Empirical Nexus between Corruption and Economic Growth (GDP): A Cross Country Econometric Analysis

Triumph O. Oni[1]and Olushina Olawale Awe[2]

[1]Department of Economics, University of the West of England, Bristol, United Kingdom
[2]Department of Mathematics, Obafemi Awolowo University, Ile-Ife, Nigeria
Email of the corresponding author: olawaleawe@yahoo.co.uk

Abstract

In recent years, corruption has become a notable issue in many countries of the world especially in developing countries where it has serious consequences. In this paper, we research on the effect of corruption on the output growth of various countries using the classical multiple linear regression model. In all analyses, we find that corruption plays a massive role in economic growth and development and it is notably negative; as the regression analysis shows that as an economy increases on the scale of index, the more increase we experience in the GDPca and other economic growth determinants such as investment, because investments (FDI) is positively correlated with cleaner economies such as Denmark, New Zealand, Finland, United States, et al. In contrast, countries with low CPIs experience impediments in their relative economic growth and development as factors such as investment is likely to decline in such countries, these countries include: Afghanistan, Somalia, Nigeria, Ghana, Mali, et al.

Index Terms: GDP, Economy, Multiple Regression, Corruption Index.

I. Introduction

The importance of corruptionis overriding in its aptitude to affect the very depth of various economies in the world today.Corruption as a phenomenon is a world-wide issue whichcan be described asthe process of acquiring wealth, power or influence through illegitimate means for private expansion at the expense of the public. Corruption, which can be likened to cockroaches, hasbeen amidst humans for a long period and rests as one of the major problems in the economies of the world, especially in developing economies with severe predicaments (Agbu, 2001). It discourages the idea of human and property rights and privileges accrued to citizens of the respective nations. It coerces essential institutions, notably political and economic institutions which therefore terrorises the theory of democracy, social and economic benefits. Venality is often a surreptitious act which complicates and affects the entire economy. Corruption has been honoured with significant time and attention amidst economists and global financial institutions such as the World Bank and IMF[1] in the last few decades, because of its dominant effect on economic growth.

Furthermore, economists and other researchers remain open-ended about the impact of corruption on economic growth, although there has been an increasing literature on the relationship between corruption and economic growth, and the generic deduction is that corruption decelerates the long-run growth of an economy via extensive mediums, such as public and private consumption, private direct investments and portfolio investments (Lambsdorff, 2003; Habib and Zurawicki, 2003). It hinders economic growth, widens the gap between the rich and the poor and ultimately undercuts the efficacy of aids and investments.However, it has been argued in several literatures, that corruption could have a positive and advantageous effect on economic growth.

In this article, we will critically analyse possible sources and reasons of corruption and economic effects of corruption across several countries of the world, in reference to a review of the current empirical and theoretical literature. Furthermore, we will also suggest an econometric (regression) model that shows the effect and relationship that subsist between corruption and economic growth and identify any possible outliers (if any). Finally, a deduction on the analysis will be conveyed.

II. Literature Review

Several intelligent academic articles are indifferent about the impact of corruption on economic growth. Some primary authors claimed that corruption has the prospect to improve productivity and growth. Leff (1964) and Huntington (1968) for instance,

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[1]International Monetary Fund. (1998), Roads to Nowhere: "How Corruption in Public Investment Hurts Growth." Washington D.C.

beheld corruption as the necessary ''grease'' to lubricate the rigid wheels of government administration. Likewise, other authors viewed corruption as a means of payment to officeholders, to encourage them to provide an efficient administrative service in the economy. Lui (1985) explained in his claim that bribes and inducements can assist in minimizing bureaucratic costs and enhance efficient public administration in economies. Beck and Maher (1986) show a similar result claiming that government officials will offer projects and contracts to firms bidding the lowest cost[2].

However, the arguments above in support of the proficiency of corruption to induce economic growth and development are reliant on fractional aspects and perspectives of corruption; that is the arguments do not take the entire picture into consideration. (Kaufmann, 1997; Aidt, 2003 and Seyf, 2001). Notably, Myrdal (1968) stated that public officeholders, that corruptive measures such as bribes creates an incentive for officials to cause greater deferments on administrative proceedings in other to appeal more bribes. Therefore arguments that support corruption, ignore the administrative delays that impedes economic development. (Kaufmann, 1995).

