The Effect of Government Debt on Private Investment in Advanced Economies: Does Institutional Quality Matter?

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Abstract

Unlike developing economies, advanced economies easily borrow debt to finance budget deficits. Government debt is one of the active measures of fiscal policy in these economies to run the economy and overcome its cyclicality. Most related studies note that government debt reduces private investment. Does it hold for advanced economies? Does institutional quality significantly affect the government debt – private investment relationship in these economies? For the answer, the study applies the PMG estimator (PMG) and the two-step difference GMM Arellano & Bond estimator (D-GMM) to investigate the impacts of government debt, institutional quality, and their interaction on private investment in 36 advanced economies from 2002 through 2019. The estimated results report that government debt crowds out private investment, while institutional quality enhances it. However, their interaction crowds out it. It seems counter-intuitive. Besides, economic growth and trade openness increase private investment while inflation decreases it. These results indicate the crucial implications for central governments in advanced countries in using and managing government debt.

Keywords: government debt; private investment; institutional quality; two-step difference GMM; PMG estimator.

JEL classification: E22; H63; D02.

1. INTRODUCTION

The public debt crisis in the Eurozone starting from Greece shows that public debt is one of the severe challenges in advanced economies. Unlike developing economies, advanced economies have easy access to debt to increase public spending. Public spending financed by debt is one of the active instruments of fiscal policy in these economies to run the economy and overcome its cyclicality. Governments in these economies increase public spending for a recession economy with more unemployment (an increased spending-based expansionary fiscal policy). By contrast, they decrease it for a hot economy with high inflation (a decreased spending-based contractionary fiscal policy). However, excessive public debt may lead to

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negative impacts on the economy such as economic crisis/recession, the low living standard of citizens, etc. Meanwhile, the private sector's investment is a crucial input of the economic growth model. In most economies, the private sector provides more jobs and contributes mainly to economic development and growth. Although the crucial roles of the private sector's investment and government debt in the economy, the government debt – private investment relationship is still a controversial topic among policymakers and economists. Most related studies confirm that government/public debt can reduce private investment. However, no studies investigate the contribution of institutional quality to the government debt – private investment relationship. Therefore, the study raises two research questions: Does the crowding-out impact of government debt on private investment hold for advanced economies? Does institutional quality affect the government debt – private investment relationship in these economies?

Regarding the global public debt situation, Kyodo News (2021) reports that in 2020, global public debt amounted to $88 trillion, which rose sharply because of the crisis. China and advanced economies captured over 90% of the worldwide accumulation debt. In 2021, public debt accounts for 97.8% of the world's GDP. Although it is 0.8% lower than one year ago, it still stands at record-high levels due to a massive fiscal response from governments to deal with the waves of the coronavirus pandemic. The statistical data by IMF note that public debt in the following years is still higher than the levels predicted before the coronavirus pandemic. The public debt in advanced economies is expected to be near 20% higher in 2026. The ratio of public debt to GDP in the United States can decline 0.61% to 133.31% in 2021, and stand at 133.51% in 2026. Meanwhile, public debt in Japan will come to 256.91% GDP this year, up 2.80% from one year ago, before decreasing to 251.90% in 2026. Business Standard (2021) notes that the coronavirus pandemic has led to a challenge to public finances. During the global financial crisis, the contraction in output and government revenues leads to public deficits and debts beyond levels. Notably, worldwide public debt is forecast to increase further from 98,0% of GDP in 2020 to near 100.0% of GDP in 2021, stemming from emerging and advanced economies.

Given the relevance of the topic, four theoretical views indicate channels through which government debt significantly affects private investment (Lau, Tan, & Liew, 2019). First, the classical views argue that the crowding-out impact of government debt on private investment comes from mobilizing available funds for the less productive use of the public sector from the private sector. These views say that government involvement in a market economy is unnecessary as the price level will automatically adjust to return the real income level of full-employment. Second, the neoclassical views indicate that public borrowing from the banks promotes its purchasing power and makes it compete for available funds with the private sector. In a full-employment economy, public spending replaces private investment by increasing the interest rate and the price level on credit. Third, by sharp contrast, the Keynesian views emphasize that public expenditure can enhance the investment of the private sector via multiplier effects although fiscal stimulus can decrease private investment. Fourth, the Ricardian equivalence theorem argues that government borrowing does not impede private investment as the private sector's investment and current interest rates remain unchanged in the case that citizens anticipate that governments will raise taxes to finance government debt in the future. Then, savings can stimulate by the amount of government debt issued to satisfy future tax obligations.

