

Institutions and Efficiency of Public Finance Policy: An Empirical Approach

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Abstract: The main objective of the fiscal and monetary policies of the United States and the Eurozone implemented in recent years was to achieve macroeconomic stability and sustainable economic growth while reducing income inequality. The purpose of this research is to examine which policies and measures need to be adopted to implement effective fiscal policy to understand the impact of institutions at a global level. To examine the importance of institutional factors, we collected data from 178 countries for the period 2002-2019, using Panel Data Methodology and VAR Models. The analysis of institutions contributes to understanding the effectiveness of fiscal policy in achieving social prosperity and limiting the impact of economic fluctuations.

Keywords: Governance, Institutions, Fiscal rules, Indicators of institutional quality, Panel data

JEL Classification Codes: E62, O43, E02, C23, and C19

1. Introduction

A huge number of theoretical and empirical studies have been devoted to the interaction between the quality of institutions and economic policy since North (1990) asserted that “the polity and the economy are inextricably interlinked in any understanding of the performance of an economy”. Formal institutional constraints, such as fiscal rules, “specify and enforce property rights that shape the basic incentive structure of an economy” but also impose the rules that are most favourable to economic growth. Furubotn and Richter (1998) defined the constitutional and operational rules of an efficient private ownership economy. In the former rules, they comprise the principles of private property, freedom of contract, and individual liability to fulfil its respective obligations. Among the operational rules, they include appropriate legal rules and specific regulations for conducting and enforcing contracts. Additionally, North (2005) held that sustained growth is not a simple function of knowledge and technology; “the key is the incentive

structure ... for productivity-improving activities" provided by the institutional matrix. In that sense, efficient government is an essential part of the institutional matrix as it embraces both the creation of rules and their enforcement within an order of law. As he explained, for market institutions to work, the state should respect the property and personal rights of its citizens through an efficient fiscal system to help its citizens "have an incentive to obey and enforce the rules" (North, 2005).

Economic policy aims to control various macroeconomic variables, such as inflation, unemployment, gross domestic product, and investment. Several surveys have been conducted to determine the exact role of fiscal policy in the Eurozone, such as those by Dixit and Lambertini (2001) and Uhlig (2002). Their main motivation was to determine whether monetary policy, pursued by the European Central Bank in the case of the Eurozone, can be used as a tool to achieve macroeconomic stability everywhere considering the different institutional settings that each country faces. Yet, the most effective tool that Eurozone countries now have, to deal with crises and external shocks and sustain economic growth, is fiscal policy.

The purpose of this research is to examine which policies and measures need to be adopted to implement effective fiscal policy to understand the impact of institutions at a global level. After the literature review in section 3, we have explained our methodology to examine the importance of institutional factors. We collected data from 178 countries for the period 2002-2019, based on previous studies measuring fiscal efficiency. In section 4, we have discussed the empirical results of our analysis. In the final section, we have concluded that there is a relationship between the debt-to-GDP ratio and GDP growth with some institutional variables. It is therefore implied that since those macroeconomic variables are affected by specific institutions, the fiscal policies that countries are implementing should also consider those indicator.

2. Literature Review

Here, we examine the extent to which institutional quality indicators affect public debt in various countries worldwide, both developed and developing. Fiscal policy is successful when additional debt creates more GDP, and our research question here aims to investigate which independent variables affect the quality of fiscal policy. A recent literature review is presented next, following a chronological order.

Gani (2007) presented panel data estimates of the relationship between indicators of governance and FDI, using a sample of seventeen countries from Asia, Latin America, and the Caribbean regions. In his model, the dependent variable was the ratio of foreign direct investment to gross domestic product, and the independent variables were market share,

freedom of trade, economic growth, and the six indicators of institutional quality. Empirical results provided evidence that the control of corruption, regulatory quality, the rule of law, political stability, and government effectiveness were strongly correlated with FDI.

Jadhav and Katti (2012) investigated the role of institutional and political factors in attracting foreign direct investment in the economies of the BRICS countries. They used panel data for the period of ten years (2000-2010), which were obtained from the World Bank. In their model, the dependent variable was direct foreign investment, and the independent variables were the six indicators of institutional quality. The results showed that apart from the Rule of Law, all independent variables were statistically significant. The regulatory quality and government effectiveness were positively related to the inflow of foreign direct investment in the BRICS countries. Three variables in the model, voice and accountability, political stability, and the control of corruption, were negatively related to the inflow of foreign direct capital into the BRICS countries.

