THE EFFECT OF MACROECONOMIC INDICATORS ON ECONOMIC GROWTH IN LITHUANIA

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Abstract
Economic growth is important for all countries of the world, regardless of their level of development, because it determines the standard of living of citizens and reduces the gap between countries of the world. In this paper, an analysis of scientific literature is carried out, which helps to identify different factors on economic growth, as and a methodology of the research process is also created, which includes selected methods to determine the relationship between the variables. The research study analyzed the influence of personal income tax, corporate income tax, investment, inflation rate, and unemployment rate on economic growth in Lithuania from 2003 to 2022. Analyzing, calculating, and evaluating the long-term and short-term relationship between GDP growth rate and macroeconomic indicators in Lithuania was used the bounds testing procedure to cointegration, within an autoregressive distributive lag (ARDL) framework. The short-run results show that the coefficient of the lagged error correction term is negative and statistically significant. This confirms the existence of long-run cointegration between the independent variables and GDP.

Key words: *economic growth, tax revenue, ARDL, Lithuania*.

JEL Classification: *M10, M20, M40, M48*

I. INTRODUCTION

One of the most important goals of public sector financial management is the creation of an effective countercyclical fiscal policy. Countercyclical fiscal policy is aimed at mitigating the effects of economic cycles and stabilizing the economy during periods of expansion or contraction. Policymakers must closely monitor economic indicators such as GDP growth, employment rates, and inflation to determine the phase of the economic cycle, and evaluations of the effectiveness of countercyclical measures allow for the continuous development and improvement of fiscal policy strategies and adjusting government spending and taxes in response to economic cycles.

Many studies have been conducted (Arnold, 2008; Johansson et al, 2008; Ferreiro et al., 2013; Macek, 2014; Barr, 2020; Elshani & Ahmeti, 2017; Kalaš et al., 2017; Borovina, 2016; Narayan, 2005; Gwartney & Lawson, 2006; Alinaghi & Reed, 2020; Gechert & Heimberger, 2022; Szarowska, 2013; Gemmel et al., 2013; Alfo et al., 2023, etc.), which analyzed the impact of tax revenues, investment, unemployment and other factors on economic growth. Studies conducted in various countries have provided conflicting conclusions about the impact of these factors and their extent on economic growth. This study will examine crucial factors influencing the economic development and stability of Lithuania, i. e. tax revenue growth, investment, inflation rate, unemployment rate, and other indicators.

Hypotheses: H_0: There is no relationship between macroeconomic indicators and Gross Domestic Product growth rate; **H_1**: There is a relationship between macroeconomic indicators and Gross Domestic Product growth rate. **The research object** of this article is to find out how taxes and other macroeconomic indicators affect economic growth. **The research aims** to assess the effect of macroeconomic indicators on economic growth in Lithuania in 2003-2022.

Research tasks:

- Evaluate the impact of selected macroeconomic indicators on economic growth in Lithuania;

- Apply the ARDL model in assessing the effect of macroeconomic indicators on economic growth in Lithuania;
- After applying the ARDL model, verify the formed hypotheses and make conclusions.

Research methods. Sources of scientific literature analysis and synthesis, macroeconomic data analysis, and econometric modeling. To create the model are used macroeconomic indicators, and the time series covers the 2003-2022 period. Data for macroeconomic indicators are quarterly and are used based on statistics from the Ministry of Finance of the Republic of Lithuania and Eurostat. The Eviews program is used to calculate model parameter estimates. This article is organized into five key sections. The second section provides a literature review, presenting the empirical findings of research conducted by the authors. The third section outlines the econometric model, variables used in the study and details the research results, and offers a discussion. Finally, the last section comprises the conclusions drawn from the study.