In the case of advanced economies with good institutional settings, governments design, formulate, and enforce regulations and policies transparently and publicly. The policies connecting with public debt financed by loans often compete with the private sector for

available funds. To easily receive the loans, governments in these economies often raise the interest rates of government bonds, which enhances the interest rates in the economy. The consequence of rising interest rates decreases the private sector's investment. The independent role of central banks is another explanation. In developed economies with good institutional settings, central banks are independent of governments' policies. These central banks use money supply to control and monitor inflation, interest rate, and exchange rate despite short-term government pressure. An increase in government debt does not put pressure on central banks to raise the money supply; therefore, there is competition for available loans between the private sector and the government, which enhances interest rates. The consequence of rising interest rates decreases private investment.

Regarding the academic perspective, the literature review presented in Section 2 highlights two aspects. First, no studies empirically investigate the role of institutional quality/governance in the government debt – private investment relationship. Second, no studies apply D-GMM and PMG for estimation and robustness check. Therefore, this paper focuses on them as a research gap in the literature.

In short, driven from the facts that the crowding-out impact of government debt on the investment of the private sector can hold for advanced economies and institutional quality can significantly affect the government debt - private investment relationship in these economies, the paper examines the impacts of government debt, institutional quality, their interaction on the private sector's investment for a group of 36 advanced economies from 2002 to 2019. The paper uses D-GMM and PMG for estimation and robustness check.

The study presents its structure as follows. Section 1 is the introduction, while Section 2 is the literature review that focuses on the impact of government debt on the private sector's investment. Section 3 describes the model specification and data, while Section 4 shows the estimated results and discussions. The final section in Section 5 notes the conclusion.

2. LITERATURE REVIEW

A high ratio of public debt to GDP leads to the public debt crisis and economic crisis. Thus, economists often recommend that governments in both advanced and developing economies should set up the public debt ceiling to eliminate the adverse effects of high public debt on the economy. In the literature, most studies report that public debt (domestic and external public debt) reduces private investment. de Mendonça and Brito (2021); Lau et al. (2019); Ncanywa and Masoga (2018); Vanlaer, Picarelli, and Marneffe (2021) emphasize that government borrowing can compete for available funds with the private sector, which boosts the interest rate in the economy and decreases private investment. Ncanywa and Masoga (2018) apply the autoregressive distributive lag (ARDL) model for South Africa from 1995 to 2016. Similarly, Lau et al. (2019) use the autoregressive distributive lag (ARDL) model for Malaysia from 1980 through 2016. Latest, de Mendonça and Brito (2021) employ the one-step difference and system GMM Arellano-Bond estimators for a group of 24 emerging economies between 1996 and 2018. In the same vein, Vanlaer et al. (2021) employ the one-step difference GMM Arellano-Bond estimator for a sample of 28 European Union (EU) countries during the period 1995-2016. They suggest that governments should look at attracting more foreign capital to compensate for the decline in domestic private investment due to high public debt levels.

Meanwhile, Korsah and Gyimah (2019) apply the Vector Error Correction Model (VECM) for Ghana from 1975 to 2014 and find that external public debt promotes private investment. They suggest that the government use external debt as one of the solutions to improve the private sector's investment in Ghana. Similarly, Zhou (2021) uses the Fully Modified Ordinary Least Squares (FMOLS) estimator for South Africa between 1995 and 2019. He discovers that external public debt enhances private investment, but domestic public debt impedes it. In contrast, Fagbemi and Adeosun (2020) report that government debt has no impact on private investment using the panel FMOLS and the panel DOLS estimators for panel data of 13 West African economies from 1986 to 2018.

