ИНСТИТУТ ЗА ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ НА БЪЛГАРСКАТА АКАДЕМИЯ НА НАУКИТЕ
ИКОНОМИЧЕСКИ ИЗСЛЕДВАНИЯ
ECONOMIC STUDIES

ГОДИНА XXVI, 2017, 6

Goce Petreski[1]
Darko Lazarov[2]

DRIVERS OF ECONOMIC GROWTH: A COMPARATIVE ANALYSIS OF MACEDONIA AND BULGARIA

The aim of the paper is to investigate the sources of economic growth in Bulgaria and Macedonia. We use a growth accounting framework based on production, demand and sector-side approach, for the period 2000-2015. The tree-sided approach enables the analysis of similarities and differences of growth models in the two countries, through altered perspectives. The estimated results of the conventional decomposition of economic growth sources indicate that the main driver of annual rate of economic growth in both countries is investment in physical capital. However, the differences are found in the contribution of labour force and TFP contribution. The higher contribution of labour force is found in Macedonia, while the contribution of TFP is more significant in Bulgaria. Additionally, the results based on demand-side approach of the sources-of-growth analysis indicate that the households consumption and government spending are the main growth drivers in both countries, with negative effects of trade deficit and, as well, negative contribution of net export to economic growth. Furthermore, the estimated results of growth accounting based on sector-side approach show that the economic growth in both countries predominantly is driven by trade and service sector, with lower contribution of manufacturing. Finally, the paper depicts several policy suggestions and recommendations based on underlying insights, estimated results and conventional guiding principles.
JEL: O40; O43; O47

1. Introduction

The analysis of the country's growth model based on exploration of sources of growth is important for many reasons. First, it provides useful insights in the growth diagnostic process as a basis for designing optimal economic policy in tackling most binding growth constraints. Furthermore, the identification of growth sources is a basis for analysis of the long run economic growth capacity. In that context, the main goal of this paper is to

[1] *Goce Petreski is from Faculty of Economics, University "Ss. Cyril and Methodius", Skopje, Republic of Macedonia, Macedonian Academy of Sciences and Arts, e-mail: gpetreski@eccf.ukim.edu.mk.*
[2] *Darko Lazarov is from Faculty of Economics, University Goce Delchev, Shtip, Republic of Macedonia, e-mail: darko.lazarov@ugd.edu.mk.*

identify the similarities and differences between Bulgarian and Macedonian growth models by applying growth accounting methods based on production, consumption and sectors approach.

The estimated results based on conventional decomposition of economic growth (contribution of capital, labour and total factor productivity) indicate that the Macedonian growth is mostly based on factors accumulation (predominantly on labour) with lower total factor productivity contribution, while the Bulgarian growth is mostly based on investment in physical capital, demonstrating higher contribution of total factor productivity. Additionally, the estimated results based on demand-side approach of growth sources analysis indicate that, households' consumption and government spending are the main growth sources in both countries, with negative effects of trade deficit, and negative contribution of net export to economic growth. Furthermore, the estimated results of growth accounting based on sectors approach show that economic growth in both countries is predominantly driven by trade and services, with lower contribution of manufacturing.

The contribution of the paper within the existing empirical literature related to growth accounting including the empirical studies focusing on Bulgaria or Macedonia is the applying the integrated three-side growth accounting (production, demand and sector) approach in an comparative dimension between Macedonia and Bulgaria for the relatively long time period which include the effects of global economic crisis. The paper findings allow us to make several conclusions about the similarities and differences of the growth models in both countries and give us useful insights for creating economic policies that will accelerate the economic growth in Macedonia and Bulgaria.

The paper is organized in the following sections. In Section 2, we describe the methodological framework of growth accounting approach. Section 3 summarizes the huge body of theoretical and empirical literature related to growth accounting as an empirical growth technique. In Section 4 we identify the growth sources in both countries based on classical production, demand and sector approach. Finally, the last section of the paper puts forward concluding remarks, based on the principal empirical findings.

2. Methodological Framework

The growth accounting method is widely applied empirical technique which quantitatively approximates the absolute and relative contribution of each production factor (capital and labor) and estimates the contribution of total factor productivity (technological progress and human capital), known as Solow's residual (Solow, 1956).

