

Growth Effects of Tax Structure: Evidence from Kosovo

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Abstract: Designing an optimal tax system and ensuring its continuous advancement for Kosovo as a country with a low level of economic development is vitally important for the sustainability of public finances and other economic outflows. Viewed in the long run, the structure of the tax system should compose tax rates that are in harmony with the level of economic development and social welfare in general. Only such a tax system would enable the effective realization of macroeconomic policy objectives, such as economic growth and social welfare. The purpose of this paper is to study the impact of tax structure on Kosovo's economic growth for the period 2004-2017. To measure this impact, the Ganger test was used, and with the ADF test we analyzed whether the variables were stationary. Regression analysis is also used to assess whether there is a statistically significant relationship between tax structure and economic growth. From the results we can conclude that out of the taxes analyzed, Value Added Tax (VAT) and Personal Income Tax (PIT) are significant and have a positive impact on economic growth in Kosovo.

Keywords: Tax structure; Economic growth; Fiscal politics; Kosovo

JEL Classification: E62; H21; H30; O47

1. Introduction

For all governments of the world as well as for Kosovo, the essence of public revenues is directly related to their decisive role in the functioning of the state and its mechanisms. In this respect, taxes are the main instrument for creating public revenues through which budget expenditures are covered and all other public needs are met. Many theorists practically show the great importance of taxes in the creation of public revenue, not surprisingly modern state designate as “tax state”. When it comes to Kosovo, as a new state with the lowest GDP per capita in Europe, the provision of public revenues for the main functions of the state including law and order, public security (police), security forces (army), education, and health, is

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challenging and problematic. Moreover, the provision of revenues for other public needs, such as energy infrastructure, roads, drinking water, environmental protection etc., is even more formidable. Fiscal policy built on the basis of an adequate tax system is vital for securing revenue and enabling the state to meet public needs in all its segments. Fiscal policy includes all the measures and instruments that the state uses to generate public revenues and cover budget expenditures. All fiscal policy measures are implemented in compliance with laws and regulations specific to the country. Current studies in this area and experiences from different countries suggest that a country's fiscal policy should be in harmony with the specifics of economic development, including trade volume level, inflation performance, unemployment rate, citizen welfare, the trade balance of payments etc.

The establishment of a fiscal policy based on the above-mentioned factors implies that if it is effective in one country, cannot be equally effective in another country that experiencing its own unique state of economic development. Through an analogy, the above conclusion can be expressed in this way: "A suit, however beautiful, does not fit everyone well". The main objective of the state of Kosovo is undoubtedly to meet the fundamental conditions for EU integration. To achieve this goal, in recent years, Kosovo has continuously engaged in the creation of fiscal legislation on the types of taxes and rates, in line with EU legislation. In this paper we have studied and analyzed the impact of the tax system on Kosovo's economic growth. The research focuses on four types of taxes, which are applied in Kosovo: Personal Income Tax (PIT), Value Added Tax (VAT), Corporate Income Tax (CIT), and Property Tax.

The paper is organized as follow: Sections I introduction and Methodology. Section II, which include a review of the literature and an analysis of the research in this field by various authors. Section III includes the conclusion and some recommendations derived from this study.

2. Tax System in Kosovo

Fiscal policy functions on the basis of some subsystems such as taxes, customs, pension contributions, health insurance, etc. In a long-term perspective, the tax system represents the most important segment within the fiscal policy of each state. After the last war in Kosovo, on 10 June 1999, the United Nations Security Council approved Resolution 1244 through which the former SFRY¹ was granted sovereignty over Kosovo and for its administration authorized the Interim United Nations Administration Mission in Kosovo (UNMIK) directed by the Special Representative of the Secretary-General (SRSG). With this resolution, UNMIK was the bearer of