Swamy (2015) examined factors affecting public debt by grouping her data by economic and institutional criteria. In her regression, she used debt as a dependent variable and as independent variables, government spending, real GDP growth, trade openness, inflation, foreign direct investment, unemployment, government spending, gross fixed capital formation, population growth, and other auxiliary variables. The results of the sample analysis revealed that government spending, real GDP growth, foreign direct investment, population growth, and inflation had negative effects on debt. Gross fixed capital formation, trade openness, and final consumption expenditure positively affected debt.

Marino *et al.* (2016) explored the relationship between the World Bank governance indicators and the BRICS countries' socioeconomic development indicators (BRICS- Brazil, Russia, India, China, South Africa). The databases of several international organisations corresponding to the 2005–12 period were assessed using panel data analysis. They used as a dependent variable the GDP growth, which measures the annual fluctuation of GDP, and the human development index, which measures the development of an area based on income, education, and life expectancy. Independent variables included the six institutional quality indicators and other explanatory variables. The results showed a positive relationship between the indicators of human development, government effectiveness and the control of corruption, and between the GDP index and the index of the control of corruption. In contrast, they portrayed a negative relationship between the GDP index and the indicators of voice and accountability and political stability.

Omrane and Omrane (2017) conducted an econometric investigation of the macroeconomic determinants of public debt in Tunisia using the VECM model for the period 1986–2015. The results of the sample analysis revealed that inflation and investment reduced the value of public debt. However, the fiscal deficit, real interest rate, and trade openness increased public debt. In the regression, the dependent variable was public debt as a percentage of GDP, and the independent variables were lagged GDP growth, gross fixed capital formation as a percentage of GDP, real interest rate, trade openness, inflation, and fiscal deficit as percentages of GDP.

Tarek and Ahmed (2017) tested the impact of institution's quality on public debt accumulation in the MENA countries (MENA- Middle East/ North Africa) during 1996–2015. The six indicators of global governance (voice and accountability, government effectiveness, political stability and absence of violence, rule of law, regulatory quality and control of corruption) were used to measure the quality of governance in these countries. Data were obtained from the World Bank, IMF, and Worldwide Governance Indicators. In their study, the dependent variable was the ratio of public debt to GDP, and the independent variables were the dependent variable with one lag, fixed per capita income, government spending as a percentage of GDP, inflation, unemployment rate, GDP growth percentage, and all six indicators of global governance. The relationship between the six worldwide governance indicators and the public debt ratio was estimated by applying the dynamic panel model that allows for dealing with country-specific effects. The econometric results partially confirmed the basic assumption that the higher the bad governance in a country, the higher the ratio of public debt to GDP.

Awan *et al.* (2018) examined the association among corruption, governance, and economic growth in five selected South Asian Association for Regional Cooperation (SAARC) countries using panel data for the period 1996–2014. The dependent variable was GDP per capita, and as independent variables, they used the education index, government effectiveness, corruption, and political stability. The findings revealed that two institutional indicators of governance, namely political stability and government effectiveness, had a positive and significant impact on economic growth. Corruption adversely affected economic growth, according to this theory. In addition, the results showed that among the governance indicators, government effectiveness had a greater impact on GDP growth.

Chirwa (2018) found results that reveal that while economic growth reduces debt in the short run, the real exchange rate, investment, and population growth reduce debt eventually. Similarly, although the real

interest rate creates debt in both the short and long run, government spending creates debt eventually. In the regression, the dependent variable was debt and the independent variables were one-lagged debt, economic growth, real interest rate, primary balance, real exchange rate, and inflation. One-lagged debt and real interest rates are positively associated with debt accumulation, whereas economic growth and primary balance are negatively associated with debt accumulation.

Ali and Yahya (2019) studied how governance affected public debt accumulation in the Arabian Gulf countries during the 1996–2015 period. They used the panel and GLS methodology. The dependent variable in this study was the ratio of public debt to GDP. This study was based on six institutional quality measures given by global governance indicators. These variables were voice and accountability, government effectiveness, political stability and absence of violence, regulatory quality, control of corruption, and the rule of law. Additional control variables had also been used, such as per capita income, government spending as a percentage of GDP, inflation rate, unemployment rate, consumer spending as a percentage of GDP, and GDP growth. Data were obtained from the following sources: International Financial Statistics (IMF), World Bank (World Databank), and Worldwide Governance Indicators (WGI). According to the authors, an increase in any governance index other than the control of corruption reduced public debt.

Hayat (2019) analysed the role of institutional quality in economic development, and more specifically, the role it played through foreign direct investments. He used data from 104 countries, drawn from the World Bank (World Databank), and applied the GMM estimation method. The dependent variable was the annual real growth rate of GDP per capita, and the independent variables were the dependent lag, macroeconomic variables, foreign direct investment, control of corruption, rule of law, government effectiveness, political stability, absence of violence, and regulatory quality. He found that better institutional quality led to stronger economic growth.