3. MODEL SPECIFICATION AND DATA

3.1 Model specification

Following de Mendonça and Brito (2021), the empirical model is as follows:

$$INV_{it} = \sigma_0 + \sigma_1 INV_{it-1} + \sigma_2 GDE_{it} + \sigma_3 PGO_{it} + \sigma_4 (PGO \times GDE)_{it} + Z_{it}\sigma' + \tau_i + \psi_{it} \quad (1)$$

where subscript t and i are the time and country index, respectively. INV_{it} is the gross fixed capital formation (% GDP), a proxy for private investment, INV_{it-1} is the initial level of private investment. GDE_{it} is gross government debt (% GDP), PGO_{it} is one of the governance indicators (political stability, voice & accountability, regulatory quality, control of corruption, rule of law, government effectiveness), a proxy for institutional quality, and $(PGO \times GDE)_{it}$ is an interaction between government debt and institutional quality. Z_{it} contains some control variables (economic growth, inflation, and trade openness,); τ_i is an unobserved country-specific, time-invariant effect and ψ_{it} is an error term; σ_0, σ_1, σ_2, σ_3, σ_4, and σ' are parameters. We have some arguments to show the significant role of institutional quality in the government debt – private investment relationship. On the one hand, a good institutional setting in advanced economies can establish a substitutionary relationship between public debt and private investment (as shown by some arguments in Section 1). On the other hand, a good institutional quality facilitates the private sector's business activities and promotes private investment (Aysan, Nabli, & Véganzonès-Varoudakis, 2007). Therefore, the paper introduces the interaction term between government debt and institutional quality $(PGO \times GDE)_{it}$ into the empirical models. In the same vein, from the literature review, the study uses economic growth (de Mendonça & Brito, 2021; Korsah & Gyimah, 2019; Vanlaer et al., 2021), trade openness (de Mendonça & Brito, 2021; Vanlaer et al., 2021), and inflation (de Mendonça & Brito, 2021; Korsah & Gyimah, 2019) as control variables in the empirical models.

The study applies Equation (1) to test the impacts of government debt, institutional quality, their interaction on the private sector's investment for a group of 36 advanced economies between 2002 and 2019. The study employs the governance indicators from the World Bank (with values ranging from –2.5 to 2.5) to proxy for institutional quality (Kaufmann, Kraay, & Mastruzzi, 2011). World Bank (2017) notes governance as a constructive process by which non-state and state actors interact together to design, formulate, and enforce regulations and policies within a certain set of informal and formal rules that are shaped by and shape power. Notably, Hope (2009) emphasizes that good institutional quality will establish constructive governments to carry out economic development targets in the future.

Some problems in econometrics arise from estimating Equation (1). Firstly, economic growth, inflation, and trade openness can be endogenous. They can correlate with τ_i, which

results in the endogenous phenomenon. Secondly, some unobserved characteristics such as geography, culture, customs, and anthropology (fixed effects) can correlate with the regressors and exist in τ_i. Thirdly, a high autocorrelation stems from the presence of INV_{t-1}. Finally, data have a short length of observation (H = 18) and a large unit (M = 36). These problems could make the OLS regression inconsistent. REM (random-effects model) and FEM (fixed-effects model) could not handle endogenous phenomena, serial autocorrelation, and the IV-2SLS estimator needs some suitable instruments out of regressors in the empirical equation. Following Judson Judson and Owen (1999), therefore, the study decides to apply D-GMM and PMG for estimation and robustness check.

The paper applies the general method of moments (GMM) Arellano and Bond (1991) estimators first proposed by Holtz-Eakin, Newey, and Rosen (1988) for estimation. Firstly, we take the first difference in Equation (1) to eliminate country-fixed effects (τ_i). Then, we use the regressors in the first difference as instrumented by their lags under the assumption that time-varying white noises in the original models are not serially (Judson & Owen, 1999). This strategy is known as the difference GMM estimator (D-GMM), which can deal with simultaneity biases in regressions.