In order to elaborate the methodological approach used in this paper we start by explaining a simple production function which assumes one sector economy:

$$Y_t = A_t K_t^a L_t^\beta \tag{1}$$

Where, L_t, stands for labor input (number of working hours); K_t, is the stock of physical capital, while, A_t stands for the level of technological efficiency, or total factor productivity.

By taking logarithm, differentiating it in terms of time and dividing it with, we obtain the rate of economic growth based on labor augmenting or labor adjusted mode:

$$\Delta Y / Y = \Delta A / A + a(\Delta K / K) + b(\Delta L / L)_3 \quad (2)$$

Coefficient, $a = (MP_K K_t / Y_t)$, presents the elasticity of production with respect to capital, while, $b = (MP_{L_i} L_{it} / Y_t)$, presents elasticity of production with respect to *i-th* type of labor, in terms of the level of education. The first part of the equation, $\Delta A / A$, presents the contribution of global factor productivity to the rate of economic growth, the second part, $a(\Delta K / K)$, measures the contribution of capital accumulation, while the last element, $b(\Delta L.L)$, expresses the contribution of all types of labor, to the rate of economic growth.

This empirical growth method is rather problematic, from theoretical and practical perspectives, due to inherent weaknesses of the economic discipline itself. First, economists do not agree about the weighted value which measures the share of national income of each of the included production factors (physical and human capital), because there is no generally accepted criteria about the valuation of weight (Barro, 1998). Second, as pointed out by Hsieh (1998) the possibility to use dual approach, based on constant returns to scale assumption[4], involves decomposition of growth through changes in the factors income (returns), rather than a change in the quantity of production, $Y = RK + wL$. Third, the measurement of physical capital as a difference between the accumulated capital and depreciation rate does not reflect the real value of capital, because some investment may be inefficient, unproductive and could be probably written off, at a rate higher than the standard (Pritchett, 2000). Fourth, this technique has not the capacity to measure the contribution of natural resources, especially in countries where a substantial share of economic growth is based on exploitation of natural resources (oil, gas, mineral resources), where the return of this factor would appear as part of total factor productivity (TFP), without being explicitly elaborated. Such a lack of precision in the measurement of factors of production makes the results to some extend unreliable.

Moreover, other drawback of growth accounting technique is the assumption of additive separability which means that each individual source of economic growth is not independent from others (Denison et al., 1962; Denison, 1985; Kendrick, 1980; Griliches, 1996; Madison, 1987; Psacharopoulos, 1985). Actually, according to the basic Solow

[3] Mathematical note:

$$\log Y = \log A + a \log K + \sum_{i=o}^{n} b_i \log L \Rightarrow \frac{d \log Y}{dt} = \frac{d \log A}{dt} + a \frac{d \log K}{dt} + \sum_{i=o}^{n} b_i \frac{d \log L}{dt} \Rightarrow$$

$$\Delta Y / Y = (\Delta A / A) + a(\Delta K / K) + \sum_{i=o}^{n} b_i (\Delta L_i / L_i)$$

[4] This assumption goes against all endogenous growth models which are based on some form of increasing returns.

model, the growth rate of the capital stock is determined by technological progress, which means that the factors are not unrelated among themselves (Solow, 1957). However, these remarks do not intend to diminish the value of this concept, but to point out to the necessity of careful interpretation of the results, and the need to use additional research, that will improve and clarify the results obtained by applying this method.

In order to create a more reliable picture about the main sources of economic growth in both countries, we use two additional growth accounting approaches (demand and sector side) which decompose the growth rate by estimating the contribution of the individual components of aggregate demand (household consumption, investments, government spending and net export) and the contribution of individual sectors (agricultural, industry and services).

3. Empricical Analysis of Growth Sources: The Case of Macedonia and Bulgaria

3.1 Growth source analysis based on production approach

The basic indicators of economic dynamics for the specified period, the real GDP and annual rate of economic growth for both countries are the following:

Table 1

Basic data for real GDP (in million USD) and growth rate in Macedonia, 2000-2015

	2000	2005	2010	2015
GDP growth (annual %)	4.55	4.72	3.36	3.67
GDP (current USD)	3773	6259	9407	10086
GDP (constant 2010 USD)	7018	7736	9407	10587
GDP deflator (base year varies by country)	89	100	117	133
GDP per capita (constant 2010 USD)	3488	3787	4561	5094

Source: World Bank Indicators database.

