The Impact of Tax Forms on Economic Growth - Evidence from Serbia

Abstract: The aim of the paper is to show the relevance of nexus between tax forms and economic growth and how they affect on gross domestic product in Serbia for the period 2006-2015. The impact is manifested through the analysis of three main tax forms: personal income tax (PIT), corporate income tax (CIT) and value-added tax (VAT) and their effect on the macroeconomic indicator as gross domestic product (GDP). The analysis is for a period of ten years in Serbia, where the regression model is constructed so that the GDP is defined as the dependent variable, while the tax forms are set as independent variables. To ensure correctly specified regression model, authors used the next test: VIF test, BP and BPG test, as well as Ramsey reset test. Results show a high degree of positive correlation between the observed variables and the positive impact of the personal income tax, corporate income tax and value-added tax on the gross domestic product, but it is only the impact of value added tax statistically significant.

Keywords: Economic Growth, Income, Tax, Serbia
Uticaj poreskih oblika na ekonomski rast - Primer Srbije

**Apstrakt:** Cilj rada je prikazati značajnost odnosa između poreskih oblika i ekonomskog rasta i kako oni utiču na bruto domaći proizvod u Srbiji za vremenski period 2006-2015. godine. Uticaj je manifestovan kroz analizu tri glavna poreska oblika: porez na dohodak građana (PIT), porez na dobit kompanija (CIT) i porez na dodatu vrednost (VAT) i njihov efekat na makroekonomski indikator: bruti domaći proizvod (GDP). Analiza je za period od deset godina u Srbiji, gde je regresioni model konstruisan tako da je BDP definisana kao zavisna varijabla, dok su poreski oblici određeni kao nezavisne varijable. Da bi se obezbedio korektan regresioni model, autori su koristili sledeće testove: VIF test, BP i BPG test, kao i Ramsey reset test. Rezultati pokazuju visok stepen pozitivne korrelacije između posmatranih varijabli i pozitivni uticaj poreza na dohodak građana, poreza na dobit kompanija i poreza na dodatu vrednost na bruti domaći proizvod, ali je samo uticaj poreza na dodatnu vrednost statistički značajan.

**Ključne reči:** Ekonomski rast, Dohodak, Porez, Srbija

1. Introduction - Theoretical background

In recent decades, tax policy has been crucial question of public debate in finance (Adkisson, Mohammed, 2012), where Clark (2007) defined a country's tax regime as a key policy instrument which may positively or negatively influence to investment. Ahmad and Sial (2016) argued that tax system plays a vital role in achieving equity, social and economic improvement in any economy. Likewise, Chigbu (2012) argued that taxation is an important instrument of government that generates revenue, which also creates fiscal goals which influence the direction of investment and timing the consumption and production of goods and services. Taxes have the main place in fiscal policy and their relevance shouldn't be ignored. Tosun and Abizadeh (2005) determine taxes as one of fiscal policy instrument and many authors researched role and impact of fiscal policy on economy (Creel et al. 2005; Romer and Romer, 2010; Baltagi et al., 2011; Alesina et al. 2012; Perotti, 2013; Bajo-Rubio, Gomez-Plana, 2015). The stable fiscal policy is a crucial precondition for economic safeness and policymakers should take care of her volatility. The significance of fiscal policy volatility has been documented by a number of papers (Fatas and Mihov, 2006; Furceri, 2007; Woo, 2009). Fatas and Mihov (2006) found that fiscal rules in form of explicitly balanced budget and spending constraints decrease fiscal policy volatility. Bernardi and Chandler (2005) define that main purpose of taxes is to finance public spending. Mankiw et al. (2009) highlight the standard theory of optimal taxation which implies that a tax system should be chosen to maximize a
social welfare function. Also, Mitra and Stern (2003) argued that an optimal
tax level and structure wouldn’t damage efficiency and growth.