The two-step D-GMM can be more asymptotically efficient, but applying the two-step D-GMM in small research samples has a problem (Roodman, 2009). It is the proliferation of instruments that quadratically increases as the time dimension increases. In this case, the number of instruments is very large relative to the number of panel units. Roodman (2009) suggests using the thumb rule to maintain the number of countries (the number of panel units) larger than or equal to the number of instruments. The study uses the Arellano-Bond, Sargan, and Hansen statistics to examine the validity of instruments. The study employs the Arellano-Bond test in detecting autocorrelation and uses the Sargan and Hansen tests to search for endogenous phenomena. So, the paper ignores AR(1) test and keeps AR(2) test.

The study applies the PMG estimator developed by Pesaran, Shin, and Smith (1999) to check the robustness of the two-step D-GMM estimates. In this estimation, the long-term coefficients are homogeneous and the short-term parameters are heterogeneous between countries. Notably, the PMG estimator emphasizes the correction dynamics between the long-run and short-run. The study presents the PMG-based Error Correction model as follows:

$$\Delta M_{it} = \gamma Z_{it-1} + \sum_{j=1}^{p} \delta_{ij} \Delta H_{it-j} + \tau_{it} + \psi_{it} \text{ where } Z_{it-1} = M_{it-1} - \varphi H_{it-1} \tag{2}$$

where M is the private sector's investment; Z_{it-1} is the deviations from equilibrium in the long run for group i at any period, and γ is the error-correction coefficient. The vector φ contains long-run coefficients. They express the long-run elasticity of the private sector's investment corresponding with every variable in H_{it-1}. Meanwhile, the vector δ captures short-run responses of the H variables. τ_i is a fixed effect, ψ_{it} is an error term. For the validity of estimates, the study uses the value and significance level of the speed of adjustment γ (negative, lower than 1).

3.2 Data

The dataset is gross fixed capital formation, gross government debt, governance indicators, real per capita GDP, inflation, trade openness. It comes from the IMF International Financial Statistics (IFS) database and the World Bank World Development Indicators (WDI) and Worldwide Governance Indicators (WGI). The sample consists of 36 advanced

economies from 2002 to 2019 (The United Kingdom, The United States, Switzerland, Spain, Sweden, Slovenia, Singapore, Slovak Republic, Portugal, Netherlands, Norway, New Zealand, Malta, Macao SAR, Latvia, Luxembourg, Lithuania, Korea, Japan, Iceland, Italy, Ireland, Israel, Hong Kong SAR, Germany, Greece, Finland, France, Estonia, Czech Republic, Denmark, Cyrus, Canada, Belgium, Austria, Australia).

The study describes the definition and descriptive statistics for the dataset in the Annexes (Tables no. A1, A2, A3 and A4). The results in Table no. A2 indicate that the average score of each dimension of governance is higher than zero, suggesting that most advanced economies are those with good institutional quality. Besides, the matrix of correlation coefficients in Table no. A3 shows that economic growth and government debt are negatively linked with private investment, but inflation is positively associated with it. However, the matrix of correlation coefficients in Table no. A4 indicates that the coefficients of the six dimensions of governance are higher than 0.8. Therefore, the study uses them separately in the empirical model to remove the co-linearity between them.

4. FINDINGS AND DISCUSSION

4.1 D-GMM estimates

Table no. 1 reports D-GMM estimates across all empirical models. Every column in Table no. 1 is a model for every dimension of governance. In all the estimations, inflation is detected to be endogenous. Therefore, inflation is used as an instrumented variable in the GMM-style, while private investment, government debt, institutional quality, economic growth, trade openness as instrumental variables in the IV-style.

The estimated results from Table no. 1 show that government debt crowds out private investment, but institutional quality enhances it. However, their interaction decreases private investment. It seems counter-intuitive. Furthermore, economic growth and trade openness promote private investment, but inflation reduces it. All results are similar to all dimensions of governance.