The data show that the real GDP of the Macedonian economy, with few exceptions[5], had constant increasing trend in the entire period, by an average of 2.83% rate of economic growth in the period 2000-2015. However, as a normative value judgment, this growth dynamics is not satisfactory having in consideration the country's aspiration for catching up to more developed transition countries.

On the other side, the data about the Bulgarian growth performance for the same period show that the country has recoded 3.61% average growth rate, which compared to the Macedonian growth performance is slightly higher, though, in the second half of the observed period the Bulgarian economy has been more seriously affected by the global economic crisis.

[5] The break in the positive growth trend was as a result of the conflict in 2001, the economy ended with negative growth of -4.5%. The impact of the global economic crisis in 2009 and 2012 was the cause of reduced economic activity -0.9%.

Table 2

Basic data for GDP (in million USD) and growth rate in Bulgaria, 2000-2015

	2000	2005	2010	2015
GDP growth (annual %)	5.0	7.2	0.1	3.6
GDP (current USD)	13148	29822	50610	50199
GDP (constant 2010 USD)	32771	43488	50610	54639
GDP deflator	57.7	73.1	100.0	109.7
GDP per capita (constant 2010 USD)	4011	5678	6843	7612

Source: World Bank Indicators database.

However, what is more important at this point is to identify the main growth sources in both countries. The first method used in growth-sources analysis is production-side growth accounting which provides a framework to quantify the absolute and relative contribution of each production factor (capital and labor) and to estimate the contribution of total factor productivity (technological progress and human capital) to economic growth (Lazarov and Petreski, 2016).

The first step is to estimation the contribution of physical capital. The measurement of the growth rate of physical capital is based on the assumption that the changes in physical capital stock, ΔK is the difference between the capital stock in period *t* and the capital from the previous period decreased by depreciation $K(t) - \delta K(t)$, plus demand for capital during the period *t*, i.e. investments $I(t)$:

$$\Delta K = K(t) - \delta K(t) + I(t) \tag{3}$$

where, δ, is the rate of depreciation (amortization). However, the actual empirical estimation of growth rate of physical capital (capital accumulation) is burdened with many difficulties. In fact, in the official statistics there is no available data on the value of physical capital, which makes impossible the implementation of the previously presented method for measuring the accumulation of capital. The only way is to assume that the value of physical capital in equilibrium is equal to investment rate (Popovic, 2010).

The estimated results based on the official statistic data about the investment dynamic in fixed assets show that the growth rate of investment in physical capital in the analyzed period is 3.54% and 6.50% in Macedonia and Bulgaria, respectively.

The second step in applying production-side growth sources analysis is to estimate the labor growth rate. The most appropriate way to estimate the growth rate of labor is to estimate the growth rate of number of working hours of employees in the economy (Popovic, 2006). Unfortunately, such data in the national statistics do not exist. Therefore, in the calculation of labor growth we use the rate of employment growth which is an appropriate approximation. The empirical estimation based on data about the total number of employees show that the average growth rate of employment in the analyzed period in Macedonia and Bulgaria is 1.23% and 0.41% respectively.

Another important issue in applying the production-side growth accounting is the assessment of partial elasticity ratio of capital and labor (a_t and b_t). When the economy is on the equilibrium growth-path, it can be formally verified the procedure to apply the Cobb-Douglas production function with constant returns of scale. This means that the factors of production must be constant, $a_t = a$ and $b_t = b.$, or with other words coefficients, do not change regardless of the change in the level of technology (technological progress). The fact that many empirical studies on the economies, with a similar level of development as the Macedonia and Bulgaria are, use given values for the parameters for partial elasticity, there are no significant reasons not to replicate this approach. Namely, the parameter that indicates the share of capital income in GDP has value 0.33, and the other parameter which indicates the share of labor income in GDP has value 0.67.

