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Fiscal Policy, Institutional Quality, and Public Debt: Evidence from Transition Countries

Thi Anh Nhu Nguyen * and Thi Thuy Huong Luong

Faculty of Finance-Banking, Ho Chi Minh City Open University, Ho Chi Minh City 70000, Vietnam; huong.ltth@ou.edu.vn
* Correspondence: nhu.nta@ou.edu.vn

Abstract: This research makes a significant contribution to the literature on the economic implications of fiscal policy and institutional quality by modeling empirically the impact of these factors on public debt in 27 transition countries over the period 2000–2018. Applying Ordinary Least Squares (OLS), Random effects, and two-step GMM methods, the research gives evidence to confirm the background theory that deducing public expenditure and improving government revenue could push government debt lower. The main findings especially demonstrate that institutional quality contributes to making an impact on public debt. Particularly, weak governance in controlling corruption leads to higher accumulation of public debt while financing to improve the institutional quality in relation to government effectiveness, regulatory quality, and rule of law after changes in the regime in those countries increases the size of public debt. The results of this paper convince policymakers of crucial implications of both fiscal policy and institutional quality in managing public debt.

Keywords: fiscal policy; institution quality; public debt; transition economies

1. Introduction

Public debt has expanded greatly across a wide scope of countries. Reducing public debt is one of the major issues and its goal is a vital factor in the development of numerous countries in the future [1]. Reinhart and Rogoff [2] found in their pioneering study that there is a negative effect of public debt on economic growth when the debt level surpasses 90% of GDP. Similarly, subsequent studies have achieved the same outcomes. Due to the 2008 financial crisis, the average of public debt to GDP was about 73% in the European Monetary Union (EMU), and about 71% in the US. Japan experienced the biggest sum of over 170% of GDP [3]. Recently, inequality among and inside countries has risen and polarization has deepened. As a result, instability of society, politics and economies has also grown [4].

Prior research examined determining factors of public debt in both separate countries and different groups of countries. Some researchers focused on analyzing the predictors of public debt in OECD members [4,5]. Other researchers, however, explored public debt in separate countries only [6]. Another group of researchers investigated the heterogeneity of public debt in developing countries [7]. Researchers also studied the relationship between public debt and economic growth [8]. Lately, Heinemann et al. [9] considered taxes and fiscal adjustment in public debt. To the best of our knowledge, there has been no study on public debt in transition countries thus far.

Recently, there has been a consensus that good governance is considered a major factor in tackling public debt. Specifically, good governance can reduce borrowing cost, manage financial risk and enhance the development of domestic debt market. In addition, good governance can preserve financial stability and improve domestic financial systems. Many empirical studies conducted in the developing world indicate that both the size of public debt and institutional quality are determinants of the relationship between public debt and economic growth. According to Dessy and Vencatchellum [10], a certain level
of institutional quality is required to attract investment, promote economic growth, and gain benefits of the policy of debt cancellation. Furthermore, studies carried out in Middle East and North Africa countries show that good governance can decrease public debt accumulation [11]. While Depken and Lafountain [12] indicates that there is a negative impact of poor governance on economic growth, the correlation between institutional quality and public debt has become an interesting topic recently and more studies should be made to extend the literature on this correlation.

In order to fill this gap, this research aims to examine the determinants of public debt in 27 transition countries based on both theoretical foundation and empirical approaches. Besides indicators considered in previous studies, this paper also concentrates on a much larger number of potential predictors of public debt in the analysis which have not been mentioned in previous studies. Accordingly, the study contributes a wider understanding of public debt to the literature on this topic. We firstly explore the determinants of public debt in transition countries. Secondly, this research confirms the background theory that the fiscal factor including government revenue and expenditure impact on public debt. Finally, we introduce and highlight the role of institutional quality comprising voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption in managing public debt in transition countries.

The next section of this research is an overview of prior studies. This section is followed by the methodology section. The results are presented in the next section. Discussion is then described. The final section is conclusion with the implications, limitations and directions of possible further research into this topic.

2. Literature Review and Hypotheses Development

2.1. Government Revenue–Expenditure and the Size of Public Debt

In the first part of the literature review, the authors shed light on the correlation between government revenue-spending and public debt based on both theoretical background and empirical research.

Looking back at the original viewpoint of macroeconomics, Keynesian followers advocated that the fiscal policy of a nation can be controlled by government income and expenditure. The steady state of budget would be defined when the spending of government eliminates its revenue. Specifically, this is shown in the following equation:

\[ B_t = G_t - T_t \]

where \( B_t \) is the balanced budget in the period \( t \), \( G_t \) denotes aggregate nation expenditure and \( T_t \) stands for the total revenue of government at time \( t \) which is also considered tax income. A budget surplus would occur when tax revenue is greater than government spending (\( B_t < 0 \)) and vice versa. The government budget meets a deficit if expenses exceed revenue (\( B_t > 0 \)). Along with the budget deficit, government debt is introduced:

\[ D_t = (1 + r)D_{t-1} + G_t - T_t \]

The connection of tax revenue with government spending and public debt in this equation which can be expressed in terms of the government debt at time \( t \) is the difference between expenditure and income plus the deferred debt in the previous periods. Moreover, Romer [13] established public debt in the intertemporal budget constraint of the government: the present value of the endowment which the government allocates to buy goods, services and investment might be less than or equal to the net present value of the government revenue after paying debt liabilities. This could be represented in the equation below:

\[ \int_{t=0}^{\infty} e^{-R(t)} G(t) dt \leq \int_{t=0}^{\infty} e^{-R(t)} T(t) dt - D(0) \]

where \( D(0) \) is the initial real liabilities outstanding; \( e^{-R(t)} \) is a discount factor corresponding with the interest rate \( R(t) \).

