Article

Public Debt, Governance, and Growth in Developing Countries: An Application of Quantile via Moments

Kazi Musa [1], Kazi Sohag [2,*], Jamaliah Said [1], Farha Ghapar [3] and Norli Ali [4]

1 Accounting Research Institute (ARI), Universiti Teknologi MARA, Shah Alam 40450, Malaysia
2 Graduate School of Economics and Management (GSEM), Ural Federal University (UrFU), Yekaterinburg 620078, Russia
3 Faculty of Accountancy, Business and Social Sciences, Kolej Universiti Poly-Tech MARA, Cheras, Kuala Lumpur 56100, Malaysia
4 Faculty of Accountancy, Universiti Teknologi MARA, Shah Alam 40450, Malaysia
* Correspondence: ksokhag@urfu.ru

Abstract: Developing countries often encounter budget deficits by taking loans from internal and external sources. The effectiveness of public debt has been a long debate in the seminal and empirical literature. In this study, we investigate the effectiveness of public debt on economic growth, incorporating the role of governance in 44 developing countries. In doing so, we applied the Quantile Via Moments approach to analyze heterogeneous panel data ranging 1990–2000 considering the scale and location properties under different economic circumstances. Our results show that public debt impedes economic growth in all quantiles. Our empirical finding corroborates our proposition that in the presence of good governance, public debt promotes economic growth in the medium to higher quantiles. The empirical findings of this study confirm that governance is far more important in promoting economic growth.

Keywords: public debt; economic growth; governance; quantile via moment; developing countries

MSC: 62P20

1. Introduction

Since the global financial crisis of 2007, the magnitude of government debt has increased substantially to mitigate the negative consequences of the crisis. Governments undertake internal and external loans to promote investment, create more jobs, stimulate the economy, and finally, maintain stable economic growth [1,2]. Anecdotal evidence shows that many countries such as Greece and Sri Lanka encountered severe economic downfall due to a high debt ratio [3]. The global financial crisis led many governments to undertake bailout policies that incurred deficit financing. Public debt also considerably increased during the COVID-19 pandemic to mitigate its adverse effects by providing financial assistance to the most vulnerable sectors, the health sector, etc. The International Monetary Fund revealed that global public debt climbed up to 256% of GDP in 2020, where the ratio for developing countries was above 140%. Although the public debt ratio has been thriving, its impact remains ambiguous in the seminal and empirical literature.

A number of propositions motivated us to conduct this study. First, the impact of public debt on economic growth is in contrast to the existing literature in the context of developing countries. A stream of studies observed that public debt stimulated macroeconomic components including production, employment, wage range, and aggregate consumption during the financial crisis and promoted the economy [3,4]. Similarly, Mohsin et al. [5] documented that debt positively affected economic growth through capital formation and new investments in emerging market countries during the economic downturn. In

contrast, many developing countries struggle with public debt management and are hardly able to generate the anticipated economic growth from that debt [6].

Second, many developing countries adopt different external and internal debts to fill the fiscal deficit. For several reasons, developing countries often struggle to deal with public debt to stabilize the macroeconomic environment. For example, Asteriou et al. [7] and Shittu et al. [8] argued that several developing countries suffer from unstable government budget balance and current account balance by adopting short- and long-term debts from different sources, resulting in twin deficits in the long run. Moreover, substantial debt service charges and instalments trigger public taxation and affect capital formation and long-term economic growth [9,10]. However, a frequent debt crisis raises public debate about the effectiveness of public debt. Given the contrasting literature, we were motivated to assess whether public debt is effective in promoting economic growth or not in the context of developing countries.

Third, many studies have emphasized the importance of good governance as a critical component of economic growth. Existing literature about the impact of governance on growth revealed contradictory findings. A group in the study confirmed that governance significantly elevated economic growth by removing the distortions from the growth process [11–14]. Some studies have also reported that different levels of the quality of governance are responsible for the increasing growth disparities across countries. Similarly, Nguyen et al. [15], Azam [16], and Sarpong & Bein [17] found robust governance and public administration patronage, rule of law, property rights, corruption control, and other administrative mechanisms that eliminated growth barriers and facilitated economic growth. Reportedly, many developing countries struggle with an unstable democracy, authoritarian regimes, and other issues, which are prone to poor governance. Mauro [18] and Cooray et al. [19] affirmed that rent-seekers were empowered by poor governance to embezzle public funds, whereas robust governance assures its proper use. Kaufmann [20] acknowledged that weak governance creates channels for government officials to benefit from public funds improperly by leveraging their political power. Our review concluded that governance is paramount in managing the public fund, while public debt is a sensitive public fund that needs to be utilized properly to benefit the national economy.

Fourth, another strand of studies has observed that governance plays a critical role in the debt–growth nexus. For example, Cooray et al. [19] and Nguyen & Luong [21] stated that good governance stimulates macroeconomic indicators through the proper utilization of the debt fund, while poor governance can lead to high public debt for a transitional economy that subsequently affects the growth through interest payments, low savings, and high taxation. In contrast, governance is insufficient to foster public debt-induced-economy growth, but trade openness is crucial, along with governance [22]. Therefore, the effect of governance on the nexus between public debt and economic growth is still debated in empirical studies, which motivated us to conduct the current study.

Pertaining to this backdrop, we aimed to examine the impact of public debt on economic growth in the context of selected developing countries. We also examined the direct impact of governance on growth. Moreover, the study also investigated the moderating role of governance on the nexus between public debt and economic growth in the context of the selected developing countries.

We contributed to the existing literature in a number of ways. First, we re-visit the public debt–economic growth nexus comprising a larger sample period including the financial crisis and COVID-19 pandemic-induced public debt for developing countries. Furthermore, we incorporated the direct and mediating role of governance in the public debt–economic growth nexus. Second, the study addressed the nonlinear properties of our data and the potential endogeneity bias among the countries' public debt and economic growth by applying the newly launched econometric model "Quantiles via Moments" proposed by Machado and Silva [23]. The conventional quantile regression models are unable to detect the presence of unnoticed heterogeneity across panel cross sections, while the Quantile via Moment method investigates the heterogeneous and distributional impacts

across quantiles. Third, our empirical findings provide a number of insights that could be beneficial for academics and policymakers. Developing countries should be cautious when it comes to public debt, as it has a negative impact on economic growth. Since governance is highly beneficial for the sustainable debt–growth relationship, countries are advised to improve the quality of governance in order to benefit from public debt.

The remainder of our paper is structured as follows. Section 2 provides a critical literature review of previous studies. Section 3 demonstrates the data, empirical model, and econometric model. Section 4 delivers the descriptive statistics and main findings. Section 5 provides discussion. Section 6 concludes and provides some policy implications along with several ideas for further research.

