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Rim El Khoury *Editor*

Business Models of the Future

How AI and Advanced Digital Transformation are Reshaping Industries

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Contents

Comparative Analysis of the Budget Revenues from Direct Taxes in North Macedonia and Serbia

Vlatko Paceskoski and Filip Taskovski

Abstract Taxes in a large number of world economies represent a basic source of public revenues, and thus financing of public consumption. Depending on the economic system and the degree of economic development, the share of direct and indirect taxes in total tax revenues differs, consequently, in some countries direct taxes are a key source of financing. In developing countries, public revenues are still based on indirect taxes, but with economic growth and development, the participation rate of direct taxes is increasing. The subject of research is the comparison of revenues from direct taxes in North Macedonia and Serbia and the correlation of direct taxes with the key macroeconomic variables of the countries. The research is based on secondary methods, during which ~~it~~ was concluded that direct tax revenues in both countries have a growing trend of participation in total tax revenues.

Keywords Budget revenues · Comparative analysis · Correlation analysis · Direct taxes and macroeconomic variables

1 Introduction

Taxes are the subject of research in a large number of economies, because they have a significant impact on the economy as a whole [1]. Namely, according to large researches, the creation of a high-quality and appropriate tax system in a country is a key factor for maintaining macroeconomic stability, encouraging economic growth and development, and mitigating macroeconomic shocks in conditions of market distortions on a national and international level, whereas on the other hand, revenues from taxes are one of the key sources of financing government expenditures, with analyzes indicating that budget revenues from taxes account for about 50% of the

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total budget revenues of developing countries [2, 3]. Taxes as an economic category can be classified according to several bases, but the basic division is that of direct and indirect taxes [4]. Namely, in addition to the fact that indirect taxes, which include the consumption tax, among others, have the most significant impact on maintaining economic growth and the largest share within the budget revenues from taxes, indirect taxes also have a significant share on economic growth, especially for developing countries and underdeveloped countries, they encourage the creation of new jobs and business investments, provided that the tax base and tax rate are created according to economic needs and characteristics [5]. According to a large number of analyses and researches, in addition to the fact that direct taxes have a significant effect on economic growth, they also have a significant share in the financing of state expenditures, while these have a relatively respectable share in tax revenues in the budgets of developing countries [6]. The subject of the research is the budget revenues from direct taxes, that is, revenues from personal income tax and profit tax in North Macedonia and Serbia. The purpose of the research is to identify the differences in the budget revenues from direct taxes in total tax revenues in North Macedonia and Serbia and to analyse the correlation between the budget revenues from direct taxes and the key macro-economic variables in order to give a concrete answer to which variable has significant correlation with the growth of budget revenues from direct taxes in both countries. Similarly, the research is based on secondary analysis and composed of (1) descriptive statistics, (2) comparative analysis and (3) correlation analysis. The results of the research can be used in the creation of tax and other macroeconomic policies by the relevant institutions. Mardan and Stimmelmayr [7] consider that tax policy in practice is different in developing and developed economies. Namely, developed economies have greater absorption power in the area of tax collection in relation to their GDP, mainly due to developed tax systems and the control of the gray economy. Crivelli et al. [8] claim that most of the tax revenues in developed countries are due to income from personal income tax, and in developing countries a high percentage of tax revenues belong to the taxation of corporate profits, through corporate tax.