¹ Socialist Federal Republic of Yugoslavia

the legislative and executive legislative power. UNMIK Regulation 1999/16 of 6 November 1999 approved the establishment of the Central Fiscal Authority of Kosovo (CFA), which is authorized to run the policy and tax system, treasury, customs and budget. The CFA functioned fully under UNMIK powers and the highest reserved authority in the fiscal field until Kosovo's independence in 2008 has been the SRSG. Since its establishment, the CFA has been engaged in the formation of related strategies and measures with the establishment of the tax system. On January 17, 2000, the CFA organized the Tax Administration of Kosovo (TAK) (RREGULLORE nr. 2000/01, n.d.). In fact, this date marks the beginning of the establishment of the tax system in Kosovo. On 18 February 2003, the authority for tax administration was transferred by UNMIK to the Ministry of Economy and Finance. TAK is the only authority that administers taxes, issues mandatory general administrative rules that are that apply to both the Tax Administration and the Taxpayer (Kida, 2013). By UNMIK Regulation 2005/17, Law No. 2004/48 was approved by which TAK became an agency within the Ministry of Economy and Finance.

In 2000, the first two taxes were applied in Kosovo: a hospitality tax at a rate of 10% of gross sales (UNMIK Regulation 2000/5), and a presumptive tax (UNMIK Regulation 2000/5). The prudential tax collection method is as follows: initially all Kosovo municipalities were systematized according to three areas A, B, C based on their level of development. Zone A included the most developed municipalities, Zone B the less developed ones, and in Zone C the undeveloped municipalities. The biased yield is paid by businesses every three months. Businesses located in Zone A with gross sales up to 15,000 DM¹ depending on the type of activity, paid fixed cash amounts of 75-400 DM. The value of gross sales of 15,000 dm paid 3% to the presumptive income with the exception of insurance companies which paid 10% of gross sales, while in Zone B paid from € 75-300 up to the specified gross sales quota and 3% above the gross sales level while those at C paid from 75 to 200 to the specified quota and 3% above the gross sales level.

On July 1, 2001, the VAT application in Kosovo started with only a 15% rate. The turnover of businesses to register for VAT was 50,000 DM. In 2009, the VAT rate was 16% while the threshold of a turnover of € 50,000. Two VAT rates are applied in 2015. The high VAT rate is 18%, while the lower rate for basic products and pharmaceuticals is 8%.

In 2002, the tax system of Kosovo included the application of taxes on wages and salaries. The tax wage standards are progressive and in amounts up to certain levels they were: 0, 5, 10, and 20%. The tax rate in profit in this period was 20%.

In 2003, the property tax was set at a rate of 0.15% to 1%.

¹ Deutsche Mark

On January 1, 2005, a personal income tax was applied which replaced the tax on wages because the subject of this tax other than the wages are also the income of individual businesses and companies. The tax rate was progressive. Also from this date, a corporate income tax rate of 20% was applied, replacing the profit tax. Since the independence of Kosovo in 2008, Kosovo's tax system has evolved from the UNMIK system of regulations, in the system of tax laws issued by the Assembly of the Republic of Kosovo, which meet international standards and materialize EU principles, are considered to be understandable and easy to administer and implement. The tax compliance strategy should be implemented in the context of economic growth, which will bring positive impact on revenue collection.

Analyzing the short history of the tax system in Kosovo, which has been effective for not yet two decades, we can say that it has constantly been followed by reforms, increasing with new taxes the expansion of the tax base, and the reduction of tax rates which have positively impacted on the collection of tax revenues. Currently in Kosovo these taxes are applied: VAT, PIT, CIT, property tax, rent tax, withholding tax for dividends, interest and property rights

3. Literature Review

Policymakers and various researchers have been interested in the impact of changes in the tax system on economic size in general. With the review of the literature, we see that many authors have studied and analyzed the relationship between taxation and economic growth and the results have shown slightly negative impact (Ferede & Dahlby 2012); (Mcbride 2012); (Sherman, 2017) Many authors have also studied the issue of taxation from different perspectives. (Judd 1985) was among the first who was interested in the productivity of government spending and its impact on the economic growth associated with funding from different types of taxes, while the first one that analyzed the ratio between the real expenditure of government consumption to real GDP was (Barro 1989); (Barro 1991) and found a significant negative correlation between these variables with the economic growth.