Conversely, current literatures have shown that corruption is more than an instrument that speeds up economic growth (see Jain 2001).For instance:Murphy and vishny (1991) claim that corruption causes the redistribution of endowed and talented individuals from productive and innovative activities to unproductive and growth impeding services[3]. Consequently, the impact of corruption on economic growth is very complex and is not as forthright as portrayed by several early authors. However, a priori empirical research have analysed and shown that corruption ultimately encumbers economic growth and development: Mauro, 1995, 1997, 1998; Tanzi et al, 1997; Kaufmann and Wei, 1999; Gupta et al., 2000; Li et al., 2000; Gupta et al., 2001; Gupta et al., 2002; Pellegrini and Gerlagh (2004: 429). Therefore, it is a common finding in academic literatures that corruption hampers and hinders economic growth and development. Svensson (2005:39) stated that virtually all academic literature; advocate that corruption relentlessly hinders economic growth and development.

Particularly, Meon and Sekkat (2005) discovered a significantly negative relationship between corruption and economic growth. They further stated that corruption doesnot "grease the wheel" as claimed by some researchers, but it "sands the wheel"[4]. Also, Rock and Bonnett (2004) found a negative effect of corruption on economic growth and they emphasized the fact that corruption decreases investment and this is more evident in most developing countries although, in emerging economies such as: China, Indonesia, Japan, Korea, and Thailand, corruption was seen to positively impact economic growth. Similarly, Mauro (1995) who is a major pioneer in the corruption study also analysed and claimed that corruption as a massive negative effect on investment and economic growth.

Further studies analysed by Mendez and Sepulveda (2006) looked into the long-run effects of corruption on the economy, and they realised that corruption severely damaging impacts or effects on the growth of the economy.

The acts of corruption are not recent issues;the account of corruption is as old as human existence (Lipset and Lenz, 2000). Corruption is endemic as well as an enemy within (Agbu, 2003). It is considered to be a cankerworm, which has eaten profoundly into the fabric of the nation; it arrays from so called little forms of corruption to bureaucratic or systemic corruptions (International Centre for Economic Growth, 1999).

III. Data and Methodology

This empirical analysis makes use of data from a large sample of countries about 178 countries (although the sample size reduced because some of the countries did not have enough data for some important economic indicators) in the year 2010. Values of annual growth population (pop), GDP per capital (GDPca), Secondary school enrolment rates (SED) which is a proxy for human capital, foreign direct investment (net inflows as a % of GDP), Imports of goods and services, Inflation (consumer prices) and Gross domestic product (GDP) were extracted from World Bank development indicators.

Furthermore, data measuring corruption levels was obtained from the Corruption Perception Index (CPI) surveyed by Transparency International and this was acquired for year 2010. The 2010 Corruption Perceptions Index was based on 13 independent surveys and the index perceived corruption for 178 countries. The index is scaled from 0 (almost corrupt) and 10 (almost clean).

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[2] For more details on corruption improving the economy, check Douglas Houston: Can corruption ever improve the economy.

[3] Details on the effect of corruption on public expenditures check Abed and Gupta (2004) a review on this subject was also made by Hillman (2004).

[4] For more details on whether corruption greases or sands the wheel (economy), check PIERRE-GUILLAUMEMÉON and KHALID SEKKAT (2005): "Does the Corruption grease or sand the wheels of the economy".

Data on these variables were subjected to econometric analysis, particularly regression analysis and ordinary least square estimation. Also, the dependent variable used for this economic model is the GDP per capital, based on the fact that most related academic literatures, consider it to be a proper measurement of economic growth (Mauro, 1995). Furthermore, the natural logarithm was applied on the dependent variable (GDPca) to reduce the effect of the asymmetric distribution of the variable.

Additionally, colinearity diagnostics tests were carried out to check for possible serial correlation-Durbin Watson statistics and correlation matrix was computed, in addition with Variance Inflation Factor (VIF), Autocorrelation, and Tolerance tests for multi-colinearity.