II. LITERATURE REVIEW

Vatavu et al. (2019) conducted a comparative analysis between the wealthiest European countries and the Central and Eastern European (CEE) countries from 1995 to 2015. The results support the notion that taxes are necessary instruments for governments and should be utilized to stimulate economic growth due to their strong correlation with population welfare. Ho et al. (2023) investigated the impact of tax income on the expansion of economic growth in 29 emerging nations. The research findings indicate that trade openness strengthens the positive correlation between tax revenue and economic growth, and tax revenue itself has an affirmative impact on growth in general. Stermugu et al. (2022) examined the effects of Direct and Indirect Taxes on the economic growth of Albania from 2012 to 2021. They discovered that while both Direct and Indirect Taxes have a significantly positive impact on Albania's economic growth, direct taxes have a greater positive effect.

Gemmel et al. (2013) examined how taxes impacted the economy in 35 OECD countries from 1996-2016 and determined a benefit of tax revenue and property tax on GDP: growth of tax revenue by 1% increases GDP by 0.29%, and a 1% increase in property tax increases GDP by 0.21%. The study conducted by Szarowska (2013) in 24 EU countries from 1995 to 2010 confirmed a statistically significant advantage of consumption taxes on GDP growth. According to Elshani & Ahmeti (2017), OECD countries applying progressive taxes should focus on corporate tax collection, as this tax is quite significant and has a positive impact on economic growth. According to Balasoiu et al. (2023), tax revenues contribute to economic growth in both high and low-fiscal efficiency countries, with a more pronounced impact observed in developed nations. Kalash et al. (2017) studied the impact of taxes on economic growth from 1996-2016 in 35 OECD countries, and they found that 1% tax revenue growth increases GDP by 0.29%. In addition, it recorded a significant and positive effect of the real estate tax, as the income of this tax increased by 1% GDP increased by 0.21%. Other studies confirmed previous analyses of globally observable variables, and the novelty of this work lies in the finding that major forms of taxation, such as personal income tax and corporate tax, do not significantly impact GDP. The model used by Kalash et al. (2017) demonstrated that tax revenue growth and social insurance contributions had a significant impact on the expansion of the US economy. The correlation matrix, according to the researchers, reveals a strong, positive relationship between tax revenue growth and corporate tax, on one hand, and gross domestic product growth, on the other. Mirovič et al. (2019), who sought to determine how different forms of taxation affect Spanish macroeconomics, discovered that tax revenue growth, personal income tax, property tax, and social security contributions exert a significant impact on GDP per capita. Their study revealed that the influence of personal income tax on investments and state expenditures outweighs that of profit tax. Additionally, Egbunike et al. (2018) concluded that tax revenue has a significant and positive effect on GDP.

Many empirical studies have discovered an inverse association between taxes and economic growth, and only a few of them have confirmed the positive impact of individual tax increases on GDP growth. A study by Gwartney & Lawson (2006) revealed that high marginal income tax rates (50% and more) have a downside on long-term economic growth - 10 percentage points reducing the country's highest marginal rate will increase the long-term annual real GDP growth rate by about 0.5 percent. Elshani & Ahmeti (2017) conducted a study of 20 European OECD countries and found a negative impact of progressive personal income tax on economic growth, and this was in line with the findings of Arnold (2008), in which the negative relationship between the progressivity of the personal income tax and economic growth was revealed. The profit tax had the greatest negative impact on GDP per capita.

Furthermore, Balasoiu et al. (2023) discovered that empirical findings regarding corporate tax consistently indicated a negative impact on economic growth across both high-fiscal-efficiency and low-fiscal-efficiency countries. This negative effect stems from corporate tax policies discouraging investment, promoting debt financing, stifling entrepreneurship, and diminishing competitiveness. Additionally, Balasoiu et al. (2023) assert

that personal taxes also exhibit adverse effects on economic growth, as they deter labor force participation, foster the growth of the informal sector, reduce disposable income, and hamper investment in human capital.

These findings are supported by Macek (2014), who evaluated the influence of various tax types on economic growth in OECD countries between 2000 and 2011. Macek emphasized that to foster economic growth in OECD nations, both economic and political institutions should prioritize reducing profit taxation and personal income taxes. Moreover, any revenue loss resulting from reductions in corporate taxes should be offset by the expansion of indirect tax revenues.