(Romero-Avila and Strauch 2008) have found that direct taxes negatively impact GDP growth rates per capita, and a strong negative impact on the accumulation of physical capital. This impact has been delayed through the personal income tax, leading to wage pressure, and thus reducing profits and investments in the European labor market. Almost the same results emerge from the study (Gemmell, Kneller & Sanz, 2015) who found a small statistical impact on capital income tax rates and consumption and an average impact of personal income tax on labor, while (Lee & Gordon, 2005), using fixed-effect regression, showed that there is a significant negative correlation between corporate tax rates and growth. The results of the survey of (Ojede & Yamarik, 2012) indicate that the real estate tax rate and the sales

tax rate have a negative impact on the growth of long-term income, while the income tax rate has had no impact. (Atems, 2015) has used the Durbin model to assess the effects of taxes on economic growth and the results show a negative effect. Also (Szarowska, 2013) using the regression analysis and the Dynamic Panel Data model, analyzed 21 European Union states for the period 1995-2012 and found a statistically insignificant tax decentralization impact on economic development, but found a statistically significant influence of positive consumption tax rate to GDP growth. (Glykou & Siokorelis, 2013), using regression analysis, found a negative correlation between tax revenue (GDP%) and GDP in Croatia between 1993 - 2009, while Bulgaria found a positive correlation between tax revenues (GDP%) and GDP. Findings of (Arnold, 2008) showed that corporate income taxes have the most negative impact on GDP per capita, while real estate taxes and especially reuse tax on real estate have a more positive effect on growth, as well as taxes in consumption and taxes on personal income. From the current researches both theoretically and empirically it is concluded that there is no optimal tax system because its construction depends on many quantitative and qualitative factors and varies from state to state. Changes in both the level of income and the structure of the tax system can affect economic activity, but not all tax changes have the same, even positive, long-term effects (Gale & Samwick, 2014). The tax structure based on selective taxation such as consumption, personal income tax, and property tax are more supportive of economic growth (Stoilova, 2017). Tax cuts may encourage individuals to work, save, and invest, but if the reduction in taxes is not covered by immediate spending cuts, it will result in an increase in the state budget deficit, which in the long run will reduce national savings and raise interest rates (Gale & Samwick 2017). According to (Gale & Samwick 2017), there is no doubt that tax policy can affect economic choices, yet it is still not clear that the cuts in tax rates will lead to long-term economic growth. So far, this claim is based only on forecasts and not on ex-ante basis. On the other hand (Font, Clerc & Lemoine, 2018) using the DSGE¹ calibrated model for France, showed that the increase in output resulting from the reduction of capital income taxes was higher than the increase in output resulting from the decrease of labor taxes, both in the short and long term. And this result of the increase in output from tax cuts on capital inflows to France is explained by the particularly high level of capital income tax, and according to authors, such tax cuts would be less effective if they were temporary. Taking into consideration the simple function of production, it is clear that tax can affect growth through its impact on (1) physical capital, (2) human capital; and (3) through its effect on total productivity factors (Stoilova, 2017).

¹Dynamic stochastic general equilibrium (DSGE) models.(J. Y. Lee 2002)

3.1. Taxes and economic growth

By “economic growth” we mean the expansion of the economy supply and the potential of Gross Domestic Product (GDP) (Gale & Samwick 2017). For more than two decades, economic growth and its determinants have been the focus of study both theoretically and practically, and the key prediction of the neoclassical growth model has often been used as an empirical hypothesis in recent years (Zarra-Nezh & Hosainpour 2011). According to neoclassical growth model, accumulation of labor and capital are the only drivers of economic growth in the long run, not pointing to the role of taxation or any other policy (Arnold, 2008). Regarding the question of whether government taxes and expenditures impact economic growth or hinder it, many authors to test this important aspect that is at the same time the key questions of public finances and tax policies have used the endogenous growth model.¹

The endogenous growth model is widely used in macroeconomics because it is consistent with Kaldor’s well-known economic growth facts, pointing out that the growth rate of output, capital-output ratio, real interest rates and income from labor are constant over time (Kongsamut, Rebelo & Xie, 2001). Endogenous growth models predict that increases in production costs financed by non-distortion² taxes will increase economic growth, while the effect is unclear if distorted³ taxes are used.