Mothibi and Mncayi (2019) examined the factors influencing public debt in South Africa. The dependent variable in their regression was government debt, whereas the independent variables were the one-lagged dependent, real gross domestic product, government spending, real interest rates, and inflation. All variables were transformed into natural logarithms. They concluded that there was a long-term relationship between debt and all independent variables, with an emphasis on real GDP, government spending, and real interest rates, and found no short-term effect of real interest rates and inflation on debt.

Moreover, Zhuo *et al.* (2020) used panel data from 31 developed countries for the period 2002-2018, applying various methods such as GMM, Sys GMM, pooled OLS, fixed effect, and random effect to investigate the impact of the six governance indicators on economic growth. The data were obtained from the World Bank and World development indicators. In their model, the dependent variable was GDP per capita, and the independent variables were GDP growth, inflation, the total share of government spending on education, the real interest rate, and the six indicators of institutional quality. Their study concluded that the rule of law, voice and accountability, and the control of corruption had a direct and significant impact on the economic development of developed countries. The study also found an indirect significant impact of political stability, regulatory quality, and government effectiveness on economic growth.

Dawood *et al.* (2021) investigated the determinants of external debt in 32 Asian countries, developing and transition economies, for 1995–2019. Estimation was performed using the Generalised Method of Moments (GMM), which can deal with potential endogeneity problems. The results showed that in both the short and long run, economic growth and investment reduced external debt, whereas the exchange rate, trade openness, and government spending increased external debt. The regression under consideration had external debt as a dependent variable and external debt with one lag (which measures the maintenance of external debt over time), economic growth, exchange rate, trade openness, investment, inflation, and government spending as independent variables. It was also revealed that the relationship between economic growth, inflation, and external debt was negative and statistically significant. Economic growth and inflation reduced external debt. Investment also had a negative effect on external debt. It was concluded that the main determinants of external debt for selected Asian developing and transition economies were economic growth, exchange rate economy, trade openness, inflation, and government spending.

Furthermore, Mehmood *et al.* (2021) dealt with all six institutional indicators. They explored the relationship between institutional quality and public debt in Pakistan from 1996 to 2018. Data were drawn from the following sources: International Financial Statistics (IMF), World Bank (World Databank), and Worldwide Governance Indicators (WGI). In their regression, the dependent variable was public debt and the independent variables were indicators of institutional quality (political stability and absence of violence, regulatory quality, voice and accountability, the rule of law, control of corruption and government effectiveness). The results

showed that the factors of regulatory quality, voice and accountability, and the control of corruption had a positive relationship with public debt, while the rule of law, political stability, and government effectiveness had a negative impact on public debt.

Mitsi (2021) surveyed the role of good governance in economic development in the group of countries labelled as PIIGS (Portugal, Italy, Ireland, Greece and Spain). The data covered the period 2002–2018 and were collected from many sources such as the World Bank's Worldwide Governance Indicators, World Bank's Worldwide Development Indicators, United Nations Conference on Trade and Development, European Commission Database, and International Monetary Fund. In her model, the dependent variable was the logarithm of GDP per capita, and the independent variables were foreign direct investment, open trade, inflation, government spending, and the six indicators of institutional quality. She found that gross capital formation, inflation, trade openness, political stability, debt rule, budget balanced rule, the rule of law, and the combination between debt rule/budget balanced rule with political stability and the combination between debt rule/budget balanced rule with the rule of law were significant drivers of economic growth in PIIGS countries, whereas foreign direct investments, government effectiveness, voice and accountability, regulatory quality, fiscal rule index, and expenditure rule were insignificant.

Bataka (2023) found that economic globalisation as a whole increased public debt in the short term while reducing it in the long term. The function it examined had public debt as a dependent variable and public debt with one lag as an independent variable, GDP growth rate, inflation, total government spending as a percentage of GDP, population growth rate, and a measure of economic globalisation which was derived using the Herfindahl–Hirschmann methodology and included trade openness in its estimation. The author found most variables positively correlated with public debt and statistically significant.

To summarise the above studies, we present the following table, which presents the variables used to construct their econometric studies. These studies have been used in the next section to conduct our own econometric analysis. Their data consists of panel data, and they mostly used the standard method of fixed effects to obtain robust results.

