Impact of Corruption on Public Debt: Evidence from Sub-Saharan African Countries

Njangang Ndieupa Henri

The Dschang School of Economics, University of Dschang, Cameroon

Abstract   This paper investigates the impact of corruption on public debt on a panel of 29 Sub Saharan African countries for the period 2000 – 2015 using the system generalized method-of-moment (GMM) estimator. Whereas a large literature agrees on the damaging nature of corruption for any economy, few quantitative studies have explicitly test the effect of corruption on public debt. This study aims to address this gap in the literature by providing an empirical study on how corruption affect public debt in Sub-Saharan African countries. Results show that corruption has a positive effect on public debt in the sample countries. In policy terms, Sub-Saharan African countries must intensify the fight against corruption in order to make their public spending more efficient and especially to reduce the sovereign debt.

Keywords   Corruption, Public debt, GMM

1. Introduction

Systemic corruption is becoming widespread. According to [1], out of the 176 countries covered by the report, 69% score below 50 and the majority of Sub-Saharan African countries are well below average. However, the consequences of corruption on the public debt are very unclear.

The literature agrees on the damaging nature of corruption for any economy. Corruption has been shown to reduce economic growth [2-7], highlight poverty [8, 9], discourages foreign direct investment [10-12], limits capital productivity [13], reduces state income [14-15] and promotes tax evasion [16].

However, there exist no equal empirical supports for the likely adverse impact of corruption on public debt. Reference [17] analyzed the effect of corruption on the public debt from a sample of 126 countries over the period 1996-2012. By applying both OLS, fixed effects, GMMs and the instrumental variables method, they show that an increase in corruption increases the public debt. Reference [18] by applying the GMM method to a wide range of countries over the period 1995-2015, conclude that corruption increases public debt. [19] in the Spanish autonomous communities found that corruption was a significant determinant of public debt. [20] in the case of OECD countries found similar results.

Our paper attempts to contribute to this recent literature by providing a first empirical study on how corruption affects public debt of Sub Saharan African countries. The results show that corruption increases public debt in Sub-Saharan African countries.

The rest of this paper is organized as follows. Section 2 presents the data and the methodology. Section 3 summarizes the empirical results and section 4 concludes.

2. Data and Methodology

2.1. Data Description and Sources

For this study, we use a sample of 29 sub-Saharan African countries over the period 2000 - 2015. This period is selected based on the availability of data.

The dependent variable in our study is the ratio of public debt to GDP, measured by the ratio of general government gross debt to GDP. This data is obtained from the World Economic Outlook (WEO) database of the International Monetary Fund (IMF).

Our main independent variable is Corruption. We have used the International Country Risk Guide (ICRG) corruption index for our main analyses. The ICRG corruption index has been chosen for two principal advantages: firstly, The ICRG corruption index has the longest time period coverage (since 1984) and cover many African's countries (36 countries). Secondly and according to [21], because the ICRG corruption index is not a composite index, its year-to-year comparison is more reliable than other indicator such as Transparency International and World Governance Indicators. The ICRG corruption index is from 0 (most corrupt countries) to 6 (least corrupt countries).

Table 1. Descriptive statistics

VARIABLES	Observations	Mean	Standard error	Min	Max	Sources
Corruption	464	5.014	0.836	0.5	4	ICRG
Debt ratio to GDP	464	70.40	88.79	6.228	789.8	IMF
Government expenditure	464	23.20	7.756	2.483	55.39	IMF
Inflation	453	11.02	34.21	-35.84	513.9	World Bank
Openness	464	36.48	16.81	10.56	155.7	World Bank
Military spending	464	1.594	1.027	-1.720	7.536	SIPRI
GDP per capita	464	6.942	0.955	5.572	9.224	World Bank
Population	464	16.22	1.230	14.02	19.02	World Bank
Political stability	435	-0.517	0.825	-2.477	1.200	ICRG

The controls variables are selected in accordance with the previous literature [17-18], although it is not identical. Among these controls variables, we have Government expenditure as a percentage of GDP, population growth, inflation rate, openness measured as the sum of import and export as a percentage of GDP, military spending as a percentage of GDP, GDP per capita and political stability. Descriptive statistics and different data sources are presented in Table 1.

2.2. Specification of Model

The purpose of our empirical analysis is to examine the impact of corruption on public debt in Sub-Saharan Africa. To this end, we employ a specification that is broadly similar to others (e.g., [16-17]). By controlling the variables widely used in the literature, we formulate the following model

$$Debtr_{i,t} = \alpha Debtr_{i,t-1} + \beta_1 Corup_{i,t} + \beta_2 X_{i,t} + u_i \\ + v_t + \varepsilon_{i,t} \quad (1)$$

Equation (1) can also be alternatively written as:

$$Debtr_{i,t} = (\alpha - 1)Debtr_{i,t-1} + \beta_1 Corup_{i,t} + \beta_2 X_{i,t} \\ + u_i + v_t + \varepsilon_{i,t} \quad (2)$$

Where i and t indicates countries and years, Debtr is the ratio of public debt to GDP, Corup is corruption, our main independent variable, $X_{i,t}$ is the vector of the control variables. μ_i captures countries specific effects and v_t takes into account the relevant time effect. $\varepsilon_{i,t}$ is a random error term that captures the effect of all omitted variables.