Also, the increase in non-distorting expenditures financed by non-distorting taxes will be neutral for growth, whereas if distorted taxes are used, the growing economic impact will be negative (Benos, 2004). The endogenous growth model includes channels through which fiscal policy can affect long-term economic growth (Benos 2004);(Y. Lee and Gordon 2005).

(Barro, 1990) in his study, “Government Spending in a Simple Model of Endogenous Growth”. led many scholars to assess their view on the relationship between fiscal policy and economic growth.

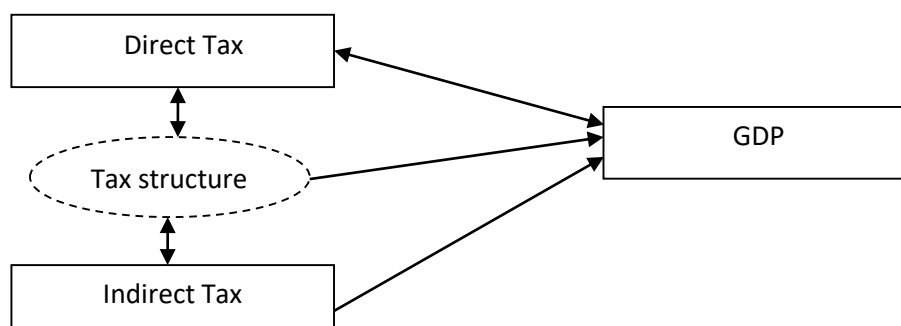
3.1.2. Conceptualization Model

Based on the literature review below we have presented the conceptual framework for this study:

¹ See (Barro, 1989); (Barro, 1990); (Barro, 1991); (Bleaney, Gemmell & Kneller, 2001); (Minea, 2008); (Zarra-Nezh & Hosainpour, 2011); (Benos, 2004); (Waweru, 2010); (Myles & Myles, 2009); (Stoilova, 2017); (Lee & Gordon, 2005).

² Taxes on domestic goods and services.

³ Taxes on income and profits; Social security contributions; Taxes on payroll and workforce; Taxes on property.



Source: Author's presentation

4. Analytical Framework and Empirical Methodology

This research is based on secondary data. Data for this research are provided through references from extensive literature and similar published research. Online research has been used for relevant references such as research of various electronic journals from research databases such as Web of Science, Scopus, EBSCO, JSTOR and EMERALD.

To accomplish the main purpose of this study, i.e., measuring the impact of taxes on economic growth, secondary data provided by the Kosovo Statistical Agency and Property Tax Department have been used, and been processed using the advanced statistical program STATA. Data on Taxes and GDP for Kosovo were analyzed for the period 2004-2017.

In measuring the impact of taxes on economic growth through the Granger test, we initially looked at whether there is a cause-and-effect relationship between GDP (as a dependent variable) and tax type (as independent variables). To perform the Granger test we first determined whether the variables are Stationary via the ADF test. If the variables are not stationary, then the test cannot be performed, and the data must be returned to stationary.

After performing ADF test we see that we are dealing with stationary data as the p-value is under 0.05 (Appendix. A). This means the null hypothesis failed in all cases. Therefore, we can perform the Granger test. The Granger causality test is that the null hypothesis is: $y(t)$ does not Granger Cause $x(t)$. If it is indirectly accepted that x causes y , then variables x causes changes to the dependent variable y . This test helps us predict the other variable from the past value of a variable. So from this we know that if x causes y , then the past of x helps us predict y . Where to do this test we have to put the null hypothesis: x do not cause y and alternative hypothesis: X CAUSE Y .