Finally, we can estimate the contribution of individual production factors (physical and human capital) and total factor productivity (TFP) to economic growth in Macedonia and Bulgaria. In the tables below are presented the estimated results of production-side growth accounting.

Table 3

Growth sources based on production approach in Macedonia, 2000-2015 (%)

Growth accounting	2000-2015		
a=0.33	Growth rate	Absolute contribution	Relative contribution
Physical capital (K)	3.54	1.17	41.34
Labor (L)	1.23	0.82	29.13
Total Factor Productivity (TFP/A)	0.84	0.84	29.53
GDP - Q	**2.83**	**2.83**	**100.00**

Source: Authors' calculation based on UN and World Bank database.

The results of the growth accounting based on production-side approach show that the major part of Macedonian growth rate in the period 2000-2015 was due to the increase in production factors (physical capital and labor). Physical capital (investments) is the most important factor of growth, with 41% relative contribution to economic growth, while the relative contribution of labor (number of workers) to growth is 29.13%.

The contribution of total factor productivity (TFP) or knowledge in its broadest sense is smaller compare with factors contribution. Actually, the absolute contribution is 0.84%, or nearly 30% of economic growth. The further decomposition of total factor productivity shows that technological progress (knowledge implemented in the machines) is insignificant with contribution of 8.5%. The impact of TFP on economic growth in Macedonia is slower compared with total factor productivity contribution which varies from 40% to 50% in developed countries, and from 35% to 40% in middle-income countries.

The growth pattern of the Bulgarian economy is different from the Macedonian growth model by the role and the importance of physical capital, as the engine of growth. Actually,

the relative contribution of investment in physical capital in Bulgaria is significantly higher (41% of average growth rate is determined by the investment in physical capital), which is automatically reflected in the total factor productivity.

Table 4

Growth sources based on production approach in Bulgaria, 2000-2015 (%)

Growth accounting	2000-2015		
a=0.33	Growth rate	Absolute contribution	Relative share
Physical capital (K)	6.50	2.15	59.55
Labor (L)	0.41	0.27	7.47
Total factor Productivity (TFP/A)	1.43	1.19	32.96
GDP - Q	**3.61**	**3.61**	**100.00**

Source: Authors' calculation based on UN and World Bank database.

Additionally, the results indicate that labor contribution to growth rate in Bulgaria is significantly lower (7.47%) than the labor contribution to economic growth in Macedonia (29.13%), which is expected, considering that the Republic of Macedonia has had high unemployment rate and low cost labor force. Finally, the results show that the relative contribution of total factor productivity to economic growth is higher in Bulgaria (almost 33%), compare with Macedonia (less than 30%). The results of growth sources in Bulgaria based on production-side approach obtained in our analysis are similar with the previous empirical studies that have been carried out by Gancev (2005), Minassian (2008), Raleva (2013) and Todorov (2016).

3.2 Growth source analysis based on demand-side approach

The growth accounting analysis based on demand-side approach provides additional specifics that go deeper into country's growth anatomy. The results will be presented in two tables; the first table refers to changes in demand structure, while the second tables represent the absolute and relative contribution of individual components of aggregate demand to economic growth.

Table 5

Aggregate demand structure and changes in Macedonia, 2000-2015 (%)

Individual components of Aggregate demand	2000	2015	Δ15-00
Households consumption including NIPIS	74.31	70.93	-3.38
Government spending	18.16	15.00	-3.16
Gross fixed capital formation	19.32	31.41	12.09
Export of goods and services	33.90	51.32	17.42
Import of goods and services	-45.84	-68.33	-22.49
Net export	-11.94	-17.01	-5.07
Gross Domestic Product	**100.00**	**100.00**	**0.00**

Source: Authors' calculations based on data from State Statistical Office of RM.