The Equation (2) is rearranged as follows:
The meaning of the budget constraint in Equation (4) is that the government needs to maintain the surplus of revenue and spend enough to compensate for the present value of government debt.

Furthermore, the budget deficit is defined by the percentage of volatility in the stock of public debt at time $t$ and it is measured by the exception of expenditure in the income of government plus the real interest on debt:

$$D(t) = (G(t) - T(t)) + r(t)D(t)$$

(5)

Not only be found in these theoretical concepts, the linkage between tax revenue, government spending and public debt has also been demonstrated in the literature research. In the beginning, evidence was found mostly in the US. Barro [14] based on the equivalent theorem of Ricardian to conclude that issuing the new public debt is the response to raising spending of government. Supporting [14] tax smoothing framework, Huang and Lin [15] explored that lower amount of government debt brings advantages to the nation’s budget to boost future output and spending of government.

Later on, there are a range of studies on debt, revenue and spending of government executed in some selected economies which have high level of government debt. A large cohort of studies carried out in Nigeria pointed out the empirical evidence for similar direction in the bond between debt, expense and income in public sector. Oladokun [16] particularly used Granger causality test to highlight the main reasons for internal debts in Nigeria from 1981 to 2012 which roots government expenditure. In line with this concept, the same results were also obtained in Greece [17], Jordan [18] and European countries [19]. These studies again clarify the crucial role of government income and expenditure in expanding the size of public debt.

As mentioned above, the topic public debt, revenue and spending have been attracting the interest of researchers but there has been a lack of publication papers working on groups of countries especially transition economies. Based on the research theories and empirical findings from previous scholars [13,17,18], the hypotheses in this paper are as follows:

**Hypothesis 1.** Government revenue has a negative effect on public debt in transition economies.

**Hypothesis 2.** Public expenditure positively impacts public debt in transition economies.

### 2.2. Institutional Quality and Public Debt

We now turn to review the institutional quality aspect which is considered the root of a nation’s budget deficits by approaching theoretical and empirical studies. Roubini and Sachs [20] is a preliminary investigation based on the new political economy theory foundation which confirmed that the performances of institutions could serve an essential part in the scarcity of government’s statement. They argued that in, every country, politically, there is no existence of exclusive politicians. The set of policies was formulated and implemented by the board of governors. Therefore, the weak governance in public areas which is accompanied by the benefits of the conflict between groups of policymakers would tend to lead to public debt accumulation. Furthermore, the tenure problem in public departments is also important because the current liabilities are mainly from debts to the deferred finance spending campaigns of predecessors.

The general formula which expresses how institutional quality influences public debt accumulation was rewritten by Romer [13] as Equation (6). These points of view provided initial proofs for the negative relationship between the quality of institutions and public debt, which was also founded by [21]. Hence, the coefficient $b$ in Equation (6) should be less than zero.

$$D_{it} = a + b \text{WEAK}_{it} + c X_{it} + e_{it}$$

(6)
where: $D_{t,I}$ denotes the level of budget deficit in time $t$ of nation $I$, which is represented by the percentage of the debt account in GDP; $WEAK_{t,I}$ implies the observed countries’ quality government variables and $X_{t,I}$ is a set of other affected elements.

The institutional quality applied to measure countries’ government quality is constituted by six indicators which include Voice and Accountability (VA); Political Stability (PS); Government Effectiveness (GE); Regulatory Quality (RQ); Rule of Law (RL); Control of Corruption (CC).

Regarding the effects of Voice and Accountability on public debt, there are two opposing views under debate. The democratic features of voice and accountability increase the transparency in governance, and this could control corruption and reduce the size of public debt [22]. Consistently, Imaginário and Guedes [23] also revealed this negative direction with the size of government debt in the sample of 164 countries from 2002 to 2015. Hence, strong voice and accountability would lead to a decrease in government debt. Furthermore, this study highlighted voice and accountability negatively, impacts on public debt in countries belonging to the low-income group. No significant effects are found in high-income countries. On the other hand, Briceño and Perote [24] argued that the government budget for maintaining a democratic society and allocating community welfare increases government debt. Additionally, Tarek and Ahmed [11] stated that a country which has democratic constrains must manage public debts based on an approved expenditure plan in an efficient way compared to other regimes. Consequently, voice and accountability increase the level of credit and possibility to access loans with an advantage interest rate, which creates an encouragement for higher public debt. According to both of the views mentioned, our hypothesis is proposed:

**Hypothesis 3.** The voice and accountability indicator is directly related to public debt in transition economies.

Similarly, a range of studies concerned the relation between Political Stability and public debt and the results are not a consensus. The negative connection was established in most research [11,21,23,25,26]. However, with regard to the expansion of public debt, La Porta et al. [27] indicated that the viewpoint of positive connection is also attractive because higher expenditure contributes to a more stable government. Furthermore, investigations confirmed that characteristics of government groups navigated the effect of political stability on public debt. In particular, the study of Briceño and Perote [24] examined whether public debt in Eurozone was related to institutional quality and stated that political stability does not have a significant bond with the size of public debt since countries in Europe must hardly face political violence. Additionally, Imaginário and Guedes [23] pointed out that, while there is a negative relationship between political stability and public debt in low-income countries, no correlation is found in the high-income group. Overall, we would expect there to be a relationship between political stability and public debt.

