

Assessing the Impact of the Global Financial Crisis on Bulgaria's Economy from the Sector Perspective

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Abstract—

The current paper represents a country-focused analysis on Bulgaria's economic development before and after the global financial crisis. Bulgarian economy is highly vulnerable to the regional and global factors due to its strong dependence on export earnings and foreign investment, weak competitiveness on international markets, the absence of protection mechanisms, and the high degree of energy intensity of production. The study relies on objective data and analytical frameworks with a view to identify the economic sectors in Bulgaria affected mostly by the global financial crisis. By implementing a detailed sector analysis the specific industry developments in Bulgaria before and after the crisis are revealed. As key macroeconomic indicators in the paper are used the gross domestic product (GDP) generated in Bulgaria's economy and the gross value added (GVA) produced by specific industries. The use of GVA helps to understand the nature of industry specific performance and the structural imbalances in the country.

Keywords— Gross value added; Gross domestic product; Global financial crisis; Bulgaria

I. INTRODUCTION

The aim of the study is to assess the impact of the global financial crisis on Bulgaria's economy from a production-side perspective or a sector perspective. The latest industry developments are examined, thus giving a valuable track-record for predicting important shifts in Bulgaria's economic sectors. An integrated approach is implemented aimed to raise the awareness of foreign investors and competitors in the latest market opportunities and risks in Bulgaria. The motivation of the study is to implement a comprehensive assessment of Bulgaria's operating environment before and after the crisis, complemented by detailed sector insight.

As key measures in the paper are used the overall GDP and the GVA produced by specific domestic industries in Bulgaria. GVA is chosen since it measures the contribution to the economy of each individual producer, industry or sector and it is the value of goods and services produced minus the value of inputs used in production. The sum of GVA across industries plus indirect taxes (value added tax and import duties) minus subsidies equals GDP. Thus, the GVA measures production value before indirect taxes and subsidies. GVA helps to understand the nature of industry specific performance and the structural imbalances in the economy.

The structure of the study is organized as follows. First, some major trends in Bulgaria's economy during the global financial crisis are described. An analysis of Bulgaria's production structure and its current imbalances is made. Bulgaria's production structure is determined as inefficient in terms of volume and added value growth. Second, an econometric study on Bulgaria's GDP and GVA produced by specific industries before and after the global financial crisis is made. This empirical study is based on the following two periods: 1) Pre-crisis period 2003-2008; 2) Post-crisis period 2009-2014. National Statistical Institute (NSI) data bases are used. Data are seasonally and working-day adjusted, by using 2010 base-year prices and 3-monthly basis. Chow test is applied in order to test the presence of a structural break. The paper concludes with summarizing the results from the study. The undertaken econometric research demonstrates that construction sector was hit most hardly by the crisis, followed by financial and insurance activities. It helps to address some key opportunities and risks across different sectors of Bulgaria's economy.

II. OVERALL TRENDS IN BULGARIAN ECONOMY DURING THE CRISIS

As the global financial crisis hit real sectors worldwide in 2008, the Bulgarian economy was no exception in terms of economic activity. The world financial crisis hit Bulgaria's economy during the fourth quarter of 2008. It impacted all economic sectors in Bulgaria, hitting consumer and business confidence and eroding export opportunities and foreign capital inflows, with annual real GDP growth slowing to 3.5% in 2008 [1]. The worst situation in Bulgaria was observed in 2009 when real GDP dropped by 5.5%. Value added in manufacturing significantly fell by 8.1% in 2009, contributing by 1.2 percentage points to the overall decline. Manufacturing sector was negatively impacted by the worsened export conditions and the reduced domestic demand. It was closely related with a decline in construction which utilizes the bulk

of intermediate consumption products, and in retail trade. Owing to the worsened market conditions companies in most industries cut material and labor spending to protect the narrowing gross operating surplus in their gross output. Reduced foreign trade was a key factor behind the drop in transport and communications sector. GVA in financial sector dropped to 52.7% in 2009.

Like most small open economies, the Bulgarian economy is highly vulnerable to the effects of the regional and global factors. This is due to the strong country's dependence on export earnings and foreign investment, its weak competitiveness on international markets, operating currency board arrangement (CBA) and absence of protection mechanisms against negative external shocks, high energy intensity of production, etc. Some of these features are also typical for the other Central and Eastern European (CEE) countries. Under the conditions of financial crisis, they lead to the problem that the efficient allocation of funds for production modernization becomes virtually impossible. This is accompanied with a loss of competitiveness of the CEE economies. However, due to the operating currency board system with a fixed exchange rate against the euro, Bulgaria's economy is much more fragile to negative external shocks than countries with other monetary regimes [2]. The CBA was introduced in Bulgaria in July 1997. Bulgarian lev (BGN) is fixed against the euro (BGN 1.95583/EUR) and the Bulgarian National Bank (BNB) has no legislative powers to implement discretionary monetary policy.

During the crisis domestic demand was constrained by static incomes, growing unemployment, weaker foreign direct investment, and low lending rates. On the other hand, weak domestic demand for durable and investment goods significantly cut imports. Declining export sales and revenues and increasing unemployment hit industries serving the domestic market. The low consumer demand during the crisis resulted in a drop in wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage, accommodation and food service activities. Manufacturing was hit hardly as domestic sales dropped. The slump of value added in construction decelerated due to the lower output both of building construction and civil engineering [3]. This trend contributed to faster real GDP decline. More than half of the Bulgarian export is composed of goods with low value added (raw materials and semi-finished products). This structure has greater inertia in terms of adverse economic developments and it is relatively more resilient to the impact of the global financial crisis. In long term, however, low-efficient production structure prevents an increase of labor productivity. The key effects of the global financial crisis in terms of Bulgaria's value added exports are the following: relatively weak changes in the structure of foreign trade; declining share of raw materials and energy resources (logical in a period of global recession); increasing share of basic necessities (food and medicines).

III. METHODOLOGY OF THE STUDY

The empirical analysis aims to assess the impact of the global financial crisis on specific economic sectors in Bulgaria. The key indicators used in this analysis are: 1) overall GDP, generated in the economy; 2) GVA, produced by specific industries. Bulgaria's national accounts are compiled by the NSI [4] in accordance with the methodological recommendations of the 'European System of Accounts, 1995' (ESA '95) issued by Eurostat and the 'System of National Accounts, 1993' (SNA '93).

The empirical study is based on NSI data. Quarterly, seasonally adjusted data are used since they provide timely information about the evolution of GVA and GDP [5]. GVA and GDP are calculated at 2010 base-year prices. The research is based on the International standard classification of economic sectors and the correspondent National classification 2008, distinguishing 10 sectors: 1) "Agriculture, forestry and fishing"; 2) "Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities"; 3) "Construction"; 4) "Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities"; 5) "Information and communication"; 6) "Financial and insurance activities"; 7) "Real estate activities"; 8) "Professional, scientific and technical activities; administrative and support service activities"; 9) "Public administration and defence; compulsory social security; education; human health and social work activities"; 10) "Arts, entertainment and recreation, repair of household goods and other services".