2 Literature Review

The introduction of taxes within the framework of a national economy aims to finance the state needs that arise as state expenses, also in economic literature several other key goals can be identified, namely: maintaining economic stability, redistribution of income and efficient allocation of resources [9, 10]. In the past period, in addition to the fact that economists have different views on the effects of taxes on economies, research shows that taxes, that is, taxation, has a significant impact on economic flows, especially economic growth and stabilization of crises [11]. Salami et al. [12] in their research concluded that taxes have a significant contribution to stimulating the economic growth of countries, especially developing countries, which have a significant role in solving financial crises. In professional literature, you can find a large number of analyses in the domain of tax revenues in state budgets, what is also characteristic of the research is the analysis of participation of direct and indirect taxes in total tax revenues, since tax revenue can be determined from the system of the country as well as the tax burden on taxpayers [13]. Based on a large number of static and dynamic analyses in the field of tax revenues and the participation of different types of taxes in total tax revenues, it has been determined that the same differs from country to country, precisely because each country has an authentic tax system designed according to economic situations and conditions in the economy, the degree of democracy and the political system [14, 15]. Consequently, when determining the tax elements, and especially the tax rate, according to current practice, it can be concluded that it is best to primarily approach the preparation of a quantitative analysis in order to determine the macroeconomic variables that have a significant role in the reduction of tax revenues [16]. According to the results of several researches, when determining the participation of direct and indirect taxes in total tax revenues of the budget of a country, a series of macroeconomic variables play a significant role, so Gupta [17] analyses the level of economic development as a key factor, reflected through the growth of GDP and GDP per capita, Ghura [18] in his research comes to the conclusion that there is a strong correlation between tax revenues and trade openness of economies and tax revenues and household income growth. Bird et al. [19] indicate that a large number of macroeconomic factors influence the degree of participation of direct and indirect taxes in total tax revenues, while they emphasize public debt, and thus government expenditure. When analyzing tax revenues, a large number of authors apply the comparison method, which provides an opportunity for qualitative static and dynamic analysis between two or more countries or a geographical entity. Thus, Zee [20] makes an inter-state comparative analysis of more developed and developing countries in which tax revenues are correlated with GDP, and it is established that in each country there is a different degree of correlation, namely in developing countries a stronger positive correlation is observed in relation to developed countries. According to Mahdavi [21] whose empirical research is based on an unbalanced panel regression analysis of selected developing countries, it has been determined that some macroeconomic variables have a significant positive impact on the level and composition of tax revenues within total revenues, and some macroeconomic variables have a negative impact, with the net effect being statistically insignificant. In his research Leuthold [22], which refers to a group of eight African countries, among other things, he concludes that in each country a different share of direct and indirect taxes in total tax revenues is noted, primarily due to the difference in the tax burden observed from country to country.

3 Research Methodology

The research explains the characteristics of tax revenues in the state budgets of the Republic of North Macedonia and the Republic of Serbia with an emphasis on tax revenues from direct taxes (personal income tax and profit tax). Correlations of direct tax revenues and total tax revenues with key macroeconomic variables in both countries are also identified. The research was conducted with secondary methods, i.e. induction, deduction, analysis, comparison, synthesis and systematic review. When choosing a data source, several criteria were applied in order to increase the validity and reliability of the research, namely: the date of publication, the publishing institution, the degree of contribution to the development of the research field. The research is composed of descriptive statistics of variables related to tax revenues, comparison of variables related to tax revenues between North Macedonia and Serbia, correlation using Microsoft excel and panel regression analysis (which includes variables from North Macedonia and Serbia), the same applies to the period from 2009 to 2023 on an annual basis.

Regression equations:

$$\mathrm{Y} = \beta_0 + \beta_1 \mathrm{X}_1 + \beta_2 \mathrm{X}_2 + \ldots + \beta_\mathrm{n} \mathrm{X}_\mathrm{n} \quad (1)$$

$$\mathrm{INF} = \beta_0 + \beta_1 \mathrm{INF} + \beta_2 \mathrm{GDS} + \beta_3 \mathrm{GEX} + \beta_4 \mathrm{CEX} + \beta_5 \mathrm{UNE} + \beta_6 \mathrm{GDP} + \varepsilon \quad (2)$$

All variables are defined in Table 1. Research hypothesis

H1: Budget revenues from personal income tax in North Macedonia and Serbia have a relatively similar percentage share in budget revenues from direct taxes.

H2: Budget revenues from profit tax in North Macedonia and Serbia have a relatively similar percentage of participation in budget revenues from direct taxes.

H3: Budget revenues from direct taxes in North Macedonia and Serbia have a relatively similar percentage share in budget revenues from direct taxes.

H4: Budget revenues from personal income tax, profit tax and total tax revenues in North Macedonia and Serbia note a significant correlation with key macroeconomic variables.

