU28 and Bulgaria's private consumptions is presented in Annex 2. The log likelihood function's curve maintains at almost the same position (-50) during 0.5 and 1.0 interval. On the other hand, the posterior distribution achieves the peak (1.0) at the limit of 0.5-1.0 values interval. (Figure 7)

Figure 7. Modelling private consumption correlation (EU28 vs Bulgaria)



Croatia faced to fluctuations in private consumption's level. As a result, its correlation to the EU economy under this indicator is not the best. As a result, the log likelihood function's curve grows for the beginning, achieves and maintains a peak (-60) and decreases (to -190) at the limit of the interval. The same conclusion is supported by the posterior distribution, which achieves the peak on the (0.0-0.5) interval and the bottom (0.0) at the limit of the whole interval (see Annex 2).

European Commission declared that Greece passed the recession in 2014. The economic recovery continued under great constraints and this process had a powerful impact on private consumption. Basically, the function's curve is almost horizontal on the analysis' interval and achieves -90. Moreover, the posterior distribution presents an inflexion point and a peak value (1.0) on the (0.5-1.0) interval. After achieving the peak, the curve decreases to 0.1 at the end of the interval.

The private consumption had almost the same trend in Romania as in Bulgaria during the analysis period. A constant log function closed to -100, is followed by a constant posterior distribution which achieves the peak value at the end of the interval.

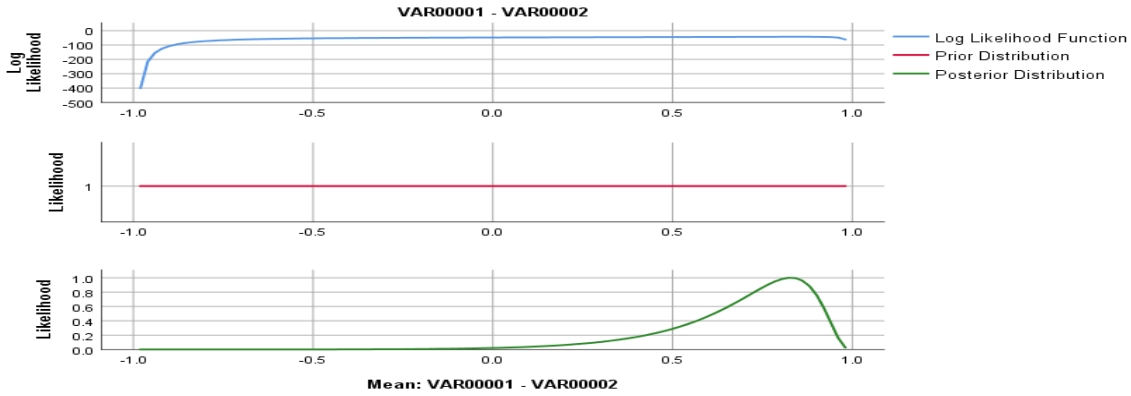
Slovenia seems to present the most dynamic curve of the log function, but the values are negative, too. On the other hand, the posterior distribution achieves peak early and maintains this value till the end of the interval.

The analysis of the public consumption points out interesting connections and trends. The credible interval was maintained. The minimum difference between the upper and the lower bounds is 0.249 in Croatia. Greece faces again to the greatest difference even that its recovery program covers the drastic decrease of the public expenditures.

The public consumption started to increase in Bulgaria in 2015. At least for the next two years, the same trend will be maintained. In relation to EU28's public consumption, the trend is

almost identical. According to the log function, the curve's value is constant during (-0.5-1.3) interval and decreases -0.75 at the end of the interval. Under the posterior distribution, the curve presents an inflexion point after it achieved the peak value (1.00) and decreases to the bottom at the end of the same interval (Figure 8).

Figure 8. Modelling public consumption correlation (EU28 vs Bulgaria)



The public consumption had a fluctuant trend in Croatia. This is why its correlation to EU28 is weak. As a result, the log function's curve decreases to -0.75 at the end of the interval in Figure 8. Moreover, the posterior distribution achieves the peak on (0.5-1.0) interval and return to the bottom at the end of the whole interval.

It is not doubt that Greece has a tradition in increasing public consumption. This indicator increased constantly during 2012-2017, excepting 2015. On the other hand, the public consumption started to be monitored by the European Commission and other European institutions under the economic recovery plan. This led to other approach for the indicator and put it under better correlation to the EU28's trends. As a result, the log function presents only a high decrease in the curve's value at the end of the interval. The posterior distribution curve faces to maximum oscillation during (-0.5-0.0) interval and return to the bottom at the end of analysis.

Public consumption covers about 14% of the GDP in Romania. It increased during 2014-2017 and will continue this trend at least on short term. There are enough common points between public consumption in Romania and Greece. This is why the curves of the log functions and posterior distribution are almost the same. The differences consist in the final value of the log function's curve and the inflexion interval.

Croatia had the better performance related to the public consumption than Romania and Greece, but lower than Croatia and Bulgaria.

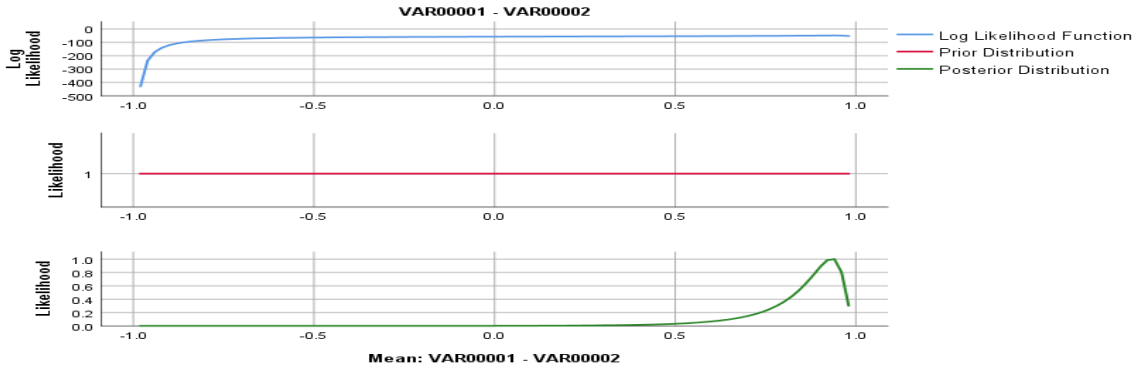
On the other hand, Slovenia is the single Balkan Member State which presents a positive posterior distribution curve's value (0.5) at the end of the analysed interval.

The logical intermediate conclusion is that public consumption leads to great disparities between the EU Balkan states and presents a weak correlation to the EU28 average.

The gross fixed capital formation has positive trend both for EU28 and the EU Balkan Member States during 2017-2019. Bulgaria presents the lowest gap between upper and lower bounds (0.311), while Greece faces to the highest one, again (see Annex 1).

The log function's curve for Bulgaria points out a positive trend which achieves the peak (-0.50) at the end of the interval. But this peak has a negative value. The inflexion point on the posterior distribution curve supports the decrease from the peak value (1.00) to a lower one (0.3) at the end of the same interval (Figure 9).

Figure 9. Modelling gross fixed capital formation correlation (EU28 vs Bulgaria)



The log function's curve for Croatia achieves a lower value than in Bulgaria of only -0.100 at the end of the statistical interval. On the other hand, the inflexion point has (1.0 and 0.75) coordinates and leads to the bottom, as well (see Annex 2).

The worst correlation is that between EU28 and Greece. As a result, the log function's curve decreases to -190 at the end of the interval. Moreover, the inflexion point is achieved early (on 0.0-0.5 interval) and leads to the bottom, as well.

There are enough common characteristics related to the gross fixed capital formation between Croatia and Romania. The log function and the posterior distribution's curves have very closed positions.

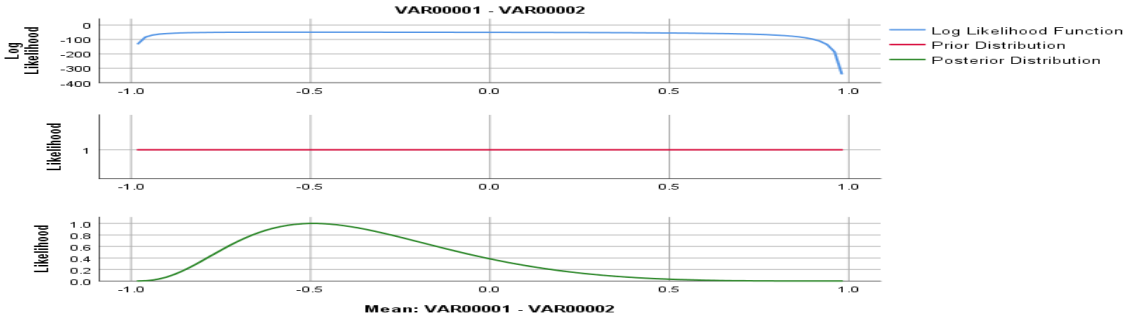
Slovenia is better correlated to EU28 average regarding gross fixed capital formation. The log function curve is stable at -0.05, while the posterior distribution achieves 0.25 at the end of the statistical interval.

The negative values of the log functions and the posterior distribution's values at the end of the interval lead to the same pessimistic conclusion that the correlation between the Balkan Member States and EU28 is weak for this indicator.

The net exports for goods and services would have positive effects on economic development (see Annex 1).

The net exports had fluctuant evolution in Bulgaria. As a result, the log function's curve decreases powerfully (till -0.350) at the end of the interval. On the other hand, the inflexion point on the posterior distribution's curve is achieved quickly (at -0.5) and is followed by a decrease to the bottom. This trend points out a weak correlation with the EU28's net exports during the analysed period (Figure 10).

Figure 10. Modelling net exports correlation (EU28 vs Bulgaria)



Croatia faces to better position related to the net exports. It is described by the constant log function curve's position during (-0.5-1.0) interval. Moreover, the posterior distribution is better than for Bulgaria and the inflexion point is closer to the statistic interval (see Annex 2).

Greece presents a log function's curve almost identical to that for Croatia. The difference between these two economies is that the posterior distribution's curve for Greece achieve positive value (0.4) at the end of the interval.

Romania experienced traditionally negative exports rates until 2017. The official forecasts point out an improvement for the next two years. This trend is reflected by the log function's evolution, which achieves the bottom at the end of the interval. The posterior distribution faces to an inflexion point and the peak value on (-0.5-0.0) interval and return to the bottom at the end of the whole interval, as well.