The empirical study distinguishes two separate periods, such as follows:

- 1) Before the global financial crisis (2003-2008);
- 2) After the global financial crisis (2009-2014).

During these periods, the overall GDP, generated in Bulgaria, and the GVA, produced by specific economic sectors, are analysed by using the following econometric approach: two econometric models are constructed for the two reviewed periods – before and after the global financial crisis. Least Squares method is used, where 24 observations are included. In fact, the sample comprises the following quarters – from 2009Q1 till 2014Q4. Only for "Information and communication" sector the reviewed periods are the following: 1) Before the global financial crisis – from 2003Q1 till 2007Q4; 2) After the global financial crisis – from 2008Q1 till 2014Q4. This is due to some amendments adopted in the statistical reporting in this sector.

Chow test is applied in order to test the presence of a structural break in the country's GDP and GVA dynamics. Chow test does confirm the suggestion made in the graphical interpretation of Bulgaria's GDP (Figure 1) that this indicator has different trends during both periods. Chow test demonstrates that the fourth quarter of 2008 can be seen as a breaking point when the upward trend of Bulgaria's GDP is broken. Even at the end of 2014, Bulgaria's GDP has not been achieved its level attained in the fourth quarter of 2008 (e.g. before the crisis).

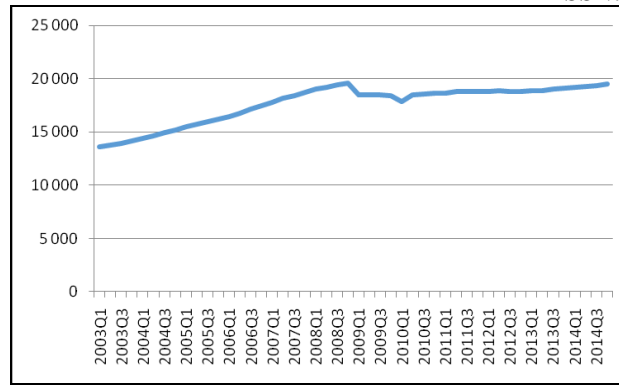


Fig. 1 GDP of Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian levs (BGN).

Logically, the next step is to analyse and compare both trends and to assess the impact of the global financial crisis on Bulgaria’s economy from a production-side perspective. Several figures are presented in order to demonstrate the dynamics of GVA generated by each economic sector. With this view, as a general measure is chosen the average exponential growth. The latter is determined by using the following econometric model:

$$Y_t = \beta_0 + \beta_1 t + \varepsilon_t$$

where: Y_t - estimated GDP, respectively GVA, t - dummy variable expressing the time, and β_1 - requested average exponential growth in GDP, respectively GVA.

IV. RESULTS FROM THE ECONOMETRIC STUDY

Bulgaria is one of the lowest income member states of the European Union to which it belongs since 2007. According to the European Commission: “The Bulgarian economy has been gradually emerging from the crisis, but a broad-based recovery is not yet in sight... The crisis has more than halved Bulgaria’s rate of potential growth thus halting real income convergence with peer economies”. [6, p. 1]. The main sectors of Bulgarian economy are services (59% of total GDP), followed by industry (24%) and agriculture (5%). Bulgaria produces a significant amount of manufactures and raw materials (iron, copper, gold, bismuth, coal), electronics, refined petroleum fuels, vehicle components, weapons and construction materials. On the expenditure side, household consumption is the main component of GDP and accounts for 63% of its total use, followed by gross fixed capital formation (21%) and government expenditure (17%). Exports of goods and services account for 65% of GDP while imports account for 66%, subtracting 1% of total GDP.

The econometric study shows that the fourth quarter of 2008 can be seen as a breaking point – during this period the GDP trend was reversed. Our constructed econometric models for Bulgaria’s GDP during both reviewed periods demonstrate the following results:

- During the pre-crisis period 2003-2008 the GDP expanded on average by BGN 274,6461 million on a quarterly basis (Table I). On an annual basis the GDP grew by BG 1098,6 million. Ample foreign investment (FDI) inflows before the crisis have benefitted some economic sectors in Bulgaria.
- During the post-crisis period 2009-2014 the GDP increased on average by BGN 43,43585 million on a quarterly basis (Table II). On an annual basis the GDP grew by BGN 173,7 million. As can be seen, there was a huge decline by more than 6 times of GDP’s average growth before and after the global financial crisis. During the period 2009-2014 the recovery in Bulgaria was slow and the economy continued to operate considerable below its potential [7]. The key factors for this trend were the following: a) the corporate sector indebtedness remained high; b) the deleveraging pressures constrained growth in some economic sectors in the country; c) the adjustment of labour market has been protracted; d) the external liabilities has been significantly increased. Within this macroeconomic environment, the FDI inflows are expected to remain a key component of funding Bulgaria’s future economic growth.

Table I Model for Bulgaria’s GDP during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13616.85	45.33782	300.3420	0.0000
T	274.6461	3.604982	76.18514	0.0000
R-squared	0.996224	Mean dependent var	16500.64	
Adjusted R-squared	0.996052	S.D. dependent var	1945.718	
S.E. of regression	122.2509	Akaike info criterion	12.52968	
Sum squared resid	328796.2	Schwarz criterion	12.62785	
Log likelihood	-148.3562	Hannan-Quinn criter.	12.55573	

F-statistic	5804.176	Durbin-Watson stat	0.322716
Prob(F-statistic)	0.000000		

Table III Model for Bulgaria’s GDP during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17280.27	165.5455	104.3838	0.0000
T	43.43585	4.704655	9.232526	0.0000
R-squared	0.794852	Mean dependent var	18778.81	
Adjusted R-squared	0.785527	S.D. dependent var	344.5008	
S.E. of regression	159.5426	Akaike info criterion	13.06215	
Sum squared resid	559984.7	Schwarz criterion	13.16033	
Log likelihood	-154.7459	Hannan-Quinn criter.	13.08820	
F-statistic	85.23953	Durbin-Watson stat	1.451842	
Prob(F-statistic)	0.000000		0.000000	

The results obtained from the econometric analysis demonstrate three distinguished trends in the GVA, produced by different economic sectors in Bulgaria:

1. Sustainable downward trend in GVA before and after the crisis.

In Bulgaria this sustainable downward trend has been observed only in sector “Agriculture, forestry and fishing”. During the pre-crisis period 2003-2008 the GVA in sector “Agriculture, forestry and fishing” declined on average by BGN 9,198721 million on a quarterly basis (Table III). On an annual basis, the GVA produced by this sector dropped by BGN 36,8 million on average. During the post-crisis period 2009-2014 the GVA declined on average by BGN 3.829070 million on a quarterly basis (Table IV). On an annual basis, the GVA contracted by BGN 15,3 million on average. This sustainable downward trend reveals the reducing contribution of “Agriculture, forestry and fishing” to Bulgaria’s GDP growth.