There are many studies which have examined the effects of taxes on
economic growth (Helms, 1985; Barro, 1990; Mullen and Williams, 1994;
Kneller et al. 1999; Bleaney et al. 2001; Folster and Henrekson, 2001;
Holcombe and Lacombe, 2004; Pjesky 2006; Arnold, 2008; Reed, 2008;
Romer and Romer, 2010; Ferede and Dahlby, 2012; Okoli et al. 2014;
Hunady and Orviska, 2015; Gale et al. 2015; Etale and Bingilar, 2016). Myles
(2000) defined economic growths as the basis of increased prosperity, while
Kira (2013) emphasized gross domestic products as one of the determinants
of country’s economic growth.

In their research, Nikolić and Zubović (2013) determined maintenance of
macroeconomic stabilization and high rates of economic growth as one of the
main objectives in economic policy. Romer and Romer (2010) researched the
impact of tax changes on economic activity and their findings indicate that tax
changes have a very large effect on output. They found that an exogenous tax
increase of 1% of GDP lowers real GDP by 3%. These findings showed that
economic growth is mostly negatively influenced by the level of the tax
burden. Bird and Wilkie (2013) argued that some countries with high tax
burden high growth rates while other countries with low tax burdens have low
tax rates. Further, Widmalm (2001) found that overall tax burden is negatively
correlated with economic growth and personal income taxes have an
especially negative effect. On the other hand, Lee and Gordon (2005)
analyzed seventy countries over the period 1980-1997 and found that
corporate taxes are robustly associated with lower economic growth while
other taxes didn’t have a statistical strongly association. Their results manifest
that cut in the corporate rate of 10% increases annual GDP growth per capita
by 0.7 to 1.1%. Ferede and Dahlby (2012) found that cutting the corporate
rate by 10% increases the annual per capita growth rate by 1-2%. Mertens
and Ravn (2013) analyzed post-war tax changes in the US and they found
that a 1% cut in the average personal income and corporate tax rate
increases real GDP per capita by 1.4% and 0.6%. Hunady and Orviska (2015)
found a positive effect of corporate taxes on economic growth and have
supported previous studies such as Mutascu et al. (2007), Kotlan et al.
(2011). Kolahi and Noor (2016) researched the effects of VAT on the
economic growth of 19 developing countries for a period of 1995-2010 and
showed results that VAT has a negative effect on capital accumulation growth
in the level and positive effect of VAT on the level of economic growth. Etale
and Bingilar (2016) showed that corporate income tax and value added tax
have significant positive impact on economic growth. Using a pool data on the
50 states between 2004 and 2010, Adkisson and Mohammed (2014)
researched the relationship between state and local tax structure and growth
of real per capita GDP. Omojime and Godwin (2012) stand out that taxes
determine the level and speed of economic growth in countries. Bhattarai (2010) concluded that OECD countries with high tax-GDP ratio generally have lower growth rates, while analysis of Arnold et al. (2011) suggests that economic growth can be increased by gradually shifting tax base towards consumption and immovable property. Their findings showed a statistical relationship between tax structure and short-term economic growth. Besley and Persson (2014) emphasize that low-income countries collect taxes between 10% and 20% of GDP, while the average for high-income countries is more like 40%. Atems (2015) showed that taxes have negative short-run and long-run own state and spatial spillover effects on growth.

This paper is focused on three main tax forms in Serbia: personal income tax, corporate income tax and value added tax for the period 2006-2015. An analysis measures the impact of taxes on a gross domestic product which is a proxy for economic growth.

2. Methodology

This section provides the methodology adopted for the study of the impact of tax forms on economic growth in Serbia. The aim of the paper is to find out the relationship between tax indicators and macroeconomic indicator, where the gross domestic product, personal income tax, corporate income tax and value-added tax are used in the regression model.