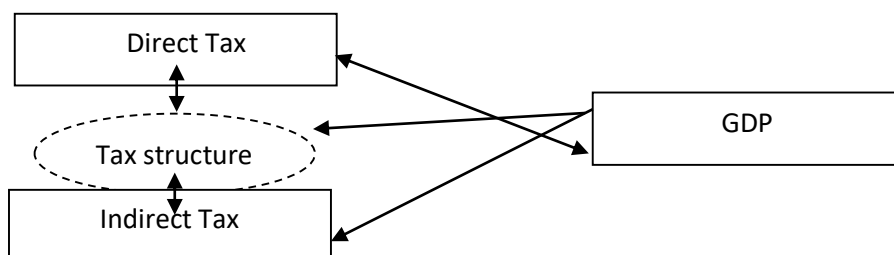
Table 1. Granger Causality Wald test for taxes

Equation	Excluded	chi2	df	Prob>chi2
GDP	PIT	8.6053	2	0.014
GDP	CIT	1.6382	2	0.441
GDP	PROPERT_TAX	1.3684	2	0.504
GDP	ALL	6.4094	6	0.379
PIT	GDP	8.7084	2	0.013
PIT	CIT	177.164	2	0.000
PIT	PROPERT_TAX	0.57784	2	0.749
PIT	ALL	47.864	6	0.000
CIT	GDP	21.049	2	0.000
CIT	PIT	0.13865	2	0.933
CIT	PROPERT_TAX	85.767	2	0.000
CIT	ALL	175.24	6	0.000
PROPERT_TAX	GDP	0.48959	2	0.783
PROPERT_TAX	PIT	10.166	2	0.006
PROPERT_TAX	CIT	14.144	2	0.001
PROPERT_TAX	ALL	23.502	6	0.001
GDP	VAT	4.5985	2	0.100
GDP	ALL	4.5985	2	0.100
VAT	GDP	11.771	2	0.003
VAT	ALL	11.771	2	0.003

Source: Authors' calculations using data from Kosovo Government Accounts 2004-2017

After the execution of the Granger test, it appears that the VAT, CIT, and property taxes do not help predict (does not Granger) GDP, GDP affects to forecast (Granger causes) VAT, PIT and CIT, PIT affects to forecast (Granger causes) GDP.

Based in our results we have this conceptual model

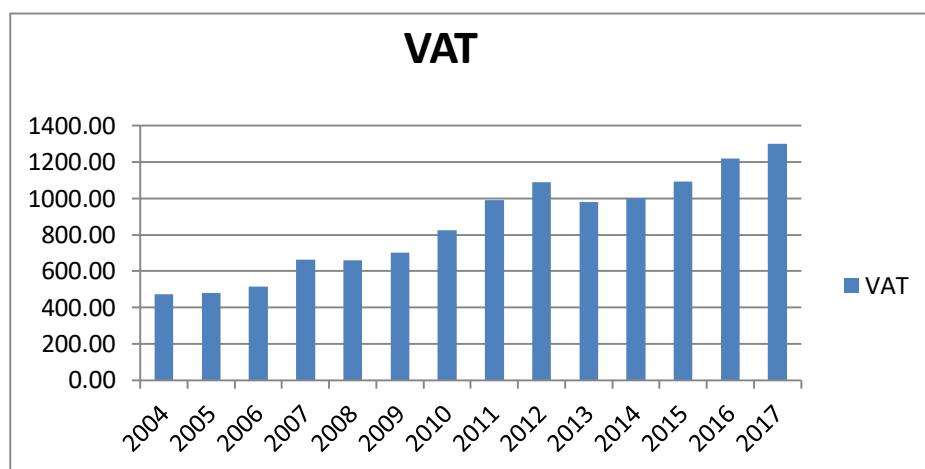


Source: Author's presentation

4.1. Fiscal Equipment

In 2015 payments in the territory of Kosovo were carried out through fiscal equipment. Although there were obstacles when this form of payment was first implemented, the Kosovo administration devised a plan to motivate citizens' to ask for a fiscal coupon after each purchase. A game was created in which TAK would