De Mendonça and Brito (2021); Lau et al. (2019); Ncanywa and Masoga (2018); Vanlaer et al. (2021) note the crowding-out impact of government debt on the private sector's investment. It can come from the fact that governments raise the interest rate to compete for funds with the private sector, which promotes the interest rate in the economy. As a result, the private sector reduces investment due to a decline in profit. Another channel for explanation stems from the independent role of central banks. In advanced economies, central banks are independent of governments' policies. These central banks often control interest rates, exchange rates, inflation through money supply despite short-term government pressure. An increase in government debt does not put pressure on central banks to increase the money supply; therefore, there is competition for available loans between the private sector and the government, which raises interest rates. The consequence of increasing the interest rate reduces the private sector's investment. In sharp contrast, institutional quality enhances private investment. The private sector significantly contributes to boosting the output and creating more jobs. In view of this fact, governments improve policies and regulations (institutional quality) to stimulate the private sector's development by facilitating start-ups, enforcing appropriate administrative procedures, supporting commercial activities, etc. Aysan et al. (2007) and Su, Sun, Ahmad, and Mirza (2021) indicate this finding. However, the interaction is detrimental to private investment. It seems counter-intuitive. Fiscal stimulus packages to promote economic growth in bad times lead

to high government debt in advanced economies. Governments in these economies formulate and enforce policies and regulations (institutional quality) to facilitate their easier access to loans, which compete for available funds with the private sector. Therefore, they easily get loans that should be prioritized for the private sector's investment, which impedes private investment. These findings in this study indicate two policy implications: (1) On the one side, an increase in government debt can lead to a government debt crisis and an economic crisis in the future. On the other side, government borrowing crowds out private investment; (2) Institutional improvement facilitates both the private sector's investment and government borrowing, which reduces private investment. Therefore, we suggest that governments should limit public spending, and leave public investment projects to the private sector. More importantly, institutional improvement should be prudent to look at the government's competition for available funds with the private sector, which impedes private investment.

Table no. 1 – Government debt and private investment: D-GMM estimates, 2002 – 2019

Dependent: *Private investment (% GDP)*

Variables	PGO1	PGO2	PGO3	PGO4	PGO5	PGO6
Private investment (-1)	0.386***	0.523***	0.357***	0.467***	0.451***	0.438***
	(0.092)	(0.052)	(0.080)	(0.075)	(0.071)	(0.056)
Government debt	-0.112**	-0.133**	-0.133***	-0.096*	-0.139**	-0.123**
	(0.052)	(0.060)	(0.045)	(0.053)	(0.058)	(0.056)
Institutional quality	12.188**	5.630**	10.202***	5.369**	3.561	3.408*
	(5.332)	(2.575)	(2.415)	(2.533)	(2.320)	(1.865)
Gov.debt*institutional quality	-0.056**	-0.090*	-0.077***	-0.116***	-0.065*	-0.107**
	(0.027)	(0.048)	(0.029)	(0.043)	(0.038)	(0.047)
Economic growth	0.083***	0.227***	0.062***	0.180***	0.203***	0.223***
	(0.030)	(0.030)	(0.021)	(0.025)	(0.029)	(0.023)
Trade openness	0.191***	0.275***	0.124	0.216***	0.241***	0.303***
	(0.045)	(0.030)	(0.033)	(0.044)	(0.041)	(0.018)
Inflation	-0.247***	-0.322***	-0.022***	-0.304***	-0.256***	-0.402***
	(0.089)	(0.079)	(0.066)	(0.111)	(0.074)	(0.057)
Instrument	23	25	20	24	26	25
Country/Observation	36/504	36/504	36/504	36/504	36/504	36/504
AR(2) test	0.574	0.814	0.200	0.821	0.989	0.654
Sargan test	0.233	0.535	0.191	0.289	0.275	0.288
Hansen test	0.529	0.663	0.392	0.812	0.790	0.655

Note: ***, ** and *report significance level at 1%, 5%, and 10%, respectively

The paper finds the impacts of trade openness, inflation, and economic growth on private investment in some related studies. de Mendonça and Brito (2021) report the positive effects of trade openness and GDP growth on the private sector's investment. Economic growth enhances capital accumulation for the private sector's development. Besides, the increase in per capita income also improves saving–investment, which sets up available funds for the private sector's investment. Similarly, the open-door policy supports the private sector looking for investment capital from capital markets in other countries. It also facilitates capital inflows from other countries for the private sector's access and investment. Meanwhile, Korsah and Gyimah (2019), and de Mendonça and Brito (2021) note the negative impact of inflation on private investment. Inflation increases the transaction cost of economic activities, which reduces the private sector's investment due to a decline in profit.