IV. Empirical Analysis and Results

The archetypal empirical studies of corruption and economic growth such as Mauro (1995), Li et al (2000) and Rock and Bonnett (2004), produced a cross-section analysis, in which average rate of growth is the dependent variable and various determinants of GDP are independent variables.

The analysis for the impact of corruption on economic growth was carried out with the use of four models:

4.1: Estimation of the models

First Model: Showing the regressors for the dependent Variable (GDPca) and their respective coefficients and T-ratios, for a sample size of 177 countries in the year 2010 (excluding the Taiwan, cause of the absence of data for GDPca).

$$LogGDPca = 6.079 + 0.580cpi$$

Regressors	Constant (β_0)	Corruption price index(CPI)
Coefficients	6.079	0.580
(S.E)	(0.162)	(0.036)
t-ratios	37.632	16.171

$R^2 = 0.599$ Adjusted $R^2 = 0.597$

DW-Statistics = 1.937

The first model shown above shows the direct effect of corruption on GDPca, as only the CPI was estimated with the exclusion of other essential determinants of GDPca. The constant of 6.079, shows that when the CPI is 0, the GDPca increases by 100(6.079)-taking the log into account, which is 607.9. Also, the intercept is very significant, with p-value < 0.05.

The CPI which is estimating the impact of corruption, has a positive coefficient, which implies that 1% increase in the CPI score (as you move towards the optimum scale of 10) GDPca increases by 100(0.58) which is 58, and CPI is also very significant with a p-value <0.05.

Ultimately, the adjusted R^2 is 0.597 which shows that 59.7% of the variation in GDPca is explained by the independent variable (CPI); this is relatively low though it is as a result of the omitted variables.

Second Model: Showing the regressors for the dependent variable (GDPca) and their respective coefficients and T-ratios for a sample size of 134, as some countries were removed cause of lack of data.

$$LogGDPca = 6.824 + 0.545cpi - 0.007GDP - 0.253pop - 0.005imp + 0.003fdi$$

Regressors	Constant (β_0)	Corruption price index(CPI)	GDP	Population growth	Imports	FDI
Coefficients	6.824	0.545	-0.007	-0.253	-0.005	0.003
(S.E)	(0.245)	(0.037)	(0.020)	(0.071)	(0.003)	(0.003)
t-ratios	27.802	14.535	-0.372	-3.560	-1.608	0.924

$R^2 = 0.698$ Adjusted $R^2 = 0.686$

DW-Statistics = 2.142

The second model shows five independent variables explaining the dependent variable (GDPca). The following shows the respective effects of the variables:

- The constant (β_0) has a value of 6.824, which shows that a zero increase in the independent variables will increase GDPca by 100(6.824) = 682.4. Additionally, it is very significant at 95% levels as the p-value is < 0.05.
- The CPI has a coefficient of 0.545, which shows that 1% increase in the CPI scale, will increase GDPca by 100(0.545) = 54.5. Also, it is very significant as the P-value is <0.05.
- The GDP has a negative coefficient of -0.007, which is not according to theory as it should be positive. It however implies that 1% increase in the GDP will decrease the GDPca by 100(0.007) 0.7. Also, it is very insignificant, as the P-value is > 0.05.
- Population growth has a negative coefficient of -0.253, which is arguably according to theory as increase in population reduces net exports hence causing GDP to fall, and it shows that 1% increase in the population growth, will decrease GDPca by 100(0.253) = 25.3. Also, it is very significant as the P-value is <0.05.
- Imports of goods, also has a negative coefficient of -0.005(according to theory), showing that 1% increase in imports will lead to a fall in GDPca by 100(0.005) = 0.5
- FDI has a coefficient of 0.003 (according to theory), showing that 1% increase in FDI will result in an increase of 100(0.003) = 0.3.
- The Adjusted R^2 has improved relative to the first model (0.686) which shows that 68.6% of the variation in the GDPca is explained by the independent variables.
- DW-statistics (which tests for serial correlation), is 2.142 and with reference to the tables, show that there is no serial correlation.

Third Model: Showing the regressors for the dependent variable (GDPca) and their respective coefficients and T-ratios for a sample size of 43.