2. Literature Review

The effectiveness of public debt on economic growth is debated from a theoretical stance. The Keynesian point of view argues that public debt positively affects the expenditure multiplier and facilitates economic growth through new investment, employment creation, and demand-side stimulation [24–26]. The Classical and Neo-classical theorists strongly criticize the Keynesian arguments and state that public debt might be helpful for a crisis period, but it triggers interest rates, and due to the crowd-out effect, the private sector faces a capital shortage that ultimately affects economic growth in long-run [27,28]. In contrast, New Keynesian theorists state that public debts support the government in capital formation and large investments that motivate the demand side with its multiplier effects [29]. Hence, the debt–growth relationship is highly debated from the different standpoints of growth theories.

Empirical studies also mostly provide conflicting results regarding the productivity of public debt on growth. A group of studies found that public debt was negatively associated with economic growth due to high-interest payments, lower national savings, tax hikes, the crowding-out effect, and fiscal crisis. For example, Asteriou et al. [7] admitted that high debt creates macroeconomic vulnerability in the economy. According to recent studies, public debt has a negative impact on the economy of developing countries due to policy failure, high corruption, and weak debt fund management, and creates low revenue, low savings, and a high tax burden [8,10]. Therefore, most empirical studies on debt-growth issues have explored the negative impacts on economic growth in different settings.

Similarly, Shahor [30] argued that public debt to GDP is favorable for the economy when the debt ratio is lower than 90% of GDP. The study also revealed that high debt is detrimental to the economy, specifically when the debt is 130% or greater than the GDP. A recent study by Ndoricimpa [31] tried to determine the threshold level of public debt for African countries by deploying an advanced panel smooth transition regression approach. The study reported that there was not any effective threshold level of public debt that could be useful for growth; moreover, the debt was detrimental to the economy. Sharaf [32] argued that debt-sustainability is one of the major challenges for most countries, while economics mostly adopts budget deficit through cyclical public debt, which has barely any growth-enhancing effects on the economy in the long run. Other studies have also found similar results on the effects of public debt on economic growth [7]. However, several studies have presented contrary results on the effectiveness of economic growth.

Yusuf and Mohd [33] examined the dynamics of public debt on economic growth in the context of Nigeria and found that it promoted long-term growth, generating national revenue. The study concluded that domestic debt was more effective than external debt and that a debt management strategy and strong governance helped to maximize the public debt benefits. Saungweme & Odhiambo [34] found that public debt was affirmative for the Zambian economy, supported producing domestic revenue base, increased capital formation, enhanced debt payability, and facilitated economic growth. Eberhardt & Presbitero [35] examined the effect of government debt on economic growth by deploying the dynamic model of the common correlated effects of the pooled group and the mean group estimators for 118 countries. The study found that long-term government debt was posi-

tively associated with economic growth, while short-term debt was detrimental. Several other studies have also found similar results where public debt promoted growth through huge investment, full employment, and huge demand creation, especially in crisis [33,36].

Abbas et al. [37] stated that public debt worked effectively on economic growth by the presence of robust governance, and the debt impacted the economy negatively when the governance quality was under the threshold level. Yasar [6] examined the dynamics of external debt on the GDP growth in emerging economies by employing the ARDL econometric model. The study reported that external debt is detrimental to economic growth due to weak debt management, poor governance, and structural rigidities that create fund leakage from public debt. A group of studies confirmed that government debt is unfavorable for long-term growth because it affects investment when it repays [38–40]. On the other hand, Shittu et al. [8] found the opposite result, where poor institutional quality sometimes motivated GDP growth from the external debt in many Sub-Saharan African countries.

Another group of studies argued that the debt–growth nexus is time and country-specific and conditional to governance [41]. Egert [42] similarly acknowledged that some factors that support economic growth from the debt fund are robust governance, cultural characteristics, and existing level of economic growth. Governance plays a moderating role in the relationship between government debt and economic growth. Furthermore, other recent empirical studies have confirmed this conditional relationship with debt and the nexus between public debt and economic growth [43,44]. Some studies have also found that poor governance is one of the main reasons for the failure of public debt [10,45]. Hence studies confirm the importance of governance on debt management and on the nexus between debt growth. On the other hand, some studies find conflicting results on the effectiveness of governance on debt management in developing countries [46]. Therefore, these conflicting studies motivated us to conduct the current study to contribute to the ongoing debate with a robust methodology.

Referring to the previous literature to determine the relationship between public debt and economic growth and the presence of governance, we found that the literature still shows a conflicting situation. Furthermore, the direct and moderating effect of governance has also been debated in prior studies. On the other hand, studies have mostly focused on EU countries, OECD, North America, Sub-Saharan African countries, individual countries, etc. At the same time, the literature on developing countries is still limited. Moreover, the application of advanced models that analyze the heterogeneous effects of independent variables on various levels of economic growth, with a focus on cross-sectional dependence, is a key gap. Therefore, we employed the newly developed robust Quantile via Moment methodology to scrutinize the relationship between public debt, governance, and economic growth in the context of developing countries from different regions to contribute to the literature with some new findings.

3. Methodology

3.1. Data

The study covered data from 1990 to 2000 and considered 44 emerging countries. The data of the focused variables were obtained from secondary sources such as the World Bank (World Development Indicators), The International Country Risk Guide (ICRG), Government Finance Statistics (GFS), and International Monetary Fund (IMF). The measurements and proxy of the variables are provided in Table 1.

Table 1. Variable description and sources.

Variable	Definition	Source	Scale of Measurement
Economic growth (GDP)	GDP per capita is obtained by dividing the gross domestic product by the total population.	World Development Indicators (WDI) The World Bank	GDP per capita (Constant in 2010)
Government debt	External debt per cent of GDP	Government Finance Statistics of IMF	Debt to GDP ratio
Quality of governance (QoG)	The index of governance has been compiled by the moving average method from the ICRG dataset.	Developed by author using the ICRG dataset	Author compilation
Trade openness (TO)	Trade is the sum of imports and exports of services and goods as a % of GDP	WDI The World Bank	Trade (as % of GDP)
Labor force (LF)	LF includes people ages 15 and older who supply labor to produce goods and services during a specified period.	WDI The World Bank	Population aged (15 and above). Per cent of the total population
Fixed capital formation (FCF)	Gross FCF (% of GDP) is used to measure the capital constant 2010 USD.	WDI The World Bank	Gross FCF as % of GDP)

3.2. Empirical Model

We formulated our empirical models based on the Solow growth model, and outputs were a function of labor (LF) and capital (FCF). Therefore, we incorporated labor force (LF) and fixed capital formation (FCF) in our empirical model. As our sample countries are characterized as open economies, we considered trade openness (TO). Government deficit finance appears as public spending or investment in our model. Finally, we considered the direct and moderating role of quality of governance (QOG) based on a stream of literature.

$$LGDPC_{it} = B_0 + \beta_1 DEBT_{it} + \beta_2 TO_{it} + \beta_3 LF_{it} + \beta_4 FCF_{it} + \varepsilon_{it} \qquad (1)$$

$$LGDPC_{it} = B_0 + \beta_1 DEBT_{it} + \beta_2 TO_{it} + \beta_3 LF_{it} + \beta_4 FCF_{it} + \beta_5 GOV_{it} + \varepsilon_{it} \qquad (2)$$

The moderating role of QoG

$$LGDPC_{it} = B_0 + \beta_1 DEBT_{it} * QoG + \beta_2 TO_{it} + \beta_3 LF_{it} + \beta_4 FCF_{it} + \beta_5 QoG_{it} + \varepsilon_{it} \qquad (3)$$

where $LGDPC$ = logarithmic form of GDP, $DEBT$ = public debt, TO = trade openness, LF = labor force, FCF = fixed capital formation, QOG = quality of governance, and ε_{it} = error.