**Hypothesis 4.** Political stability is directly related to public debt in transition economies.

Government Effectiveness (GE) reflects the cognition of the quality of services in the public area, examines its dependence on the pressure correlated with political motivation, and measures the quality of public policies and the reliability of the government’s engagement in such policies [28]. Conceptually, Sanchez et al. [29] judged that the government effectiveness index captured distinctive elements regarding the performance of public administration systems, institutions and legislations, the development of the economy, and the level of citizens’ income per year. Additionally, La Porta et al. [27] discussed that the size of government positively influences its performance, but a wider size of government needs more expenditure to maintain and manage itself, thus leading to a higher level of government debt. Likewise, when analyzing data set of 164 countries over 2002–2015,
Imaginário and Guedes [23] demonstrated that a higher level of government effectiveness results in higher public debt. As a consequence, we propose a hypothesis as follows:

**Hypothesis 5.** Government effectiveness is positively related to public debt in transition economies.

Regulatory Quality (RQ) approaches the capability of government in building up and applying the effective regulations and policies in the public sector in order to encourage the development of the nonpublic sector which includes investment from domestic and global sources [28]. Tarek and Ahmed [11] stated that better quality of regulations could achieve more goods production in the public area and boost the advancement of private sector. Moreover, Friedman et al. [30] indicate that if existing illegal activities occur despite the regulations in society, the size of the shadow economy would expand. However, Tarek and Ahmed [26] argued that there is a positive influence of regulatory quality on government debt. They explained the positive influence of regulatory quality on government debt based on the expenditure for the government system. Accordingly, our hypothesis is as follows:

**Hypothesis 6.** Regulatory quality is positively related to public debt in transition economies.

Rule of Law (RL) regards the level of trust and compliance with laws of individuals. Particularly, this indicator deals with the effectiveness of contract enforcement, the rights of wealth, the departments related to the police and the courts in the public domain, and the probability of criminality and violence [28]. Based on these characteristics, rule of law is an essential piece of governance. Méon and Sekkat [31] believed the weak quality of laws causes ineffective government and legal disputes that tend to raise the negative impacts of bureaucracy on investment activities. According to Briceño and Perote [24], when higher institutional quality is presented by good Rule of Law, government abides by public finance policies strictly. As a result, the level of government debt would reduce. However, this negative nexus faces the uncertainty because of the expense of compliance. The authors explained that in, several special cases, the connection is positive. Furthermore, Imaginário and Guedes [23] indicated the positive correlation between Rule of Law and public debt in 25 low-income economies. As clarified by Weingast [25], poor countries have been spending more budget to rebuild governance, especially the law system, to reach a better society without violence and disorder compared to developed countries. Thus, in the context of transition economies, we also expected a hypothesis as follows:

**Hypothesis 7.** Rule of Law positively impacts public debt in transition economies.

Control of Corruption (CC) reflects the level of cognition to which the power of government is used for non-public profit represented by behavior correlated to bureaucracy and planned corruption cases including government activities executed by the private sector which its own interests [28]. In general, the influences of corruption in some aspects of economy meet two opposite viewpoints. “Sand on wheels” followers convinced that the existence of corruption contributes to reducing economic growth [32] through financing for military, interfering in private investment [33], reducing tax revenue and raising public spending [28,34], boosting tax evasion [35]. Conversely, “Grease on wheels” supporters supposed that corruption with the “speed money” function could smooth public procedures and encourage global investment [36] and promote the growth of the economy [37]. Particularly, the interaction of corruption and public debt also exerts different outcomes. Looking at the negative side, the weak control of corruption is considered the main reason for loosening of the government budget, raising ineffective government expenditure and public debt [24]. Hence, this study poses a hypothesis as follows:

**Hypothesis 8.** Control of Corruption negatively affects public debt in transition economies.
3. Methodology

3.1. Empirical Research Models

This paper aims at finding the influences of government revenue, public expenditure and institutional quality on the size of public debt in transition countries. Based on the theoretical background and Equations (5) and (6) of Romer [13] introduced in the literature review section, we first build up two specified empirical models which represent the government income–expenditure policies in Model 1. Then, we add institutional quality to Model 2 which examines the aggregate effects of total government revenue, public spending and institutional quality on public debt accumulation, in particular in transition countries. Model 1 and Model 2 could be presented as follows:

Model 1: \[ \text{Public Debt}_{1,t} = \alpha_0^1 + \beta_1^1 \text{GR}_{1,t} + \beta_2^1 \text{PE}_{1,t} + \beta_3^1 \text{IF}_{1,t} + \beta_4^1 \text{UEPT}_{1,t} + \epsilon_{1,t} \] (7)