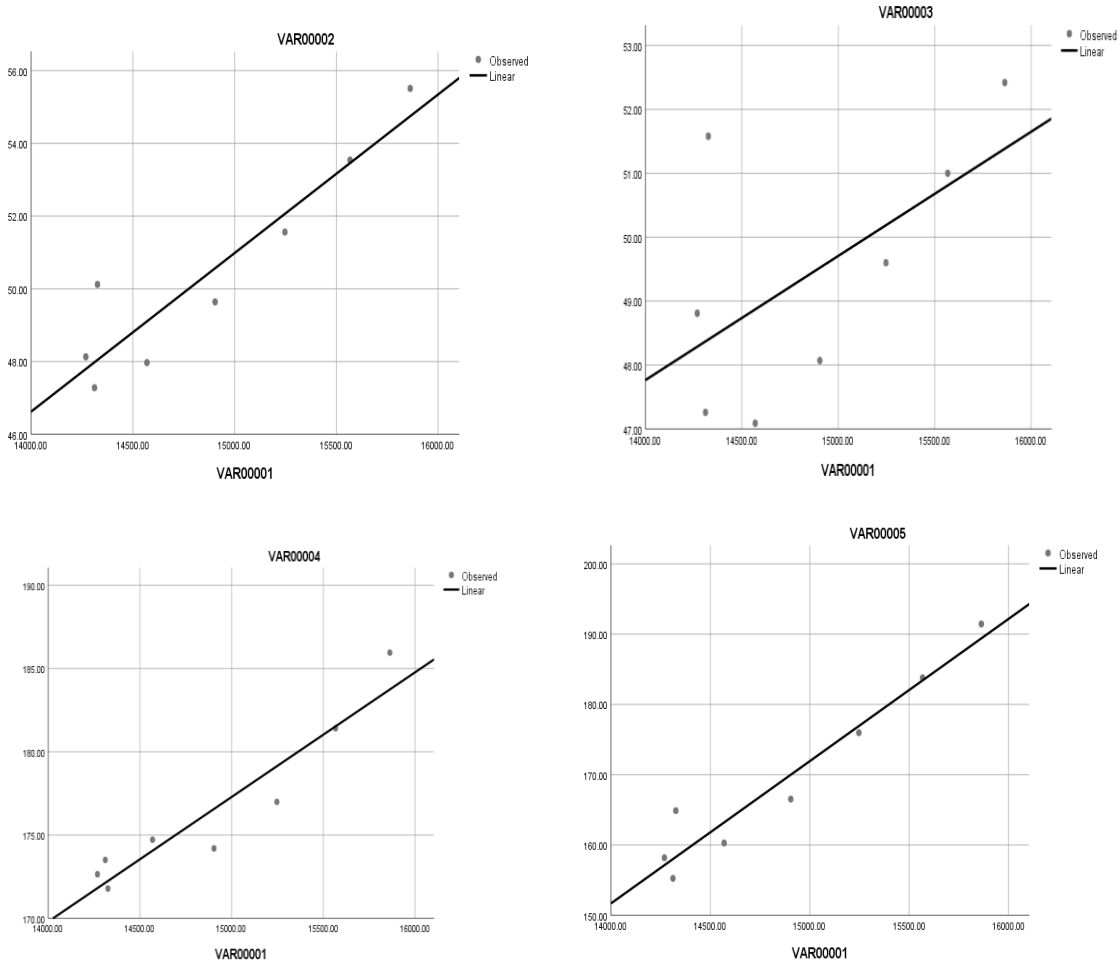
Slovenia faces to the same log function as Croatia and Greece. Moreover, the posterior distribution is almost the same with that in Croatia.

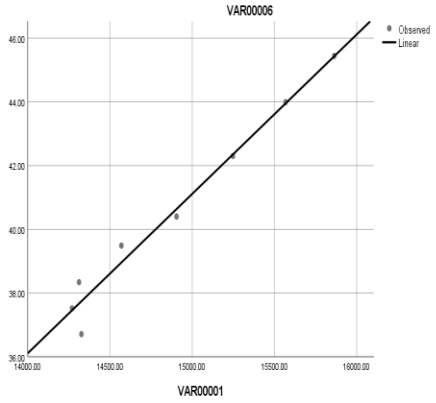
The above analysis points out that the net exports brought new disparities between EU Balkan economies and were not able to increase correlation to the EU economy.

In order to improve the analysis of the disparities between EU28 and EU Balkan economies regression is very usefully. In order to realise it, the dependent variables are the economic indicators from the six economic entities and time is the independent variable. The procedure is realised under ANOVA conditions.

Figure 11 presents the connections between EU28 (VAR00001), Bulgaria (VAR00002), Croatia (VAR00003), Greece (VAR00004), Romania (VAR00005) and Slovenia (VAR00006) regarding GDP during 2012-2019.

Figure 11. Regional disparities regarding GDP





According to the above figure, Slovenia has the best situation, while Croatia the worst. Basically, only Slovenia is closed correlated to EU28 economy under this indicator.

The disparities related to private consumption are presented in the same way in Annex 2. Romania has the best correlation to the EU28 regarding the private consumption. Croatia faces to great fluctuations, while Greece faces again to the worst position across EU Balkan countries.

The analysis of the public consumption leads to a distinct situation. Slovenia is closed correlated to EU28 under this indicator, while Bulgaria, Croatia and Romania present different correlation degrees.

An interesting situation is that related to public consumption in Greece. According to the above figure, Greece presents a negative correlation to EU28 as a result of the economic austerity policy imposed by the European organisms in order to solve the economic problems in this country.

There are good correlations between EU28, Bulgaria and Slovenia regarding gross fixed capital formation. Croatia and Romania face to some fluctuations, while Greece "play other card" under supranational economic policy's constraints.

Finally, the net exports of goods and services present a strange correlation to EU28. Greece and Croatia seem to have closer correlation to the European average. On the other hand, Romania is far away from the European trend during the analysed period (see Annex 2).

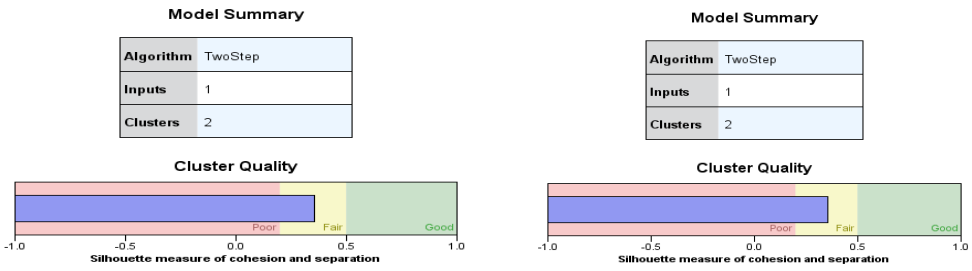
The new intermediate conclusion is that regression support the above conclusion that the disparities between EU Balkan economies are huge and their correlation the EU average is weak sometimes. Basically, there is not an economy which succeeded a high integration to the EU28 from these five analysed economic entities.

4. Results

The whole above analysis pointed out that at least two from five EU Balkan countries had different trends regarding the economic indicators put into discussion. As a result, a cluster approach is more

than interesting in trying to identify the correlations between these economies and between them and EU28 average. The analysis covers two years: 2017 and 2019 and starts from the hypothesis that there are two clusters. The two-step cluster analysis related to the GDP leads to the following results. (Figure 12)

Figure 12. Cluster approach on GDP



2017 2019

The cluster quality in fair (0.4) in 2017 and 2019. It points out the economic growth's disparities between the analysed countries.

The cluster analysis leads to the same results for the other analysed indicators. This means that there will be not important changes in the regional economy at least on short period.

Under such pessimistic approach, the forecasting procedures can support in proposing a regional economic leader in the region able to stimulate the economic development. The forecast uses ARIMA condition. The dependent variables are the analysed economic indicators for each EU Balkan economy, while the independent variable is time.

Under the GDP, the forecasted values are presented in Figure A.23. According to this figure, Romania will become the greatest Balkan economy in 2021. It will be followed by Greece. On the other hand, Croatia will face to a decrease in GDP in 2021 compared to 2019.

The same conclusions come from the forecasting of the private consumption, where Croatia will face to a new challenge in 2019.

Some economies, including Bulgaria, Croatia and Romania will face to a decrease in public consumption during the forecasting period, even the EU trend is a positive one.

In 2021, Slovenia will be the single EU Balkan economy able to achieve a gross fixed capital formation value greater than in 2019.

Greece, Croatia and Slovenia will achieve positive impact of the net exports on GDP during 2020-2021.

According to same figure, EU average will achieve positive trends for all analysed indicators during the forecasting indicators.

5. Conclusions

The analysis of the statistical data for 2017, of official forecasted data for 2018-2019 and of the paper's forecasted data as well, lead to the idea that Balkans can become again a peripheral economic region of the EU.