3.3. Method

To estimate our empirical models, we applied the Quantile via Moment approach developed by Machado and Silva [23] for several crucial reasons. First, our variables were highly heterogeneous for the countries and over time. Standard panel data-based techniques often fail to capture cross-sectional heterogeneity and variation over time [47,48], while Quantile via Moment unavoidably examines the conditional heterogeneous covariance impact [49]. Moreover, the approach can address the conceivable presence of endogenous properties in the independent variables, suitable in cases where impacts submerge the panel data model, and it yields reliable estimates in the case of the nonlinear model, allows for location-based asymmetries, and so on [23,49]. The method is able to generate heterogeneous estimations across the entire distribution. Existing panel regression models such as the fully modified ordinary least square model and dynamic ordinary least square model are capable of dealing

with correlation and endogeneity, but those methods are unable to deal with non-linearity and heterogeneity. This study adopted the Quantile via Moment method, which is able to deal with endogeneity and heterogeneity issues considering the nonlinearity and asymmetric association of the dependent variable.

$$Q_y(\tau|X_{it}) = (a_i(\tau) + \delta_i q(\tau)) + X'_{it}\beta(\tau) + Z'_{it}\gamma(\tau) \tag{4}$$

where $a_i(\tau)$ is the quantile-τ fixed effect for countries i, or the distributional effect (location effect), $\delta_i(\tau)$ is the scale effect, τ is the quantile, $Q_y(\tau|X_{it})$ is the quantile of the dependent variable, $X'_{it}\beta$ is the vector of the independent variables; Z is a vector of known differentiable (with probability 1) transformations of the components of X.

The advantage of our approach is that it allows for the use of methods that are only valid in the estimation of conditional means such as differencing out the cross-sectional effects in panel data models, while providing information on how the regressors affect the entire conditional distribution. These informational gains are perhaps the most striking feature of quantile regression [50,51] and were emphasized, for example, in the surveys by Koenker & Hallock [52], Cade & Noon [53], and Bassett & Koenker [54]. Aside from greatly facilitating the estimation of complex models, our approach also leads to estimates of the regression quantiles that validate a crucial requisite often ignored in empirical applications [55,56].

4. Result and Discussion

4.1. Descriptive Analysis

Table 2 displays the study's descriptive statistics of the considered developing countries. The table also shows the data behavior (i.e., the total number of observations, mean value, standard deviation, and minimum and maximum values). The standard deviation in the table shows it is profound under the "between" option for most of the variables, implying the presence of growth disparity in different countries.

Table 2. Descriptive statistics.

Variable	Observation	Mean	Std. Dev.	Min	Max
LGDPC	1346	8.4113	1.1881	5.8700	11.1386
DEBT	1085	3.7468	0.7804	0.9894	5.6683
TO	1319	4.3568	0.5417	2.6212	6.0806
LF	1330	15.4459	1.8763	11.7334	20.4839
FCF	1266	23.6976	7.6414	0.00	69.6727
QOG	1177	0.5761	0.1897	0.1296	1.00

Descriptive Statistics: The 44 developing countries.

4.2. Main Results

Table 3 depicts the impacts of public debt on economic growth for the selected developing countries under different economic circumstances. The estimations take the form $Q_{LGDPC}(\tau|DEBT, TO, LF, FCF) = \alpha + X'(DEBT, TO, LF, FCF)\beta + \sigma(\delta + Z'\gamma)q(\tau)$. The coefficients of public debt were negative and significant at a 1% significance level under all quantiles, indicating that public debt impedes economic growth in different economic conditions for developing countries. As a result, an increase in public debt is detrimental to the economic activities of the sample countries. Some studies found that developing countries mostly failed to trigger macroeconomic performance using public debt due to fiscal misman-agement, weak policymaking, high debt service charges, high policy implementation charges, and so on [57]. Similarly, Temsumrit [58] argued that the level of democracy and institutional quality were two major factors that supported the proper use of public debt and promoted economic growth, while most developing countries faced difficulties in maintaining stable democratic governments and strong institutional quality. The poor governance issue might be the cause of poor economic growth in the concerned developing countries, which were

also examined in this study. However, Figure 1 also confirms that public debt is negatively associated with economic growth in developing countries.

Table 3. Impact of public debt on economic growth.

VARIABLES	Location	Scale	q10	q20	q30	q40	q50	q60	q70	q80	q90
DEBT	−0.265 ***	−0.00584	−0.256 ***	−0.259 ***	−0.262 ***	−0.263 ***	−0.265 ***	−0.266 ***	−0.269 ***	−0.272 ***	−0.275 ***
	−0.0367	−0.022	−0.0484	−0.0406	−0.0376	−0.0366	−0.0366	−0.0377	−0.041	−0.0473	−0.0562
TO	0.840 ***	−0.184 ***	1.143 ***	1.025 ***	0.953 ***	0.901 ***	0.853 ***	0.797 ***	0.720 ***	0.623 ***	0.518 ***
	−0.0623	−0.0373	−0.0825	−0.0694	−0.0641	−0.0621	−0.0622	−0.0643	−0.0704	−0.0807	−0.0948
LF	−0.112 ***	−0.0567 ***	−0.0191	−0.0552 ***	−0.0774 ***	−0.0934 ***	−0.108 ***	−0.126 ***	−0.149 ***	−0.179 ***	−0.212 ***
	−0.0182	−0.0109	−0.0242	−0.0203	−0.0188	−0.0182	−0.0182	−0.0189	−0.0206	−0.0236	−0.0277
FCF	−0.00803 **	0.00252	−0.0122 **	−0.0106 **	−0.00958 **	−0.00887 **	−0.00820 **	−0.00744 *	−0.00638	−0.00506	−0.00361
	−0.00404	−0.00242	−0.00532	−0.00446	−0.00414	−0.00402	−0.00402	−0.00414	−0.0045	−0.0052	−0.00617
Constant	7.650 ***	2.415 ***	3.679 ***	5.214 ***	6.159 ***	6.842 ***	7.481 ***	8.211 ***	9.222 ***	10.49 ***	11.87 ***
	−0.513	−0.307	−0.684	−0.577	−0.532	−0.511	−0.513	−0.535	−0.588	−0.669	−0.776
Observations	1241	1241	1241	1241	1241	1241	1241	1241	1241	1241	1241