Model 2: \[ \text{Public Debt}_{2,t} = \alpha_0^2 + \beta_1^2 \text{GR}_{2,t} + \beta_2^2 \text{PE}_{2,t} + \beta_3^2 \text{IF}_{2,t} + \beta_4^2 \text{UEPT}_{2,t} + \beta_5^2 \text{VA}_{2,t} + \beta_6^2 \text{PS}_{2,t} + \beta_7^2 \text{GE}_{2,t} + \beta_8^2 \text{RQ}_{2,t} + \beta_9^2 \text{RL}_{2,t} + \beta_{10}^2 \text{CC}_{2,t} + \epsilon_{2,t} \] (8)

where: the dependent variable of both Model 1 and Model 2 is Public debt (PD), which is evaluated by the percentage of GDP. The main explanatory variables of Model 1 consist of Government Revenue (GR) and Public Expenditure (PE) which are the component elements of fiscal policy in macroeconomic theory. Inflation (IF) and Unemployment (UEPT) are also added to the models as control variables. Model 2 includes both fiscal policy and institutional quality factors. Particularly, institutional quality is comprised of six indicators: Voice and Accountability (VA), Political Stability and Absence of Violence (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and Control of Corruption (CC); \( \epsilon_{1,t} \) and \( \epsilon_{2,t} \) are the error term; \( i, t \) indicates the country \( i \) at year \( t \).

There are several distinctive methods adopted in this study. Pooled-OLS was the first method applied in Model 1 and Model 2 to find whether or not explanatory variables impact the size of public debt. However, the Pooled-OLS model could not examine the unobservable factors existing across countries and the periods of time because each nation has basic differences in history and geographical characteristics, human and capital resources, and policies and government quality. Hence, in order to handle these problems, a fixed effects model and a random effects model are employed. Then, the Hausman test is carried out to define and select a more appropriate model and a random effects model is selected.

Furthermore, to handle endogenous problems occurring in empirical estimation models, this paper uses the Generalized Method of Moments—GMM estimation. With some advantages such as stable and unbiased estimated coefficients, and standard and effective distributions, the GMM model was then improved by Arellano and Bond [38] to fit with dynamic panel estimation. By a using lagged level of endogeneity variables as instrument variables, the GMM method could not only control the endogenous problems and the errors in measurement but also handle observed and unobserved characteristic factors which impact the level of public debt in transition countries. Particularly, this research applies a two-step GMM approach [39] in which the estimated regression set is split up in the first step. Then, high-order GMM estimation is used to regress the factors and the residuals. The two-step GMM model is a more advanced calculation compared to the one-step GMM estimator through minimizing the numbers of equations and parameters.

3.2. Data

In order to analyze the empirical models, this paper uses historical data during the period 2000–2018 in 27 transition countries. The list of selected countries is presented in the Appendix. These countries are grouped according to the classification of the International Monetary Fund and collected due to the availability of data.

The investigated factor in this research is the size of public debt, which is represented by the general government debt data set of the International Monetary Fund (IMF) and
calculated as the percentage of GDP. The main effected factors include fiscal policy and institutional quality factors in which Government Revenue (GR) and Public Expenditure (PE) are measured by the percentage of GDP and collected from UNU-WIDER and World Bank data resources, respectively. Additionally, institutional quality factor is collected from the Worldwide Governance Indicators (WGI—World bank). Six indicators were used to measure institutional quality include Voice and Accountability (VA), Political Stability and Absence of Violence (PS), Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL), and Control of Corruption (CC). All of them are estimated with a range from approximately $-2.5$ (weak) to $2.5$ (strong). Moreover, inflation and unemployment data are summarized by the World bank and considered control factors added to the empirical models.

4. Empirical Analysis and Results

4.1. Descriptive Statistics

The short descriptive statistics and data sources of these variables are shown in Table 1 below. In general, the percentage of public debt in transition countries is about $36.95\%$ GDP. The highest and lowest debt level is $123.03\%$ GDP and $3.22\%$ GDP, respectively. While government revenue in selected transition countries stood at $33.35\%$ GDP, government final consumption expenditure data which represent public expenditure in these countries are about $15.75\%$ GDP. Furthermore, factors which are considered to evaluate institutional quality such as Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law, Control of Corruption have the range value between $-2.124$ (Voice and Accountability) and $1.698$ (Regulatory Quality). The mean value of institutional quality is much lower compared with the strong value of $2.5$ in countries which have experienced a transition period.