The results of the study by Barr (2020) in the USA showed that personal income tax reduction is the main short-term economic growth factor, while business taxes are the main long-term factor. Borovina (2016) conducted a study of 11 countries in the Central and Eastern European region in 2004-2012 for the analysis of taxation and to determine the relationship between economic growth and the level of taxation. The obtained results proved the inverse relationship between the economy and the level of tax growth and the influence of tax changes on consumption and investments. An econometric model showed that a decrease in the total level of taxation by 0.74 percentage points increases economic growth by one percentage point. Chairassamee et al. (2023) conducted a study on the impact of various state-level taxes on key economic indicators at the county level, confirming that taxes have a negative influence on local economies. Their findings reveal that a 10 percent increase in income and payroll taxes correlates with a 3 percent decrease in the nonfarm proprietor's employment rate and a decline of USD 3000 in GDP per capita. Similarly, a 10 percent rise in sales taxes leads to a 4.5 percent reduction in the nonfarm proprietor's employment rate, while a 10 percent increase in property taxes is associated with a significant 5.3 percent decrease in nonfarm owner employment.

Gemmel et al. (2013), who researched how taxes influenced the economy in 35 OECD countries between 1996 and 2016, found that the goods and services tax have a detrimental effect on economic growth: when the tax increases by 1%, it causes a decrease in GDP by 0.60%. Alinaghi & Reed (2013), after summarizing 979 estimates of OECD countries from 49 studies, concluded that taxes and their increase have the opposite effect on economic growth, i.e., a tax increase of 3.5 percentage points (roughly equivalent to a 10 percent increase) reduces annual GDP growth by about 0.2 percent. Alfo et al. (2023) researched the impact of taxation on the growth rate of real GDP per capita in 21 OECD countries between 1965 and 2010 and, also confirmed that tax increases have a negative impact on growth: 10% after reducing the personal income tax rate, the GDP growth rate can increase by 0.6%, and by 10% lowering the corporate tax rate can increase the GDP growth rate by 0.3%. However, Gechert & Heimberger (2022), who investigated whether corporate tax affects economic growth, found that corporate tax changes do not have an economically or statistically significant impact on economic growth. According to the researchers, the average impact of corporate tax cuts on growth is zero and there is no significant difference between OECD and non-OECD countries in the impact of corporate tax changes on growth.

III. MODEL SPECIFICATION AND RESULTS

Analyzing and evaluating the short-term and long-term interrelationship between the growth rate and macroeconomic indicators in Lithuania, we utilized the bounds testing procedure for co-integration within the Autoregressive Distributive Lag (ARDL) structure developed by Pesaran & Shin (1995), Pesaran et al. (2001), Pesaran et al. (2004). In our study, we selected this model for several reasons. First and foremost, it enables the estimation of the short-term and long-term relationships between GDP growth rate and macroeconomic indicators. The speed of adjustment in this model indicates how rapidly the GDP growth rate converges to the long-run equilibrium dimension. Secondly, it proves to be relatively more efficient with limited data. Thirdly, it can be specified for a combination of variables with I(1), I(0), and can also be specified if all variables are of order I(1); it may include both endogenous and exogenous variables, unlike a VAR model, which only considers endogenous variables. Finally, it serves as an alternative tool to circumvent the issue of spurious regression.

The empirical estimation is based on the Autoregressive Distributed Lag (ARDL (p, q)) model (1):

$$Y_t = \gamma_0 + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \cdots + \beta_p Y_{t-p} + \delta_1 X_t + \delta_2 X_{t-1} + \delta_3 X_{t-2} + \cdots + \delta_q X_{t-q} + \varepsilon_t \quad (1)$$

Y_t is the lags of the dependent variable; X_t is the lags of the explanatory variables; ε_t is the lags of the error; β, and δ are coefficients; γ is the constant; p, q - optimal lag orders; p - dependent variable, q - independent variable.