Note: ***, ** & * indicate 1%, 5%, & 10% the significance level; Observations: The 44 developing countries.
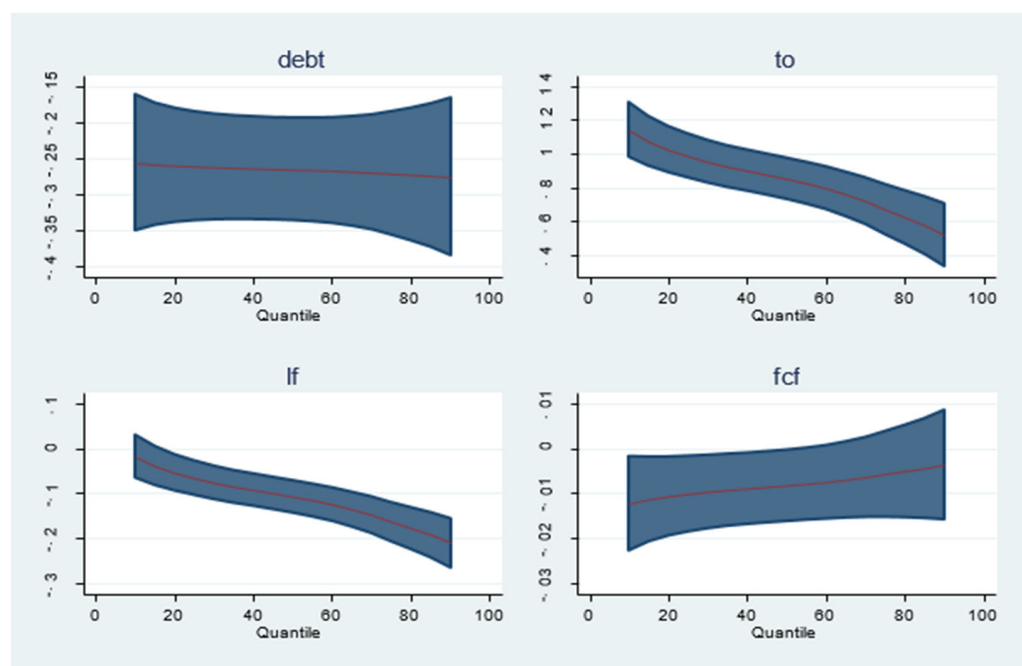

Figure 1. The Impact of public debt on growth under different quantiles.

Table 3 also shows that the coefficients of trade openness (TO) were positive and significant at a 1% significance level under all quantiles. Developing countries might export more than they import, following a free-market economy that promotes the economy Darku & Yeboah [59]. Additionally, the parameter of labor force (LF) was found to be negative and significant under all quantiles by the 1% significance level, except the lowermost quantile, which was negative but insignificant. Implying that the increase in the labor force is unfavorable for economic growth was acute in the lower quantiles to upper quantiles. As for the gross fixed capital formation (FCF), the magnitudes of the coefficients were negative and significant from the lower quantiles to upper-middle quantiles up to a 10% significance level, and the top quantiles were also negative but insignificant. The findings imply that domestic investment barely produces economic growth for developing countries. The results of our study are in harmony with the findings of Topcu et al. [60]. Furthermore, the figure demonstrates the graphical results of the TO, LF, and FCF, which were also in line with the estimations in Table 3.

Table 4 demonstrates the direct impact on economic growth in different quantiles. The estimations take the form $Q_{LGDPC}(\tau|DEBT, TO, LF, FCF, QOG) = \alpha + X'(DEBT, TO, LF, FCF, QOG)\beta + \sigma(\delta + Z'\gamma)q(\tau)$. The magnitudes of the coefficients show that governance has positive and significant impacts on economic growth under different economic circumstances at the 1% significance level. However, the lowermost

quantile and two upper quantiles were positive and significant up to the 10% significance level. The results imply that governance has high growth-enhancing effects in all quantiles. Although the results were higher in the medium quantiles, the significance levels gradually decreased from the medium quantiles to the upper quantiles. The findings indicate that developing countries need to focus extensively on governance to generate continuous economic growth. The number of previous studies is in line with the findings by Azam [16] and Awuzie & Monyane [61]. However, the results of the two upper quantiles show that too strict rules and regulations of governance sometimes slow down economic growth. Figure 2 shows that the impacts of governance on economic growth were positive and consistent in all quantiles. The figure also shows that while debt, labor force, and fixed capital formation were all negative, trade openness was positive.

Table 4. Impact of governance on growth under different quantiles.

VARIABLES	Location	Scale	q10	q20	q30	q40	q50	q60	q70	q80	q90
DEBT	−0.210 ***	−0.0575 ***	−0.114 **	−0.154 ***	−0.175 ***	−0.192 ***	−0.204 ***	−0.222 ***	−0.249 ***	−0.280 ***	−0.312 ***
	−0.0364	−0.0222	−0.0465	−0.0387	−0.0363	−0.0357	−0.036	−0.0378	−0.0424	−0.0494	−0.0587
TO	0.980 ***	−0.226 ***	1.357 ***	1.202 ***	1.120 ***	1.051 ***	1.006 ***	0.933 ***	0.827 ***	0.708 ***	0.580 ***
	−0.0614	−0.0373	−0.079	−0.0666	−0.0613	−0.0599	−0.0606	−0.0645	−0.073	−0.0838	−0.0981
LF	−0.103 ***	−0.0529 ***	−0.0147	−0.0511 ***	−0.0704 ***	−0.0865 ***	−0.0972 ***	−0.114 ***	−0.139 ***	−0.167 ***	−0.197 ***
	−0.0184	−0.0112	−0.0236	−0.0198	−0.0184	−0.018	−0.0182	−0.0192	−0.0217	−0.0251	−0.0295
FCF	−0.0141 ***	0.00348	−0.0200 ***	−0.0176 ***	−0.0163 ***	−0.0152 ***	−0.0145 ***	−0.0134 ***	−0.0118 **	−0.00996 *	−0.00797
	−0.00418	−0.00254	−0.00533	−0.00443	−0.00416	−0.00409	−0.00413	−0.00432	−0.00484	−0.00566	−0.00674
QoG	0.493 ***	−0.00678	0.504 **	0.499 ***	0.497 ***	0.495 ***	0.493 ***	0.491 ***	0.488 ***	0.484 **	0.481 *
	−0.158	−0.0958	−0.201	−0.167	−0.157	−0.156	−0.156	−0.163	−0.182	−0.213	−0.254
Constant	6.611 ***	2.674 ***	2.138 ***	3.977 ***	4.955 ***	5.769 ***	6.311 ***	7.172 ***	8.433 ***	9.832 ***	11.36 ***
	−0.503	−0.306	−0.655	−0.559	−0.505	−0.49	−0.497	−0.538	−0.613	−0.693	−0.8
Observations	1091	1091	1091	1091	1091	1091	1091	1091	1091	1091	1091