| Variable                  | Measure       | Obs. | Mean     | Std. Dev. | Min   | Max   |
|---------------------------|---------------|------|----------|-----------|-------|-------|
| Public Debt               | %GDP          | 513  | 36.951   | 20.874    | 3.220 | 123.303|
| Government Revenue        | %GDP          | 513  | 33.349   | 8.276     | 11.805| 55.082|
| Public Expenditure        | %GDP          | 513  | 15.747   | 4.397     | 3.460 | 25.878|
| Inflation                 | consumer prices (annual %) | 513 | 6.625 | 10.524 | -1.710 | 168.620 |
| Unemployment              | % of total labor force | 513 | 9.685 | 6.148 | 0.999 | 37.250 |
| Voice and Accountability  |               | 513  | -0.179   | 0.980     | -2.124| 1.213 |
| Political Stability       | ranges from $-2.5$ (weak) to $2.5$ (strong) | 513 | 0.013 | 0.715 | -2.021 | 1.303 |
| Government Effectiveness  |               | 513  | -0.026   | 0.677     | -1.230| 1.192 |
| Regulatory Quality        |               | 513  | 0.108    | 0.791     | -2.105| 1.698 |
| Rule of Law               |               | 513  | -0.198   | 0.759     | -1.477| 1.373 |
| Control of Corruption     |               | 513  | -0.317   | 0.686     | -1.415| 1.506 |

Source: authors' calculations.

In order to capture the change of public debt in each country across nearly two decades, the authors plot Figure 1 in detail showing the rate of public debt in 2018 (horizontal axis) and in 2000 (vertical axis). Geographically, according to the World Bank classification, transition countries are grouped into four regions: Central and Eastern European (CEE), The Baltics, Commonwealth of Independent States (CIS), and Asia. These groups are presented in Figure 1 in different colors. The grey diagonal line, which is a slope, shows...
that transition countries that have experienced positive changes in minimizing the level of public debt appear above this line on the left side and vice versa.

![Figure 1. Public debt rate from 2000 to 2018. Source: authors’ calculations.](image)

In general, most transition countries appear on the right at the bottom. This means these countries expanded the size of their public debt in 2018 compared to 2000. Countries in CEE accounted for the majority of this group. Indeed, some countries, for example Croatia and Slovenia, are located very far below the grey diagonal line, which shows a two-fold increase in public debt during this period. Additionally, Asia’s transition nations also faced the problem of increasing public debt. However, they maintained the safe range of around 30–50% GDP. On the other hand, most transition countries in the CIS region which have made positive effort to diminish the size of their public debt such as Kyrgyz Republic and Tajikistan, lie in the top left. Likewise, Slovak Republic’s public debt accumulation nearly remained unchanged over the period when this country stood at the diagonal line in Figure 1. In addition, transition countries in the Baltics kept the low rate of public debt under 40%, especially Estonia with under 10%.

The preliminary connection of public debt with government revenue, public expenditure, and institutional quality could be evaluated by the correlation matrix in Table 2. In general, government revenue has a negative relationship with the size of public debt while the expenditure of government has a positive one. Moreover, some variables representing institutional quality (Voice and Accountability, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption) boost the level of public debt. Only Political Stability and Absence of Violence exert adverse influences.

|      | PD | GR  | PE  | IF  | UEPT | VA  | PS  | GE  | RQ  | RL  | CC  |
|------|----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|
| PD   | 1  |     |     |     |      |     |     |     |     |     |     |
| GR   |-0.201 | 1  |     |     |      |     |     |     |     |     |     |
| PE   | 0.007 | 0.705 | 1  |     |      |     |     |     |     |     |     |
| IF   |-0.193 | -0.044 | -0.079 | 1  |      |     |     |     |     |     |     |
| UEPT | 0.146 | 0.222 | 0.542 | -0.109 | 1  |     |     |     |     |     |     |
| VA   | 0.160 | 0.400 | 0.532 | -0.389 | 0.345 | 1  |     |     |     |     |     |
| PS   | -0.019 | 0.343 | 0.261 | -0.320 | -0.039 | 0.676 | 1  |     |     |     |     |
| GE   | 0.056 | 0.393 | 0.447 | -0.465 | 0.143 | 0.799 | 0.754 | 1  |     |     |     |
| RQ   | 0.066 | 0.309 | 0.418 | -0.473 | 0.227 | 0.900 | 0.706 | 0.900 | 1  |     |     |
| RL   | 0.055 | 0.423 | 0.461 | -0.437 | 0.140 | 0.871 | 0.786 | 0.951 | 0.923 | 1  |     |
| CC   | 0.042 | 0.448 | 0.492 | -0.382 | 0.190 | 0.826 | 0.759 | 0.923 | 0.860 | 0.943 | 1  |

Source: authors’ calculations.
4.2. Econometric Results and Discussion

Table 3 shows the regression results of Model 1 which estimates the impact of fiscal policy on government debt. Particularly, government revenue and spending are the main explanatory variables which represent fiscal policy in Model 1. At the beginning of empirical analyses, the ordinary least square (OLS) regression shown in column 1 indicates that there is a negative statistically significant relationship between government revenue (GR) and public debt (PD), while the nexus of public expenditure (PE) and public debt (PD) is positive. However, the problem of unobservable factors and heterogeneity across countries is not controlled by employing the OLS regression. Therefore, the random effects model, fixed effects model, and the Hausman test are applied again to define a more appropriate model. With a p-value > 0.05, the result in column 2 with the null hypothesis is not rejected so the random effect estimator is preferred. The random effects regression shows a similar result to OLS regression, strengthening the adverse relationship between the income of government (GR) and public debt (PD). Although the random effects model indicates no statistically significant relationship between public expenditure (PE) and public debt (PD), it supports the positive influence of government spending on the size of public debt.