H5: Key fiscal determinants have a significant impact on direct tax revenues.

4 Research Results

4.1 Descriptive Statistics

As shown in Table 2, the average annual budget revenues from personal income tax in North Macedonia are 14.97 million denars, and in Serbia, 34.97 million denars. The average annual budget revenues from profit tax in North Macedonia are 8.93 million denars, and in Serbia, 49.33 million denars. The average annual budget revenues from direct taxes in North Macedonia are 23.90 million denars, and the average tax revenues are 101.63 million denars. In Serbia, the average annual budget revenues from direct taxes amount to 84.23 million denars and from total taxes 506.18 million denars. The data distribution of the variables "PTXM", "CTXM" and "DTXM" is platykurtic, and for the other variables it is leptokurtic. The frequency distribution

Table 1 Research variables

Variable	Abbreviation	Source
Budget revenues from personal taxes	PTXM/PTXS	Annual budgets of North Macedonia and Serbia
Budget revenues from profit taxes	CTXM/CTXS	
Budget revenues from direct taxes	DTXM/DTXS	
Budget revenues from taxes	TXRM/TXRS	
Inflation	INFM/INFS	NBRNM/NBS
Gross domestic savings (% of GDP)	GDSM/GDSS	IMF
Government expenditures (% of GDP)	GEXM/GEXS	
Capital expenditures	CEXM/CEXS	Annual budgets of North Macedonia and Serbia
Unemployment	UNEM/UNES	IMF
Annual GDP growth	GDPM/GDPS	Ministry of finances of N. Macedonia and Serbia

of the variables has a positive symmetry, with the exception of “CTXM” where the frequency distribution has a negative symmetry.

4.2 Comparative Analysis

As shown in Fig. 1, the share of revenues from the personal income tax in the revenues from direct taxes of the budget of North Macedonia ranges from 52 to 72%, consequently it is dominant in relation to the revenues from other direct taxes. In Serbia, a permanent decrease in the share of personal income tax revenues in direct tax revenues was recorded. Moving from 71% in 2009 it decreases to a level of 32% in 2023. As shown in Fig. 1, the percentage share of income from profit tax in the period from 2009 to 2012 and from 2016 to 2023 is decreasing, so that in 2023 it is 32%. It is characteristic for Serbia that the percentage share of revenues from the profit tax is constantly growing, with the fact that in 2023 it amounts to 68%. Based on Fig. 1, it can be stated that there has been an increase in the percentage share of direct taxes in total tax revenues in North Macedonia, from 19% in 2009 to 25% in 2023. The percentage share of direct taxes in total tax revenues Serbia recorded a decline from 2009 to 2016, and a slight increase from 2017 to 2023, so that in 2023 the percentage share was 21%.

4.3 Correlation Analysis

As shown in Table 3, personal income tax revenue and total tax revenue are significantly correlated with key macroeconomic variables shown in Table 1 except for

Table 2 Descriptive statistics

	PTXM	CTXM	DTXM	TXRM	ITXS	CTXS	DTXS	TXRS
Mean	14.97266667	8.932	23.90466667	101.6306667	34.96866667	49.32533	84.227333	506.182
Standard Error	1.388604461	1.0844051	2.381021963	6.788618589	2.858033767	8.244273	10.536034	44.576431
Median	14.21	10.77	24.98	100.06	34.92	39.35	64.62	470.63
Mode	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Standard Deviation	5.378041952	4.199883	9.221658409	26.29220674	11.06,911718	31.92993	40.805882	172.64378
Sample Variance	28.92333524	17.639017	85.03898381	691.2801352	122.5253552	1019521	1665.12	29805.873
Kurtosis	−0.399415922	−1.7119,397	−1.147910648	0.417,922713	0.523578167	0.881212	1.519243	0.0623412
Skewness	0.593198925	−0.1705082	0.136986802	0.876830468	0.963534943	1.124175	1.4460137	0.9074652
Range	17.79	11.11	28.64	9158	37.1	109.47	134.72	572.64
Minimum	8.71	3.65	12.56	71.02	22.99	15.63	50.47	304.45
Maximum	26.5	14.76	41.2	162.6	60.09	125,1	185.19	877.09
Sum	224.59	133.98	358.57	1524.46	524.53	739.88	1263.41	7592.73
Count	15	15	15	15	15	15	15	15
Confidence Level(95,0%)	2.978260363	2.3258177	5.106784209	14.56013878	6.129872778	17.68221	22.597544	95.606937