Table 6

Aggregate demand structure and changes in Bulgaria, 2000-2015 (%)

Individual components of Aggregate demand	2000	2015	Δ15-00
Households consumption including NIPIS	63.35	69.98	6.63
Government spending	20.85	14.68	-6.17
Gross fixed capital formation	16.18	22.36	6.18
Changes in inventory	1.29	1.79	0.49
Export of goods and services	35.48	61.15	25.67
Import of goods and services	-38.22	-70.11	-31.90
Net export	-2.74	-8.97	-6.23
Gross Domestic Product	**100.00**	**100.00**	**0.00**

Source: Authors' calculations based on data from National Statistical Institute of RB

The analysis of demand structure shows that the household consumption (including the consumption of non-profit institutions serving households – NIPIS) has the highest relative share in total aggregate demand, both in Macedonia and Bulgaria. Actually, the relative share of household consumption in Macedonia and Bulgaria is 71% and 70%, respectively in 2015. The government spending (government expenditures of final goods and services) participated with 15% and 15.5% in the total aggregate demand in Macedonia and Bulgaria, respectively. Gross capital formation has a relatively high relative share in total aggregate demand in Macedonia (31%), compare with Bulgaria (23%). Finally, net export has negative share in total aggregate demand in both countries, but that negative share is significantly higher in Macedonia (17%), compared to Bulgaria (9%).

Based on the analysis of relative share of individual components of aggregate demand and its dynamic (the change in the relative share of individual components in the aggregate demand), we estimate the growth sources by identifying the relative contribution of individual components of aggregate demand to economic growth.

Table 7

Growth sources based on demand-side approach in Macedonia, 2000-2015 (%)

Growth sources	2000-2015		
	Growth rate	Absolute contribution	Relative contribution
Households consumption including NIPIS	2.61	1.96	69.41
Government spending	2.05	0.34	12.14
Gross fixed capital formation	6.79	1.67	58.98
Export of goods and services	6.32	2.42	85.43
Import of goods and services	5.96	-3.28	-115.86
Gross Domestic Product	**2.83**	**2.83**	**100.00**

Source: Authors' calculations based on data from State Statistical Office of RM.

The estimated results show that households consumption (including the consumption of non-profit institutions serving households - NPISH) with the average relative share of 75% and the average growth rate of 2.61%% in the period 2000-2015 has the largest absolute

and relative contribution to the economic growth in Macedonia. Government spending and gross investment has relative contribution to economic growth of 12.14% and 58.98%, respectively. On the other hand, net export has negative relative contribution to economic growth of 30.5%, due to the increasing trend of trade deficit (higher growth of import than the export growth).

Table 8

Growth sources based on demand-side approach in Bulgaria, 2000-2015

Growth sources	2000-2015		
	Growth rate	Absolute contribution	Relative contribution
Households consumption including NIPIS	4.24	2.95	83.98
Government spending	1.14	0.20	5.56
Gross fixed capital formation	6.50	1.54	43.91
Changes in inventory	6.50	0.12	3.51
Export of goods and services	7.62	3.64	103.68
Import of goods and services	8.30	-5.00	-142.36
Gross Domestic Product	**3.61**	**3.61**	**100.00**

Source: Authors' calculations based on data from National Statistical Institute of RB.

The identification of growth sources in Bulgaria based on demand-side approach indicating that the relative contribution of final consumption of households to Bulgarian economic growth is much more significant (83%), which reflects the huge trade imbalance and significantly higher negative contribution of net export to Bulgarian growth (39%). On the other side, the contribution of government spending and gross investment is lower compare with the case of Macedonia. Actually, the relative contribution of government spending is 5.56%, while the contribution of gross investment is almost 44%.

The general conclusion of this analysis is that the household consumption and government spending are the main drivers of economic growth, with significant trade deficit and negative contribution of net export in both countries. This is facilitated by the bank credit expansion to household and the budget deficits of the countries. However, it's not surprising if we analyze the growth model that the majority of countries in the South-East European region are based on in the last two decades, where the main source of growth is the final consumption.

3.3 Growth source analysis based on sector-side approach

The sectoral decomposition of the growth sources allows us to identify the sectors structure and the contribution of each sector to economic growth. First, we analyze the relative share of individual sectors in real GDP calculated according to production method and changes in the added value of each sector in total country value added.