Table 3. The results of Model 1 without the institutional quality factor.

|                | OLS          | Random Effects | Two-Step GMM |
|----------------|--------------|----------------|--------------|
|                | (1)          | (2)            | (3)          |
| **PD**_{t-1}   |              | 0.685 ***      | (0.041)      |
|                | -0.810 ***   | -0.879 ***     | -0.661 ***   |
|                | (0.184)      | (0.166)        | (0.213)      |
| **GR**         | 0.407 ***    | 0.034          | 0.441 ***    |
|                | (0.149)      | (0.165)        | (0.049)      |
| **PE**         | -0.006 **    | -0.004 *       | -0.019 ***   |
|                | (0.003)      | (0.002)        | (0.004)      |
| **IF**         | 0.015 ***    | 0.033 ***      | 0.099 ***    |
|                | (0.004)      | (0.007)        | (0.036)      |
| **UEPT**       | 0.015 ***    | 0.033 ***      | 0.099 ***    |
|                | (0.004)      | (0.007)        | (0.036)      |
| **Obs.**       | 513          | 513            | 459          |
| Hausman Test   |              |                | 0.5946       |
| Arellano–Bond Test for 2nd order (p-value) | 0.543 | Hansen Test for overid (p-value) | 0.13 |
| Hansen Test excluding group (p-value) | 0.08 | Difference test of exogenous | 0.603 |

Standard errors reported in parenthesis. ***, **, *, significant at the 1%, 5%, and 10% levels, respectively. Source: authors’ calculations.

Furthermore, to overcome the endogenous problem in Model 1, the empirical results of two-step GMM estimator in column 3 indicate similar results to OLS estimation. The findings confirm the coefficient of government revenue (GR) and public expenditure (PE) which estimate a negative and positive statistically significant relationship with public debt (PD), respectively. Accordingly, the findings have supported Hypotheses 1 and 2. Consistent with theories introduced by Romer [13] and the finding of previous research by Huang and Lin [15], the findings are found based on empirical research in the US. Likewise, the results of research on debt, revenue and spending of government performed in countries with high level of government debt proposed that an increase in government expenditure leads to an expansion in public debt [11,16,17]. Contrary to government expenditure, raising government income is believed to offset liabilities and this could push government debt lower as shown by the research findings of [17].
Table 4 reports results of Model 2 when the institutional quality factor is added alongside the fiscal policy factor. The results of estimating both fiscal policy and institutional quality factors simultaneously show that the coefficient of government revenue (GR) is estimated to be negative and statistically significant at $p$-value 1% level with public debt (PD) in all three methods OLS, random effects and two-step GMM. However, both OLS and random effects estimation gave a negative nexus of public expenditure (PE) and public debt (PD), but this is not a statistically significant impact. However, when handling the endogeneity problem, the finding of the two-step GMM method highlights a positive relationship between government spending and public debt. Accordingly, once again it emphasizes that the findings support Hypotheses 1 and 2 when the estimation simultaneously includes both the fiscal and institutional quality factors.

Table 4. The results of Model 2 with both fiscal policy and institutional quality.

|               | OLS          | Random Effects | Two Step-GMM |
|---------------|--------------|----------------|--------------|
|               | (1)          | (2)            | (3)          |
| PD$_{t-1}$    |              | 0.674 ***      |              |
|               |              | 0.094          |              |
| GR            | $-0.964$ *** | $-0.796$ ***   | $-1.183$ **  |
|               | (0.178)      | (0.154)        | (0.487)      |
| PE            | $0.142$      | $0.087$        | $0.394$ ***  |
|               | (0.15)       | (0.152)        | (0.104)      |
| IF            | $-0.007$ **  | $-0.004$ ***   | $-0.003$ *   |
|               | (0.003)      | (0.002)        | (0.002)      |
| UEPT          | $0.010$ **   | $0.030$ ***    | $0.013$ *    |
|               | (0.004)      | (0.006)        | (0.007)      |
| VA            | $0.593$ ***  | 0.127          | $-0.488$     |
|               | (0.074)      | (0.096)        | (0.749)      |
| PS            | $0.088$      | $-0.455$ ***   | $-0.02$      |
|               | (0.072)      | (0.057)        | (0.061)      |
| GE            | $0.550$ ***  | 0.277 ***      | 0.279 ***    |
|               | (0.155)      | (0.131)        | (0.105)      |
| RQ            | $-0.815$ *** | $-0.348$ ***   | 0.259 **     |
|               | (0.147)      | (0.118)        | (0.125)      |
| RL            | 0.03         | 0.756 ***      | 0.570 ***    |
|               | (0.159)      | (0.155)        | (0.176)      |
| CC            | $-0.201$     | $-0.152$       | $-1.324$ *** |
|               | (0.146)      | (0.137)        | (0.235)      |
|               |              | 0.1089         |              |
| Obs.          | 513          | 513            | 459          |
| Hausman Test  | 0.1089       | 0.761          | 0.132        |
| Hansen Test   | 0.132        | 0.244          | 0.148        |
| Hansen Test   | 0.244        | 0.148          |              |
| excluding     |              |                |              |
| exogenous     |              |                |              |

Standard errors reported in parenthesis. ***, **, *, significant at the 1%, 5%, and 10% levels, respectively. Source: authors' calculations.