provide citizens with a tax refund based on the number of fiscal coupons they collected. Winners were divided into three groups: 1) those sending more than 30 coupons with a total value from € 250 to € 500 to the Tax Administration received a refund valued at €10; 2) those sending 40 coupons in the total value from €501 to €800 received a refund valued at €15 Euros; and 3) those sending more than 50 coupons with a total value over €800 received a refund valued at €20. This has incentivized citizens to ask for fiscal coupons with each purchase. If we analyze VAT over the years, we see that there is a linear trend of growth; the graph shows that even in 2009 we have seen an increase of VAT, resulting from a VAT increase from 15% to 16%. At the end of 2015, the VAT was changed and since this time two fixed rates for VAT are applied. The low fixed rate of 8% applies to basic food products and medicines, and the high fixed rate of 18% applies to all other products. As can be seen from the VAT charts, in the case of the implementation of fiscal coupons, there has been a significant increase (approximately 12%) in 2016 compared to 2015. Despite changes in the VAT rate, the strategy employed by the tax administration was effective. Although the same form of game is not applied today, citizens are accustomed to asking for fiscal coupons for every purchase they make and are more aware of the benefits that the payment of taxes brings to the economy



Graphic 1. VAT incomes during 2004-2017

Source: Author's presentation

4.2. Regression Analysis

(Kneller, Bleaney & Gemmell 1999), based on (Barro, 1990) model concluded an equation that helps researchers investigate the effect of fiscal policy on economic growth:

$$g_{it} = \alpha + \sum_{i=1}^k \beta_i \gamma_{it} + \sum_{j=1}^{m-1} (\gamma_j - \gamma_m) X_{jt} + u_{it}$$

According to this equation g_{it} is state growth rate for time t , it is a function of conditioned (non-fiscal) variables γ_{it} , and fiscal variables, X_{jt} , while α and β represent respectively the constant term and the slope coefficient of the not fiscal variables, respectively (there are such k variables).

While γ_j is the coefficient that influences the growth of the variable X_{jt} , one of the $m-1$ fiscal variables, and γ_m measures the growing effect of the m th fiscal variables, which finances the change in one of $m-1$ of fiscal policy instruments.

The standard hypothesis test of a zero coefficient of X_{jt} is actually testing the zero hypothesis that $(\gamma_j - \gamma_m) = 0$ than $\gamma_j = 0$.

Consequently, the exact interpretation of the coefficient in each fiscal category is the effect of changing a unit in the relevant variable offset by a unit change in the excluded category, which is the implied financing element. If the missing selected category is changed, the estimated coefficients of the categories involved will change (Gemmell, Kneller & Sanz, 2015); (Benos, 2004).

With the end of the Kosovo War, improving and designing the Kosovo's tax system is vital for improving public finances, growth, and job creation, stabilizing economic power and enhancing wealth. Tax structures in rich countries differ from those in the poorer countries, relying more on personal income tax, and in a trend for higher tax rates in the richer countries (Lee & Gordon, 2005). Kosovo since the end of the war is constantly adapting laws on taxes and tax rates. With the review of literature, we see that in the macroeconomic literature the role of tax structure in fiscal policy and economic growth has not been frequently addressed. So this study has been trying to analyze: how the tax structure has an impact on economic growth. Before linear regression model we did heteroskedasticity test and we have found out that we have homoscedasticity (Appendix B.1. and B.2.) Based on the model of (R. J. Barro 1990) and (Stoilova 2017) after some modifications we form the linear regression OLS:

$$y_{it} = \beta_0 + \beta_1 VAT + \beta_2 PIT + \beta_3 CIT + \beta_4 Propert_{tax} + \varepsilon_{it}$$