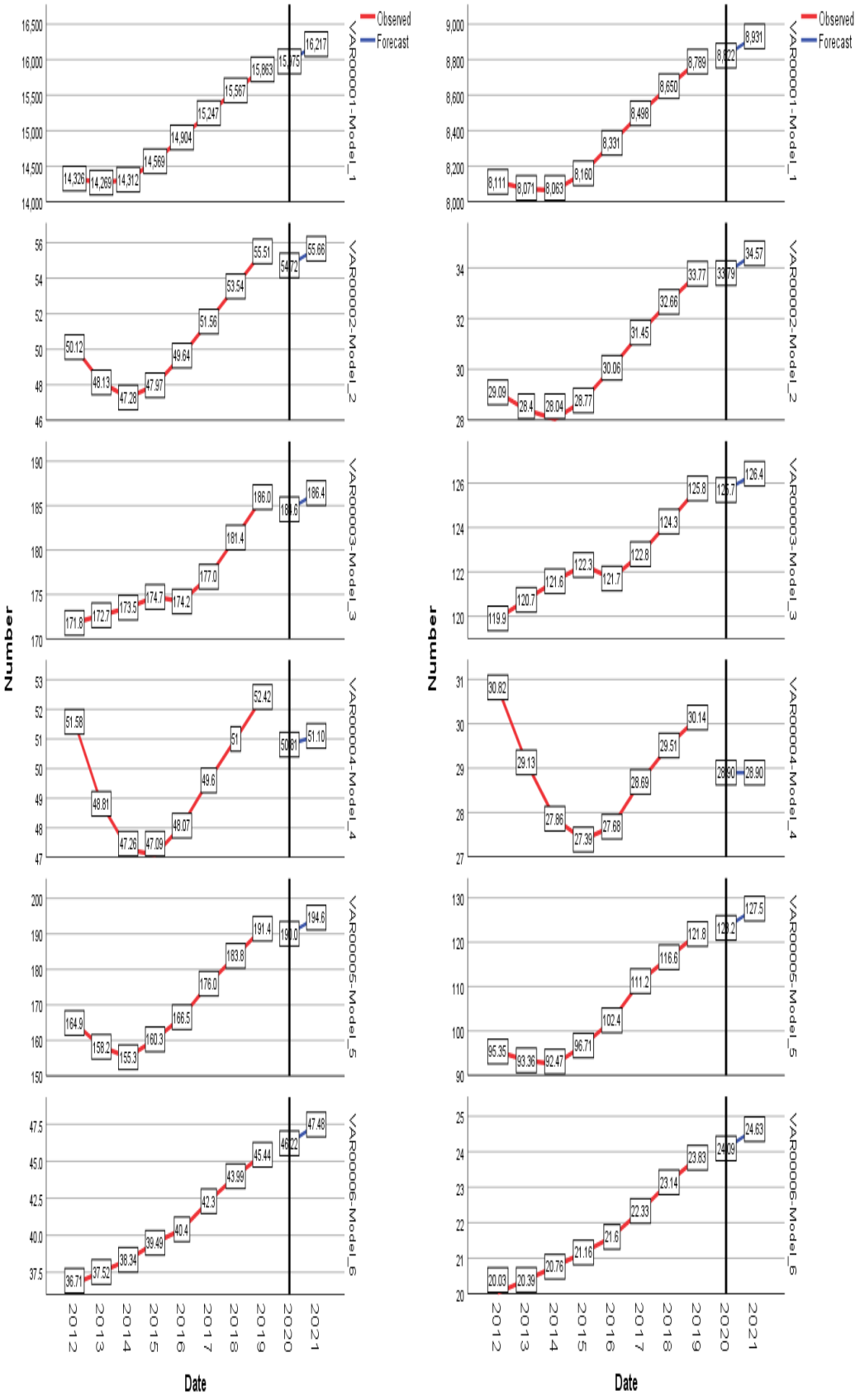
The great socio-economic differences between Balkan economies will not decrease on short and medium terms.

In this context, the solution seems to rely on the Romanian economy, which will be the greatest one in the region in 2021. The positive economic performance in Romania is based on high GDP growth rates (more than 4%), positive trend in investment, including equipment, low inflation rate and low government gross debt as % of potential GDP.

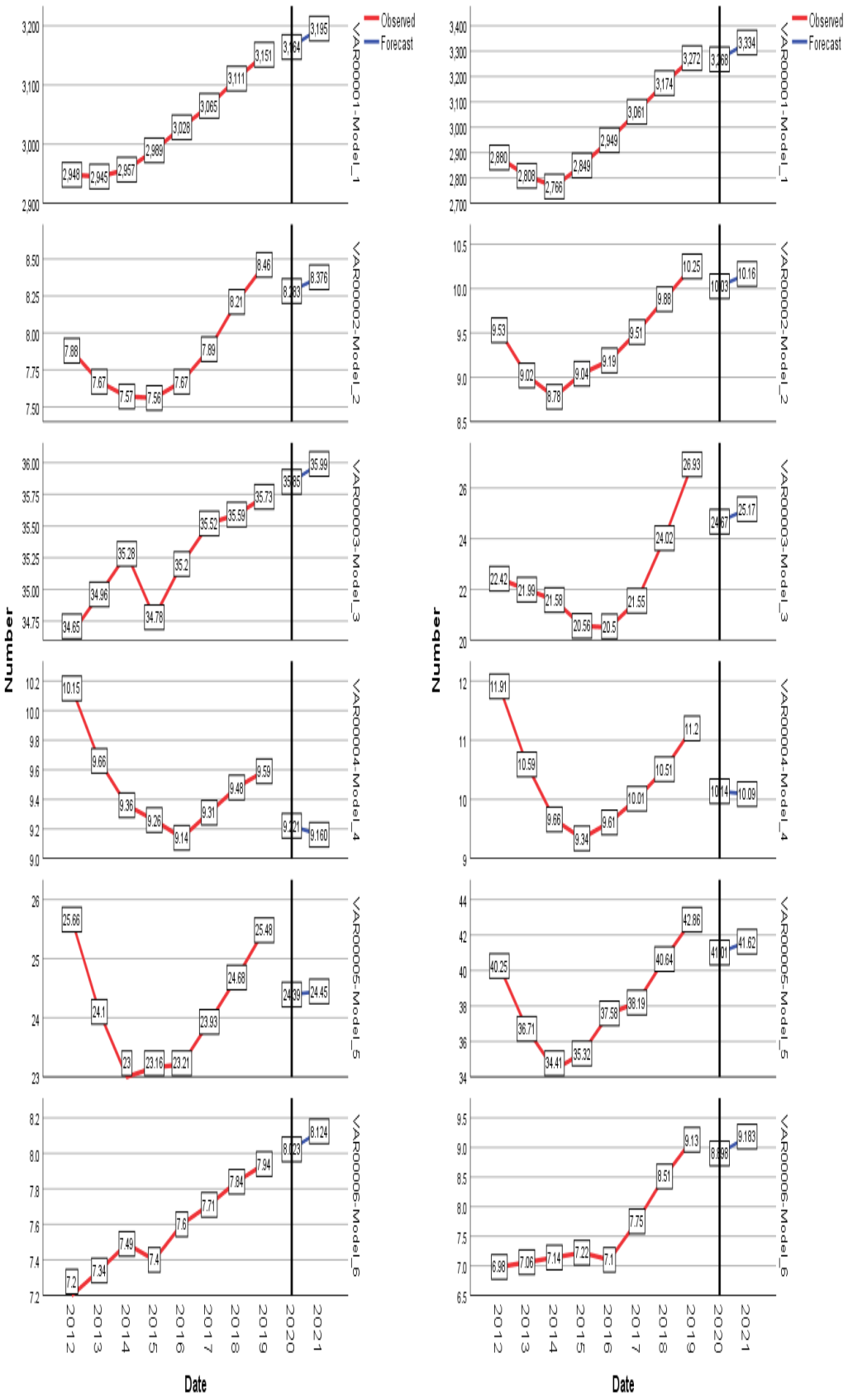
The economic recovery in Greece will bring this country in the same cluster as Romania and will increase the chances to transform the Balkans region into a growth pole.

Unfortunately, the other cluster (Bulgaria, Croatia and Slovenia) is not yet able to generate prosperity in the region. On the other hand, the three economies from this cluster are smaller and more dynamic and can eliminate the present economic lag (Figure 13).

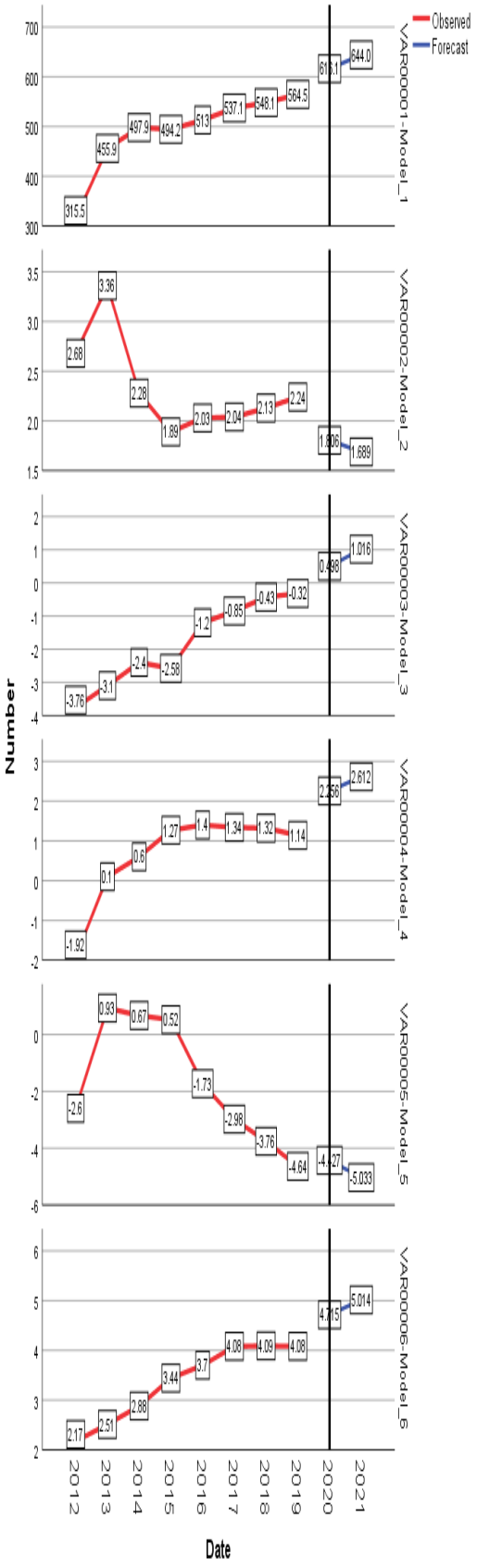
Figure 13. EU Balkan economies' forecasting performances



GDP Private consumption



Public consumption Gross fixed capital formation


Observed
Forecast
VAR00001-Model_1
VAR00002-Model_2
VAR00003-Model_3
VAR00004-Model_4
VAR00005-Model_5
VAR00006-Model_6
Number
Date
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021

Net exports

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ANNEXES

Annex 1

Table 1. Posterior Distribution Characterization for Pairwise Correlations (GDP)

			VAR1	VAR2	VAR3	VAR4	VAR5	VAR6
VAR00001	Posterior	Mode		.920	.935	.567	.961	.984
		Mean		.849	.875	.424	.921	.967
		Variance		.012	.009	.072	.004	.001
	95% Credible Interval	Lower Bound		.627	.687	-.105	.796	.912
		Upper Bound		.987	.990	.875	.994	.998
	N		8	8	8	8	8	8
VAR00002	Posterior	Mode	.920		.891	.829	.991	.855
		Mean	.849		.801	.712	.981	.748
		Variance	.012		.019	.033	.000	.027
	95% Credible Interval	Lower Bound	.627		.525	.348	.950	.418
		Upper Bound	.987		.981	.966	.999	.975
	N		8	8	8	8	8	8
VAR00003	Posterior	Mode	.935	.891		.580	.917	.947
		Mean	.875	.801		.436	.843	.895
		Variance	.009	.019		.070	.013	.007
	95% Credible Interval	Lower Bound	.687	.525		-.087	.616	.735
		Upper Bound	.990	.981		.882	.986	.992
	N		8	8	8	8	8	8
VAR00004	Posterior	Mode	.567	.829	.580		.757	.457
		Mean	.424	.712	.436		.621	.329
		Variance	.072	.033	.070		.047	.080
	95% Credible Interval	Lower Bound	-.105	.348	-.087		.187	-.228
		Upper Bound	.875	.966	.882		.945	.822
	N		8	8	8	8	8	8
VAR00005	Posterior	Mode	.961	.991	.917	.757		.909
		Mean	.921	.981	.843	.621		.830
		Variance	.004	.000	.013	.047		.015
	95% Credible Interval	Lower Bound	.796	.950	.616	.187		.587
		Upper Bound	.994	.999	.986	.945		.985
	N		8	8	8	8	8	8
VAR00006	Posterior	Mode	.984	.855	.947	.457	.909	
		Mean	.967	.748	.895	.329	.830	
		Variance	.001	.027	.007	.080	.015	
	95% Credible Interval	Lower Bound	.912	.418	.735	-.228	.587	
		Upper Bound	.998	.975	.992	.822	.985	
	N		8	8	8	8	8	8

The analyses assume reference priors (c = 0).