<i>Authors</i>	<i>Dependent Variable</i>	<i>Independent Variables</i>
Gani (2007)	FDI to GDP	<ul style="list-style-type: none"> • Economic Growth and market share indices • Trade openness • Six indicators of institutional quality

Jadhav and Katti (2012)	FDI	<ul style="list-style-type: none"> • Six indicators of institutional quality
Swamy (2015)	Debt	<ul style="list-style-type: none"> • Real GDP growth • Government spending • Inflation • Trade openness • Unemployment • Foreign Direct Investment • Gross fixed capital formation • Government spending • Population growth • Other auxiliary variables
Marino <i>et al.</i> (2016)	GDP growth	<ul style="list-style-type: none"> • Six indicators of institutional quality • Other explanatory variables
Omrane and Omrane (2017)	Public debt as a percentage of GDP	<ul style="list-style-type: none"> • Lagged GDP growth • Gross fixed capital formation as a percentage of the GDP • Inflation • Real interest rate • Trade openness • Fiscal deficit as a percentage of GDP
Tarek and Ahmed (2017)	Debt to GDP	<ul style="list-style-type: none"> • Debt to GDP lagged • Fixed per capita income • Government expenditure to GDP • Unemployment rate • Inflation-GDP Growth • Six indicators of institutional quality
Awan, R. U <i>et al.</i> (2018)	GDP per capita	<ul style="list-style-type: none"> • Control of Corruption • Education index • Government Effectiveness • Political stability and absence of violence
Chirwa (2018)	Debt	<ul style="list-style-type: none"> • One-lagged debt • Economic growth • Real interest rate • Primary balance • Real exchange rate • Inflation
Ali and Yahya (2019)	Debt to GDP	<ul style="list-style-type: none"> • Six indicators of institutional quality
Hayat (2019)	Real growth rate of GDP per capita	<ul style="list-style-type: none"> • The real growth rate of GDP per capita lagged • FDI • Other macroeconomic variables • Rule of Law • Control of Corruption • Political stability and absence of violence • Regulatory Quality • Government Effectiveness

Mothibi and Mncayi (2019)	Government debt	<ul style="list-style-type: none"> • The one-lagged dependent • Real gross domestic product • Government spending • Real interest rates • Inflation
Zhuo <i>et al.</i> , (2020)	GDP per capita	<ul style="list-style-type: none"> • Six indicators of institutional quality • Inflation • GDP Growth • Real interest rate • Total share of government spending on education
Dawood <i>et al.</i> (2021)	External debt	<ul style="list-style-type: none"> • External debt with one lag • Economic growth· Exchange rate • Trade openness • Investment • Inflation • Government spending
Mehmood <i>et al.</i> (2021)	Debt	<ul style="list-style-type: none"> • Six indicators of institutional quality
Mitsi (2021)	Logarithm of GDP per capita	<ul style="list-style-type: none"> • Six indicators of institutional quality • Trade openness • FDI • Government expenditure • Inflation
Bataka (2023)	Public Debt	<ul style="list-style-type: none"> • Public debt with one lag • GDP growth rate • Inflation
GDP		<ul style="list-style-type: none"> • Government spending as a percentage of • Population growth rate • Trade openness

3. Methodology

To examine the importance of institutional factors, we collected data from 178 countries for the period 2002–2019. The data were collected on the basis of previous studies that mentioned them as important factors for measuring fiscal efficiency.

As dependent variables, we used the variables of debt to GDP, GDP growth, and foreign direct investment to GDP. After the stationarity tests were completed, we considered the simplest form of the models. Our regressions were based on an unbalanced panel dataset, and we conducted our analysis in a manner similar to the presented literature review. We used the fixed-effects model on every occasion; our final models were based on the results of the redundant fixed effects test and the Hausman test and we presented the final estimations where all the variables were statistically significant. We also conducted a VAR

estimation that incorporated the relationships between the three dependent variables.

3.1. Regressions using only institutional indicators

We began our regressions with the debt-to-GDP variable. After removing the insignificant variables, we observed that the debt-to-GDP variable was affected by the Rule of Law, Political Stability, and Regulatory Quality using a fixed-effects model.

Table 1: Debt-to-GDP regression (only institutional indicators)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>	<i>P-Value</i>
constant	52,49	0,5344	98,22	0,000
law	14,25	5,9128	2,41	0,017
polstab	-12,85	5,611	-2,29	0,023
regq	-26,93	7,8284	-3,44	0,001

Subsequently, we observed that FDI was not affected by changes in institutional quality indicators. The only variable that appeared to have some explanatory power in the model was the Rule of Law, but only at the 10% statistical significance level.

Table 2: FDI-to-GDP regression (only institutional indicators)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>	<i>P-Value</i>
constant	6,09	0,1539	39,57	0,000
law	5,90	3,2777	1,80	0,074

Next, we noticed that the variables, the Rule of Law, Political Stability, and Voice and Accountability affected GDP growth.