y_{it} the annual GDP growth rate for Kosovo, VAT is the abbreviation for value added tax, PIT refers to personal income tax, CIT represents corporate income tax and finally property TAX, tax on property, the term error is marked with ε_{it} . From this we have formed our model:

$$GDP = -2.4411 + 0.0039 VAT + 0.0210 PIT - 0.0209 CIT + 0.0322 Propert_{tax}$$

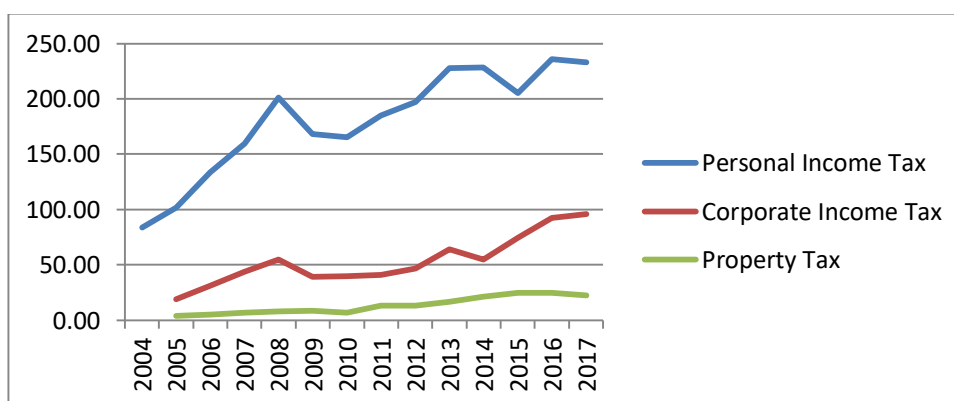
Table 2. OLS regression analysis

GDP	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
VAT	.0039143	.001422	2.75	0.025	.0006351	.0071935
PIT	.0210797	.0056982	3.70	0.006	.0079396	.0342198
CIT	-.0209193	.0126156	-1.66	0.136	-.0500109	.0081723
PROPERT_TAX	.0322755	.0558447	0.58	0.579	-.0965026	.1610537
_CONS	-2.441179	.8360722	-2.92	0.019	-4.369165	-.5131931

Source: Authors' calculations using data from Kosovo Government Accounts 2004-2017

What makes us cautious is how much VAT affects GDP. The model indicates that VAT is a statistically significant variable. This result is also supported by the study conducted by (Anojan, 2015), whose results showed that indirect taxes such as VAT have a significant impact on Sri-Lanka's GDP. From the table2 we see that all the other variables are significant except of corporate income tax and property tax which are not significant and have no impact on GDP. Personal Income Tax (PIT) as a direct tax contributes positively to growth, this result is consistent with some empirical studies done as (Stoilova, 2017); (Bernardi, 2013).

Some of the direct taxes in effect in Kosovo, such as personal income tax and corporate income tax in 2009, have decreased from 20% to 10%. Changing these tax rates has not resulted in increased revenues; on the contrary, revenues declined. This runs counter to the Laffer Curve, which means that lowering the tax rate influenced the increase of tax revenues, but actually has the opposite effect. This may be due to the fact that today businesses, instead of increasing the number of employees, investment in new technologies. At the same time, this may be another indicator that makes corporate taxation and property tax unrelated to economic growth. As the effects of the fall in tax revenues are observed, they are affecting a slight economic growth in Kosovo as a developing country.

**Graph. 2. Direct tax incomes during 2004 - 2017**

Source: Author's presentations

5. Conclusions

Based on the current economic and social circumstances of Kosovo, an optimal tax system must be built, compatible with the level of economic development, which would thus contribute to the functioning of a quality fiscal policy enabling the realization of the primary objective of its economic policy, which is undoubtedly economic growth.