Table 2. Posterior Distribution Characterization for Pairwise Correlations (private consumption)

			VAR1	VAR2	VAR3	VAR4	VAR5	VAR6
VAR00001	Posterior	Mode		.993	.303	.902	.998	.972
		Mean		.985	.210	.819	.996	.943
		Variance		.000	.087	.017	.000	.002
	95% Credible Interval	Lower Bound		.961	-.366	.562	.989	.852
		Upper Bound		.999	.742	.983	1.000	.996
	N		8	8	8	8	8	8
VAR00002	Posterior	Mode	.993		.397	.868	.995	.942
		Mean	.985		.281	.768	.989	.887
		Variance	.000		.083	.024	.000	.008
	95% Credible Interval	Lower Bound	.961		-.279	.455	.971	.716
		Upper Bound	.999		.797	.976	.999	.991
	N		8	8	8	8	8	8
VAR00003	Posterior	Mode	.303	.397		.108	.328	.144
		Mean	.210	.281		.073	.228	.098
		Variance	.087	.083		.092	.086	.091
	95% Credible Interval	Lower Bound	-.366	-.279		-.506	-.343	-.481
		Upper Bound	.742	.797		.638	.758	.658
	N		8	8	8	8	8	8
VAR00004	Posterior	Mode	.902	.868	.108		.895	.967
		Mean	.819	.768	.073		.807	.932
		Variance	.017	.024	.092		.018	.003
	95% Credible Interval	Lower Bound	.562	.455	-.506		.537	.824
		Upper Bound	.983	.976	.638		.982	.995
	N		8	8	8	8	8	8
VAR00005	Posterior	Mode	.998	.995	.328	.895		.965
		Mean	.996	.989	.228	.807		.929
		Variance	.000	.000	.086	.018		.003
	95% Credible Interval	Lower Bound	.989	.971	-.343	.537		.816
		Upper Bound	1.000	.999	.758	.982		.995
	N		8	8	8	8	8	8
VAR00006	Posterior	Mode	.972	.942	.144	.967	.965	
		Mean	.943	.887	.098	.932	.929	
		Variance	.002	.008	.091	.003	.003	
	95% Credible Interval	Lower Bound	.852	.716	-.481	.824	.816	
		Upper Bound	.996	.991	.658	.995	.995	
	N		8	8	8	8	8	8

The analyses assume reference priors (c = 0).

Table 3. Posterior Distribution Characterization for Pairwise Correlations (public consumption)

			VAR1	VAR2	VAR3	VAR4	VAR5	VAR6
VAR00001	Posterior	Mode		.829	.836	-.236	.333	.949
		Mean		.712	.722	-.161	.231	.899
		Variance		.033	.031	.090	.086	.006
	95% Credible Interval	Lower Bound		.348	.367	-.712	-.340	.744
		Upper Bound		.968	.968	.414	.761	.993
	N		8	8	8	8	8	8
VAR00002	Posterior	Mode	.829		.650	.268	.753	.712
		Mean	.712		.504	.185	.615	.570
		Variance	.033		.062	.088	.047	.054
	95% Credible Interval	Lower Bound	.348		.008	-.389	.178	.107
		Upper Bound	.968		.909	.728	.944	.933
	N		8	8	8	8	8	8
VAR00003	Posterior	Mode	.836	.650		-.353	.113	.951
		Mean	.722	.504		-.247	.076	.903
		Variance	.031	.062		.086	.091	.006
	95% Credible Interval	Lower Bound	.367	.008		-.772	-.501	.753
		Upper Bound	.968	.909		.321	.640	.993

	N		8	8	8	8	8	8
VAR00004	Posterior	Mode	-.236	.268	-.353		.787	-.391
		Mean	-.161	.185	-.247		.658	-.277
		Variance	.090	.088	.086		.041	.084
	95% Credible Interval	Lower Bound	-.712	-.389	-.772		.250	-.796
		Upper Bound	.414	.728	.321		.956	.285
	N		8	8	8	8	8	8
VAR00005	Posterior	Mode	.333	.753	.113	.787		.145
		Mean	.231	.615	.076	.658		.098
		Variance	.086	.047	.091	.041		.091
	95% Credible Interval	Lower Bound	-.340	.178	-.501	.250		-.476
		Upper Bound	.761	.944	.640	.956		.664
	N		8	8	8	8	8	8
VAR00006	Posterior	Mode	.949	.712	.951	-.391	.145	
		Mean	.899	.570	.903	-.277	.098	
		Variance	.006	.054	.006	.084	.091	
	95% Credible Interval	Lower Bound	.744	.107	.753	-.796	-.476	
		Upper Bound	.993	.933	.993	.285	.664	
	N		8	8	8	8	8	8

The analyses assume reference priors (c = 0).

Table 4. Posterior Distribution Characterization for Pairwise Correlations (gross fixed capital formation)

			VAR1	VAR2	VAR3	VAR4	VAR5	VAR6
VAR00001	Posterior	Mode		.933	.757	.299	.832	.928
		Mean		.871	.621	.207	.716	.862
		Variance		.010	.047	.088	.032	.011
	95% Credible Interval	Lower Bound		.678	.188	-.370	.353	.658
		Upper Bound		.989	.947	.740	.967	.988
	N		8	8	8	8	8	8
VAR00002	Posterior	Mode	.933		.839	.575	.961	.860
		Mean	.871		.726	.432	.922	.755
		Variance	.010		.031	.071	.004	.026
	95% Credible Interval	Lower Bound	.678		.374	-.093	.798	.430
		Upper Bound	.989		.969	.878	.994	.974
	N		8	8	8	8	8	8
VAR00003	Posterior	Mode	.757	.839		.595	.809	.867
		Mean	.621	.726		.450	.686	.766
		Variance	.047	.031		.069	.037	.024
	95% Credible Interval	Lower Bound	.188	.374		-.074	.299	.451
		Upper Bound	.947	.969		.883	.961	.977
	N		8	8	8	8	8	8
VAR00004	Posterior	Mode	.299	.575	.595		.725	.260
		Mean	.207	.432	.450		.584	.178
		Variance	.088	.071	.069		.052	.089
	95% Credible Interval	Lower Bound	-.370	-.093	-.074		.126	-.404
		Upper Bound	.740	.878	.883		.936	.717
	N		8	8	8	8	8	8
VAR00005	Posterior	Mode	.832	.961	.809	.725		.727
		Mean	.716	.922	.686	.584		.586
		Variance	.032	.004	.037	.052		.052
	95% Credible Interval	Lower Bound	.353	.798	.299	.126		.131
		Upper Bound	.967	.994	.961	.936		.935
	N		8	8	8	8	8	8
VAR00006	Posterior	Mode	.928	.860	.867	.260	.727	
		Mean	.862	.755	.766	.178	.586	
		Variance	.011	.026	.024	.089	.052	
	95% Credible Interval	Lower Bound	.658	.430	.451	-.404	.131	
		Upper Bound	.988	.974	.977	.717	.935	
	N		8	8	8	8	8	8

The analyses assume reference priors (c = 0).

Table 5. Posterior Distribution Characterization for Pairwise Correlations (net exports)

			VAR1	VAR2	VAR3	VAR4	VAR5	VAR6
VAR00001	Posterior	Mode		-.493	.859	.943	-.238	.868
		Mean		-.359	.754	.888	-.163	.767
		Variance		.078	.026	.008	.089	.024
	95% Credible Interval	Lower Bound		-.840	.427	.718	-.711	.455
		Upper Bound		.190	.973	.991	.414	.976
	N		8	8	8	8	8	8
VAR00002	Posterior	Mode	-.493		-.549	-.587	.304	-.689
		Mean	-.359		-.408	-.442	.211	-.544
		Variance	.078		.073	.070	.087	.057
	95% Credible Interval	Lower Bound	-.840		-.864	-.882	-.362	-.921
		Upper Bound	.190		.128	.083	.746	-.063
	N		8	8	8	8	8	8
VAR00003	Posterior	Mode	.859	-.549		.755	-.643	.948
		Mean	.754	-.408		.619	-.497	.898
		Variance	.026	.073		.047	.063	.006
	95% Credible Interval	Lower Bound	.427	-.864		.184	-.905	.741
		Upper Bound	.973	.128		.946	.005	.993
	N		8	8	8	8	8	8
VAR00004	Posterior	Mode	.943	-.587	.755		-.087	.840
		Mean	.888	-.442	.619		-.059	.727
		Variance	.008	.070	.047		.092	.030
	95% Credible Interval	Lower Bound	.718	-.882	.184		-.624	.376
		Upper Bound	.991	.083	.946		.522	.969
	N		8	8	8	8	8	8
VAR00005	Posterior	Mode	-.238	.304	-.643	-.087		-.550
		Mean	-.163	.211	-.497	-.059		-.408
		Variance	.089	.087	.063	.092		.073
	95% Credible Interval	Lower Bound	-.711	-.362	-.905	-.624		-.867
		Upper Bound	.414	.746	.005	.522		.125
	N		8	8	8	8	8	8
VAR00006	Posterior	Mode	.868	-.689	.948	.840	-.550	
		Mean	.767	-.544	.898	.727	-.408	
		Variance	.024	.057	.006	.030	.073	
	95% Credible Interval	Lower Bound	.455	-.921	.741	.376	-.867	
		Upper Bound	.976	-.063	.993	.969	.125	
	N		8	8	8	8	8	8

The analyses assume reference priors (c = 0).