LogGDPca = 8.120 + 0.488cpi – 0.595pop – 0.017imp – 0.009fdi -0.001sec

Regressors	Constant (β_0)	Corruption price index(CPI)	Population growth	Imports	FDI	SEC
Coefficients (S.E)	8.120 (0.673)	0.488 (0.068)	-0.595 (0.151)	-0.017 (0.008)	-0.009 (0.031)	-0.001 (0.005)
t-ratios	12.074	7.209	-3.929	-2.021	-0.307	-0.132

$R^2 = 0.758$ Adjusted $R^2 = 0.725$ DW-Statistics = 1.854

The third model shows an improvement in terms of model specification though the estimate of FDI is not according to theory; however, the sample size reduced to 43(because of absence of data for certain countries).

Additionally, adjusted R^2 has improved to 0.725, showing that 75% of the variations in GDPca are explained by the independent variables. Also, DW-statistics shows that there is no serial correlation.

Fourth Model: Showing the regressors for the dependent variable (GDPca) and their respective coefficients and T-ratios for a sample size of 116.

LogGDPca = 7.027 + 0.515cpi – 0.442pop – 0.006imp + 0.004fdi + 0.014inf[5]

Regressors	Constant (β_0)	Corruption price index(CPI)	Population growth	Imports	FDI	Inflation
Coefficients (S.E)	7.027 (0.288)	0.515 (0.040)	-0.442 (0.086)	-0.006 (0.003)	0.004 (0.003)	0.021 (0.018)
t-ratios	24.401	12.747	-5.122	-1.905	1.376	1.155

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[5]**Notes: The interpretations of the third and fourth models are similar to what is done for the second model.**

$R^2 = 0.734$ Adjusted $R^2 = 0.722$

DW-Statistics = 2.000

The DW statistics for the fourth model is 2.000, which in reference to the DW tables shows that there are no serial correlations.

Conclusively, we consider the Third model to be the best model, because it relatively has the highest value of adjusted $R^2 = 0.725$. The coefficients of most of the regressors are according to theory, compared to the second or third model and most of the variables are significant at 95% levels. Nevertheless all the models were relatively good.

The table below gives a relative comparison of the four regression models:

Economic model (determinants of GDP per capital)

Independent Variable	Model 1	Model 2	Model 3	Model 4
Intercept	6.079** (37.632)	6.824** (27.802)	8.12** (12.074)	7.027** (24.401)
CPI Score	0.58** (16.171)	0.545** (14.535)	0.488** (7.209)	0.515** (12.747)
GDP		-0.007 (-0.372)		
Population growth		-0.253** (-3.560)	-0.595** (-3.929)	-0.442** (-5.122)
Imports		-0.005 (-1.608)	-0.017** (-2021)	-0.006** (-1,905)
FDI		0.003 (0.924)	-0.009 (-0.307)	0.004 (1.376)
Secondary school enrolment			-0.001 (-0.132)	
Inflation				0.021 (1.155)

Alpha (α) = 0.05 significance levels,

t-values are in parenthesis.

** denotes significance at 5% level

V. Conclusion

The primary objective of this study is to critically access the impact of corruption on the economic growth of different countries of the world. The above analysis have therefore shown that corruption plays a massive role in the economic growth and development is notably negative as the regression analysis shows that as an economy improves on the scale of the index (the

cleaner an economy) it increases the GDPca and other economic growth determinants such as investment, because investments (FDI) is positively correlated with cleaner economies such as Denmark, New Zealand, Finland, United States, et al. In contrast, countries with low CPIs experience impediments in their relative economic growth and development as factors such as investment is likely to decline in such countries, these countries include: Afghanistan, Somalia, Nigeria, Ghana, Mali, et al.

Therefore in other to improve economic growth and development, policy holders and other officials should engage in measures that will curb corruption, these measures include: Increasing efforts aimed at providing adequate information about the long-run negative impacts of corruption, also more severe measures should be adopted, ensuring that public funds are not embezzled these could include; examination of records and independent auditing[6].

Conclusively, Government should improve her political determination to fight corruption to a standstill in the economy. Existing exertions are producing good outcomes,although the range of application of these measures could be expanded especially in developing economies.

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[6] See Adela Shera for more details on corruption eradication (2011)