Up to 2007 the development of this sector was determined mostly by domestic factors within the economy. After the country’s accession into the EU the external factors has gained a primary importance. Considerable efforts have been focused only on legislation harmonization, institution-building to implement the EU Common Agricultural Policy, etc., but not on the measures to increase the agricultural production efficiency. The technological level of production remains relatively low in this sector. This affects the labour productivity, which is currently about 3 times lower than that of other economic sectors, and this is the reason for the existing very low farm incomes – about 40% below the national average.

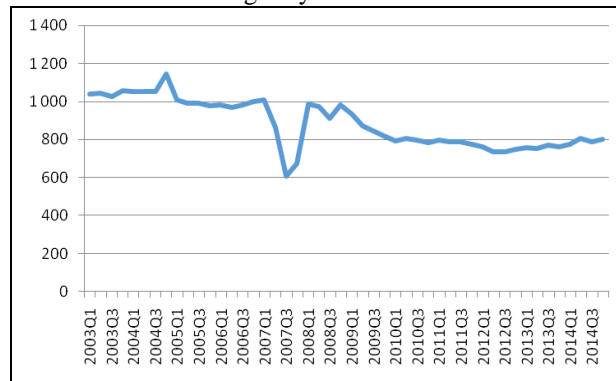


Fig. 2 GVA produced by sector “Agriculture, forestry and fishing” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian Levs (BGN).

Table IIIII Model for Bulgaria’s GVA produced by “Agriculture, forestry and fishing” during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1069.284	36.38557	29.38759	0.0000
T	-9.198721	2.893155	-3.179478	0.0043
R-squared	0.314836	Mean dependent var	972.6974	
Adjusted R-squared	0.283692	S.D. dependent var	115.9233	
S.E. of regression	98.11165	Akaike info criterion	12.08974	
Sum squared resid	211769.7	Schwarz criterion	12.18792	
Log likelihood	-143.0769	Hannan-Quinn criter.	12.11579	

F-statistic	10.10908	Durbin-Watson stat	1.072708
Prob(F-statistic)	0.004337		0.004337

Table IVV Model for Bulgaria’s GVA produced by “Agriculture, forestry and fishing” during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1069.284	36.38557	29.38759	0.0000
T	-9.198721	2.893155	-3.179478	0.0043
R-squared	0.314836	Mean dependent var	972.6974	
Adjusted R-squared	0.283692	S.D. dependent var	115.9233	
S.E. of regression	98.11165	Akaike info criterion	12.08974	
Sum squared resid	211769.7	Schwarz criterion	12.18792	
Log likelihood	-143.0769	Hannan-Quinn criter.	12.11579	
F-statistic	10.10908	Durbin-Watson stat	1.072708	
Prob(F-statistic)	0.004337		0.004337	

2. Sustainable upward trend in GVA before and after the crisis, but its growth rate is much lower during the post-crisis period.

This trend is observed in the following five economic sectors in Bulgaria:

A. Sector “Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities”.

During the pre-crisis period 2003-2008 the GVA in sector “Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities” rose by BGN 45.53509 million on a quarterly basis on average (Table V). On an annual basis, the GVA produced by this sector increased by BGN 182,14036 million on average. However, this economic sector comprising mostly export-oriented industries with a sizable share of exported output, began feeling the global economic crisis by the third quarter of 2008 and its value added started to decline. Amid falling external demand, Bulgarian companies tried to boost efficiency and cut expenses, while downward trends in commodity and energy prices supporting their efforts. According to the EU survey reports – these Bulgarian sectors are examples of low value added industries. Most of them are subject of archaic dependence on the available natural resources.

Moreover, the Bulgarian economy is the most energy-intensive in the EU, with low energy and resource efficiency. Bulgaria covers more than 70% of its gross energy demand by imports. The dependency on import of natural gas and crude oil is practically full and has a traditional single origin – the Russian Federation. The Russian natural gas is supplied by only one route – through the Ukraine. The high cost of energy represents an important challenge to some parts of industry and targeted adaptation strategies could be useful.

During the post-crisis period 2009-2014 the GVA produced by this sector rose on average only by BGN 20.51996 million on a quarterly basis (Table VI). On an annual basis, the GVA increased by BGN 82,07984 million on average. In fact, the average growth rate of GVA was contracted more than 2 times during the post-crisis period in comparison to the pre-crisis one. FDI inflows in Bulgaria appear to have benefitted parts of the manufacturing and energy sectors. Manufacturing has attracted 21% of the investment flows during the period 2010-2013 [7]. Investments in manufacturing have improved the sector’s competitiveness and boosted the county’s export performance, which has been the only driver of growth after the global financial crisis. FDI flows show a shift in the interests of foreign investors. The energy sector in Bulgaria, including renewable energy sources, has attracted the most attention. The FDI stock in energy sector in Bulgaria has doubled over the period 2010-2014.

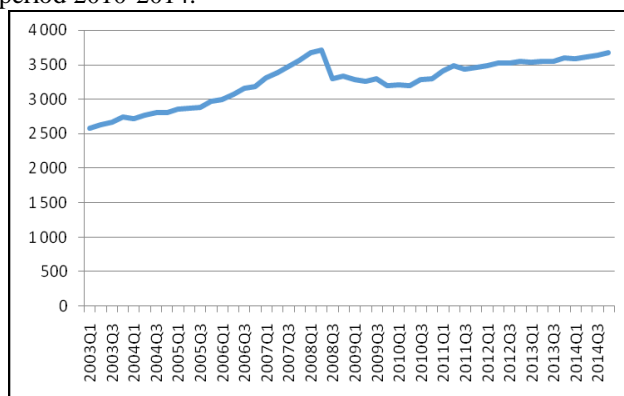


Fig. 3 GVA produced by sector “Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian levs (BGN).