Based on the objective, the paper looks to test the following hypothesis:

H1: There is no significant impact of tax indicators and GDP
H1a: There is no significant impact of PIT on GDP
H1b: There is no significant impact of CIT on GDP
H1c: There is no significant impact of VAT on GDP

Authors have analyzed the impact of main tax forms on gross domestic product in Serbia. In the model, GDP is the dependent variable, while PIT, CIT and VAT are classified as independent variables. The database was used from Bulletin Public Finance from Ministry of Finance.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Notation</th>
<th>Source</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross domestic product</td>
<td>GDP</td>
<td>Bulletin of Public Finance</td>
<td>+</td>
</tr>
<tr>
<td>Personal income tax</td>
<td>PIT</td>
<td>Bulletin of Public Finance</td>
<td>+</td>
</tr>
<tr>
<td>Corporate income tax</td>
<td>CIT</td>
<td>Bulletin of Public Finance</td>
<td>+</td>
</tr>
<tr>
<td>Value added tax</td>
<td>VAT</td>
<td>Bulletin of Public Finance</td>
<td>+</td>
</tr>
</tbody>
</table>

Source: Authors' review
Model specification can be represented:

\[ \log(GDP_t) = \beta_0 + \beta_1 \log(PIT_t) + \beta_2 \log(CIT_t) + \beta_3 \log(VAT_t) + \ldots + \epsilon_t \]  

where

GDP = gross domestic product, the dependent variable and proxy for economic growth;
PIT = personal income tax, the first independent variable;
CIT = corporate income tax, the second independent variable;
VAT = value added tax, the third independent variable;
\( \beta \) = the constant term;
\( \beta_B \) = the coefficient of the independent variables;
\( \epsilon \) = the error term of the equation.

The explanatory variables for the paper include:

- Gross domestic product is a monetary measure of the market value of final goods and services produced in a yearly period.
- Personal income tax represents the tax paid by persons who earn income, where it covers salaries, income from self-employment, income from capital, income from real estate, capital gains and other incomes.
- Company income tax represents the tax paid by the company or other legal entities which are established for profit, while profit tax base shall be the taxable income.
- Value-added tax is a general consumption tax which is calculated and paid on delivery of goods and services at all stages of production and supply of goods and services including the importation of goods.

3. Data and results

This paper examines the impact of PIT, CIT and VAT on GDP, using OLS technique based the statistical software program STATA 13 version. Firstly, authors show the trend of gross domestic product and tax forms in Serbia from 2006 to 2015.

Figure 1 reflects the trend of GDP measured by annual growth rate in Serbia for period 2006-2015. Observed period can be divided into pre-crisis period and period after a crisis where indicator has growing rate above 5% in 2006.
and 2007. After that, gross domestic product decreased and this downfall is a very intensive in 2009 when it was a negatively of 3.9%. Similarly, countries in the region recorded decrease of 4.5% in the same period (Filipović and Miljković, 2014). However, observed indicator records a positive trend where it was 0.6 in 2015 which is more than 2014 when it decreased by 1.8%.

Figure 1. Trend of GDP growth rate in Serbia 2006-2015

Figure 2. Trend of observed tax forms in Serbia 2006-2015

Figure 2. shows the trend of absolute values of the personal income tax, corporate income tax and value-added tax in million dinars in Serbia from 2006-2015. First, personal income tax has growing trend except in 2013 and
2014 when it recorded decrease of 5.55% and 6.15%. Corporate income tax has a similar trend there it reaches the maximum level of 72744 million dinars in 2014, which is less for 10076 million dinars than the end of 2015. Finally, it’s presented value added tax which is the most generous tax form in the observed group, where it recorded increase of 92.6% in observed ten-year period.

Table 2 reflects the absolute values of the gross domestic product, personal income tax, corporate income tax and value-added tax, where the value of the dependent variable is presented in billion dinars and the value of independent variables in million dinars. In order to obtain adequate model results, their values are logarithmically.