Table 3: GDP Growth regression (only institutional indicators)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>	<i>P-Value</i>
constant	3,89	0,048	80,03	0,000
law	-1,78	0,9081	-1,96	0,052
polstab	1,02	0,408	2,50	0,013
voice	2,70	1,011	2,67	0,008

3.2. Regressions using the full sample

We began our regressions with the debt-to-GDP variable. After removing the insignificant variables, we observed that the debt-to-GDP variable was affected by the Rule of Law, Political Stability, Regulatory Quality, and Inflation using a fixed-effects model.

Table 4: Debt-to-GDP regression (full sample)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>	<i>P-Value</i>
constant	52.31	0.5158065	101.41	0.000
law	14.55	5.744636	2.53	0.012
polstab	-13.73	5.495787	-2.50	0.013
regq	-24.08	7.248267	-3.32	0.001
inflation	0.0028	0.0001481	18.62	0.000

From the results of the regressions we conducted, with dependent FDIs to GDP, we saw that the indicators of institutional quality did not affect the intention of foreign investors to inflow capital into the respective country. On the contrary, the only variable that was said to influence was trade openness, which was expected to influence based on economic theory.

Table 5: FDI-to-GDP regression (full sample)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>	<i>P-Value</i>
constant	5.82	0.0001872	31,089.74	0.000
trade	-0.001114	0.0001272	-8.76	0.000

Finally, we noticed that the variables, Rule of Law, Regulatory Quality, Voice and Accountability, Government Expenditure, Inflation, and Trade Openness affected GDP Growth.

Table 6: GDP Growth Regression (full sample)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>	<i>P-Value</i>
constant	6.55	1.295041	5.06	0.000
law	-2.35	0.7034145	-3.35	0.001
regq	1.43	0.5911634	2.42	0.017
voice	3.35	1.292324	2.59	0.010
govex	-0.14	0.0656289	-2.13	0.034
inflation	-0.00036	0.0000185	-19.29	0.000
trade	0.0028	0.0003117	8.87	0.000

3.3. Granger Causality Test

Table 7: Granger Causality Test

<i>ONE LAG (1)</i>	<i>TO Debt</i>	<i>TO FDI</i>	<i>TO GDP Growth</i>	<i>TWO LAGS(2)</i>	<i>TO Debt</i>	<i>TO FDI</i>	<i>TO GDP Growth</i>
FROM Debt	-	0,0603	0,0000	FROM Debt	-	0,0951	0,0000
FROM FDI	0,5478	-	0,5760	FROM FDI	0,4770	-	0,7922
FROM GDP Growth	0,0000	0,7232	-	FROM GDP Growth	0,0000	0,8393	-

The table above shows the results of the Granger causality test, in which we tested the nature of the relationship between the three dependent variables used in the previous regressions. We performed the test for both one and two lags.

From the results of the table above, we see that the results do not differ between the first and second lags. We observe that there is a two-way relationship between debt to GDP and GDP growth, whereas foreign direct investment to GDP is not related to any of the other two variables.

Therefore, we continued with the analysis of VAR models, using debt to GDP and GDP growth as dependent variables, to examine the interaction between them as well.

3.4. Vector autoregressive models

3.4.1. VAR Model using only dependent variables

Table 8: VAR model with dependent variables (criteria)

	AKAIKE	SCHWARZ
1st LAG	13,64045	13,65241
2nd LAG	13,48542	13,50638
3rd LAG	13,45855	13,48953
4th LAG	13,46040	13,50259

The table above shows the results of the regressions of the VAR models, where we used only the dependent variables with their lags. To determine the optimal number of lags, we considered the Akaike and Schwarz criteria.

We observe from the above table that the criteria decrease up to the third lag and increase in the fourth lag. Therefore, the optimal model is the one that uses three lags.

Therefore, the VAR Model, with Debt to GDP as the dependent variable, is as follows:

Table 9: VAR model with dependent variables (regressions)

Variable	Coefficient	Standard Error	t-statistic
constant	5.498319	0.44019	12.4909
debt(-1)	1.157035	0.01962	58.9823
debt(-2)	-0.111829	0.02938	-3.80646
debt(-3)	-0.131020	0.01832	-7.15051
gdpgr(-1)	-0.074834	0.04095	-1.82747
gdpgr(-2)	-0.128910	0.04062	-3.17378
gdpgr(-3)	-0.076037	0.03759	-2.02268

The VAR model, with GDP Growth as the dependent variable, is as follows:

Table 10: VAR model with dependent variables (regressions)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>
constant	2.484067	0.21119	11.7623
debt(-1)	-0.048357	0.00941	-5.13807
debt(-2)	0.035904	0.01410	2.54726
debt(-3)	0.009336	0.00879	1.06205
gdpgr(-1)	0.104862	0.01965	5.33742
gdpgr(-2)	0.133978	0.01949	6.87522
gdpgr(-3)	0.097613	0.01804	5.41219

3.4.2. VAR Model using the six institutional indicators

Table 11: VAR model using six institutional indicators (criteria)

	<i>AKAIKE</i>	<i>SCHWARZ</i>
1st LAG	13,61498	13,65086
2nd LAG	13,46738	13,51351
3rd LAG	13,44684	13,50437
4th LAG	13,45135	13,52166

In the above table, we present the results of the regressions of the VAR models with institutional quality indicators as independent variables.

The Akaike and Schwarz criteria decrease again up to the third lag and increase from the fourth lag. Therefore, the optimal model is the one with the three lags.

The final form of the VAR model, with debt to GDP as the dependent variable, is as follows:

Table 12: VAR model using six institutional indicators (regressions)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>
constant	5.691146	0.44353	12.8314
debt(-1)	1.147294	0.01963	58.4489
debt(-2)	-0.111257	0.02929	-3.79873
debt(-3)	-0.126322	0.01839	-6.86911
gdpgr(-1)	-0.071985	0.04115	-1.74928
gdpgr(-2)	-0.126150	0.04086	-3.08702
gdpgr(-3)	-0.070515	0.03796	-1.85747
corrupt	-0.633730	0.68910	-0.919651
goveff	2.854659	0.78661	3.62904
law	0.952656	0.87196	1.09255
polstab	-0.639698	0.33736	-1.89618
regq	-2.244278	0.64994	-3.45308
voice	0.006896	0.36358	0.01897

The VAR model, with GDP Growth as the dependent variable, is as follows:

Table 13: VAR model using six institutional indicators (regressions)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>
constant	2.551812	0.21268	11.9985
debt(-1)	-0.046371	0.00941	-4.92669
debt(-2)	0.036328	0.01404	2.58676
debt(-3)	0.008703	0.00882	0.98693
gdpgr(-1)	0.091211	0.01973	4.62238
gdpgr(-2)	0.119745	0.01959	6.11102
gdpgr(-3)	0.081849	0.01820	4.49635
corrupt	0.134545	0.33043	0.40718
goveff	-0.316107	0.37719	-0.83806
law	-0.171956	0.41811	-0.41127
polstab	0.130712	0.16177	0.80802
regq	0.327872	0.31165	1.05206
voice	-0.625801	0.174434	-3.589561

3.4.3. VAR Model using Additional Independent Variables

Table 14: VAR model using additional independent variables (criteria)

	AKAIKE	SCHWARZ
1st LAG	13,52600	13,57783
2nd LAG	13,37965	13,44256
3rd LAG	13,35217	13,42740
4th LAG	13,36844	13,43750

The table above shows the results of the VAR Model for our two dependent variables using the six indicators of institutional quality as independent variables and inflation, government spending, population, and trade openness as additional independent variables.

In this case, the optimal model is the one with three lags, as the Akaike and Schwarz criteria decrease up to the third lag and increase again from the fourth lag.

Therefore, the VAR Model, with Debt to GDP as the dependent variable, is as follows:

Table 15: VAR model using additional independent variables (regressions)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>
constant	4.494454	0.57050	7.87815
debt(-1)	1.122849	0.01891	59.3870
debt(-2)	-0.070262	0.02824	-2.48782

contd. table 15

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>
debt(-3)	-0.140360	0.01770	-7.92774
gdpgr(-1)	-0.031133	0.03975	-0.78231
gdpgr(-2)	0.067603	0.03953	-1.71004
gdpgr(-3)	-0.046425	0.03655	-1.27016
corrupt	-1.090710	0.66917	-1.629951
goveff	2.320639	0.77367	2.99951
law	1.579120	0.85872	1.83893
polstab	-0.683528	0.33136	-2.06281
regq	-1.447581	0.67256	-2.15234
voice	-0.118522	0.35804	-0.33103
govex	0.023975	0.01664	1.44110
inflation	0.002231	0.000152	15.2052
population	0,000000000666	0,0000000014	0.47060
trade	-0.000215	0.00583	-0.03688

The VAR model, with GDP Growth as the dependent variable, is as follows:

Table 16: VAR model using additional independent variables (regressions)