To estimate our empirical model, we used system GMM estimator developed by [22] and [23]. These two authors show that system GMM estimator can dramatically improve efficiency and avoid the weak instruments problem in the first-difference GMM estimator.

Following [24], Equation (1) can be transformed into a first-difference equation to eliminate country-specific effects as follows:

$$Debtr_{i,t} - Debtr_{i,t-1} = \alpha(Debtr_{i,t-1} - Debtr_{i,t-2}) \\ + \beta_1(Corup_{i,t} - Corup_{i,t-1}) \quad (3) \\ + \beta_2(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1})$$

To address the possible simultaneity bias of the explanatory Variables and the correlation between $(Debtr_{i,t-1} - Debtr_{i,t-2})$ and $(\varepsilon_{i,t} - \varepsilon_{i,t-1})$, [24] proposed that the lagged levels of the regressors are used as instruments. It is valid under the assumptions that the error term is not serially correlated and the lag of the explanatory variables are weakly exogenous. This strategy is known as Difference GMM estimation and the moment conditions can be listed as follows:

$$E\left[Debtr_{i,t-s}.(\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0 \ for \ s \geq 2; \ t = 3,...,T \quad (4)$$

$$E\left[Corup_{i,t-s}.(\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0 \ for \ s \geq 2; \ t = 3,...,T \quad (5)$$

$$E\left[X_{i,t-s}.(\varepsilon_{i,t} - \varepsilon_{i,t-1})\right] = 0 \quad for \ s \geq 2; \ t = 3,...,T \quad (6)$$

If the variables are persistent, however, their past values convey little information about their future changes, making their lagged value a weak instrument for their differenced series [25]. This may be the case for the institution variables which may lead to a biased estimation of parameters in small samples and asymptotically larger variance. [22] suggested a combination of the differenced Equation (3) and level Equation (1). [23] showed that this estimator is able to increase the efficiency via its reduction in biases, and imprecision characterized the Difference GMM estimator, especially the above-mentioned weak instrument problem. [22] and [23] proposed a System GMM estimator as follows. In addition to the moment conditions of Equations (4)–(6), the authors proposed that the System GMM uses the following moment conditions:

$$E\left[(Debtr_{i,t-s} - Debtr_{i,t-s-1}).(\eta_i + \varepsilon_{i,t})\right] = 0 \quad for \ s = 1 \quad (7)$$

$$E\left[(Corup_{i,t-s} - Corup_{i,t-s-1}).(\eta_i + \varepsilon_{i,t})\right] = 0 \quad for \ s = 1 \quad (8)$$

$$E\left[(X_{i,t-s} - X_{i,t-s-1}).(\eta_i + \varepsilon_{i,t})\right] = 0 \quad for \ s = 1 \quad (9)$$

The consistency of the System GMM estimator depends on the validity of the assumption that the error term does not exhibit serial correlation and on the validity of the instruments. By construction, the test for the null hypothesis of no first-order serial correlation should be rejected under the assumption that the error is not serially correlated; but the

test for the null hypothesis of no second-order serial correlation, should not be rejected. We use two diagnostics tests proposed by [22] and [23]: the Sargan test of over-identifying restrictions, and whether the differenced residuals are second-order serially correlated. If the null hypothesis of both tests cannot be rejected, this would indicate that the model is adequately specified and the instruments are valid.

3. Empirical Results and Discussion

The results of the system GMM are reported in Table 2. Columns (1) and (2) give us estimates of the impact of corruption (ICRG corruption) on the public debt.

Table 2.   System GMM estimation with control variables

Dependent variable: Public debt ratio to GDP		
	(1)	(2)
Independent variables		
Corruption ICRG	0.64**	0.92*
	(1.912)	(2.05)
Government expenditure	0.599	0.831
	(1.37)	(1.395)
Inflation	0.00192	0.0214
	(0.0721)	(0.116)
Openness	0.504***	0.870***
	(0.455)	(0.516)
Military spending	-0.420	-0.99
	(2.950)	(0.231)
GDP per capita	1.05**	1.15***
	(4.782)	(6.033)
Population	0.490	0.501
	(0.558)	(0.688)
Political stability		-0.33***
		(4.819)
Lag Debt ratio to GDP	-0.538***	-0.389***
	(0.0516)	(0.0782)
Constant	-1.8**	-1.5**
	(6.99)	(7.20)
Observations	420	392
Number of countries	29	29
Hansen test for over-identifying restriction: p-value	0.37	0.73
Arellano-Bond test for AR2: p-value	0.26	0.32

Note: Robust standard errors reported in parenthesis. ***, **, * Denotes significance level at 1%, 5% and 10% respectively.

Column (1) shows that the coefficient of corruption is positive and statistically significant at the 5% level. Thus, a 1-unit increase in corruption leads to an increase in the public debt of 0.64 unit. This result confirms the negative nature of corruption for any economy and especially for the public debt. This finding corroborates the earlier findings of [17] and [18] that a positive relation exists between corruption and public debt.