Table 2. Data presentation and analysis

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP</th>
<th>PIT</th>
<th>CIT</th>
<th>VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>2055</td>
<td>118591</td>
<td>18313</td>
<td>216007</td>
</tr>
<tr>
<td>2007</td>
<td>2355</td>
<td>115772</td>
<td>29686</td>
<td>225197</td>
</tr>
<tr>
<td>2008</td>
<td>2745</td>
<td>138451</td>
<td>39007</td>
<td>285465</td>
</tr>
<tr>
<td>2009</td>
<td>2880</td>
<td>133482</td>
<td>31213</td>
<td>301689</td>
</tr>
<tr>
<td>2010</td>
<td>3067</td>
<td>139051</td>
<td>32593</td>
<td>296927</td>
</tr>
<tr>
<td>2011</td>
<td>3408</td>
<td>150824</td>
<td>37806</td>
<td>319369</td>
</tr>
<tr>
<td>2012</td>
<td>3584</td>
<td>165262</td>
<td>54780</td>
<td>342446</td>
</tr>
<tr>
<td>2013</td>
<td>3876</td>
<td>156085</td>
<td>60865</td>
<td>367472</td>
</tr>
<tr>
<td>2014</td>
<td>3908</td>
<td>146484</td>
<td>72744</td>
<td>380624</td>
</tr>
<tr>
<td>2015</td>
<td>3995</td>
<td>146775</td>
<td>62668</td>
<td>416056</td>
</tr>
</tbody>
</table>

Source: Authors based on Bulletin Public Finance

Table 3 shows descriptive statistics of observed variables as a macroeconomic indicator (GDP) and tax indicators (PIT, CIT and VAT) in Serbia from 2006 to 2015. Authors used diagnostic tests to ensure validity and reliability of the empirical results. First, it’s analyzed the presence of multicollinearity in the model by Variance Inflation Factor (VIF).

Table 3. Descriptive statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>10</td>
<td>3.493817</td>
<td>.0984497</td>
<td>3.312812</td>
<td>3.601517</td>
<td>0.3151</td>
<td>0.7728</td>
</tr>
<tr>
<td>PIT</td>
<td>10</td>
<td>5.146368</td>
<td>.0492633</td>
<td>5.063603</td>
<td>5.218173</td>
<td>0.4508</td>
<td>0.9150</td>
</tr>
<tr>
<td>CIT</td>
<td>10</td>
<td>4.609188</td>
<td>.185194</td>
<td>4.26276</td>
<td>4.861797</td>
<td>0.5892</td>
<td>0.9304</td>
</tr>
<tr>
<td>VAT</td>
<td>10</td>
<td>5.4867</td>
<td>.0945496</td>
<td>5.334468</td>
<td>5.619152</td>
<td>0.5464</td>
<td>0.6125</td>
</tr>
</tbody>
</table>

Source: Authors’ calculation based on STATA

Table 4 represents the calculation of VIF test for independent variables: personal income tax (PIT), corporate income tax (CIT) and value added tax (VAT). Using this test, authors confirm an absence of multicollinearity...
between independent variables, bearing in mind that reference value of this test is 10.

**Table 4. Diagnostic Tests - VIF test**

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
<th>1/VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAT</td>
<td>7.15</td>
<td>0.139900</td>
</tr>
<tr>
<td>CIT</td>
<td>5.48</td>
<td>0.182536</td>
</tr>
<tr>
<td>PIT</td>
<td>3.45</td>
<td>0.290267</td>
</tr>
</tbody>
</table>

Mean VIF = 5.36

Source: Authors' calculation based on STATA

**Table 5. Diagnostic Tests - BP test**

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

<table>
<thead>
<tr>
<th>chi2(1)</th>
<th>Prob &gt; chi2</th>
</tr>
</thead>
<tbody>
<tr>
<td>= 0.36</td>
<td>= 0.5493</td>
</tr>
</tbody>
</table>

Source: Authors' calculation based on STATA

Breusch-Pagan Godfrey test was adopted in the paper and results discovered probability values of 0.5493 which exceeds p=0.05 and rejected the null hypothesis of heteroskedasticity residuals.