Table V Model for Bulgaria’s GVA produced by “Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities” during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2581.130	45.25131	57.03989	0.0000
T	45.53509	3.598104	12.65530	0.0000
R-squared	0.879225	Mean dependent var	3059.248	
Adjusted R-squared	0.873735	S.D. dependent var	343.3849	
S.E. of regression	122.0176	Akaike info criterion	12.52586	
Sum squared resid	327542.7	Schwarz criterion	12.62403	
Log likelihood	-148.3104	Hannan-Quinn criter.	12.55191	
F-statistic	160.1566	Durbin-Watson stat	0.776267	
Prob(F-statistic)	0.000000			0.000000

Table VI Model for Bulgaria’s GVA produced by “Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities” during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2737.217	54.06616	50.62717	0.0000
T	20.51996	1.536512	13.35489	0.0000
R-squared	0.890194	Mean dependent var	3445.155	
Adjusted R-squared	0.885203	S.D. dependent var	153.7868	
S.E. of regression	52.10566	Akaike info criterion	10.82408	
Sum squared resid	59729.99	Schwarz criterion	10.92225	
Log likelihood	-127.8890	Hannan-Quinn criter.	10.85012	
F-statistic	178.3532	Durbin-Watson stat	0.703432	
Prob(F-statistic)	0.000000			0.000000

B. Sector “Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities”.

During the pre-crisis period 2003-2008 the GVA in sector “Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities” rose on average by BGN 46.60379 million on a quarterly basis (Table VII). On an annual basis, the GVA produced by this sector increased by BGN 186,415 million on average. As can be seen, the growth rates of GVA produced in the last two economic sectors were almost equivalent. The trend observed during the crisis was also very similar in both industries. Foreign investments in this sector have improved competitiveness and increased exports. Broadening the range of business activities that attract FDI within this sector would provide a strong base for continued exports growth. Major examples of increased activity include the automotive and pharmaceutical industries.

When business environment in Bulgaria was negatively affected by the crisis and FDI flows dried up, foreign investors have shifted their sectoral focus. As a result, during the post-crisis period 2009-2014 the GVA produced by sector “Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities” rose on average only by BGN 21.69796 million on a quarterly basis (Table VIII). On an annual basis, the GVA increased by BGN 86, 79184 million on average.

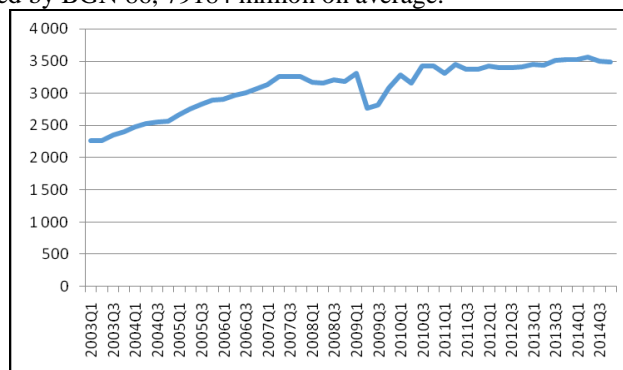


Fig. 4 GVA produced by sector “Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian levs (BGN).

Table VII Model for Bulgaria's GVA produced by "Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities" during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2353.015	31.44478	74.83009	0.0000
T	46.60379	2.500294	18.63933	0.0000
R-squared	0.940448	Mean dependent var	2842.355	
Adjusted R-squared	0.937741	S.D. dependent var	339.8122	
S.E. of regression	84.78908	Akaike info criterion	11.79787	
Sum squared resid	158162.1	Schwarz criterion	11.89604	
Log likelihood	-139.5744	Hannan-Quinn criter.	11.82391	
F-statistic	347.4246	Durbin-Watson stat	0.307936	
Prob(F-statistic)	0.000000			0.000000

Table VIII Model for Bulgaria's GVA produced by "Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities" during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2600.382	140.6538	18.48781	0.0000
T	21.69796	3.997257	5.428213	0.0000
R-squared	0.572529	Mean dependent var	3348.962	
Adjusted R-squared	0.553099	S.D. dependent var	202.7707	
S.E. of regression	135.5536	Akaike info criterion	12.73627	
Sum squared resid	404245.0	Schwarz criterion	12.83444	
Log likelihood	-150.8352	Hannan-Quinn criter.	12.76231	
F-statistic	29.46550	Durbin-Watson stat	1.341663	
Prob(F-statistic)	0.000019			0.000019

C. Sector „Information and communication”.

The highest growth in GVA produced by sector „Information and communication” was observed in the first quarter of 2008 (Fig. 5). This is due to some amendments adopted in the statistical reporting in this sector. As a result, the reviewed periods in GVA developments in sector “Information and communication” are the following: 1) before the global financial crisis – from 2003Q1 till 2007Q4; 2) after the global financial crisis – from 2008Q1 till 2014Q4.

During the pre-crisis period 2003-2007 the GVA produced by sector „Information and communication” raised by 5.712921 BGN million on average quarterly (Table IX). This means that on an annual basis the average growth of GVA was BGN 22,852 million. During the post-crisis period 2008-2014, the average growth in GVA generated by this sector in Bulgaria was only BGN 1.392109 million quarterly or 5,568 annually (Table X). There is a huge decline by more than 4 times of this indicator. Reduced foreign trade was a key factor behind falls in transport and communications during the crisis [8].

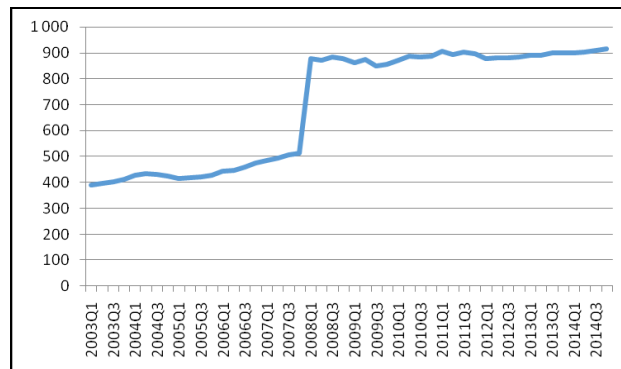


Fig. 5 GVA produced by sector “Information and communication” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian levs (BGN).

Table IX Model for Bulgaria's GVA produced by “Information and communication” during the period 2003-2007 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	393.1418	5.790457	67.89479	0.0000
T	5.712921	0.563750	10.13378	0.0000

R-squared	0.850862	Mean dependent var	441.7017
Adjusted R-squared	0.842577	S.D. dependent var	36.64061
S.E. of regression	14.53776	Akaike info criterion	8.286015
Sum squared resid	3804.235	Schwarz criterion	8.385588
Log likelihood	-80.86015	Hannan-Quinn criter.	8.305453
F-statistic	102.6936	Durbin-Watson stat	0.250078
Prob(F-statistic)	0.000000		0.000000

Table X Model for Bulgaria’s GVA produced by “Information and communication” during the period 2008-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	841.7292	8.754684	96.14616	0.0000
T	1.392109	0.261421	5.325156	0.0000

R-squared	0.521683	Mean dependent var	886.9728
Adjusted R-squared	0.503286	S.D. dependent var	15.85467
S.E. of regression	11.17404	Akaike info criterion	7.733812
Sum squared resid	3246.337	Schwarz criterion	7.828970
Log likelihood	-106.2734	Hannan-Quinn criter.	7.762903
F-statistic	28.35729	Durbin-Watson stat	0.940958
Prob(F-statistic)	0.000014		0.000014

D. Sector „Real estate activities”.

Before the crisis real estate sector in Bulgaria has experienced an unprecedented boom. Capital flows in real estate activities have increased Bulgaria’s tourism potential and the country has gained world market shares in travel services. On the negative side, the rapid build-up of FDI has resulted in an overheating with inflated fixed asset prices in the abovementioned sector. During the pre-crisis period 2003-2008 the GVA produced by sector “Real estate activities” rose by BGN 19.39839 million on a quarterly basis on average (Table XI). On an annual basis, the GVA produced by this sector increased by BGN 77,594 million on average. Since 2009 this upward trend has been reversed. Following the domestic economy weakening, real estate business started to decline and this trend was retained in the next years. During the post-crisis period 2009-2014 the GVA produced by sector “Real estate activities” rose on average by BGN 5.233717 million on a quarterly basis (Table XII). On an annual basis, the GVA increased by BGN 20,935 million on average.