Note: ***, ** & * indicate 1%, 5%, & 10% significance level, Observations: The 44 developing countries.
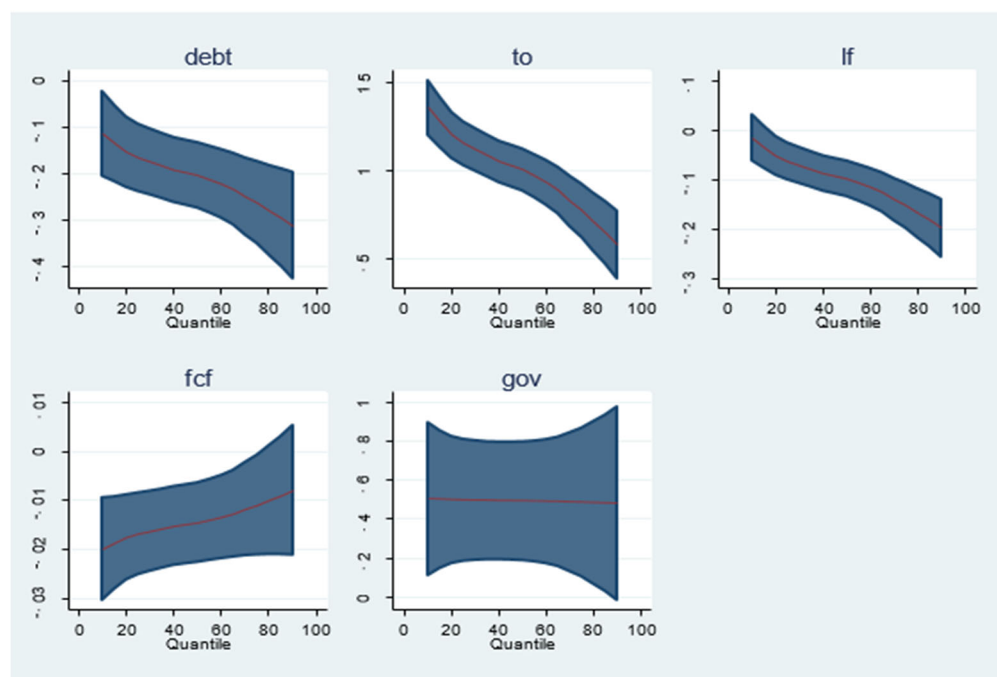

Figure 2. The impact of governance on growth under different quantiles.

Table 5 depicts the moderating role of governance on the nexus between public debt and economic growth in different economic circumstances. The estimations take the form $Q_{LGDPC}(\tau|DEBT, TO, LF, FCF, GOV, BD * GOV) = \alpha + X'(DEBT, TO, LF, FCF, GOV, DEBT * GOV)\beta + \sigma(\delta + Z'\gamma)q(\tau)$. The results demonstrated that the magnitudes of the coefficients were highly significant from the lower-middle quantiles to the top most quantiles. Although the impacts of governance were slow in the first two quantiles, the impacts were higher from the lower medium quantiles to the upper quantiles at the 1% significance level. The results imply that the nexus between public debt and economic growth works perfectly well when governance moderates the relationship. Therefore, developing countries must

focus on governance and keep improving their quality of governance to bring the best outcomes from public debt to economic growth. The results are coherent with the previous studies by Al Mamun et al. [12] and Erum & Hussain [62]. According to studies, strong governance aids in implementing government policies including economic growth plans through the utilization of public debt. Figure 3 demonstrates that the impacts of governance on the relationship between public debt and economic growth are highly positive and significant from the lower to upper quantiles.

Table 5. The moderating role governance on the nexus between public debt and growth.

VARIABLES	Location	Scale	q10	q20	q30	q40	q50	q60	q70	q80	q90
DEBT	−0.735 ***	−0.288 ***	−0.243	−0.445 ***	−0.566 ***	−0.643 ***	−0.710 ***	−0.807 ***	−0.933 ***	−1.075 ***	−1.222 ***
	−0.125	−0.0755	−0.168	−0.139	−0.127	−0.124	−0.125	−0.13	−0.143	−0.163	−0.19
TO	0.918 ***	−0.279 ***	1.395 ***	1.199 ***	1.082 ***	1.007 ***	0.943 ***	0.848 ***	0.726 ***	0.589 ***	0.446 ***
	−0.0634	−0.0382	−0.0853	−0.0722	−0.0647	−0.0625	−0.0632	−0.0669	−0.0739	−0.0831	−0.0959
LF	−0.118 ***	−0.0659 ***	−0.00582	−0.0521 **	−0.0797 ***	−0.0973 ***	−0.113 ***	−0.135 ***	−0.164 ***	−0.196 ***	−0.230 ***
	−0.0188	−0.0114	−0.0253	−0.0212	−0.0192	−0.0186	−0.0188	−0.0197	−0.0217	−0.0246	−0.0285
FCF	−0.0130 ***	0.00425 *	−0.0202 ***	−0.0172 ***	−0.0154 ***	−0.0143 ***	−0.0133 ***	−0.0119 ***	−0.0100 **	−0.00794	−0.00577
	−0.00416	−0.00251	−0.00556	−0.00458	−0.00423	−0.00413	−0.00414	−0.0043	−0.00473	−0.00543	−0.00634
QoG	−2.505 ***	−1.277 ***	−0.326	−1.224	−1.757 **	−2.099 ***	−2.395 ***	−2.826 ***	−3.383 ***	−4.012 ***	−4.666 ***
	−0.694	−0.419	−0.928	−0.767	−0.705	−0.688	−0.691	−0.719	−0.791	−0.906	−1.056
DEBT * QoG	0.809 ***	0.339 ***	0.231	0.469 **	0.611 ***	0.701 ***	0.780 ***	0.894 ***	1.042 ***	1.208 ***	1.382 ***
	−0.181	−0.109	−0.242	−0.2	−0.184	−0.179	−0.18	−0.187	−0.206	−0.236	−0.275
Constant	9.038 ***	3.952 ***	2.294 **	5.071 ***	6.721 ***	7.782 ***	8.696 ***	10.03 ***	11.75 ***	13.70 ***	15.72 ***
	−0.771	−0.465	−1.04	−0.887	−0.788	−0.76	−0.77	−0.819	−0.907	−1.012	−1.165
Observations	1091	1091	1091	1091	1091	1091	1091	1091	1091	1091	1091