**Table 6. Diagnostic Tests - BPG test**

<table>
<thead>
<tr>
<th>lags (p)</th>
<th>Breusch-Godfrey Serial Correlation LM test</th>
<th>F</th>
<th>DF</th>
<th>Prob &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(1, 5)</td>
<td>1.291</td>
<td>0.3074</td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors' calculation based on STATA

Results of the Serial Correlation Test was adopted in the study and results revealed high positive probability value of 0.3074 which exceeds p=0.05. This means rejection of the null hypothesis of the presence of serial correlation between observed variables.

**Table 7. Ramsey Reset test - misspecification**

<table>
<thead>
<tr>
<th>Ramsey Reset test</th>
<th>F(3, 3)</th>
<th>Prob &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>= 0.64</td>
<td>= 0.6368</td>
</tr>
</tbody>
</table>

Source: Authors' calculation based on STATA

To ensure correctly specified regression model, authors test the null hypothesis of model misspecification and results showed that there is high probability value of 0.6368 which is the above the value of p=0.05 and determined the positive relationship between observed variables.

The results above manifests the regression result between GDP, PIT, CIT and VAT. The R-square shows that PIT, CIT and VAT explain about 98.49% of the
variations in GDP, where after adjusting for degree of freedom, the variables explain about 99.7% of the variations in GDP. Looking at the value of t statistics, there is a positive effect of dependent variables, but it's only the impact of VAT statistically significant.

Table 8. Regression analysis of observed variables

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>Df</th>
<th>MS</th>
<th>Number of obs = 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>.085911533</td>
<td>3</td>
<td>.028637178</td>
<td>F( 3, 6) = 130.22</td>
</tr>
<tr>
<td>Residual</td>
<td>.001319522</td>
<td>6</td>
<td>.000219922</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Total</td>
<td>.087231055</td>
<td>9</td>
<td>.009692339</td>
<td>R-squared = 0.9849</td>
</tr>
</tbody>
</table>

\[F(3, 6) = 130.22, \quad \text{Prob} > F = 0.0000, \quad \text{R-squared} = 0.9849\]

Table 9. Correlation matrix

<table>
<thead>
<tr>
<th>Variable</th>
<th>GDP</th>
<th>PIT</th>
<th>CIT</th>
<th>VAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PIT</td>
<td>0.8859*</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0006</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>CIT</td>
<td>0.9330*</td>
<td>0.7851*</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0001</td>
<td>0.0071</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>VAT</td>
<td>0.9810*</td>
<td>0.8402*</td>
<td>0.9028*</td>
<td>1.0000</td>
</tr>
<tr>
<td></td>
<td>0.0000</td>
<td>0.0028</td>
<td>0.0003</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: Authors' calculation based on STATA

In an attempt to determine the relationship between variables, authors carried out correlation matrix and the results are presented in the table below. Table manifests the relationship between variables where results showed that there
exist a high positive relationship between PIT, CIT and VAT with GDP. Looking at p-values, this positive relationship of observed variables is significant and it can conclude there is an emphasized correlation between personal income tax, corporate income tax and value added tax with gross domestic product.

4. Conclusion

Taxes reflects an important tool for the government and their main function is to collect funds to finance and coverage public expenditures. An adequately designed tax system with optimally defined tax types facilitates the functioning of the economy and contributes to growth. Using regression model, it's displayed a positive impact of personal income tax, corporate income tax and value-added tax on the gross domestic product. The results confirmed the hypothesis that PIT and CIT don't have a significant impact on GDP but on the other hand, VAT has a positive impact on GDP and it's a statistically significant. Similarly, the correlation matrix shows an extremely high degree of positive correlation between observed variables, which is statistically significant. This paper has a novelty and diversity which can be substantiated by the fact that there is not similar research in Serbia. Also, it's confirmed that the personal income tax and corporate income tax don't have a statistically significant impact on GDP, as well as positive impact of value-added tax which differs from previous research in other countries. Future research will be focused on adding new variables and widening to other countries in the region to their comparative analysis.

References