The last strong FDI inflow in real estate was in 2009, when the sector attracted over 20% of the total FDI in the country. Due to the crisis there has been a negative trend in Bulgaria’s real estate market concerning vacation homes, hotels, housing, as well as office space and agricultural land. In 2009 the prices started to fall, in some cases up to more than 50%. Real estate sector has witnessed an outflow of investments amounting to 6% of the total FDI flows since 2010.

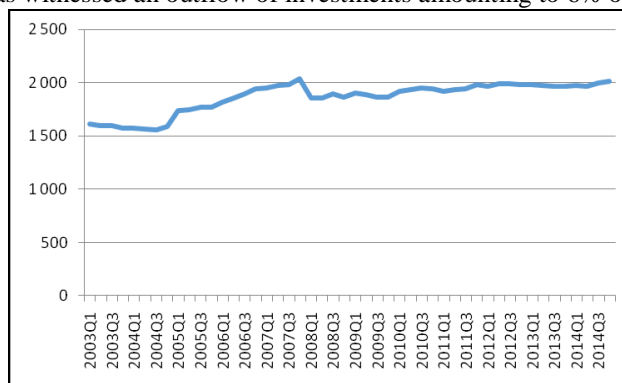


Fig. 5 GVA produced by sector “Real estate activities” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian levs (BGN).

Table XI Model for Bulgaria’s GVA produced by “Real estate activities” during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1574.040	29.25716	53.80017	0.0000
T	19.39839	2.326348	8.338559	0.0000

R-squared	0.759646	Mean dependent var	1777.723
Adjusted R-squared	0.748721	S.D. dependent var	157.3784

S.E. of regression	78.89029	Akaike info criterion	11.65365
Sum squared resid	136920.9	Schwarz criterion	11.75182
Log likelihood	-137.8438	Hannan-Quinn criter.	11.67969
F-statistic	69.53157	Durbin-Watson stat	0.513068
Prob(F-statistic)	0.000000		0.000000

Table XII Model for Bulgaria’s GVA produced by “Real estate activities” during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1771.015	17.24699	102.6854	0.0000
T	5.233717	0.515008	10.16241	0.0000
R-squared	0.798878	Mean dependent var	1941.111	
Adjusted R-squared	0.791142	S.D. dependent var	48.16788	
S.E. of regression	22.01319	Akaike info criterion	9.089910	
Sum squared resid	12599.09	Schwarz criterion	9.185067	
Log likelihood	-125.2587	Hannan-Quinn criter.	9.119000	
F-statistic	103.2745	Durbin-Watson stat	0.921071	
Prob(F-statistic)	0.000000		0.000000	

E. Sector „Professional, scientific and technical activities; administrative and support service activities”

The empirical analysis shows that during the pre-crisis period the GVA produced by this sector in Bulgaria increased on average by BGN 17.89020 million on a quarterly basis. Its growth on an annual basis was around BGN 71,561 million on average. During the post-crisis period the average growth in the GVA in sector “Professional, scientific and technical activities; administrative and support service activities” was only BGN 2.510036 million on a quarterly basis. On an annual basis, this growth was too low – BGN 10,040 million. As a result, a sharp contraction by more than 8 times of this indicator is also observed. This was a logic result from the severe downturn in many traditional industries in Bulgaria during the crisis which are complemented and supported by the professional services sector. Such stagnating industries were: “Construction”; “Financial and insurance services”; “Real estate activities”; “Manufacturing”, etc. Within employment data, the business services offered by lawyers, accountants and consultants were captured at the broad level by the “Professional, scientific and technical activities” sector.

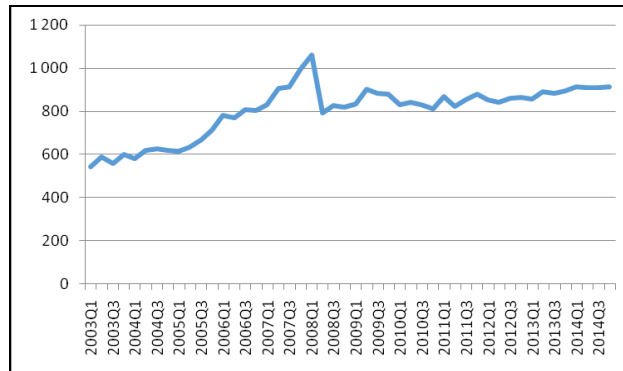


Fig. 6 GVA produced by sector “Professional, scientific and technical activities; administrative and support service activities” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian lev (BGN).

Table XIII Model for Bulgaria’s GVA produced by “Professional, scientific and technical activities; administrative and support service activities” during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	549.0057	25.73595	21.33225	0.0000
T	17.89020	2.046363	8.742434	0.0000
R-squared	0.776491	Mean dependent var	736.8527	
Adjusted R-squared	0.766332	S.D. dependent var	143.5595	
S.E. of regression	69.39556	Akaike info criterion	11.39718	
Sum squared resid	105946.4	Schwarz criterion	11.49535	
Log likelihood	-134.7661	Hannan-Quinn criter.	11.42322	
F-statistic	76.43016	Durbin-Watson stat	0.989480	
Prob(F-statistic)	0.000000		0.000000	

Table XIV Model for Bulgaria’s GVA produced by “Professional, scientific and technical activities; administrative and support service activities” during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	781.4337	27.26924	28.65623	0.0000
T	2.510036	0.774968	3.238891	0.0038
R-squared	0.322877	Mean dependent var	868.0299	
Adjusted R-squared	0.292099	S.D. dependent var	31.23533	
S.E. of regression	26.28043	Akaike info criterion	9.455181	
Sum squared resid	15194.54	Schwarz criterion	9.553352	
Log likelihood	-111.4622	Hannan-Quinn criter.	9.481226	
F-statistic	10.49042	Durbin-Watson stat	1.225287	
Prob(F-statistic)	0.003770		0.003770	

3. Upward trend of GVA before the crisis and a strong decline after the crisis.

This trend is observed in the following four economic sectors in Bulgaria:

A. Sector “Construction”.

During the pre-crisis period this sector was evolving rapidly in Bulgaria and covered both construction activity – housing, hotels, resorts, offices, road construction, etc, and industries directly associated with the construction and supply of building materials and products, including products indirectly related to the industry [9]. After Bulgaria’s accession into the EU in 2007, the country has been targeting European funds under the PHARE, SAPARD and ISPA Programmes. The EU programmes are aimed mostly at financing the transport infrastructure and environment protection projects stated in the Operational Programmes “Regional Development” and “Transport”. During the pre-crisis period 2003-2008 the GVA produced by “Construction” sector rose by BGN 29.59234 million on a quarterly basis on average (Table XV). On an annual basis, the GVA produced by this sector increased by BGN 118,369 million on average. After years of remarkable growth rates, an outstanding performance and an initial delay in 2009, the financial turmoil severely hit the construction sector in Bulgaria. Moreover, the EU subsidies for infrastructure suspended in 2008 could not soften the overall decline in construction works. Thus, following an overall output of BGN 18 billion in 2008, the Bulgarian construction sector entered a new phase of development [10].

The construction industry in Bulgaria was hit hardly by the global financial turbulence. During the post-crisis period 2009-2014, the GVA produced by the building industry declined on average by BGN 17.95617 million on a quarterly basis or by BGN 71,825 million on an annual basis (Table XVI). This trend was similar to many other EU countries experiencing negative construction growth due to the worsened business climate. Construction companies, building material producers, developers and investors recorded considerable losses. The economic downturn in Bulgaria resulted from the huge drop in foreign direct investment (FDI) flows and the limited bank financing. The renovation programs initiated by the government and international organizations in 2007-2008 have been abandoned. The overall decrease in orders was additionally worsened by the government’s will to keep a balanced state budget and thus postponing the payment of more than BGN 500 million (or EUR 255,646) to construction companies for already completed works. The key difficulties encountered by the construction industry were the tightened credit conditions, the low demand for new premises, the low investment levels and the lack of confidence in future prospects.

In 2013, the government adopted a partnership agreement with the EU for the use of the investment funds allocated to the country for the 2014–2020 period. Until the end of 2020, BGN 19.5 billion is expected to be invested, of which BGN 15 billion will be allocated through Cohesion Policy Funds. The number and significance of the so-called green projects is increasing, and Bulgaria is a partner in many international activities. Leading segments in the building sector will be road construction due to the large-scale infrastructural projects financed through the EU Programmes.

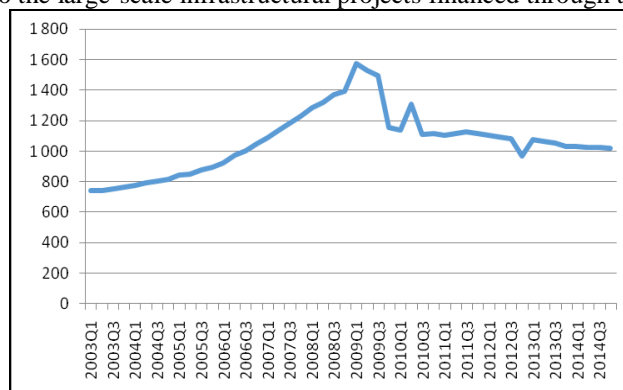


Fig. 7 GVA produced by sector “Construction” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian leva (BGN).

Table XV Model for Bulgaria's GVA produced by "Construction" during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	673.2694	20.14570	33.42000	0.0000
T	29.59234	1.601861	18.47372	0.0000
R-squared	0.939440	Mean dependent var	983.9889	
Adjusted R-squared	0.936688	S.D. dependent var	215.8886	
S.E. of regression	54.32176	Akaike info criterion	10.90738	
Sum squared resid	64918.78	Schwarz criterion	11.00555	
Log likelihood	-128.8886	Hannan-Quinn criter.	10.93343	
F-statistic	341.2784	Durbin-Watson stat	0.096232	
Prob(F-statistic)	0.000000		0.000000	

Table XVI Model for Bulgaria's GVA produced by "Construction" during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1763.767	108.6477	16.23382	0.0000
T	-17.95617	3.087671	-5.815441	0.0000
R-squared	0.605871	Mean dependent var	1144.279	
Adjusted R-squared	0.587957	S.D. dependent var	163.1204	
S.E. of regression	104.7080	Akaike info criterion	12.21988	
Sum squared resid	241202.9	Schwarz criterion	12.31805	
Log likelihood	-144.6386	Hannan-Quinn criter.	12.24593	
F-statistic	33.81936	Durbin-Watson stat	0.823006	
Prob(F-statistic)	0.000008		0.000008	

B. Sector "Financial and insurance activities".

Since July 1997 the Bulgarian banking system has consistently won praise for its stable and well-capitalized institutions, high liquidity and low risk. However, a severe downturn has been observed since the beginning of the global financial crisis. The profitability and liquidity of the banking sector as a whole has declined. Private sector lending, however, has continued to stagnate. Following a period of very rapid growth before the global financial crisis, the expansion of credit to both firms and households has come to a halt since 2010. This persisting trend reflects issues with accumulated excessive leverage and weak economic performance, weighing on credit demand, as well as increased risk averseness by banks, which have to deal with a significant stock of legacy non-performing loans in an environment of inefficient insolvency procedures [6]. The flow of credit to firms recovered relatively quickly to its pre-2009 level, while the flow to households is still in a process of very slow recovery. But the stock of credit has remained largely stable, indicating that — for the system as a whole — new loans have merely replaced or refinanced maturing loans. The overall indebtedness within the non-financial sector in Bulgaria remains high. Newly introduced rules on late payments and revised bankruptcy procedures should facilitate the deleveraging process [7].

The econometric study shows that during the post-crisis period 2009-2013, the GVA produced by sector „Financial and insurance activities” declined on average by BGN 2.925717 million on a quarterly basis (Table XVIII). On an annual basis, its decline was around BGN 11,7 million. In contrast, during the pre-crisis period, the GVA produced by this sector grew by BGN 35.53066 million on a quarterly basis (Table XVII). Its growth on an annual basis was around BGN 142,1 million.

In June 2014 or 17 years since the currency board's introduction in Bulgaria, the banking system has come under attack in the worst run on banks. In the days of panic in June jittery depositors on two major Bulgarian commercial banks withdrew more than BGN 1 billion from "Corporate Commercial Bank" (CCB) and around BGN 800 million from "First Investment Bank" (FIB). In the third quarter of 2014 these liquidity funds came back again in the banking system, as the big winners were "Unicredit Bulbank" and "DSK Bank". On June 30th, the European Commission approved a request by the Bulgarian government to extend an emergency credit-line of EUR 1.7 billion to local banks. In 2016, the European Commission stated that: "Despite significant improvements since the liquidity crisis in mid-2014, the banking sector remains a potential source of macroeconomic risks and imbalances. Public confidence in the banking system appears to have recovered, while banks' liquidity and profitability has on aggregate improved. Nevertheless, issues related to the asset-quality of certain parts of the system, particularly the lack of adequate diversification and the existence of connected lending and related-party transactions, continue to pose significant challenges to the supervisor. Similar problems persist in certain parts of the insurance and pension fund industries as well. To address these issues, the financial sector supervisors, in close cooperation with European institutions, have launched comprehensive third-party reviews of the banking, pension fund and insurance sectors." [6, p. 6].