<i>Variable</i>	<i>Coefficient</i>	<i>Standard Error</i>	<i>t-statistic</i>
constant	3.579881	0.28192	12.6980
debt(-1)	-0.043933	0.00934	-4.70198
debt(-2)	0.026955	0.01396	1.93136
debt(-3)	0.013707	0.00875	1.56664
gdpgr(-1)	0.073842	0.01964	3.75922
gdpgr(-2)	0.100627	0.01954	5.15085
gdpgr(-3)	0.071624	0.01806	3.96538
corrupt	0.468220	0.33068	1.41592
goveff	-0.660005	0.38233	-1.72628
law	0.026766	0.424435	-0.06307
polstab	0.312978	0.16375	1.91134
regq	-0.163377	0.33236	-0.49156
voice	-0.432945	0.17694	-2.44691
govex	-0.041332	0.00822	-5.02739
inflation	-0.000373	0.000073	-5.15044
population	0,00000000232	0,000000070	3.32125
trade	0.003539	0.00288	1.22764

4. Results

The graph below (Figure 1: Debt to GDP Ratio per country) shows the world map presenting the level of debt-to-GDP per country. The darker the colour of a country, the higher its debt-to-GDP ratio. We observe that the most developed countries, such as those in North America, Europe, and Japan, are among those with higher debt-to-GDP ratios for the period 2002–2019.

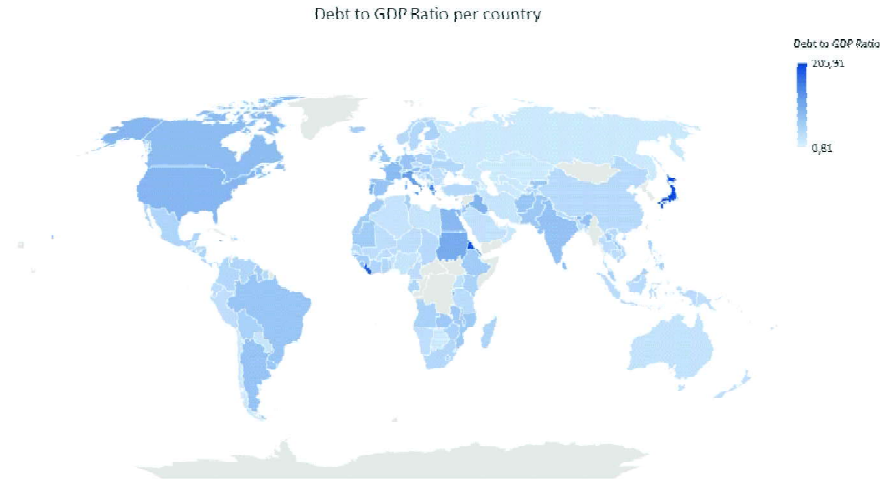


Figure 1: Debt to GDP ratio per country; Data from the World Bank; Our map

The next graph (Figure 2: FDI Inflows to GDP Ratio per country) depicts the ratio of FDI inflows per country. The darker the colour of the country, the higher its FDI to GDP ratio. As we conclude from the graph below, FDI Inflows to GDP do not show great variations. There are a few outliers (Malta and Cyprus), while the rest of the data is concentrated around a percentage below 5%.

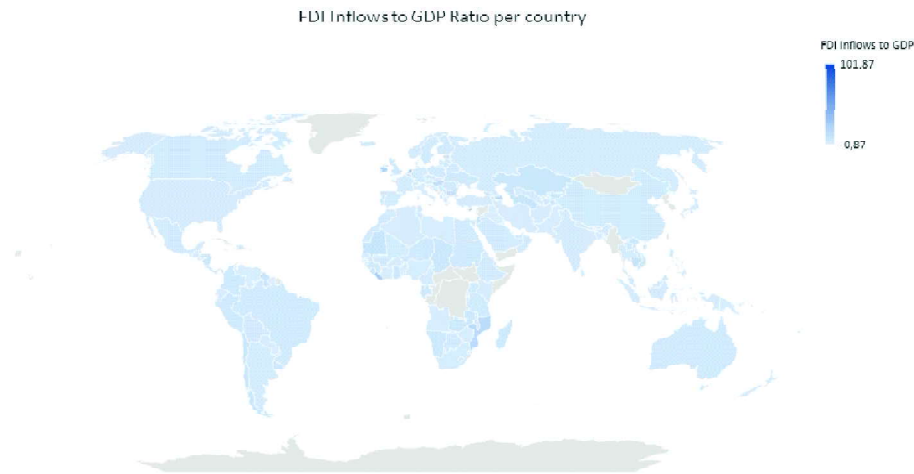


Figure 2: FDI inflows to GDP ratio per country; Data from the World Bank; Our map

The next graph presents GDP growth per country for the period 2002–2019. As we can observe, a higher percentage of GDP growth appears in