Note: ***, ** & * indicate 1%, 5%, & 10% significance level, Observations: The 44 developing countries.
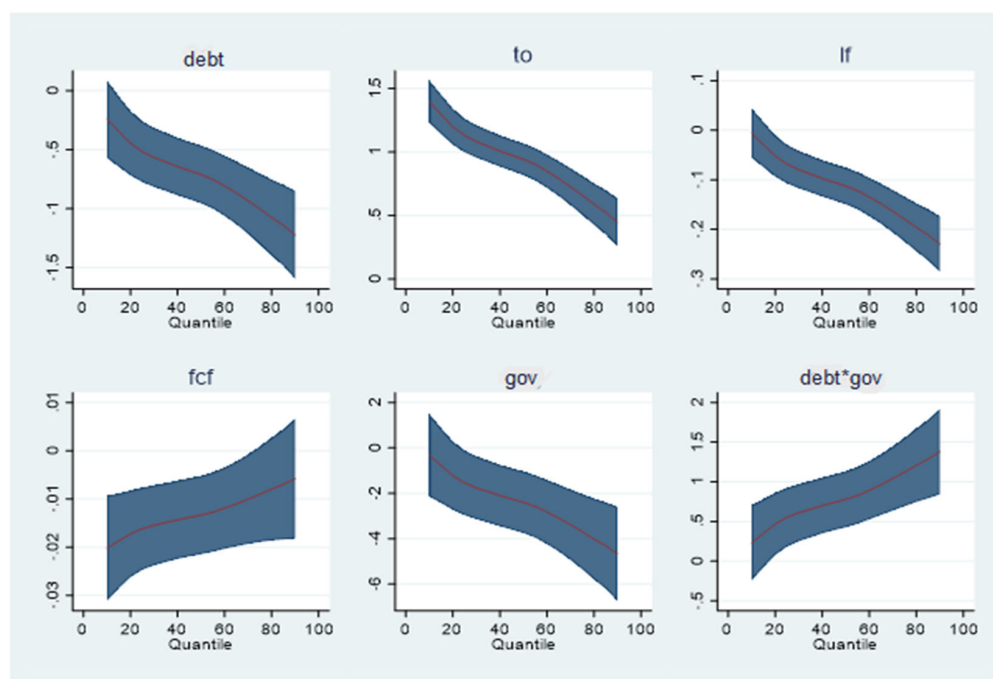

Figure 3. The moderating role of governance on the nexus between public debt and growth under different quantiles.

5. Discussion

Our empirical findings provide significant insights regarding the public debt, governance, and economic growth of developing countries. The findings indicate that public debt barely promotes economic growth in the selected developing countries. The results specify that governance directly encourages economic growth, and in the presence of good governance, public debt highly motivates economic growth in developing countries. Our findings can be explained by the number of theories and seminal studies. The magnitudes of the coefficients of public debt on economic growth were negative and significant, and the negative impacts showed an increasing trend from lower quantiles to upper quantiles; the findings were similar to the notion of the debt over-hang theory. Furthermore, governance directly spurs economic growth throughout the quantiles, which is in line with endogenous growth theory and the

seminal studies of Kraay et al. [63] and Acemoglu & Johnson [64]. In addition, the coefficients of the moderating role of governance on the debt–growth nexus were highly positive and significant, which is parallel to the New Keynesian economic thoughts.

The empirical findings of our study harmonize and antagonizes the existing literature. For example, public debt has negative impacts on the growth of low-income countries [2], and public debt is detrimental to the growth of emerging economies [40], so public debt follows the debt overhang hypothesis and affects the GDP growth for Commonwealth Independent States [6]. In comparison, public debt facilitates capital formation and new investment, and increases jobs and aggregate demand, increasing economic growth during the economic downturn in developing countries [3,5]. Furthermore, the impacts of governance on economic growth were verified as positive in the selected developing countries. Prior studies have similarly found that better governance smooths the production function and supports economic growth in emerging economies [65], and governance improves the growth prospects of developing countries [66,67]. However, too strict governance somewhat demotivates economic growth, as the coefficients of the upper quantiles show. Our findings also imply that governance plays a conditional role in the nexus between public debt and growth, which were highly positive and significant in our setting. The results are coherent with previous studies in developing countries [12,62]. These studies acknowledge that strong governance assists in the best use of the public fund in the context of developing counties, which also further improves the economic growth of those countries. The propositions are in line with a number of existing studies, in other words, good governance upholds government effectiveness, controls corruption, regulatory quality, and the rule of law and supports the utilization of public debt for economic growth in developing countries [21]; stable politics and government effectiveness have boosted the debt–growth relationship in developing Latin American countries [16], and some other studies have also confirmed that good governance motivates the debt–growth nexus in developing countries [43].

6. Conclusions and Policy Implications

Developing countries borrow a considerable public debt to execute the national budget. The impact of public debt is controversial; here, we re-investigated the role of public debt on economic growth, incorporating the part of governance. Our assessments show that public debt is detrimental to economic growth, while governance has growth-enhancing impacts under different economic conditions. However, our analysis showed that strict rules and governance regulations sometimes slow down economic activities. Our investigations also illustrate that good governance is paramount in the nexus between economic growth and public debt and that it promotes sustainable economic growth.

Based on the results, we provide several policy implications. First, the results show that public debt negatively impacts growth sustainability in the context of developing countries. Anecdotal evidence suggests that many economies such as Greece and Sri Lanka suffer in the long run when dealing with public debt. Hence, policymakers should consider the feasibility of public debts, importantly before adopting this tool. Second, governance has growth-enhancing effects; therefore, this group of countries should highly prioritize maintaining a high level of governance. The coefficients of governance, on the other hand, showed a decreasing trend in the upper quantiles. This implies that an overly strong governance mechanism impedes economic growth, which must be carefully adjusted in policymaking. Finally, governance is overall highly positive and significant in the debt–growth relationship. Therefore, developing countries should improve their governance to reap the benefits of public debt for sustainable economic growth.

This study examined the long-term impacts of public debt on economic growth in the context of developing countries from 1990 to 2020. In the meantime, the COVID-19 outbreak has once again fostered public debt, and countries are raising their debt stocks to mitigate the adversity of the economy from the harmful effects of the ongoing pandemic. However, the current study was unable to incorporate the recent data after 2020 due to

data unavailability. Hence, future studies should be focused on this topic, looking at the short- and even long-term implications of the pandemic-era state debt on economic growth in different income levels countries including developing countries. Furthermore, future studies could examine the debt–growth relationship with the individual components of governance in a different setting to provide additional insights.