ARDL Bound test model (2):

$$\Delta Y_t = \gamma_0 + \sum_{i=1}^{p} \lambda_i \Delta Y_{t-1} + \sum_{i=0}^{q} \delta_i \Delta X_{t-1} + \varphi_1 Y_{t-1} + \varphi_2 X_{t-1} + \upsilon_t \quad (2)$$

Unit root tests are used to test the stationarity of each variable. The augmented Dickey-Fuller test (Dickey

& Fuller, 1979; Dickey & Fuller, 1981) was applied for an examination of stationarity variables. The error correction term (ECT) obtained from ARDL incorporates short-term dynamics into the long-term equilibrium while retaining all long-term information. Before advancing to the bound F-test for cointegration, we determine the optimal lag length by employing the Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ). The ARDL running is dependent on the F-Statistics value. When the cointegration results confirm a long-run relationship between the study variables, we test the short-run coefficients. Equation 3 is the short-run and the long-run ARDL:

$$\Delta Y_t = \gamma_0 + \sum_{i=1}^{p} \lambda_i \Delta Y_{t-i} + \sum_{i=0}^{q} \delta_i \Delta X_{t-i} + \eta_1 ECT_{t-1} + \upsilon_t \quad (3)$$

The ECT indicates the speed of dynamic adjustment of short-term deviations of variables from long-term equilibrium and how much time it will take to reach the equilibrium path in the long run. To ensure convergence toward equilibrium in the long run, ECT should be less than zero and significant; otherwise, the model is considered unstable and explosive if it is positive. Most macroeconomic models have the problems of autocorrelation, multicollinearity, stability, and heteroscedasticity. The model should be free of serial correlation (tested using the Breusch-Godfrey Serial Correlation LM test), without heteroscedasticity and ARCH effect (Breusch-Pagan-Godfrey and ARCH tests), and its residuals must be distributed normally (Jarque-Bera test). Additionally, the model must be stable (tested using CUSUM and CUSUMsq).

The empirical estimation is based on the autoregressive distributed lag model, enabling the identification of a flexible dynamic relationship between GDP and the growth of tax revenues, personal income tax, profit tax, investments, inflation level, and unemployment rate. The study made use of quarterly time series data including from 2003Q1 to 2022Q3 (Table 1).

Table 1. Variables and their notation

Variable	Notation[1]
Gross domestic product growth, (%)	GDP
Tax revenue growth, (%)	TTR
Personal income tax, (% of GDP)	PIT
Corporate income tax, (% of GDP)	CIT
Investment, (% of GDP)	I
Inflation rate, (%)	IR
Unemployment rate, (%)	UR

[1] Econometric model variables

The basic econometric model is the following:

$$GDP_t = \alpha_0 + \alpha_1 TTR_t + \alpha_2 PIT_t + \alpha_3 CIT_t + \alpha_4 I_t + \alpha_5 IR_t + \alpha_6 UR_t + \varepsilon_t \quad (4)$$

Where t is a variable for the period and ε_t is the error term, GDP is a gross domestic product, TTR is tax revenue growth, personal income tax is represented by PIT, corporate income tax is CIT, investment is I, IR is the inflation rate and UR is the unemployment rate. α_0 is constant while $\alpha_1 TTR_t + \alpha_2 PIT_t + \alpha_3 CIT_t + \alpha_4 I_t + \alpha_5 IR_t + \alpha_6 UR_t$ are tax revenue growth, personal income tax, corporate income tax, investment, inflation rate, unemployment rate.

The stationarity of all-time series variables was checked using the Augmented Dickey-Fuller unit root test (ADF) and the Akaike Information Criterion. Table 2 displays the results of the unit root test for both the level and first difference.

Table 2. Result of Unit Root Test

Augmented Dickey-Fuller				
Variables	Level Intercept		First difference Intercept	
	t-stat	Remark	t-stat	Remark
GDP	-4.625661*	I(0)		
TTR	-4.372067*	I(0)		
PIT	-1.509066		-5.116239*	I(1)
CIT	1.233877		-6.344108*	I(1)
I	-3.332653*	I(0)		
IR	-2.131019		-3.516656*	I(1)
UR	-3.452151*	I(0)		

Note: *, **, *** indicate 1%, 5%, 10%; researcher's calculation using EViews 12

Different lag order selection methods were applied to select a suitable lag for the dependent and the independent variables. In time series data, the AIC and SIC methods are the most popular. In this study (Table 3), we select lag through AIC.