Annex 2

Figure A.1. Modelling the GDP correlation (EU28 vs Croatia)

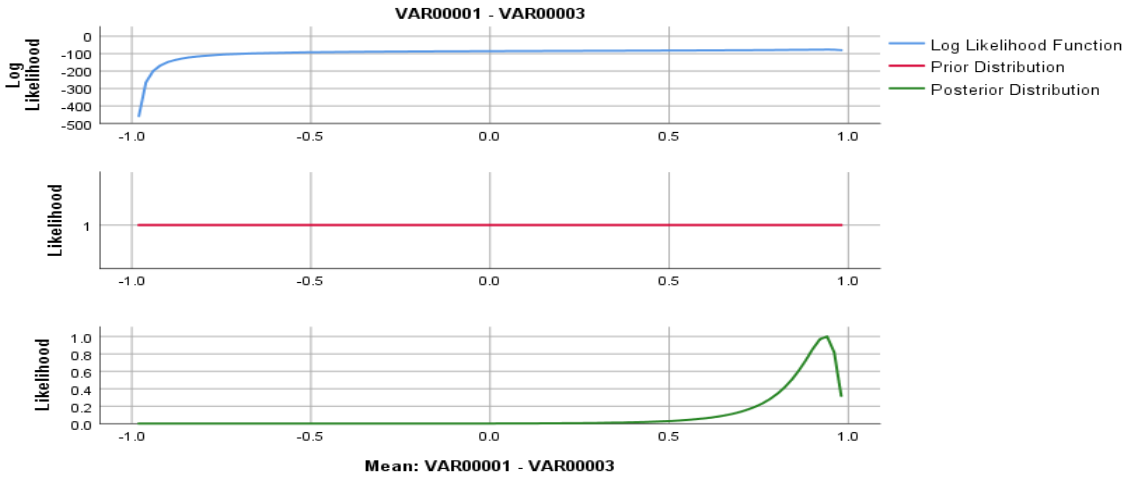


Figure A.2. Modelling the GDP correlation (EU28 vs Greece)

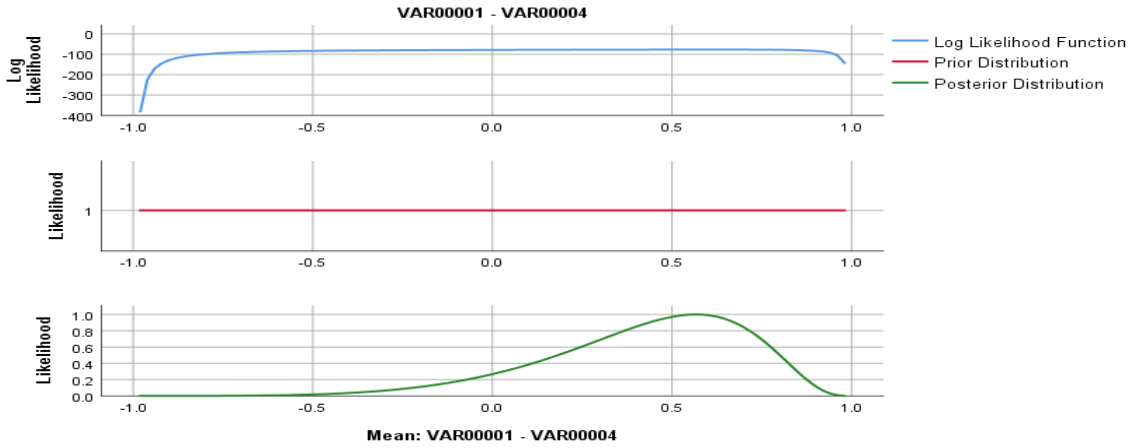


Figure A.3. Modelling the GDP correlation (EU28 vs Romania)

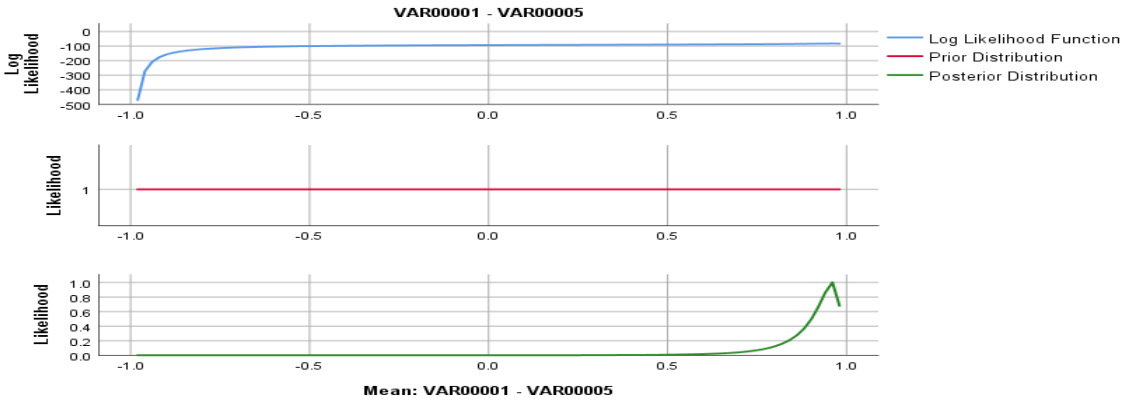


Figure A.4. Modelling the GDP correlation (EU28 vs Slovenia)

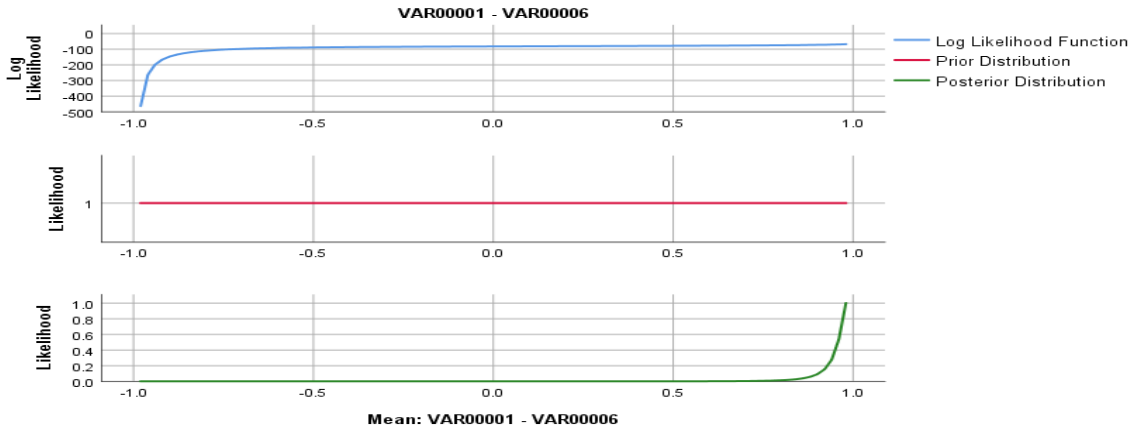


Figure A.5. Modelling private consumption correlation (EU28 vs Croatia)

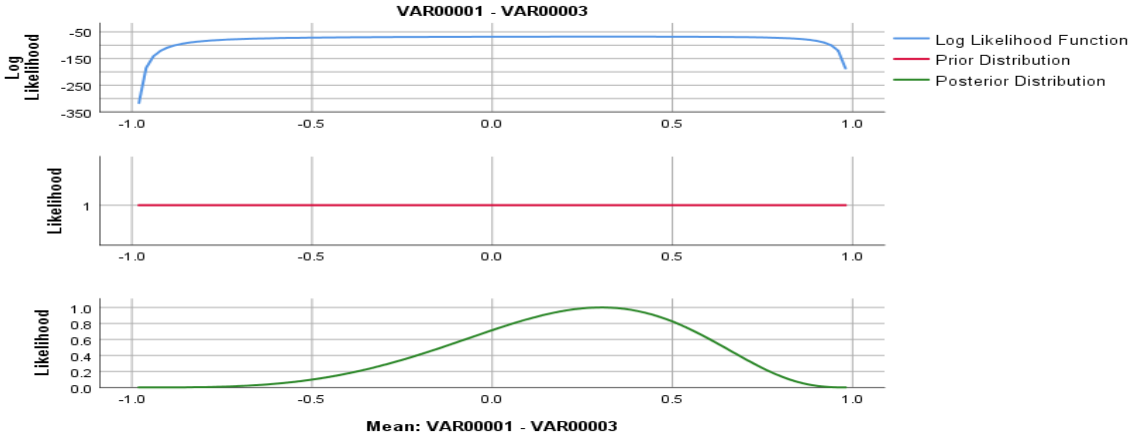


Figure A.6. Modelling private consumption correlation (EU28 vs Greece)

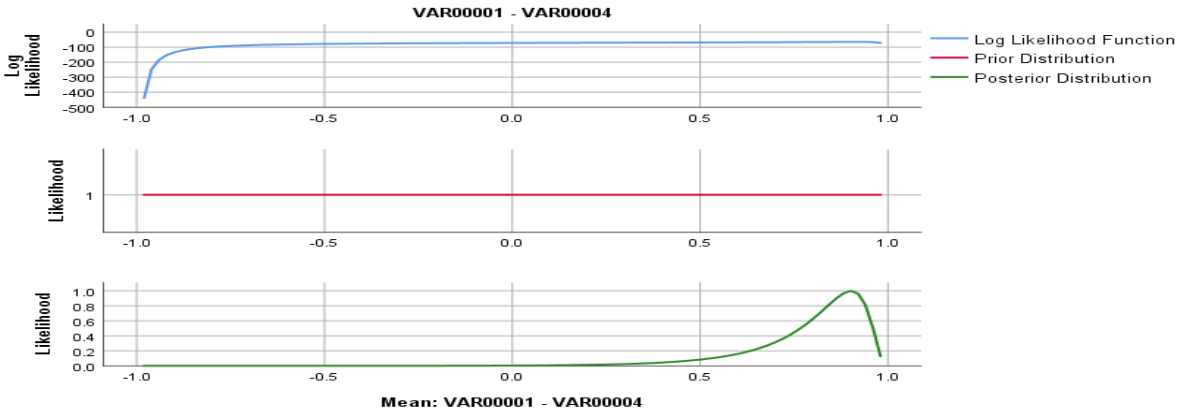


Figure A.7. Modelling private consumption correlation (EU28 vs Romania)