Table 9

Sectors structure and sectors changes in Macedonia, 2000-2015 (%)

SECTORS	2000	2015	Δ 15-00
Agriculture, hunting, forestry and Fishing (A+B)	10.23	7.70	-2.53
Mining and quarrying, and Electricity, gas and water supply (C+E)	3.67	3.19	-0.48
Manufacturing (D)	8.51	10.51	2.00
Construction (IF)	6.36	11.15	4.79
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods, Hotels and restaurants (ISICG-H)	11.23	15.01	3.78
Transport, storage and communication (I)	5.89	7.88	1.98
Other private and public services (IJ-P)	42.61	32.93	-9.68
Value Added	**88.49**	**88.35**	**-0.14**
Net taxes on products	11.51	11.65	0.14
Real GDP - Gross Domestic Product	**100.00**	**100.00**	**0.00**

Source: Authors' calculations based on National Statistical Office and UN database.

The data related to sectors structure in Macedonia indicates that manufacturing has negligible share in real GDP, though there is an increasing trend from 8.5% in 2000 to 10.5% in 2015. However, the other part of industry (construction and mining sector) has much significant share in real GDP. Actually, the relative share of these sectors increased from 10% in 2000 to 14.5% in 2015.

On the other hand, it is evident an increasing trend in the relative share of widely define "trade" and the tourism sector - hotels and restaurants (line G-H) from 11.23% in 2000 to almost 15% in 2015 and increasing trend of transport sector from 5.9% in 2000 to 7.9% in 2015, while the other private and public services as a largest sector in Macedonian economy has significant decreasing trend from 42.6% to 32%

The analysis of sectoral structure changes in Bulgaria indicate that the relative share of manufacturing had an increasing trend from 12.75% in 2000 to 13.89% in 2015, showing that there is no trend of deindustrialization. On the other side, there is an increasing trend in trade and transport sector, while significant decreasing trend in the relative share of agricultural from 9.75% in 2000 to 4.59% in 2015. In the table below is presented the demand structure and changes in demand structure in Bulgaria in the period 2000-2015.

Table 10

Sectors structure and sectors changes in Bulgaria, 2000-2015 (%)

SECTORS	2000	2015	Δ15-00
Agriculture, hunting, forestry and Fishing (A+B)	9.78	4.59	-5.20
Mining and quarrying, and Electricity, gas and water supply (C+E)	6.46	5.13	-1.33
Manufacturing (D)	12.75	13.89	1.15
Construction (IF)	5.27	4.90	-0.37
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods, Hotels and restaurants (ISICG-H)	11.06	14.15	3.10
Transport, storage and communication (I)	8.39	10.49	2.10
Other private and public services (IJ-P)	33.32	32.61	-0.72
Value Added	**86.90**	**85.90**	**-0.99**
Net taxes on products	13.10	14.10	0.99
GDP – Gross Domestic Product	**100.00**	**100.00**	**0.00**

Source: Authors' calculations based on data from National Statistical Institute of RB.

However, the main challenge in this section is to identify the contribution of individual sectors to growth rate in both countries by applying a sector-side growth sources analysis. The estimated results indicate that trade; construction and industry are the main driving sectors to economic growth in Macedonia. Actually, the relative contribution of trade defined in its broadest sense to economic growth in the analyzed period is almost 29%, the construction sector has 23% relative contribution to the rate of economic growth, while the relative contribution of industry (including mining sector and manufacturing) to economic growth is 22%.

The other sectors have smaller contribution: agriculture has 4.85%, service sector (including public administration, defense, social security, education, health and social work sector and the transport, storage, communications and information) has 16.64%, while transport sector has 15% contribution to economic growth.

Table 11

Sectors sources of economic growth in Macedonia, 2000-2015 (%)

Sectors	2000-2015		
	Growth rate	Absolute contribution	Relative contribution
Agriculture, hunting, forestry and Fishing (A+B)	1.31	0.13	4.85
Mining and quarrying, and Electricity, gas and water supply (C+E)	2.96	0.13	4.79
Manufacturing (D)	4.58	0.48	16.99
Construction (IF)	7.48	0.65	23.13
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods, Hotels and restaurants (ISICG-H)	5.17	0.81	28.91
Transport, storage and communication (I)	5.17	0.42	15.17
Other private and public services (IJ-P)	1.13	0.47	16.64
Value Added	**2.82**	**2.43**	**86.03**
Net taxes on products	3.05	0.42	14.96
GDP – Gross Domestic Product	**2.83**	**2.83**	**100.00**