Table 3. Test of lag order selection

Lag	LR	FPE	AIC	SC	HQ
0	NA	12.556	5.367	5.589	5.455
1	34.869	7.489	4.850	5.103	4.951
2	1.338	7.541	4.857	5.141	4.970
3	6.621	6.971	4.778	5.0945	4.904
4	7.265*	6.367*	4.687*	5.034*	4.825*

Note: *, **, *** indicate 1%, 5%, 10%; researcher's calculation using EViews 12

Critical table values (bounds) for small samples (ranging from 30 to 80) were calculated by Narayan (2005). These critical bounds are utilized by both Narayan (2005) and Pesaran et al. (2001), with Narayan's bounds applicable to sample sizes up to 80 and Pesaran et al.'s for sample sizes exceeding 80. To reach a decision, F-statistics are compared with the critical values provided by Narayan (2005). The results of the bound test for cointegration are presented in Table 4. This table shows that the F-statistic value of 14.500 exceeds the Critical Value Bounds for the upper bound I(1) at a 1% level of significance. Consequently, this indicates cointegration, suggesting a long-run relationship between the dependent and independent variables.

Table 4. Cointegration test results

Bound test for cointegration		
Critical value bounds of the F statistic: unrestricted intercept and unrestricted trend F-statistic is 14.500*		
Critical values are obtained from Narayan (2005)	**k=6, n=75**	
Critical Value	**Lower bound I (0)**	**Upper bound I (1)**
1 per cent	4.00	5.397
5 per cent	3.077	4.284
10 per cent	2.657	3.776

Notes: *, **, *** denote significant at 1%, 5%, 10%, respectively. Critical values are obtained from Narayan (2005)

The short-run results presented in Table 5 indicate that the coefficient of the lagged error correction term, CointEq(-1), is negative and statistically significant, confirming the presence of long-run cointegration between the independent variables and GDP. Specifically, the coefficient of CointEq(-1) of -0.630172 suggests that approximately 63% of the deviation from the long-run equilibrium of GDP in the previous year is corrected in the current quarter to restore equilibrium.

Table 5 presents the results of the estimated short-run ARDL model. From the table, it is observed that all variables, except D(PIT), D(IR), D(IR(-1)), and D(UR(-2)), exhibit statistical significance at either the 1% or 5% level. Notably, investment at lags 1, 2, and 3 demonstrates a positive impact on GDP. Specifically, a one-unit increase in D(I(-1)), D(I(-2)), and D(I(-3)) corresponds to GDP increases of approximately 20%, 31%, and 30%, respectively.

Table 5. Estimation Results of ARDL(1, 0, 1, 1, 4, 3, 3) (ARDL Error Correction Regression)

Dependent Variable: D(GDP)				
Short-run Coefficients (ECM Regression)				
Variable	**Coefficient**	**Std. Error**	**t-stat**	**Prob.**
C	- 0.907646*	0.209856	-4.325085	0.000
D(PIT)	0.365615	0.262925	1.390568	0.170
D(CIT)	- 0.103720*	0.022215	-4.669027	0.000
D(I)	0.361828*	0.064479	5.611570	0.000
D(I(-1))	0.193166**	0.070120	2.754795	0.008
D(I(-2))	0.312424*	0.070817	4.411723	0.000
D(I(-3))	0.298531*	0.066380	4.497325	0.000

Variable	Coefficient	Std. Error	t-stat	Prob.
D(IR)	- 0.117307	0.218155	-0.537726	0.593
D(IR(-1))	0.262089	0.225135	1.164139	0.249
D(IR(-2))	0.654028**	0.204164	3.203443	0.002
D(UR)	- 0.633699**	0.259105	-2.445724	0.018
D(UR(-1))	- 0.577611**	0.276665	-2.087761	0.041
D(UR(-2))	- 0.436812	0.269544	-1.620560	0.111
CointEq(-1)*	- 0.630172*	0.059394	-10.61003	0.000
R^2 = 0.744827 Adjusted R^2 =0.690446				
F-stat = 13.69646 Prob(F-stat) = 0.000000				
Durbin-Watson stat = 2.210529				