Source Authors' calculation

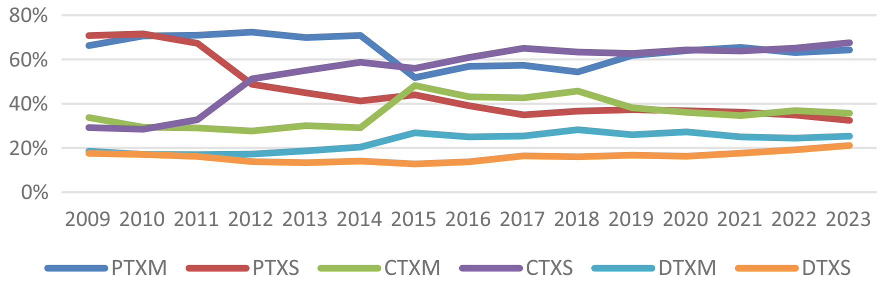

Fig. 1 Share of revenues from personal taxes, profit taxes and direct taxes in Macedonian and Serbian state budgets

inflation and GDP. The strongest negative correlation is observed between personal income tax revenues and unemployment in North Macedonia and Serbia, and the strongest positive correlation is observed between budget tax revenues and capital investments in North Macedonia and Serbia.

Table 3 Correlation analysis

	PTXM	CTXM	TXRM	INF	GDS	GEX	CEX	UNE	GDP
PTXM	1.00								
CTXM	0.85	1.00							
TXRM	0.99	0.85	1.00						
INF	0.21	−0.06	0.27	1.00					
GDS	0.57	0.75	0.51	−0.21	1.00				
GEX	0.60	0.25	0.58	0.34	−0.16	1.00			
CEX	0.72	0.46	0.79	0.46	−0.02	0.71	1.00		
UNE	−0.98	−0.86	−0.94	−0.15	−0.68	−0.56	−0.62	1.00	
GDP	0.08	0.14	0.18	0.01	0.10	−0.34	0.22	−0.03	1.00
	PTXS	CTXS	TXRS	INF	GDS	GEX	CEX	UNE	GDP
PTXS	1.00								
CTXS	0.74	1.00							
INF	0.64	0.27	0.22	1.00					
GDS	0.42	0.84	0.88	−0.22	1.00				
GEX	0.18	0.15	0.17	0.00	0.11	1.00			
CEX	0.84	0.95	0.96	0.35	0.78	0.30	1.00		
UNE	−0.62	−0.80	−0.82	0.10	−0.87	−0.16	−0.79	1.00	
GDP	0.23	0.44	0.49	−0.11	0.62	−0.25	0.47	−0.35	1.00

Source Authors' calculation

Table 4 Panel regression results

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	−41.6796	43.4493	−0.9593	0.3474	−131.5613	48.2020	−131.5613	48.2020
INF	1.6751	0.7486	2.2378	0.0352	0.1266	3.2236	0.1266	3.2236
GDS	0.7590	0.8021	0.9463	0.3538	−0.9002	2.4182	−0.9002	2.4182
GEX	2.0292	0.6815	2.9775	0.0067	0.6194	3.4391	0.6194	3.4391
CEX	0.2078	0.0273	7.6074	0.0000	0.1513	0.2643	0.1513	0.2643
UNE	−0.7098	0.5879	−1.2074	0.2396	−1.9259	0.5063	−1.9259	0.5063
GDP	0.2582	0.8160	0.3164	0.7545	−1.4299	1.9463	−1.4299	1.9463

Source Authors' calculation

4.4 Panel Regression Analysis

According to regression statistics, 95.3% of the variability of direct tax revenues in the budgets of North Macedonia and Serbia is explained by the variability of the variables implemented in the model. The results of the F test indicate the statistical significance of the panel regression. According to the panel regression shown in Table 4, inflation, government expenditures, and capital investments have a significant positive impact on the growth of direct tax revenues.