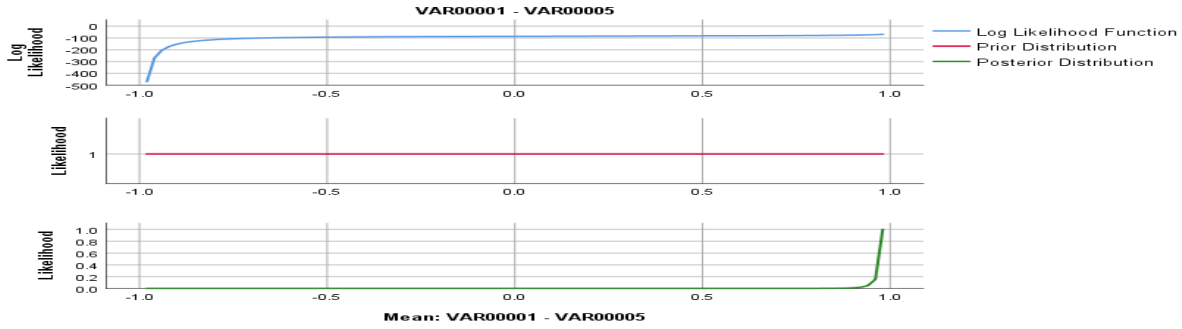


Figure A.8. Modelling private consumption correlation (EU28 vs Slovenia)

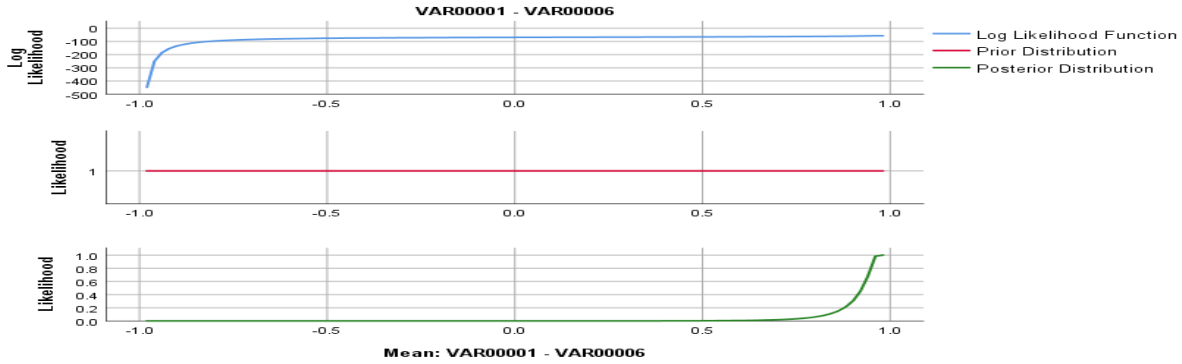


Figure A.9. Modelling public consumption correlation (EU28 vs Croatia)

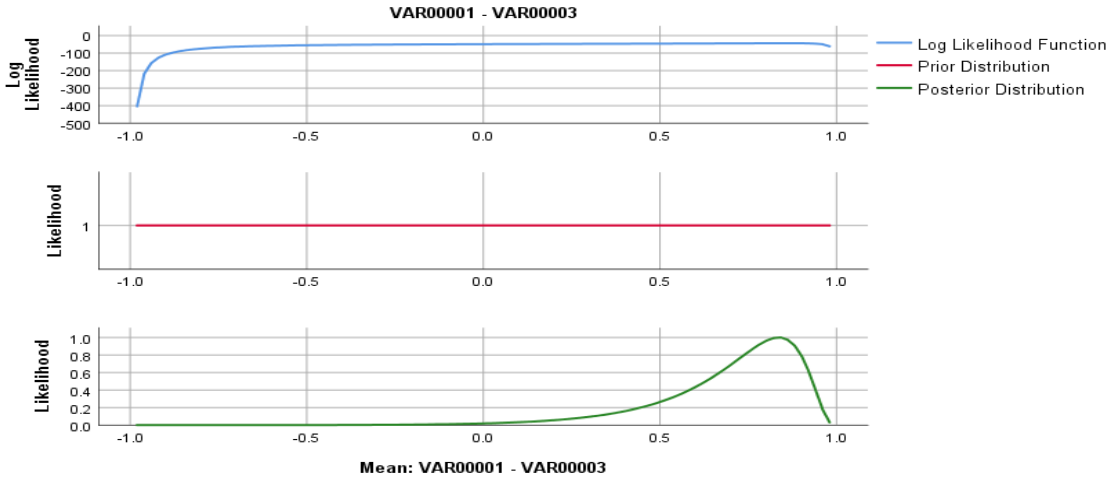


Figure A.10. Modelling public consumption correlation (EU28 vs Greece)

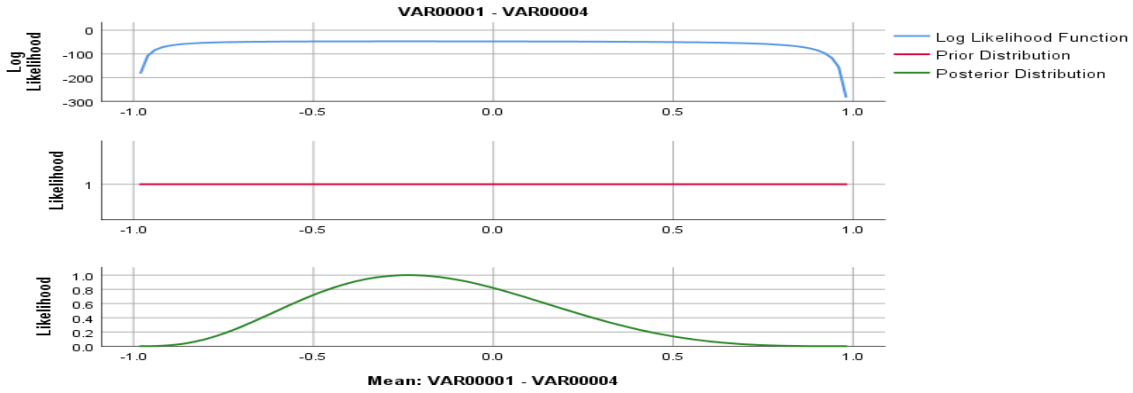


Figure A.11. Modelling public consumption correlation (EU28 vs Romania)

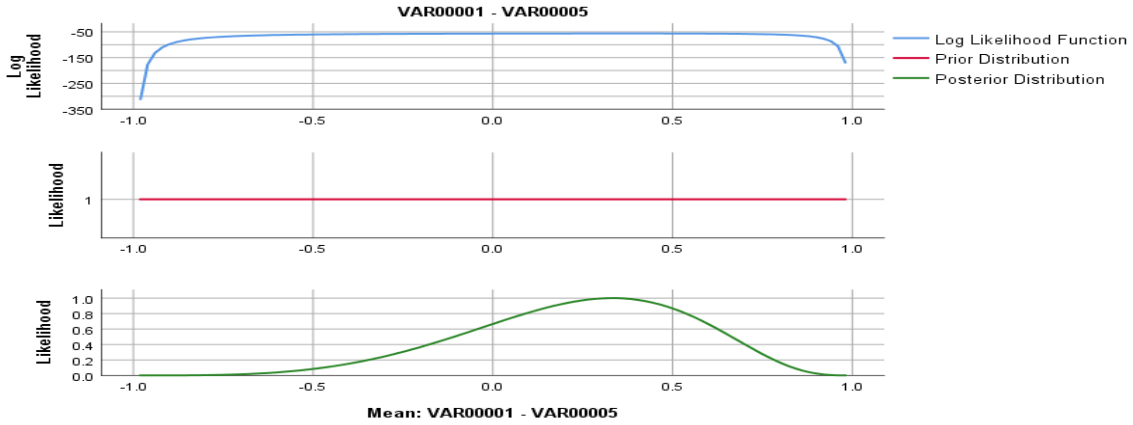


Figure A.12. Modelling public consumption correlation (EU28 vs Slovenia)

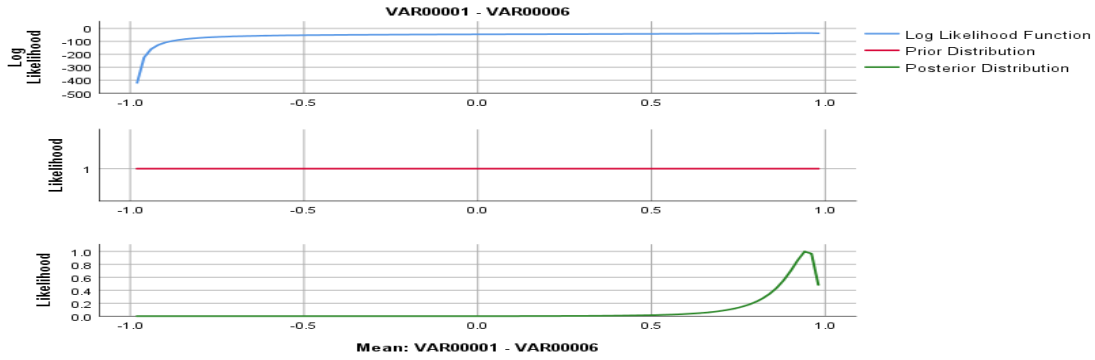


Figure A.13. Modelling gross fixed capital formation correlation (EU28 vs Croatia)

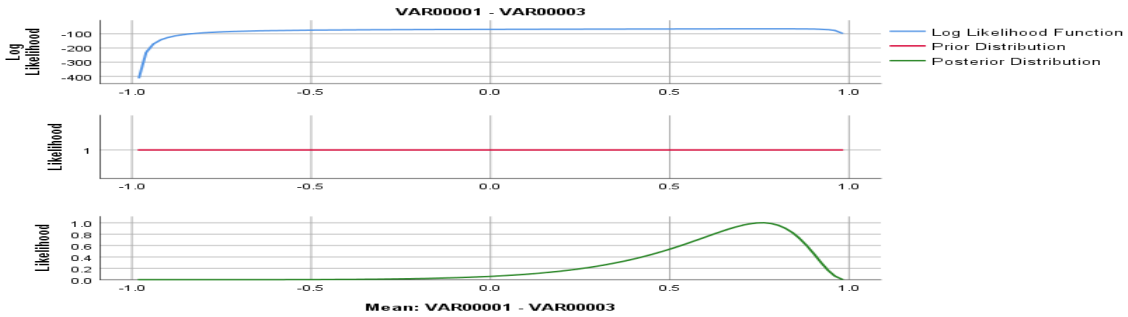


Figure A.14. Modelling gross fixed capital formation correlation (EU28 vs Greece)