Source: computed by authors from Eviews 12 Output. Notes: *, **, &*** represent statistical significance at 1%, 5% & 10% respectively

With cointegration established, the conditional ARDL long-run model was estimated, and the results are reported in Table 6. The findings indicate that TTR, D(CIT), I, and D(IR) are statistically significant at the 1%, 5%, and 10% levels. TTR and I have a positive impact on GDP, with a unit increase in TTR and I corresponding to GDP increases of approximately 15% and 18%, respectively. Conversely, D(CIT) and D(IR) exhibit a negative impact on GDP. Specifically, a unit increase in D(CIT) and D(IR) results in GDP decreases of 40% and 130%, respectively, with the estimated coefficients statistically significant at the 5% level.

Table 6. Estimated Long-run ARDL coefficients (1, 0, 1, 1, 4, 3, 3)

Long-run Coefficients				
Variable	Coefficient	Std. Error	t-stat	Prob.
TTR	0.146717*	0.040712	3.603743	0.0007
D(PIT)	- 0.551453	1.462228	-0.377132	0.7075
D(CIT)	- 0.398860**	0.188422	-2.116842	0.0388
I	0.181789***	0.102500	1.773561	0.0817
D(IR)	-1.299711**	0.617162	-2.105949	0.0398
UR	- 0.039118	0.114412	-0.341904	0.7337
EC = GDP - (0.1467*TTR - 0.5515*D(PIT) - 0.3989*D(CIT) + 0.1818*I - 1.2997*D(IR) - 0.0391*UR)				

Source: Computed by Authors from Eviews 12 Output. Notes: *, **, &*** represent statistical significance at 1%, 5% & 10% respectively

Furthermore, the diagnostic statistics reported in Table 5 suggest that the data fit the model reasonably well. The R-squared value of the model indicates that approximately 74.45% of the variation in the dependent variable (GDP) is explained by the combined effects of all the explanatory variables used in the study. This suggests that 25.55% of the variation in GDP is attributed to other factors not included in the model. Moreover, the Durbin-Watson value of 2.2, as shown in Table 5, is closer to the value of 2 than to 0. This indicates the absence of autocorrelation in the dataset.

Table 7. Post Estimation Diagnostic Breusch-Godfrey Serial Correlation LM Test

F-statistic	2.515324	Prob. F(4,51)	0.0727
Obs*R-squared	12.35803	Prob. Chi-Square(4)	0.0149

Table 8. Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.58357	Prob. F(19,55)	0.094
Obs*R-squared	26.5206	Prob. Chi-Square(19)	0.116
Scaled explained SS	16.3354	Prob. Chi-Square(19)	0.634

Tables 7 and 8 present the post-estimation diagnostic statistics. The serial correlation LM test yields a probability value of 0.07, which exceeds the significance level of 0.05. Therefore, the null hypothesis of the absence of autocorrelation in the model cannot be rejected. Similarly, the probability value for the test of heteroskedasticity is 0.09, indicating that the null hypothesis of the absence of heteroskedasticity in the model cannot be rejected.