Source: Authors' calculations based on data from State Statistical Office of RM

On the other side, the estimated results of the sector-side growth sources analysis for Bulgaria show that the industry (mining and quarrying, electricity supply, gas, steam and air conditioning, and manufacturing) has lower relative contribution to the economic growth rate (approximately 19.5%), compare with the relative contribution of industry to Macedonian growth rate (approximately 22%). The similar situation is recorded in the comparative analysis between Macedonia and Bulgaria in terms of the relative contribution of construction and agriculture sector to economic growth. Actually, the contribution of these sectors to economic growth is significantly higher in Macedonia (approximately 28%), compared to Bulgaria (approximately 3.5%).

The growth model of Bulgaria is primarily based on trade and service sectors. For illustration, the relative contribution of trade and service sector to economic growth is much than 50%, while contribution of transport sector is almost 15%. This conclusion about the

main sectors that drive the economic growth is also valid for Macedonia, but the relative contribution of these sectors is much lower in the case of Macedonia (60%). In the table below is presented the results of sector-side growth accounting analysis for Bulgaria.

Table 12

Sectors sources of economic growth in Bulgaria, 2000-2015 (%)

SECTORS	2000-2015		
	Growth rate	Absolute contribution	Relative contribution
Agriculture, hunting, forestry and Fishing (A+B)	-0.96	-0.06	-1.69
Mining and quarrying, and Electricity, gas and water supply (C+E)	1.95	0.10	2.93
Manufacturing (D)	4.29	0.59	16.68
Construction (IF)	3.35	0.18	5.24
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods, Hotels and restaurants (ISICG-H)	5.31	0.67	18.94
Transport, storage and communication (I)	5.17	0.52	14.87
Other private and public services (IJ-P)	3.39	1.11	31.65
Value Added	**3.42**	**2.95**	**83.93**
Net taxes on products	4.33	0.60	17.06
GDP - Gross Domestic Product	**3.61**	**3.61**	**100.00**

Source: Authors' calculations based on data from National Statistical Institute of RB.

The empirical estimates are open to generic (and specific, as the time length observed) criticisms attached to inherent flaws of aggregate economic modelling (deterministic countenances, intertemporal structures and time distribution, lags, internal linkages in the mechanics of growth, elasticity, productivity and efficiency differentials within the substructures. Nevertheless, the obtained results reveal unequivocal and categorical structures and trends.

4. Conclusion

The estimation of main sources of economic growth and the identification of growth model that the country is based on could give very useful insights for improvement of economic policies. Three growth accounting methods are most commonly applied in the growth theory and empirics: classical production-side, demand-side and sector-side approach. The first method, estimate the contribution of production factors (physical capital and labour force) and TFP (Total Factor Productivity). The demand-side approach investigates the contribution of each components of aggregate demand (household consumption, investment, government spending and net export) to economic growth, while the sectoral-side growth accounting approach estimates the contribution of each sector (agricultural, manufacturing, and services) to economic growth.

The main objective of the paper is to investigate the growth-sources and to identify the main drivers of economic growth in Macedonia and Bulgaria by applying the production, demand and sector approaches. The estimated results of the conventional decomposition of economic growth sources indicate that the main driver of annual rate of economic growth in both countries is investment in physical capital. However, the differences are found in the contribution of labour and TFP contribution. The higher contribution of labour force is found in Macedonia, while the contribution of TFP is more significant in Bulgaria. Additionally, the results based on demand-side approach of the sources-of-growth analysis indicate that the households consumption and government spending are the main growth drivers in both countries, with negative effects of trade deficit and, as well, negative contribution of net export to economic growth. Furthermore, the estimated results of growth accounting based on sector-side approach show that the economic growth in both countries predominantly is driven by trade and service sector, with lower contribution of manufacturing. However, the application of growth accounting framework to identify the main growth drivers is open to generic and specific criticisms attached to intrinsic weaknesses of aggregate economic modelling. Some of those drawbacks were discussed in details within the paper. Still, the results provide some convincing conclusions.