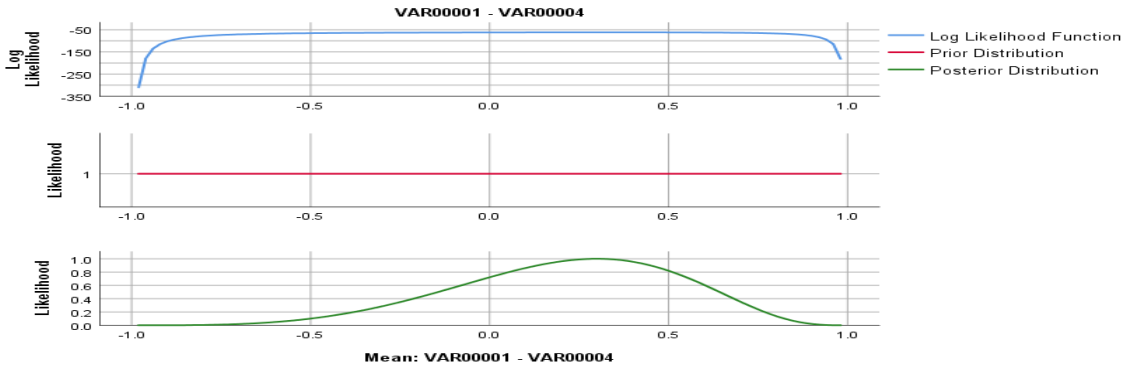


Figure A.15. Modelling gross fixed capital formation correlation (EU28 vs Romania)

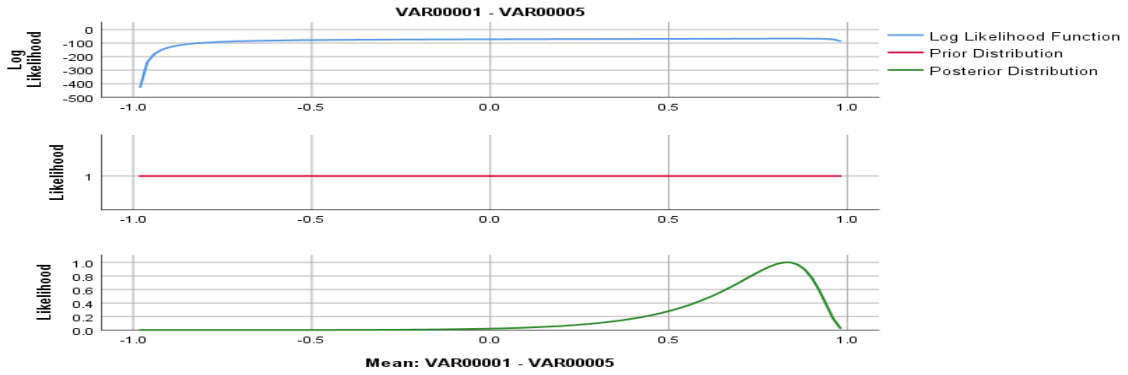


Figure A.16. Modelling gross fixed capital formation correlation (EU28 vs Slovenia)

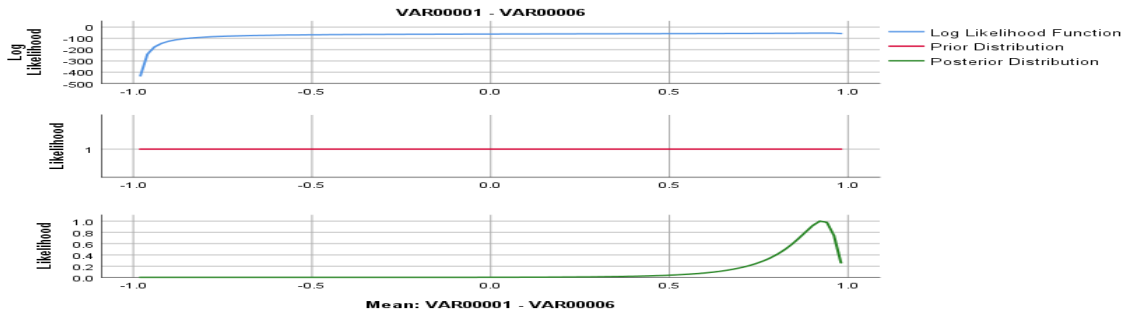


Figure A.17. Modelling net exports correlation (EU28 vs Croatia)

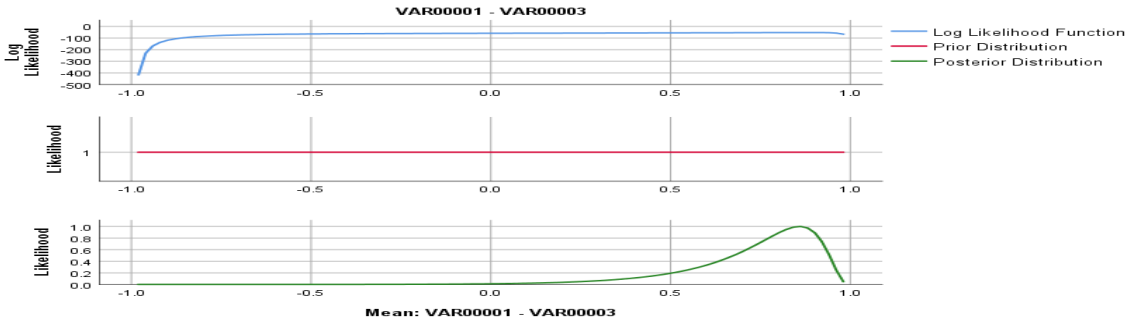


Figure A.18. Modelling net exports correlation (EU28 vs Greece)

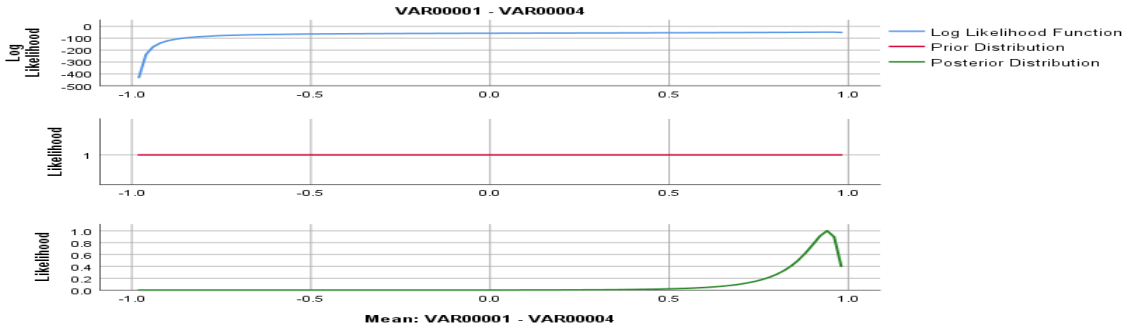


Figure A.19. Modelling net exports correlation (EU28 vs Romania)

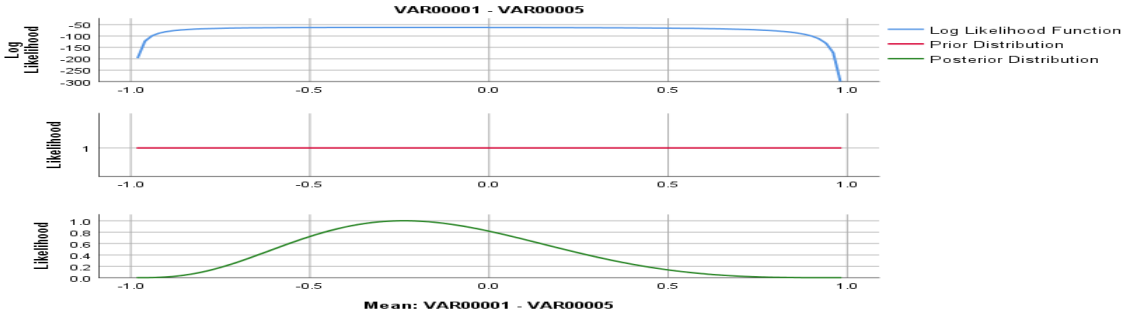


Figure A.20. Modelling net exports correlation (EU28 vs Slovenia)