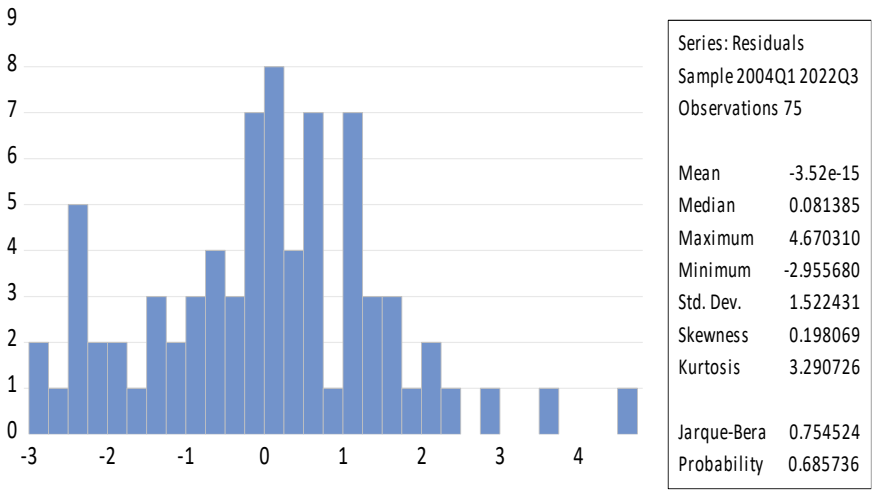

Figure 1. Normality Plot
Source: Researchers Computation using EViews 12

Moreover, the normality plot depicted in Fig 1 reveals that the Jarque-Bera value is 0.7545, with a corresponding probability of 0.6857. As such, the null hypothesis that the error terms of the data utilized in this study are normally distributed cannot be rejected.

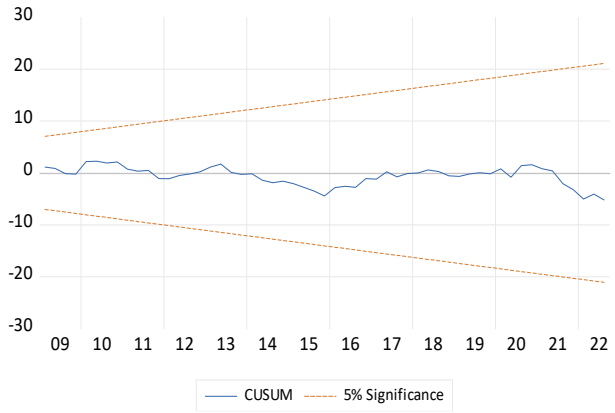

Figure 2. CUSUM Plot for Stability
Source: Researchers Computation using EViews 12

The results also pass the test of stability, as indicated by the CUSUM plot depicted in Fig 2, which does not cross either of the 10% critical lines. Thus, it can be concluded that the estimated parameters for the study remain stable throughout the period under investigation.

IV. CONCLUSIONS

The literature review reveals the significance of tax revenues and selected macroeconomic indicators in evaluating economic growth. This study employs the bounds testing procedure for co-integration within an autoregressive distributive lag (ARDL) framework to analyze, calculate, and evaluate the long-term and short-term relationship between the GDP growth rate and macroeconomic indicators in Lithuania.

In the short run, the analysis confirms the existence of long-run cointegration between the independent variables and GDP, with the coefficient of the lagged error correction term, CointEq(-1)*, being negative and statistically significant. This implies that about 63% of the deviation from the long-run equilibrium of GDP in the previous year is corrected in the current quarterly to restore equilibrium.

The short-run ARDL model indicates that all variables, except D(PIT), D(IR), D(IR(-1)), and D(UR(-2)), are statistically significant at either 1% or 5%. Investment at lags 1, 2, and 3 exhibits a positive impact on GDP, with a unit increase in D(I(-1)), D(I(-2)), and D(I(-3)) leading to GDP increases of approximately 20%, 31%, and 30%, respectively.

The serial correlation LM test suggests that the null hypothesis of the absence of autocorrelation in the model cannot be rejected, with a probability value of 0.07 exceeding the threshold of 0.05. Tax revenue growth (TTR) is found to positively impact GDP, with a unit increase in TTR and I increasing GDP by about 15% and 18%, respectively.

However, D(CIT) (corporate income tax) and D(IR) (inflation rate) have a negative impact on GDP. Specifically, a unit increase in D(CIT) and D(IR) results in GDP decreases of 40%. The R-square of the model indicates that approximately 74.45% of the variation in GDP is explained by the combined effects of all explanatory variables, suggesting that 25.55% of the variation in GDP is attributable to other factors not included in the model.

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