Besides, other control variables, namely openness and GDP per capita also impact significantly on the public debt. For example, results shows that GDP per capita and openness significantly and positively impacted on public debt, implying that a unit increase in these variables would increase public debt by 0.504 and 1.05 units respectively. The results imply that more economic growth would be associated with more public debt.

This conclusion is confirmed in column (2) with the introduction of the political stability variable. Thus, a 1-unit increase in corruption leads to an increase in the public debt of 0.92 unit.

4. Conclusions

The main objective of this paper was to analyze the impact of corruption on public debt of 29 Sub-Saharan African countries during the period 2000 – 2015. Other variables such as, government expenditure, inflation, openness, GDP per capita, military spending, population and political stability were used as control variables. The results suggest that the corruption measured by the ICRG corruption index has a statistical and significant influence on public debt.

Based on these findings, an important policy recommendation emerges. Several African countries have set up anti-corruption structures, but the results are still very mixed. Sub-Saharan African countries must therefore intensify the fight against corruption in order not only to make their public spending more efficient but especially to reduce the debt.

In policy terms, Sub-Saharan African countries must intensify the fight against corruption in order to make their public spending more efficient and especially to reduce the sovereign debt.

REFERENCES

[1] Transparency international (2016). Corruption perception index.

[2] d'Agostino, G., Dunne, J. P. and Pieroni, L. (2016). Government Spending, Corruption and Economic Growth. World Development, 84, 190-205.

[3] Dzhumashev, R. (2014). Corruption and growth: The role of governance, public spending, and economic development. Economic modelling, Vol. 37, 202-2015.

[4] Farooq, A., Shahbaz, M., Arouri, M. and Teulon, F. (2013). Does corruption impede economic growth in Pakistan? Economic Modelling, 35: 622-633.

[5] Del Monte, A. and Erasmo, P. (2001). Public Expenditure, Corruption, and Economic Growth: The Case of Italy. European Journal of Political Economy, Vol. 17, 1-16.

[6] Tanzi, V. and Davoodi, H. (2002). Corruption, Public Investment, and Growth. In: Governance, Corruption, and Economic Performance, Abed, G. T. and Gupta, S (Eds), (pp. 280–299), Washington, D.C, International Monetary Fund, Publication Services.

[7] Mo, P. K. (2001). Corruption and Economic Growth. Journal of Comparative Economics, Vol. 29, 66–79.

[8] Justesen, M. K. and Bjørnskov, C. (2014). Exploiting the Poor: Bureaucratic Corruption and Poverty in Africa. World Development, Vol. 58, 106-115.

[9] Gupta, S., De Mello, L. and Sharan, R. (2001). Corruption and military spending. European Journal of Political Economy, Vol. 17(4), 749–777.

[10] Egger, P. and Winner, H. (2006). How Corruption Influences Foreign Direct Investment: A Panel Data Study. Economic Development and Cultural Change, Vol. 54(2), 459-486.

[11] Lambsdorff, J. (2003a). How Corruption Affects Persistent Capital Flows. Economics of Governance, Vol. 4, 229-243.

[12] Wei, Shang-Jin, (2000). How Taxing is Corruption on International Investors? Review of Economics and Statistics, Vol. 82, 1-11.

[13] Lambsdorff, J. (2003b). How Corruption Affects Productivity. Kyklos, Vol. 56, 457-474.

[14] Aghion, P., Akcigit, U., Cage, J. and Kerr, W.R. (2016). Taxation, Corruption, and Growth. European Economic Review, 86, 24-51.

[15] Imam, P. and Jacobs, D. (2007). Effect of Corruption on tax revenues in the Middle East. IMF Working Paper, 07/270, International Monetary Funds, Washington, DC.

[16] Kaufmann, D. (2010). Can Corruption Adversely Affect Public Finances in Industrialized Countries? Brookings.

[17] Cooray, A., Dzhumashev, R. and Schneider, F. (2017). How Does Corruption Affect Public Debt? An Empirical Analysis. World Development, Vol. 90, 115–127.

[18] Benfratello, L., Del Monte, A. and Pennacchio, L. (2017). Corruption and public debt: a cross-country analysis. Applied Economics Letters, 24(5) 340-344.

[19] González-Fernández and González-Velasco, (2014). Shadow Economy, Corruption and Public Debt in Spain. Journal of Policy Modeling, 36 (6), 1101–1117.

[20] Grechyna, D. (2012). Public corruption and Public Debt: Some Empirical Evidence. University of Auckland working paper.

[21] Hessami, Z. (2014). Political corruption, public procurement, and budget composition: Theory and evidence from OECD countries. European Journal of Political Economy, Vol. 34, 372-389.

[22] Arellano, M. and Bover, O. (1995). Another look at instrumental variables estimation of error component models. Journal of Econometrics, Vol. 68, 29–51.

[23] Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics, 87, 115-143.

[24] Arellano, M. and Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence with an Application for Employment Equations. Review of Economic Studies, Vol. 58, 277–97.

[25] Acemoglu, D. and Robinson, J. (2008). Persistence of Power, Elites, and Institutions. American Economic Review, Vol. 98, 267–93.