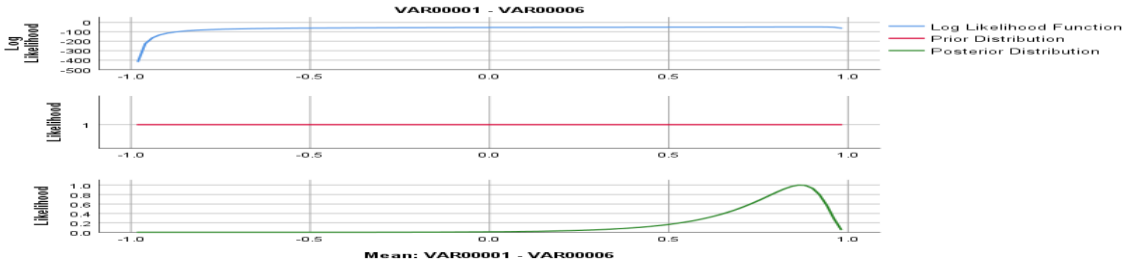


Figure A.21. Regional disparities regarding private consumption

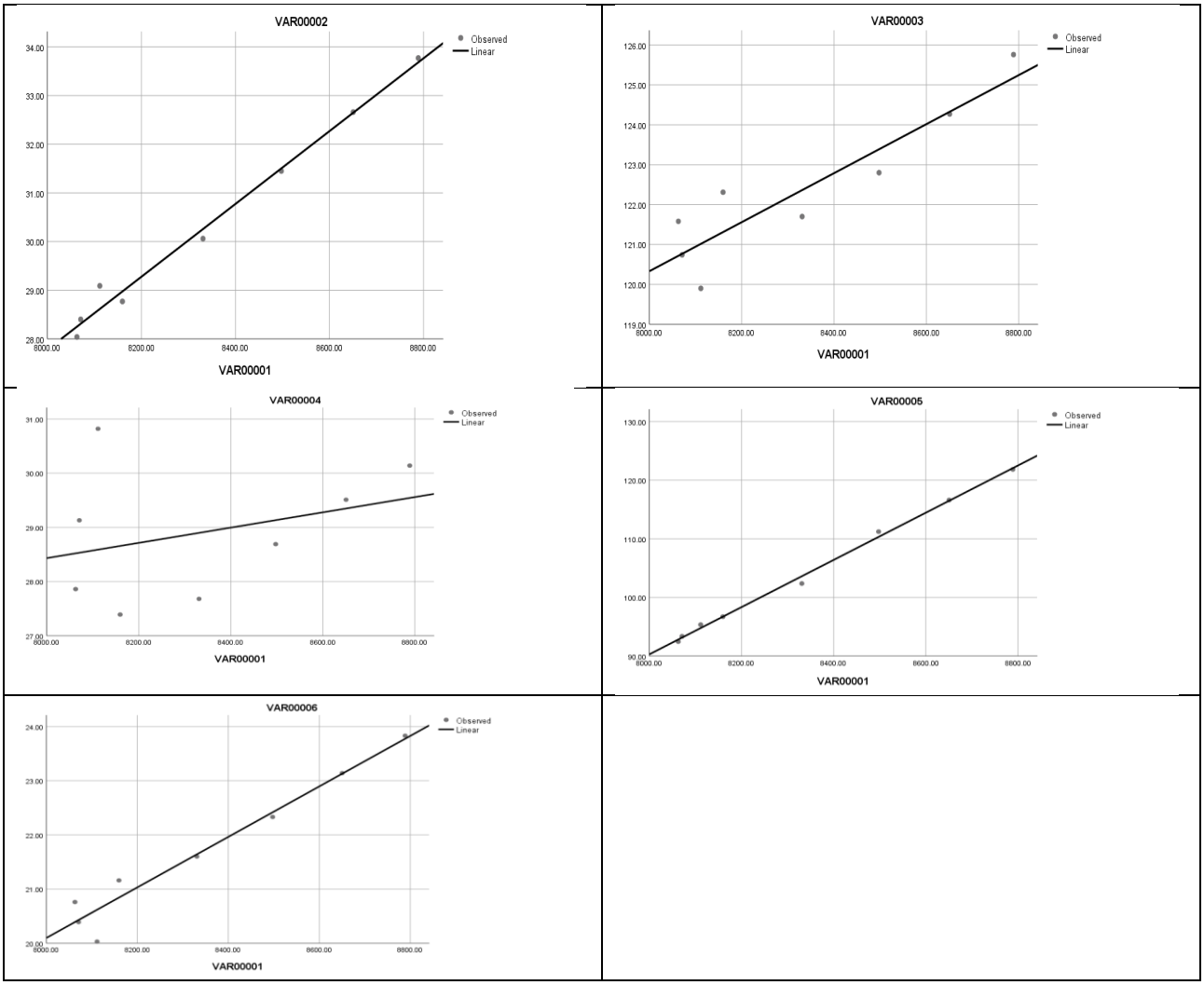
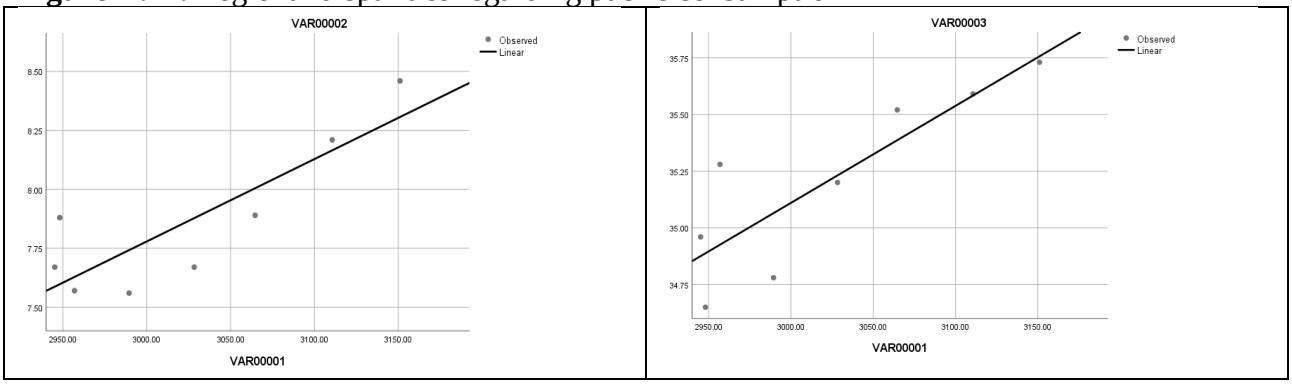


Figure A.22. Regional disparities regarding public consumption



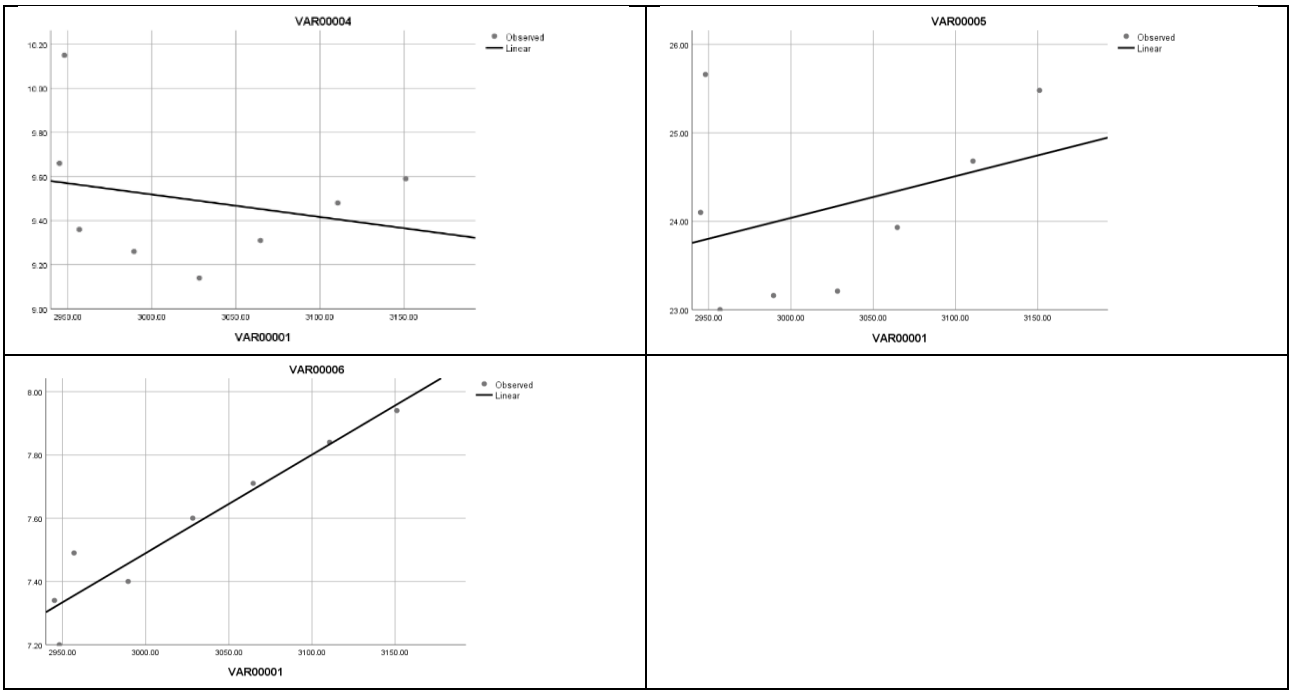


Figure A.23: Regional disparities regarding gross fixed capital formation

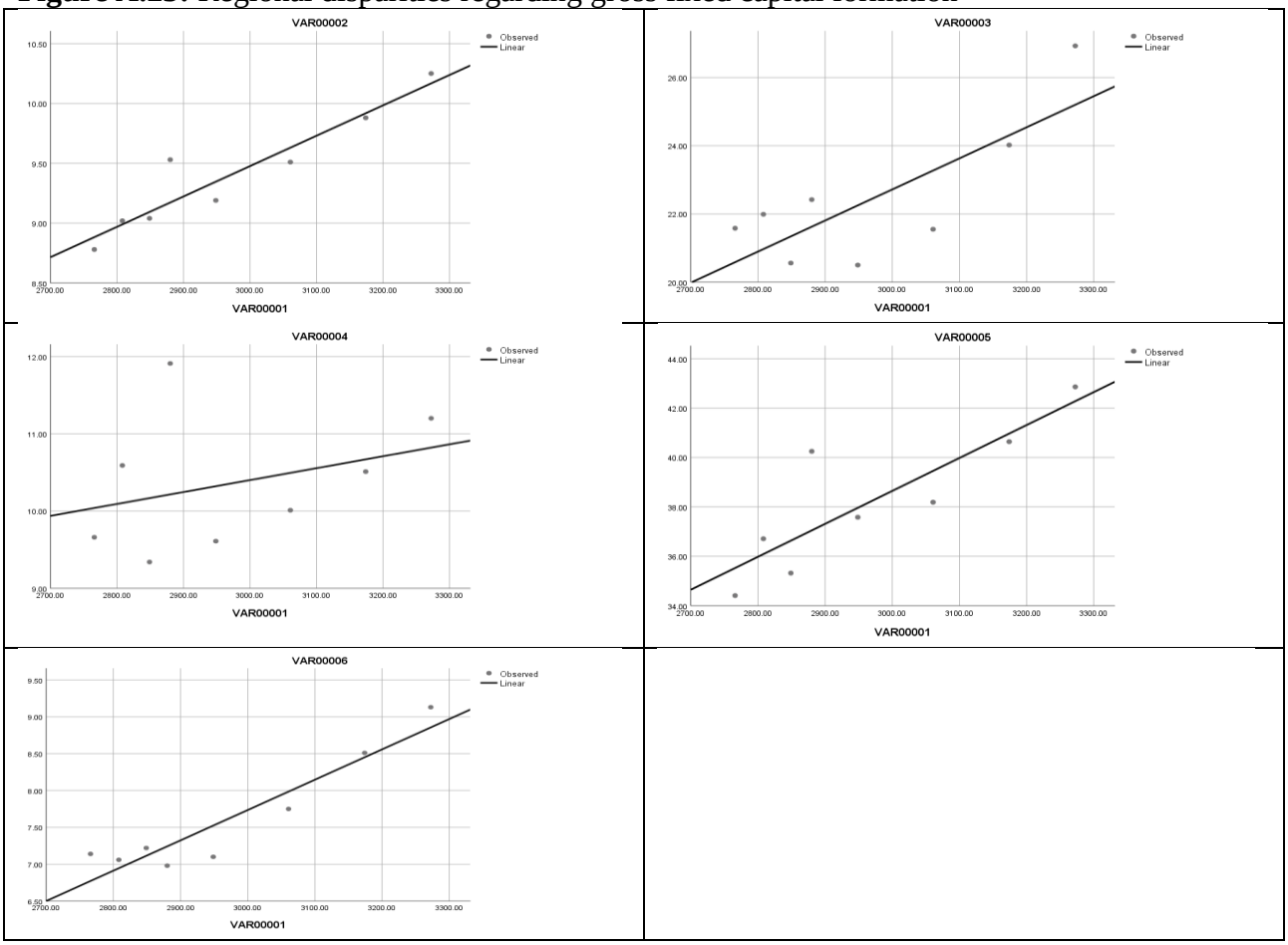


Figure A.24. Regional disparities regarding net exports