The results are also in line with fiscal policy theories by Romer [13], as a budget surplus would occur when tax revenue is greater than government spending and vice versa, the government budget meets a deficit if expenses exceed revenue. These results are impressive and show that in transition economies there is a negative and statistically significant association between government revenue and debt while the nexus of public expenditure and public debt is positive. This suggest that, on the one hand, increasing government revenue could decrease the debt ratio of government. Indeed, tax revenue has long accounted for the vast majority of government budgets in every nation. When the main income of a government decreases, in the short-term, governments might borrow
from other resources to finance their expenditure and investment demand. Barro [14] pointed out that borrowing only is the policy which transfers tax burden from this period to the next generation. Hence, if a government has greater income source to serve spending, the probability of borrowing would decrease, and the level of public debt would also reduce. The adverse nexus of government revenue and public debt in this paper is consistency with Mah et al. [17] while Krogstrup [40] supported the positively connection.

On the other hand, decreasing expenditure of government also contributes to a decrease in government debt. From a theoretical background, this positive connection is proven by the same direction of $G(t)$ and $D(t)$ in Equation (5) of [13]. Generally, the spending in public area which represents the size of government and the main reasons of debt can explain government policies to spend most of budget from tax revenue and debt resources in strengthening and expanding their size. The arguments and the results of this paper are also consistent with those found in [11,16,17].

Additionally, Table 4 also reports findings of the impact of the institutional quality through six indicators including Voice and Accountability (VA); Political Stability (PS); Government Effectiveness (GE); Regulatory Quality (RQ); Rule of Law (RL); Control of Corruption (CC) on public debt. In the first column, the results show that voice and accountability and government effectiveness are found to be statistically significant and positive while regulatory quality exerts the adverse correlation with public debt. There is not a statistically significant relationship between the remaining indicators and public debt.

On the contrary, column 2 in Table 4 shows a negative and statistically significant nexus of political stability, rule of law and public debt. Particularly, OLS and random effects methods show that there is no statistically significant linkage between control of corruption and public debt. However, the estimated two-step GMM coefficients shown in column 3 (Table 4) indicate that control of corruption is statically valid, with the magnitude of coefficient (−1.324), verifying a negative association between control of corruption and public debt in transition economies. Accordingly, the finding has supports hypothesis 8.

Generally, there are two existing contrary viewpoints on corruption. The finding of this research supports the view of “Sand on wheels” and it suggests that the existence of corruption interferes with private investment [33], reduces tax revenue, raises public spending [28,34], and boosts tax evasion [35].

Interestingly, while most indicators of institutional quality factor such as Government Effectiveness (GE); Regulatory Quality (RQ); Rule of Law (RL); Control of Corruption (CC) have a statistically significant nexus with public debt, Voice and Accountability (VA), and Political Stability (PS) have no association with this factor. Thus, the results do not support Hypotheses 3 and 4. Particularly, while voice and accountability could impress the transparency in governance, control corruption and reduce the size of public debt in the sample of 164 countries [23]. In MENA countries [11] and the Eurozone [24], this paper shows the different outcome of the transition countries group. These findings are similar to previous studies in high-income countries [23]. The explainable reason is that transition countries historically suffered a regime transformation period to reach a unified institution. Hence, the destruction of a government and political instability by unconstitutional or violent activities rarely happens.

Similarly, coherence in the positive linkage between public debt and the range of three indicators: Government Effectiveness (GE); Regulatory Quality (RQ); Rule of Law (RL) is a significant finding. This finding clarified that an increase in the unit of institutional quality related to government effectiveness, regulatory quality, and rule of law leads to a larger unit of 0.279; 0.259 and 0.57 of public debt, respectively. Hence, these results support Hypotheses 5, 6 and 7. After being converted, generally, government in transition countries spend more resources on operating and monitoring the system including regulatory and law efficiently, thus leading to a higher level of government debt. This encourages the romantic view in governance, which is also supported by [23,25–27].

Furthermore, the result of two-step GMM revealed that the level of public debt also depends on the accumulation of liabilities in the past period represented by the positive
coefficient (0.674) of $PD_{t-1}$. This finding is consensus with theory in Equation (5) of Romer, [13] when debt in the past is added to the debt term in the present. This implies that the borrowing of a government is the consequence of overspending in the past and, if this problem is not controlled efficiently, the government can inadvertently shift the burden of debt payment to the next generation. As the result, the rising trend of public debt never ends.

4.3. Robustness Check

This paper also assesses the robustness in the relationship between fiscal policy, institutional quality, and public debt by adding shadow economy as an extra control variable to both Model 1 and Model 2. The shadow economy is considered in order to take the different economic efficiency across countries into account and due to its probability of impacting on the extent of public debt. The positive linkage between the volume of the shadow economy and public debt has been demonstrated in a number of studies, especially Elgin and Uras [41] and Gonzalez-Fernandez and Gonzalez-Velasco [42]. However, the presence of shadow part in the economy could increase the growth of GDP in transition countries [43]. “Grease on the wheel” viewpoint followers believe the fact that shadow economy and corruption complement each other well leads to either more efficiency in public expenditure [44] or economic development in low-income countries [30,45]. Therefore, prior to the estimate of the regression model, we cannot determine the expected sign of the shadow economy. The dataset of the shadow economy is presented by the percentage of GDP and available until 2017 [46], while other variables can be observed from 2000 to 2018. Hence, the number of observations is reduced in Table 5.