4.2 Robustness test

The paper employs the PMG estimator in Equation (2) to test the robustness of D-GMM estimates. In the PMG estimation, we only use government debt, six governance indicators, and economic growth. The PMG estimator is a type of ECM model that needs co-integration. First, the study examines the stationary of all regressors in the empirical model to guarantee that they all have the same order. Next, the study performs panel co-integration tests by Westerlund (2007).

The results in Table no. 2 note that private investment, government debt, six dimensions of governance, and economic growth are stationary at significance levels lower than 10%, suggesting all variables in the empirical model have the same integration (zero-order I(0)). Meanwhile, the co-integration tests in Table no. 3 report that three in four tests deny the null hypothesis (no co-integration). Therefore, private investment co-integrates with government debt, six dimensions of governance, and economic growth.

The paper presents the main results in Table no. 4. Similar to those by the two-step D-GMM estimates, the estimates by the PMG estimator report that government debt crowds out and institutional quality stimulates private investment, but the interaction decreases it. Furthermore, economic growth enhances private investment. The value and significance level of the speeds of adjustment at the bottom of the tables indicate PMG estimates are completely reliable.

Table no. 2 – Fisher type unit root tests: 2002 – 2019

| Variables | ADF test | | PP test | |
| | Prob > chi2 | | Prob > chi2 | |
	Without trend	With trend	Without trend	With trend
Private investment	106.664***	97.433***	63.571**	43.011
Government debt	108.162***	88.659*	55.520	69.091
Governance 1	88.798*	72.874	109.124***	95.020**
Governance 2	143.434***	86.204	174.897***	170.159***
Governance 3	108.434***	82.367	274.762***	223.838***
Governance 4	73.761	98.167**	102.973***	115.307***
Governance 5	87.666	99.753**	134.173***	117.146***
Governance 6	160.607***	119.540***	135.866***	107.072***
Economic growth	83.768	122.872***	57.926	41.625

Note: ***, ** and *report significance level at 1%, 5%, and 10%, respectively

Table no. 3 – Westerlund panel co-integration tests: 2002 – 2019

Normalized variable: *Private investment (% GDP)*

Covariates	G_t	G_α	P_t	P_α
Government debt	-2.727***	-11.142***	-20.754***	-17.660***
Governance 1	-2.940***	-10.089***	-18.610***	-10.785***
Governance 2	-2.997***	-9.019**	-14.060***	-8.415***
Governance 3	-3.041***	-10.243***	-13.225***	-8.461***
Governance 4	-2.741***	-11.127***	-18.534***	-13.721***
Governance 5	-2.416***	-9.975***	-19.251***	-11.242***
Governance 6	-3.083***	-7.726	-17.949***	-11.218***
Economic growth	-2.699***	-7.715	-20.722***	-6.828***

Note: ***, ** and *report significance level at 1%, 5%, and 10%, respectively

Table no. 4 – Government debt and private investment: PMG estimates, 2002 – 2019

Long run co-integrating vectors
Dependent variable: *Private investment (% GDP)*

Variables	PGO1	PGO2	PGO3	PGO4	PGO5	PGO6
Government debt	-0.113***	-0.001***	-0.091***	-0.061**	-0.049	-0.013
	(0.037)	(0.022)	(0.028)	(0.028)	(0.030)	(0.024)
Institutional quality	5.522**	1.593	7.252***	3.801**	4.896***	3.341**
	(2.619)	(1.083)	(1.629)	(1.499)	(1.939)	(1.328)
Gov. debt* institutional quality	-0.022	-0.019	-0.073***	-0.034**	-0.047**	-0.036**
	(0.024)	(0.010)	(0.019)	(0.015)	(0.021)	(0.017)
Economic growth	0.689***	0.173*	0.757***	0.686***	0.623***	0.211***
	(0.070)	(0.010)	(0.078)	(0.066)	(0.064)	(0.010)
Error correction	-0.390***	-0.438***	-0.378***	-0.393***	-0.379***	-0.458***
	(0.036)	(0.058)	(0.078)	(0.038)	(0.039)	(0.070)
Observation	612	612	612	612	612	612
Log likelihood	-601.52	-573.59	-598.38	-581.40	-600.73	-572.37