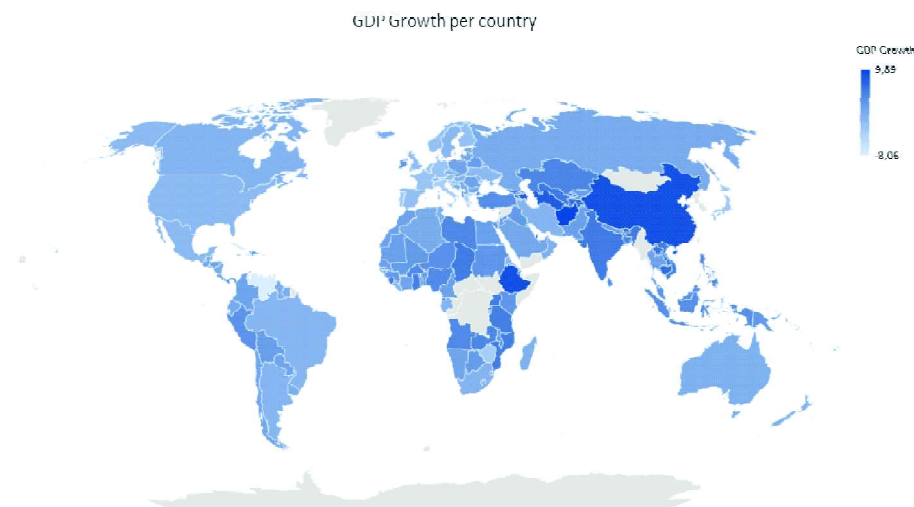
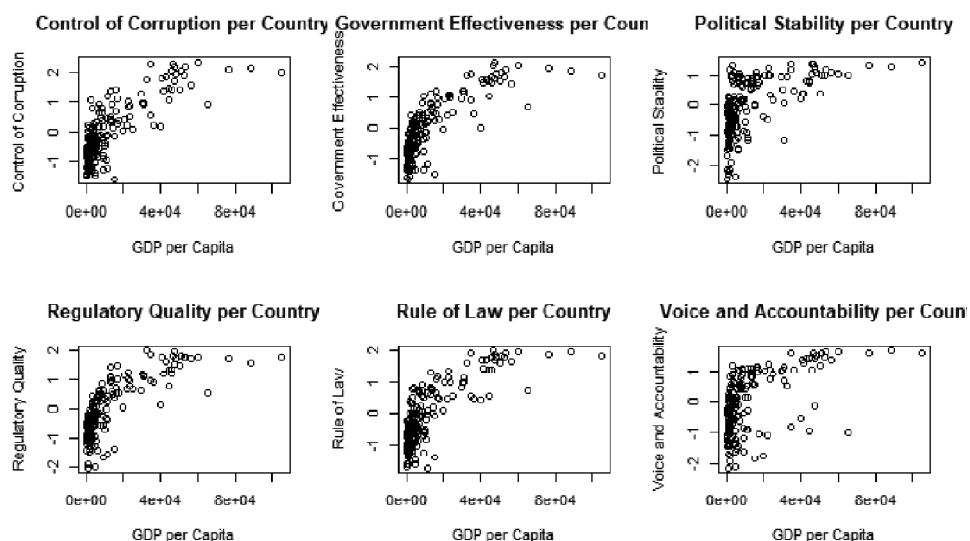


Figure 3: GDP growth per country; Data from the World Bank; Our map

developing countries during the given period, such as in Asian and African countries. Generally, GDP seemed to be growing during the examined period worldwide.

The next set of graphs present how the indicators of institutional quality behave based on a country's GDP per capita index. We may observe that in all cases, the greater the GDP per capita, the greater the likelihood



**Figure 4: Six indicators of institutional quality vs. GDP per capita;
Data from the World Bank; Our map**

of an institutional index to rise. However, we must point out, that GDP per capita starts to affect countries' indices that demonstrate at least a neutral score (a score of zero).

5. Conclusions

The purpose of this paper is to introduce and examine if and how institutional variables affect the fiscal policies of countries.

We conducted empirical research in 178 countries worldwide during 2002–2019. To proxy the fiscal policy of countries, we used three macroeconomic variables as dependent variables: the debt-to-GDP ratio, the FDI inflows-to-GDP ratio, and the GDP growth of those countries.

Our econometric analysis showed that there is a relationship between the debt-to-GDP ratio and GDP growth with institutional variables, thus implying that those macroeconomic variables are affected by institutions and that the fiscal policies that countries are implementing should also take into account those indicators.

Future research should focus on discovering new relationships between macroeconomic variables and those indicators, using different econometric approaches, to better approximate the true nature and impact of those institutional indicators.

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