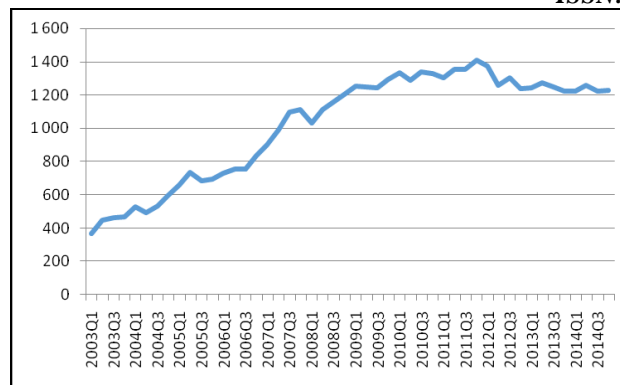


Fig. 8 GVA produced by sector “Financial and insurance activities” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian levs (BGN).

Table XVII Model for Bulgaria’s GVA produced by “Financial and insurance activities” during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	392.8167	18.99180	20.68349	0.0000
T	35.53066	1.510110	23.52853	0.0000
R-squared	0.961778	Mean dependent var	765.8886	
Adjusted R-squared	0.960041	S.D. dependent var	256.1833	
S.E. of regression	51.21032	Akaike info criterion	10.78941	
Sum squared resid	57694.93	Schwarz criterion	10.88759	
Log likelihood	-127.4730	Hannan-Quinn criter.	10.81546	
F-statistic	553.5916	Durbin-Watson stat	0.862852	
Prob(F-statistic)	0.000000		0.000000	

Table XVIII Model for Bulgaria’s GVA produced by “Financial and insurance activities” during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1386.452	52.82161	26.24782	0.0000
T	-2.925717	1.501143	-1.948993	0.0642
R-squared	0.147240	Mean dependent var	1285.515	
Adjusted R-squared	0.108478	S.D. dependent var	53.91441	
S.E. of regression	50.90623	Akaike info criterion	10.77750	
Sum squared resid	57011.78	Schwarz criterion	10.87567	
Log likelihood	-127.3300	Hannan-Quinn criter.	10.80355	
F-statistic	3.798574	Durbin-Watson stat	0.734812	
Prob(F-statistic)	0.064161		0.064161	

C. Sector “Public administration and defence; compulsory social security; education; human health and social work activities”.

Economic sectors in Bulgaria which have not attracted significant FDI, including education, healthcare, social security and social work activities, are among those most in need of transformation. The empirical analysis shows that during the pre-crisis period the GVA produced by this sector increased on average by BGN 9.923500 million on a quarterly basis (Table XIX). Its growth on an annual basis was around BGN 39,7 million. This trend has been reversed in a negative direction since the beginning of the global financial crisis. During the post-crisis period the GVA produced by this sector declined on average by BGN 0.209785 million on a quarterly basis (Table XX). On an annual basis, its average decline was around BGN 0,8 million during the post-crisis period.

Global financial crisis hit this sector in the following main directions: reduction in employment; lower investments due to the unfavourable business environment; pressure on public services due to the reduced fiscal deficits and levels of government debt; wage cuts or pay freezes in the public services, etc. Some authors argue that in Bulgaria the public services accounted for a larger share of value added than employment during the crisis. Moreover, the share of employment and value added accounted for by public services in Bulgaria was below the EU average [11]. Public services’ share of whole-economy investment in Bulgaria was also lower than the EU average.

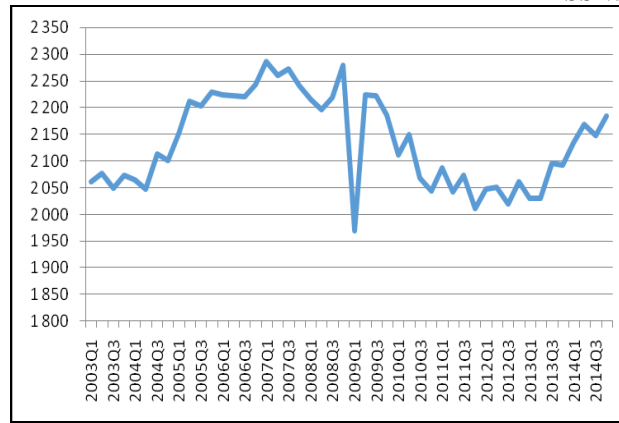


Fig. 9 GVA produced by sector “Public administration and defence; compulsory social security; education; human health and social work activities” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian lev (BGN).

Table XIX Model for Bulgaria’s GVA produced by “Public administration and defence; compulsory social security; education; human health and social work activities” during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2074.030	15.57494	133.1645	0.0000
T	9.923500	1.238423	8.013014	0.0000
R-squared	0.744804	Mean dependent var	2178.227	
Adjusted R-squared	0.733205	S.D. dependent var	81.30715	
S.E. of regression	41.99697	Akaike info criterion	10.39273	
Sum squared resid	38802.39	Schwarz criterion	10.49090	
Log likelihood	-122.7127	Hannan-Quinn criter.	10.41877	
F-statistic	64.20839	Durbin-Watson stat	0.536324	
Prob(F-statistic)	0.000000		0.000000	

Table XX Model for Bulgaria’s GVA produced by “Public administration and defence; compulsory social security; education; human health and social work activities” during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2101.531	73.76034	28.49134	0.0000
T	-0.209785	2.096203	-0.100078	0.9212
R-squared	0.000455	Mean dependent var	2094.293	
Adjusted R-squared	-0.044979	S.D. dependent var	69.53901	
S.E. of regression	71.08570	Akaike info criterion	11.44530	
Sum squared resid	111169.9	Schwarz criterion	11.54348	
Log likelihood	-135.3437	Hannan-Quinn criter.	11.47135	
F-statistic	0.010016	Durbin-Watson stat	0.933130	
Prob(F-statistic)	0.921189		0.921189	

D. Sector “Arts, entertainment and recreation, repair of household goods and other services”.

This sector includes: Creative, arts and entertainment activities (Libraries, archives, museums and other cultural activities; Gambling and betting activities; Sports activities and amusement and recreation activities); Other service activities (Activities of membership organizations; Repair of computers and personal and household goods; Other personal service activities), etc.