Note: ***, ** and *report significance level at 1%, 5%, and 10%, respectively

5. CONCLUSION

Public spending financed by debt is one of the active instruments of fiscal policy in advanced economies to run the economy and overcome its cyclicality. The increase in government debt can crowd out the private sector's investment. Besides, institutional quality can affect the government debt-private investment relationship. In view of these facts, the study tests the impacts of government debt, institutional quality, their interactions on private investment for a group of 36 advanced economies from 2002 to 2019. The study applies the two-step D-GMM and the PMG for estimation and robustness check. The results note that government debt crowds out and institutional quality promotes private investment, but interaction decreases it. It seems counter-intuitive. Besides, economic growth and trade openness enhance private investment while inflation reduces it in these economies.

The findings in the study suggest that the governments in advanced economies should be prudent in formulating and enforcing regulations and policies (institutional quality) to finance government debt. Not only does government debt crowd out the private sector's investment, but regulations and policies (institutional quality) focused on government debt decrease it as well. These governments, therefore, must control and gradually decrease government debt to eliminate adverse effects on the economy and the private sector's investment. These regulations and policies (institutional quality) should focus on reducing government debt and limiting its crowding-out effect on private investment. More importantly, national resources (capital and land) should be prioritized for the private sector's development. Future research should look at the role of institutional quality in the government debt – private investment by the kind of debt (domestic government debt/external government debt).

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ANNEXES

Table no. A1 – Data description

Variable	Definition	Type	Source
Regulatory Quality (PGO1)	Regulatory Quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.		
Rule of Law (PGO2)	Rule of Law captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.		
Voice and Accountability (PGO3)	Voice and Accountability captures perceptions of the extent to which a country's citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media.		
Control of Corruption (PGO4)	Control of Corruption captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests.	level	World Bank
Government Effectiveness (PGO5)	Government Effectiveness captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies.		
Political Stability (PGO6)	Political Stability and Absence of Violence/Terrorism measures perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism.		
Private investment (INV)	Gross fixed capital formation (% GDP)	%	IMF
Public debt (GDE)	Gross debt consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future (% GDP)	%	IMF
Economic growth (GDP)	GDP per capita (constant 2010 US$)	level	World Bank
Trade openness (OPE)	Trade is the sum of exports and imports of goods and services (% GDP)	%	World Bank
Inflation (INF)	Inflation, consumer prices (annual %)	%	World Bank

Table no. A2 – Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Regulatory quality	648	1.370	0.710	-0.189	2.469
Rule of Law	648	1.430	0.468	0.197	2.436
Voice and Accountability	648	.831	0.527	-1.626	1.755
Control of Corruption	648	1.391	0.383	0.148	2.260
Government Effectiveness	648	1.389	0.478	0.083	2.100
Political Stability	648	1.147	0.412	-0.387	1.800
Private investment	648	22.437	4.356761	9.485	53.697
Public debt	648	62.061	43.63318	0	234.859
Economic growth	648	41201.4	20336.28	8013	111968.4
Trade openness	648	119.98	88.25239	20.685	442.62
Inflation	648	2.02452	1.859078	-3.047	15.253

Table no. A3 – Matrix of correlation coefficients between variables

	INV	GDE	GDP	OPE	INF
INV	1				
GDE	-0.286***	1			
GDP	-0.089**	0.080**	1		
OPE	0.014	-0.262***	0.036	1	
INF	0.255***	-0.256***	-0.159***	0.018	1

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent levels respectively

Table no. A4 – Matrix of correlation coefficients between six dimensions of governance

	PGO1	PGO2	PGO3	PGO4	PGO5	PGO6
PGO1	1					
PGO2	0.918***	1				
PGO3	0.463***	0.437***	1			
PGO4	0.818***	0.813***	0.434***	1		
PGO5	0.940***	0.898***	0.495***	0.814***	1	
PGO6	0.500***	0.349***	0.304***	0.260***	0.553***	1

Note: ***, ** and *denote significance at 1 percent, 5 percent and 10 percent levels respectively

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