The role and function of the state in guiding economic policy to deliver this objective is incontrovertible. Economic well-being is also closely linked to political knowledge because these two factors are crucial in creating a better and more satisfactory standard of living for all of its citizens. The permanent reform of the fiscal system of Kosovo, as a new state and still in its state-building phase, is of great importance both for economic development and well-being in general. The results of this study show that not all taxes which apply to a country have a positive impact on its economic growth. Based on the analysis of the selective taxes included in this study, it is concluded that VAT and personal income tax (TAP) are significant and have a positive impact on Kosovo's GDP, unlike property tax and corporate taxes, which are not significant and have had a negative impact on economic growth. Based on several quantitative and qualitative factors, we conclude that corporate income tax and property tax have been shown to be non-significant as the contribution of these two direct taxes to the total tax revenue structure is low in percentage terms. In total tax revenue, the corporate income tax accounts for about 5% on average, while property taxes account for approximately 1%.

Small amounts of corporate tax revenue result from the following factors: the tax rate is low 10%, and EBTs to businesses included in the category of this tax are in small monetary amounts see (Annual financial reports, Ministry of Finance). Despite lowering the rate of this tax from 20 to 10%, there has been a symbolic rise in employment. Also property tax results are small value for the following reasons: there is a low rate of 0.15% to 1% the management of this tax is within the competence of the Municipalities and the collection is at not appropriate level, on average 40% of the calculated tax.

5.1. Contributions of the Study

The findings of this study should serve policy-making in Kosovo, in addition to the fight against organized crime and corruption, to work harder in advancing the tax system and achieving the main objectives of its economic policy. Kosovo's primary goal is to enter the European Union; therefore necessarily the fiscal field package should be as qualitative as possible and be built in accordance with EU laws and tax rates. Creating a sustainable and advanced fiscal system will be an important prerequisite for increasing direct foreign investment, will affect export growth, reduce tax evasion, and generally increase the wellbeing of its citizens.

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Appendix. A.

Appendix A. Augmented Dickey – Fuller (ADF) test for unit root

Null Hypothesis: VAT has a unit root

	Test statistic	1% critical value	5% critical value	10% critical value
Z(t)	-3.517	-4.380	-3.600	-3.240

MacKinnon approximate p-value for $z(t) = 0.0377$

Null Hypothesis: CIT has a unit root

	Test statistic	1% critical value	5% critical value	10% critical value
Z(t)	-3.414	-4.380	-3.600	-3.240

MacKinnon approximate p-value for $z(t) = 0.0496$

Null Hypothesis: PIT has a unit root

	Test statistic	1% critical value	5% critical value	10% critical value
Z(t)	-7.528	-4.380	-3.600	-3.240

MacKinnon approximate p-value for $z(t) = 0.0000$

Null Hypothesis: GDP has a unit root

	Test statistic	1% critical value	5% critical value	10% critical value
Z(t)	-65.782	-4.380	-3.600	-3.240

MacKinnon approximate p-value for $z(t) = 0.0000$

Null Hypothesis: Property tax has a unit root

	Test statistic	1% critical value	5% critical value	10% critical value
Z(t)	-5.224	-4.380	-3.600	-3.240

MacKinnon approximate p-value for $z(t) = 0.0001$

Appendix B. Test for heteroskedasticityB.1. White's test for H_0 : homoscedasticityagainst H_a : unrestricted heteroskedasticity

$$\text{Chi2 (5)} = 5.17$$

$$\text{Prob} > \text{chi2} = 0.3951$$

Cameron & Trivedi's decomposition of IM-test

Source	Chi2	Df	p
Heteroskedasticity	5.17	5	0.3951
Skewness	2.89	2	0.2363
Kurtosis	1.47	1	0.2252
Total	9.53	8	0.2997

B.2. Breusch – Pagan / Cook – Weisberg test for heteroskedasticity

 H_0 : Constant variance

Variables: fitted values of GDP

$$\text{Chi2(1)} = 1.25$$

$$\text{Prob} > \text{chi2} = 0.2635$$