The econometric study demonstrates that during the pre-crisis period the GVA produced by this sector grew on average by BGN 9.185825 million on a quarterly basis. This means that on an annual basis its average growth was around BGN 36,7 million. This upward trend was reversed during the time of crisis. Over 2009-2014 the GVA produced by this sector dropped by BGN 2.592317 million on a quarterly basis. On an annual basis, its decline was around BGN 10,4 million during the post-crisis period.

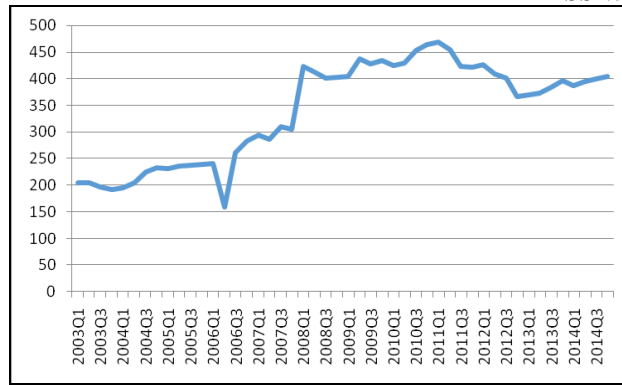


Fig. 10 GVA produced by sector “Arts, entertainment and recreation, repair of household goods and other services” in Bulgaria during the period 2003 – 2014. Quarterly data, seasonally and working-day adjusted, 2010 base-year prices. In Million Bulgarian lev (BGN).

Table XIX Model for Bulgaria’s GVA produced by “Arts, entertainment and recreation, repair of household goods and other services” during the period 2003-2008 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	169.6719	14.83984	11.43354	0.0000
T	9.185825	1.179972	7.784782	0.0000
R-squared	0.733665	Mean dependent var	266.1230	
Adjusted R-squared	0.721559	S.D. dependent var	75.83229	
S.E. of regression	40.01480	Akaike info criterion	10.29603	
Sum squared resid	35226.05	Schwarz criterion	10.39420	
Log likelihood	-121.5524	Hannan-Quinn criter.	10.32208	
F-statistic	60.60283	Durbin-Watson stat	0.899675	
Prob(F-statistic)	0.000000			0.000000

Table XX Model for Bulgaria’s GVA produced by “Arts, entertainment and recreation, repair of household goods and other services” during the period 2009-2014 (on a quarterly basis)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	503.8418	23.63434	21.31821	0.0000
T	-2.592317	0.671667	-3.859528	0.0008
R-squared	0.403729	Mean dependent var	414.4069	
Adjusted R-squared	0.376626	S.D. dependent var	28.84884	
S.E. of regression	22.77733	Akaike info criterion	9.169064	
Sum squared resid	11413.75	Schwarz criterion	9.267235	
Log likelihood	-108.0288	Hannan-Quinn criter.	9.195109	
F-statistic	14.89596	Durbin-Watson stat	0.470598	
Prob(F-statistic)	0.000849			0.000849

V. CONCLUSIONS

The global financial crisis hit Bulgaria’s economy during the fourth quarter of 2008. It impacted all economic sectors, hitting consumer and business confidence and eroding export opportunities and foreign capital inflows. Bulgarian economy is highly vulnerable to the effects of the regional and global factors. This is due to the strong country’s dependence on export earnings and FDI inflows, its weak competitiveness on international markets, operating currency board arrangement, absence of protection mechanisms against negative external shocks, and high energy intensity of production,

By applying an econometric study on the GVA produced by different economic sectors, the current study reveals the impact of the global financial crisis on Bulgaria’s economy from a production-side perspective. Results from the econometric study shows that the fourth quarter of 2008 is the breaking point when the sustainable upward trend of Bulgaria’s GDP was reversed. The study distinguishes three different trends in the GVA developments during the periods 2003-2008 and 2009-2014, depending on the specific economic sectors in Bulgaria, such as follows:

First, a sustainable downward trend in GVA before and after the crisis which is experienced only in sector “Agriculture, forestry and fishing”.

Second, a sustainable upward trend in GVA before and after the crisis, but its growth rate is much lower during the post-crisis period. This trend has been observed in the following five economic sectors in Bulgaria: “Mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; water supply; sewerage, waste management and remediation activities”, “Wholesale and retail trade; repair of motor vehicles and motorcycles; transportation and storage; accommodation and food service activities”, „Information and communication”, „Real estate activities”, and „Professional, scientific and technical activities; administrative and support service activities”.

Third, an upward trend of GVA before the crisis and a strong decline after the crisis. This trend has been experienced in the following four economic sectors in Bulgaria: “Construction”, “Financial and insurance activities”, “Public administration and defence; compulsory social security; education; human health and social work activities”, and “Arts, entertainment and recreation, repair of household goods and other services”.

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REFERENCES

- [1] BNB, *Annual Report 2008*, Bulgarian National Bank, Sofia, 2009.
- [2] Nenovsky, N., and T. Marinova, “Sovereign Debt during the Crisis: Comparative Analysis between Eastern and Southern European Countries”, *University of Orleans Seminars Working Papers*, No. 227, University of Orleans, 2013.
- [3] Ministry of Finance of the Republic of Bulgaria, *Convergence Programme of the Republic of Bulgaria 2014-2017*, Sofia, April 2014.
- [4] NSI, *Statistical Reference Book 2013*, National Statistical Institute of the Republic of Bulgaria, Sofia, 2013.
- [5] Eurostat, *Essential SNA: Building the basics*, Eurostat Manuals and Guidelines, Eurostat, Luxembourg, 2014.
- [6] European Commission, *Country Report Bulgaria 2016, Including In-Depth Review on the prevention and correction of macroeconomic imbalances*, Commission Staff Working Document, Brussels, 26.2.2016, SWD(2016), 72 final.
- [7] European Commission, *Macroeconomic Imbalances Bulgaria 2014*, *European Economy Occasional Papers*, vol. 173, March 2014, ISBN: 1725-3209 (online); ISBN: 1725-3195 (printed).
- [8] Trifonova, S., “An Empirical Analysis on the Gross Value Added Growth: the Case of Bulgaria”, in *Proc. of the Second Intl. Conference on Advances in Management, Economics and Social Science – MES 2015*, Institute of Research Engineers and Doctors, USA, ISBN: 978-1-63248-046-0 doi: 10.15224/ 978-1-63248-046-0-64, pp. 78-82.
- [9] Prism Environment, *PRISM Report on the Construction Sector in Bulgaria*, Prism Environment, European Commission, Enterprise Europe Network, 2010.
- [10] Buildecon, *Bulgaria Construction Market Report up to 2012*, Budapest, August 2010.
- [11] Cambridge Econometrics, *Mapping evolutions in Public Services in Europe: towards increased knowledge of industrial relations*, Cambridge Econometrics, Cambridge, May 2013.