References

1. Bhat, K.U.; Chen, S.; Chen, Y.; Jebran, K. Debt capacity, debt choice, and underinvestment problem: Evidence from China. *Econ. Res.-Ekon. Istraživanja* **2020**, *33*, 267–287. [CrossRef]
2. Gómez-Puig, M.; Sosvilla-Rivero, S.; Martínez-Zarzoso, I. On the heterogeneous link between public debt and economic growth. *J. Int. Financ. Mark. Inst. Money* **2022**, *77*, 101528. [CrossRef]
3. Petrović, P.; Arsić, M.; Nojković, A. Increasing public investment can be an effective policy in bad times: Evidence from emerging EU economies. *Econ. Model.* **2021**, *94*, 580–597. [CrossRef]
4. Baum, A.; Checherita-Westphal, C.; Rother, P. Debt and growth: New evidence for the euro area. *J. Int. Money Financ.* **2013**, *32*, 809–821. [CrossRef]
5. Mohsin, M.; Ullah, H.; Iqbal, N.; Iqbal, W.; Taghizadeh-Hesary, F. How external debt led to economic growth in South Asia: A policy perspective analysis from quantile regression. *Econ. Anal. Policy* **2021**, *72*, 423–437. [CrossRef]
6. Yasar, N. The Causal Relationship Between Foreign Debt and Economic Growth: Evidence from Commonwealth Independent States. *Foreign Trade Rev.* **2021**, *56*, 415–429. [CrossRef]
7. Asteriou, D.; Pilbeam, K.; Pratiwi, C.E. Public debt and economic growth: Panel data evidence for Asian countries. *J. Econ. Financ.* **2021**, *45*, 270–287. [CrossRef]
8. Shittu, W.O.; Hassan, S.; Nawaz, M.A. The nexus between external debt, corruption and economic growth: Evidence from five SSA countries. *Afr. J. Econ. Manag. Stud.* **2018**, *9*, 319–334. [CrossRef]
9. Pjanić, M.; Milenković, N.; Andrašić, J.; Kalaš, B.; Mirović, V. Public debt's predictors in EU: Evidence from members and non-members of European Monetary Union. *Econ. Res.-Ekon. Istraživanja* **2020**, *33*, 3562–3579. [CrossRef]
10. Law, S.H.; Ng, C.H.; Kutan, A.M.; Law, Z.K. Public debt and economic growth in developing countries: Non-linearity and threshold analysis. *Econ. Model.* **2021**, *98*, 26–40. [CrossRef]
11. Wang, M.L.; Ntim, V.S.; Yang, J.; Zheng, Q.; Geng, L. Effect of institutional quality and foreign direct investment on economic growth and environmental quality: Evidence from African countries. *Econ. Res.-Ekon. Istraživanja* **2022**, *35*, 4065–4091. [CrossRef]
12. Al Mamun, M.; Sohag, K.; Hassan, M.K. Governance, resources and growth. *Econ. Model.* **2017**, *63*, 238–261. [CrossRef]
13. Fraj, S.H.; Hamdaoui, M.; Maktouf, S. Governance and economic growth: The role of the exchange rate regime. *Int. Econ.* **2018**, *156*, 326–364. [CrossRef]
14. Knack, S.; Keefer, P. Institutions and economic performance: Cross-country tests using alternative institutional measures. *Econ. Politics* **1995**, *7*, 207–227. [CrossRef]
15. Nguyen, C.V.; Giang, L.T.; Tran, A.N.; Do, H.T. Do good governance and public administration improve economic growth and poverty reduction? The case of Vietnam. *Int. Public Manag. J.* **2021**, *24*, 131–161. [CrossRef]
16. Azam, M. Governance and economic growth: Evidence from 14 Latin America and Caribbean countries. *J. Knowl. Econ.* **2022**, *13*, 1470–1495. [CrossRef]
17. Sarpong, S.Y.; Bein, M.A. Effects of good governance, sustainable development and aid on quality of life: Evidence from sub-saharan Africa. *Afr. Dev. Rev.* **2021**, *33*, 25–37. [CrossRef]
18. Mauro, P. Corruption and growth. *Q. J. Econ.* **1995**, *110*, 681–712. [CrossRef]
19. Cooray, A.; Dzhumashev, R.; Schneider, F. How does corruption affect public debt? An empirical analysis. *World Dev.* **2017**, *90*, 115–127. [CrossRef]
20. Kaufmann, D.; Kraay, A.; Mastruzzi, M. The worldwide governance indicators: Methodology and analytical issues. *Hague J. Rule Law* **2011**, *3*, 220–246. [CrossRef]
21. Nguyen, T.A.N.; Luong, T.T.H. Fiscal Policy, Institutional Quality, and Public Debt: Evidence from Transition Countries. *Sustainability* **2021**, *13*, 10706. [CrossRef]
22. Butkus, M.; Seputiene, J. Growth effect of public debt: The role of government effectiveness and trade balance. *Economies* **2018**, *6*, 62. [CrossRef]

23. Machado, J.A.; Silva, J.S. Quantiles via moments. *J. Econom.* **2019**, *213*, 145–173. [CrossRef]

24. Tempelman, J.H.; James, M. Buchanan on public-debt finance. *Indep. Rev.* **2007**, *11*, 435–449.

25. Aspromourgos, T. Keynes, public debt, and the complex of interest rates. *J. Hist. Econ. Thought* **2018**, *40*, 493–512. [CrossRef]

26. Castelnuovo, E.; Lim, G.; Pellegrino, G. Macroeconomic Policies in a Low Interest Rate Environment: Back to Keynes? *Aust. Econ. Rev.* **2018**, *51*, 70–86. [CrossRef]

27. Tsoulfidis, L. Classical economists and public debt. *Int. Rev. Econ.* **2007**, *54*, 1–12. [CrossRef]

28. Barreyre, N.; Delalande, N. *A World of Public Debts. A Political History*; Springer: Berlin/Heidelberg, Germany; Cham, Switzerland, 2020.