Table 5. Robustness check: shadow economy control.

|                        | Two Step-GMM          |
|------------------------|-----------------------|
|                        | Model 1 | Model 2 |
| PD_{t-1}               | 0.784 *** | 0.803 *** |
| GR                     | (0.019) | (0.071) |
| PE                     | (0.108) | (0.476) |
| IF                     | (0.073) | (0.221) |
| UEPT                   | (0.002) | (0.002) |
| VA                     | (0.002) | (0.006) |
| PS                     | (0.816) |
| GE                     | (0.049) | 0.191 * |
| RQ                     | (0.109) | 0.267 *** |
| RL                     | (0.103) | 0.329 * |
| CC                     | (0.176) | –0.995 *** |
| SE                     | (0.222) |
|                        | (0.002) | 0.011 * |
|                        | (0.008) |
| Obs.                   | 428    | 428     |
| Arellano–Bond Test for 2nd order (p-value) | 0.366 | 0.584 |
Comparing the consistent result of column 1—Table 5 and column 3—Table 3, we conclude that the effect of fiscal policy on public debt expressed in Model 1 is statistically robust. Indeed, the coefficient of government revenue in Table 5 was slightly higher but remained negative and statistically significant. Likewise, we obtain similar results for public expenditure and its positive correlation with public debt. These findings robustly support our Hypotheses 1 and 2 and confirm background theory again. The findings also emphasize that increasing public spending and declining government revenue could enlarge the size of public debt.

A remarkable point in this paper is that we also check the robustness of Model 2 by re-estimating the effect of shadow economy component. The result is displayed in column 2 of Table 5. Generally, the results in Table 5 still remain unchanged compared with the results in Table 4. Particularly, Voice and Accountability (VA), and Political Stability (PS) are still not statistically significant while Government Effectiveness (GE), Regulatory Quality (RQ), Rule of Law (RL) and Control of Corruption (CC) maintain their statistically significant influence on the extent of public debt. Hence, after the robustness checks, Hypotheses 5, 6, 7 and 8 are still supported and Hypotheses 3 and 4 are still not. This is in line with a large cohort of studies [23,25–27].

Overall, our analysis is completed by checking the robustness through adding the shadow economy as a control variable to the empirical research model. Additionally, the Arellano–Bond test and Hansen tests indicate the validity of two-step GMM method applied. Despite a minor change in the magnitude of the coefficient, all independent and control variables keep their dimension and significant correlation with the dependent variable. Consequently, we confidently confirm the main findings of this paper presented in the Section 4.2 part above are stable and statistically robust.

### 5. Conclusions

The research examines the determinants of public debt in transition countries. Different from previous studies which just paid attention to the nexus of the fiscal factor or governance factor and public debt in advanced and high-income economies, this paper simultaneously investigated the effect of both fiscal policy and institutional quality on public debt in transition countries from 2000 to 2018. The empirical evidence confirms that there is a significant effect of the fiscal factor on the size of public debt. This effect is strong in various model specifications and sensitivity analyses. These findings highlight that the fiscal factor is no longer exclusive to advanced economies. Additionally, this factor exerts a major influence in transition economies. This is in line with fiscal policy theories by Romer [13]. Particularly, the results show that in transition economies there is a negative and statistically significant association between government revenue and debt while the nexus of public expenditure and public debt is positive. This clearly highlights that higher levels of public expenditure lead to higher accumulation of public debt, and increasing government income could push government debt lower. Hence, the size of public debt depends on how government revenue and government expenditure complement each other.
Regarding six governance indicators, the results show that there is a positive relationship between public debt and three governance indicators including Government Effectiveness (GE); Regulatory Quality (RQ); Rule of Law (RL). However, the results also confirm the view of “Sand on wheels” and support that corruption is an obstacle to private investment, leading to a reduction in tax revenue and this could cause difficulty in decreasing the size of public debt. This paper also offers new evidence; while the majority of indicators of institutional quality are found to be statistically significant with public debt, only two governance indicators consisting of Voice and Accountability (VA) and Political Stability (PS) are found not to have a relationship with public debt.

Accordingly, the results of this paper provide considerable implications for policy. Indeed, governments in transitional economies can decline their public debt by raising government revenue and imposing control of corruption. In addition to these suggestions, reducing government expenditure could be a practical option to manage the size of public debt. Additionally, transition countries have a challenging task in allocating the government’s budget in order to improve the quality of institution system along with controlling the level of public debt.

In terms of suggestions for future work, besides institutional quality, the characteristics of each country encompassing human capital, religion, custom, and ethnic should be observed. Moreover, the optimal threshold of public debt in transition countries should also be examined.

Author Contributions: Conceptualization and methodology, T.A.N.N.; software, validation and formal analysis, T.T.H.L.; Resources, data, and writing, T.A.N.N. and T.T.H.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.

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