5 Discussion

Based on the results of the research, it can be concluded that the share of income from personal income tax of the income from direct taxes in North Macedonia and Serbia differs with the income from personal income tax in North Macedonia having a permanently significant share of the income from direct taxes with the fact that it ranges from 52 to 72%, which in Serbia is permanently decreasing. It is characteristic that in North Macedonia the personal income tax rate for the entire research period is 10%, and in Serbia, it is the same from 2018 and ranges from 10 to 15% depending on the type of income that individuals have, whereas previously the rate was 15%. Regarding income from profit tax, it is characteristic that, in general, in North Macedonia and Serbia, there is a growing trend, while in Serbia, a significantly higher percentage share of this type of tax income of the income from direct taxes is noted. In North Macedonia, the profit tax rate is 10%, and in Serbia it is 15%. According to the comparative analysis, it can be concluded that the percentage share of direct taxes of the total tax revenues in North Macedonia is higher than in Serbia. Namely, the percentage share of direct taxes of the total tax revenues in North Macedonia generally shows an increase, while in Serbia the same has been decreasing since the beginning of the accounting period, and from 2017 begins to record a permanent increase. The comparative analysis shows that in the cases of both countries the share of indirect taxes does not exceed 30% in total tax revenues. Based on the correlation analysis, it can be concluded that in North Macedonia personal income tax revenues and total tax revenues have the strongest positive correlation with capital expenditures, and profit tax revenues with gross domestic savings. In Serbia, the three variables have the strongest positive correlation with capital investments. According to the correlation of the two countries in the case of the three variables, the strongest negative correlation was noticed with unemployment, confirming the basic macroeconomic regularities. Panel regression analysis shows that government expenditures and capital investments have a significant stimulating effect on direct tax revenues. Analogous to the research results, it can be concluded that hypotheses H1, H2 and H3 are rejected, hypothesis H4 is accepted, and H5 is partially accepted. Based on the research, it can be concluded that the limited access to data on the targeted financial measures in the field of tax relief during the Corona crisis, the effects of the measures on economic flows and the dynamics of tax collection and the fiscal condition are a limiting factor in the research.

6 Conclusion

Tax revenues are one of the most important revenues of budgets of countries, it is characteristic that they have a significant role in stimulating the economic development of countries, especially those that are developing or underdeveloped. Although each country has a different economic constellation and a different tax system, the common thing is that tax revenues are divided into revenues from direct and indirect taxes. In practice, direct taxes often have a smaller share in total tax revenues compared to revenues from indirect taxes, precisely because of VAT, which belongs to the category of indirect taxes, and if taken into account that it is a tax on consumption, it has the most significant share in the domain of tax revenues. According to the comparative analysis, it can be concluded that the volume of revenues from direct taxes in North Macedonia and Serbia differ. Namely, in the case of North Macedonia, the income from personal income tax has a significantly higher share in income from direct taxes in relation to Serbia, and in the domain of income from the profit tax, the opposite situation was observed, basically in Serbia a permanent increase of the percentage share was observed in relation to the case of North Macedonia. Regarding the share of direct taxes in total tax revenues, it can be concluded that North Macedonia has a higher percentage share compared to Serbia. Based on the correlation analysis, it can be concluded that income from personal income tax and income from profit tax in the case of both countries has a high degree of negative correlation with unemployment, that is, when unemployment decreases, these incomes increase, and when they increase, direct tax revenues decrease, in the case of Serbia, they have a significant positive correlation with capital investments, and in the case of North Macedonia, personal income tax revenues have a strong positive correlation with capital investments, and profit tax revenues with gross domestic savings. According to the Panel regression, government expenditures and capital investments have a significant impact on direct tax revenues. In order to increase tax revenues from direct taxes, according to the analysis and in the cases of both countries, they must resort to stimulation of capital investments, the creation of state policies aimed at stimulating the investment of companies in new profitable projects and create state policies that will affect the reduction of unemployment.

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