29. Greenwald, B.C.; Stiglitz, J.E. Keynesian, new Keynesian, and new classical economics. *Oxf. Econ. Pap.* **1987**, *39*, 119–133. [CrossRef]

30. Shahor, T. The impact of public debt on economic growth in the Israeli economy. *Isr. Aff.* **2018**, *24*, 254–264. [CrossRef]

31. Ndoricimpa, A. Threshold effects of public debt on economic growth in Africa: A new evidence. *J. Econ. Dev.* **2020**, *22*, 187–207. [CrossRef]

32. Sharaf, M.F. The asymmetric and threshold impact of external debt on economic growth: New evidence from Egypt. *J. Bus. Socio-Econ. Dev.* **2021**, *2*, 1–18. [CrossRef]

33. Yusuf, A.; Mohd, S. The impact of government debt on economic growth in Nigeria. *Cogent Econ. Financ.* **2021**, *9*, 1946249. [CrossRef]

34. Saungweme, T.; Odhiambo, N.M. Government debt, government debt service and economic growth nexus in Zambia: A multivariate analysis. *Cogent Econ. Financ.* **2019**, *7*, 1622998. [CrossRef]

35. Eberhardt, M.; Presbitero, A.F. Public debt and growth: Heterogeneity and non-linearity. *J. Int. Econ.* **2015**, *97*, 45–58. [CrossRef]

36. Hilton, S.K. Public debt and economic growth: Contemporary evidence from a developing economy. *Asian J. Econ. Bank.* **2021**, *5*, 173–193. [CrossRef]

37. Abbas, Q.; Junqing, L.; Ramzan, M.; Fatima, S. Role of governance in debt-growth relationship: Evidence from panel data estimations. *Sustainability* **2021**, *13*, 5954. [CrossRef]

38. Hammudeh, S.; Sohag, K.; Husain, S.; Husain, H.; Said, J. Non-linear relationship between economic growth and nuances of globalisation with income stratification: Roles of financial development and governance. *Econ. Syst.* **2020**, *44*, 100761. [CrossRef]

39. Dey, S.R.; Tareque, M. External debt and growth: Role of stable macroeconomic policies. *J. Econ. Financ. Adm. Sci.* **2020**, *25*, 185–204. [CrossRef]

40. Kharusi, S.A.; Ada, M.S. External debt and economic growth: The case of emerging economy. *J. Econ. Integr.* **2018**, *33*, 1141–1157. [CrossRef]

41. Eggertsson, G.B.; Krugman, P. Debt, deleveraging, and the liquidity trap: A Fisher-Minsky-Koo approach. *Q. J. Econ.* **2012**, *127*, 1469–1513. [CrossRef]

42. Égert, B. The 90% public debt threshold: The rise and fall of a stylised fact. *Appl. Econ.* **2015**, *47*, 3756–3770. [CrossRef]

43. Kranke, M. Tomorrow's Debt, Today's Duty: Debt Sustainability as Anticipatory Global Governance. *Glob. Soc.* **2022**, *36*, 223–239. [CrossRef]

44. Briceño, H.R.; Perote, J. Determinants of the public debt in the Eurozone and its sustainability amid the Covid-19 pandemic. *Sustainability* **2020**, *12*, 6456. [CrossRef]

45. Appiah Kubi, S.N.K.; Malec, K.; Phiri, J.; Krivko, M.; Maitah, K.; Maitah, M.; Smutka, L. Key Drivers of Public Debt Levels: Empirical Evidence from Africa. *Sustainability* **2022**, *14*, 1220. [CrossRef]

46. Dorobantu, S.; Müllner, J. Debt-side governance and the geography of project finance syndicates. *J. Corp. Financ.* **2019**, *57*, 161–179. [CrossRef]

47. Canay, I.A. A simple approach to quantile regression for panel data. *Econom. J.* **2011**, *14*, 368–386. [CrossRef]

48. Koenker, R. Quantile regression for longitudinal data. *J. Multivar. Anal.* **2004**, *91*, 74–89. [CrossRef]

49. Awan, A.; Abbasi, K.R.; Rej, S.; Bandyopadhyay, A.; Lv, K. The impact of renewable energy, internet use and foreign direct investment on carbon dioxide emissions: A method of moments quantile analysis. *Renew. Energy* **2022**, *189*, 454–466. [CrossRef]

50. Buchinsky, M. Changes in the US wage structure 1963–1987: Application of quantile regression. *Econom. J. Econom. Soc.* **1994**, *62*, 405–458.

51. Chamberlain, G. Quantile regression, censoring, and the structure of wages. In *Advances in Econometrics: Sixth World Congress*; Cambridge University Press: Cambridge, UK, 1994; Volume 2, pp. 171–209.

52. Koenker, R.; Hallock, K.F. Quantile regression. *J. Econ. Perspect.* **2001**, *15*, 143–156. [CrossRef]

53. Cade, B.S.; Noon, B.R. A gentle introduction to quantile regression for ecologists. *Front. Ecol. Environ.* **2003**, *1*, 412–420. [CrossRef]

54. Bassett, G.W.; Koenker, R. A quantile regression memoir. In *Handbook of Quantile Regression*; Chapman and Hall/CRC: Boca Raton, FL, USA, 2017; pp. 3–5.

55. He, J. A new approach to non-linear partial differential equations. *Commun. Nonlinear Sci. Numer. Simul.* **1997**, *2*, 230–235. [CrossRef]

56. Chernozhukov, V.; Rigobon, R.; Stoker, T.M. Set identification and sensitivity analysis with Tobin regressors. *Quant. Econ.* **2010**, *1*, 255–277. [CrossRef]

57. Nuru, N.Y.; Gereziher, H.Y. The effect of fiscal policy on economic growth in South Africa: A non-linear ARDL model analysis. *J. Econ. Adm. Sci.* **2021**, *38*, 229–245. [CrossRef]

58. Temsumrit, N. Democracy, institutional quality and fiscal policy cycle: Evidence from developing countries. *Appl. Econ.* **2022**, *54*, 75–98. [CrossRef]

59. Darku, A.B.; Yeboah, R. Economic openness and income growth in developing countries: A regional comparative analysis. *Appl. Econ.* **2018**, *50*, 855–869. [CrossRef]

60. Topcu, E.; Altinoz, B.; Aslan, A. Global evidence from the link between economic growth, natural resources, energy consumption, and gross capital formation. *Resour. Policy* **2020**, *66*, 101622. [CrossRef]

61. Awuzie, B.; Monyane, T.G. Conceptualising sustainability governance implementation for infrastructure delivery systems in developing countries: Success factors. *Sustainability* **2020**, *12*, 961. [CrossRef]

62. Erum, N.; Hussain, S. Corruption, natural resources and economic growth: Evidence from OIC countries. *Resour. Policy* **2019**, *63*, 101429. [CrossRef]

63. Kaufmann, D.; Kraay, A.; Zoido-Lobatón, P. *Aggregating Governance Indicators*; World Bank publications: Washington, DC, USA, 1999; Volume 2195.

64. Acemoglu, D.; Johnson, S. Institutions, corporate governance. *Corp. Gov. Cap. Flows A Glob. Econ.* **2003**, *1*, 32.

65. Islam, M.R.; McGillivray, M. Wealth inequality, governance and economic growth. *Econ. Model.* **2020**, *88*, 1–13. [CrossRef]

66. Abdelbary, I.; Benhin, J. Governance, capital and economic growth in the Arab Region. *Q. Rev. Econ. Financ.* **2019**, *73*, 184–191. [CrossRef]

67. Bekana, D.M. Innovation and economic growth in sub-Saharan Africa: Why institutions matter? An empirical study aross 37 countries. *Arthaniti J. Econ. Theory Pract.* **2021**, *20*, 161–200. [CrossRef]