The paper gives some general policy suggestions and recommendations based on the estimated results. First, both countries should focus their policy to support productive investment in order to increase the total factor productivity. In that context, transfer of technology, attracting high-technology intensive FDI, improvements in educational system and investment in human capital must be of a high priority. Moreover, the public investment should be focused in infrastructure that will increase the countries competitiveness. Second, both countries should enhance manufacturing sector and industries with higher added value, considering a set of active industrial policies, as a way to improve their export performance. Finally, both countries should gradually bring together shifts in their current demand driven growth models towards supply side induced growth, as the only way to generate and accelerate sustainable long-run economic growth.

References

Barro, R. (1998). Notes on Growth Accounting. – Journal of Economic Growth, 4(2), p. 119-137.

Denison, E. F. (1962). Sources of Growth in the United States and Alternatives Before Us. – Supplement Paper 13, New York, Committee for Economic Development.

Denison, E. (1985). Trends in American Economic Growth 1929-82. Washington, D. C., Brooking Institute.

Ganev, K. (2005). Measuring Total Factor Productivity: Growth Accounting for Bulgaria. – Bulgarian National Bank Discussion Paper N 48.

Hausmann, R., Rodrik, D., Velasco, A. (2005). Growth Diagnostics. John F. Kennedy School of Government, Harvard University, mimeo, 35.

Hsieh, C.-T. (1999). Productivity Growth and Factor Prices in East Asia. – The American Economic Review, Vol. 89(2), p. 133-138.

Griliches, Z. (1996). Education, Human Capital, and Growth: A Personal Perspective. – NBER Working Paper Series, National Birou of Economic Research, Working Paper 5426.

Jorgenson, D. W., Griliches, Z. (1967). The Explanation of Productivity Change. – Review of Economic Studies 34(3), p. 249-280.

Kendrick, J. W. (1980). Survey of the Factors Contributing to the Decline in US Productivity Growth in The Decline in Productivity Growth. – Conference Series, N 22, Boston: Federal Reserve Bank of Boston.

Lazarov, D., Petreski, G. (2016). Human capital as a binding constraint to economic growth: The case of Macedonia. – Croatian Economic Survey, Vol. 18 (1), p. 35-70.

Madison, A. (1987). Growth and Slowdown in advanced Capitalist Economies: Techniques of Quantitative Assessment. – Journal of Economic Literature, 25, p. 649-698.

Madison, A. (1982). Phases of Capitalist Development. Oxford University Press.

Mankiw, N. G., Romer, D., Weil, D. N. (1992). A Contribution to the Empirics of Economic Growth. – Quarterly Journal of Economics, 107(2), p. 407-437.

Mankiw, N. G. (1995). The Growth of Nations. – Brookings Papers on Economic Activity, 1, p. 275-327.

Madison, A. (1987). Growth and Slowdown in advanced Capitalist Economies: Techniques of Quantitative Assessment. – Journal of Economic Literature, 25, p. 649-98.

Minassian, G. (2008). Is the Bulgarian Economy Overheating?. – Economic Thought, N 3, p. 3-29.

Popovic, M. (2006). Capital Augmenting and Labor Augmenting Approach in Measuring Contribution of Human Capital and Education to Economic Growth. – Montenegrin Journal of Economics, 2(4), p. 71-109.

Popovic, M. (2010). Privredni Rast Crne Gore – Analiza, Dijagnoza, Alternativa. Podgorica: Daily Press.

Pritchett, L. (2000). The Tyranny of Concepts: CUDIE (Cumulated, Depreciated, Investment Effort) Is Not Capital. – Journal of Economic Growth, 5(4), p. 361-384.

Psacharopoulos, G. (1985). Return to Education: A Further international Update and Implications. – Journal of Human Resources, 200(4), p. 583-604. http://dx.doi.org/10.2307/145686.

Raleva, S. (2013). Inflation and Economic Growth. Sofia: Publishing Complex of the University of National and World Economy.

Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. – Quarterly Journal of Economics 70(1), p. 65-94.

Solow, R. M. (1957). Technical Change and the Aggregate Production Function. – Review of Economic and Statistics, 39, p. 312-320.

Todorov, I. (2016). Supply-side factors of economic growth in Bulgaria. – Economic Alternatives, 2, p. 159-174.