

## **Bidirectional relationship between Corruption and Income Inequality and its Impact on Economic Development**

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### **Abstract**

Due to the devastating effect of corruption and income inequality on economic development, the study and significance of this relationship is very crucial in the empirical literature. Traditionally the linkage between corruption and income inequality is perceived as a bidirectional association. If this is the case then the individual and combine the effect of corruption and income inequality on economic development is worst studying, which has been neglected in the existing literature in the field of development economics. This study uses the Granger Causality Wald test and OLS estimation techniques; first to identify the triangular bidirectional association between corruption, income inequality, and economic growth and secondly to analyze the separate and combined effect of corruption and income inequality on economic development. The results of the study confirm the existence of a bidirectional relationship between corruption and income inequality. Furthermore, the significant and negative individual and combined effect of corruption and income inequality on economic development is also evident. The magnitude of this combined effect is stronger as compared to individual impact, whereby curbing both at the same time by one unit leads economic development to increase by 11 percent. On the bases of research, we suggest to curb both corruption and income inequality simultaneously, to achieve the progressively desirable development goals in Ghana.

**JEL Classification:** I3, O1

**Key Words:** Dynamics, Bidirectional, Corruption, Inequality, Economic Development

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### **I. INTRODUCTION**

Corruption, regarded as bribery or extortion, it is an abuse of public assets for private gains, it is illegal payments for undeserved benefits which therefore increases transaction cost and uncertainty in the economy (Cieslik and Goczek, 2018). The past few decades elucidated corruption as a provoking issue in the field of economic development. Under the light of existing literature Dutta et al. (2017) vindicate the detrimental behavior of corruption on economic development. Li et al. (2000) argue that corruption deteriorates development by hampering social programs, tax system (dead-weight loss to welfare), investment in education and health, redistributive system, and resource allocation. These little chunks heap ascendance in public debt, which stimulates economic instability, and this infectiousness yields economic development to suffer. In his paper, Liedong (2017) demonstrates that corruption creates negative externality in the form of income inequality, which has substantial adverse sway on economic development. In support of his arguments Smith (2007) exemplifies the phenomenon of bureaucratic bottlenecks, where corruption in the public sector drives a wedge between those who can pay and who can't pay bribe to overcome bottlenecks for private gains, thereby culminating in inequality in society. Based on facts, the causality relationship between corruption and income inequality can be established, where corruption causes income inequality.

On other hand, empirical evidence also suggests a causal influence of income inequality as an initiator on corruption. Contributions by Gyimah-Brempong (2006) and Apergis et al. (2010) suggest a significant influence of income inequality on corruption, which ultimately leads toward impeding economic development. Jing-sung, Y, and Khagram, S (2005) justify this association by indicating that income inequality adversely influences social norms which in result introduce a more acceptable behavior towards corruption. Furthermore, under income inequality, wealthier people have a high probability to engage in corruption due to the availability of resources to bribe for private benefits. This phenomenon of transitional behavior from income inequality towards corruption is very subtle in developing and underdeveloped economies and empirically examined and authenticated by Gyimah-Brempong (2006) in his study about African countries.

Under the light of the above-stated facts, this meticulous study aims at exploring the causal relationship between corruption and income inequality and ultimately investigates the individual and combined effect of corruption and income inequality on economic development. Although there exists a small body of literature

which investigated the causality of corruption and income inequality, the novelty of this study lies under the assessment of the combined effect of corruption and income inequality on economic development, which is not explored in the existing literature. According to the consensus of current literature, there exists a bidirectional causality between corruption and income inequality (but in this study this causality has again experimented), and under bidirectional causality, the ultimate impeding factor is economic development. So it is inevitably necessary to comprehend the combined influence of corruption and income inequality on economic development, and this can be done through the introduction of statistical procedures of interaction term. Although the implication of this phenomenon is subtle for developing and underdeveloped economies due to the existence of high corruption and income inequality which has adversely impeded economic development, this particular study only addresses the empirical investigation of the Republic of Ghana, and a good case for wider generalization about African continent under the phenomenon of corruption and income inequality. In his report about evidence of corruption in the Republic of Ghana, Transparency International (2019) argues that although Ghana is a prominent African country and an important oil-producing country in Africa but for years it is struggling to decrease income inequality and unemployment. Furthermore report highlights that, 14 percent of the total government revenue comes from the oil sector but its benefits have not trickled down to the poor, mainly due to the misappropriation of government assets and funds by corrupt elites and this is the reason for Ghana's underdevelopment. Transparency International (2019) talks about the existence of two types of corruption in Ghana; (1) Rent-seeking behavior from the government in form of abuse of power, embezzlement, bribe, and nepotism and (2) To preserve power which appears as electoral, judicial and public jobs corruption. Under the existing phenomenon of corruption, Ghana has lost around 400 billion US\$ in public funds since its independence (Transparency, 2019). The following part of the study develops literature that link corruption, income inequality, and economic development.

## **II. EXISTING LITERATURE**

This meticulous part of the study addresses the existing literature in two folds; firstly the bidirectional association between corruption and income inequality, secondly the effect of corruption and income inequality on economic development.

### **2.1 Bidirectional Association between Corruption and Income Inequality**

The impact of corruption on income inequality is beyond doubts, where it reinforces poverty and derails economic development. This influential channel is very obvious in the studies of Gupta et al. (2002) and Apergis (2010) where they estimated the magnitude and concluded that one standard deviation escalation in the corruption perception index yields income inequality to grow by eleven digits and this ultimately costs growth by five percent. This negative behavior of corruption towards income inequality can be justified under the reasoning that corruption benefits rich people more and increases the income gap hence poor become poorer which hampers economic development. This evidence is observed in developing and underdeveloped economies where this phenomenon is very prominent in economic development.

By considering data on fifty states of United States Berisha et al. (2018) suggested the existence of a "vicious cycle" between high corrupted countries and income inequality, where a high level of unemployment is created by the rise in income inequality. In his study, Berisha et al. (2018) elucidates the inverse association between corruption and personal income level. Therefore, based upon their investigation it can be deduced that a high level of corruption causes unemployment to ascend which in result creates income inequality and on a whole impoverish vulnerability to economic development.

In another study, this dilemma is apparent, whereby considering OECD and Asian countries Gyimah-Brempong (2006) concluded that a ten percent decrease in corruption causes income inequality to demise by 1.7 percent which benefits economic growth by 2.7 percent. Benfratello et al. (2018) argued that in developing countries public sector plays a crucial role in income redistribution to ensure equity among people, but on the other hand developing economics have a high corruption rate in the public sector causing public debt to increase which escalate poverty and obstructs economic development.

Research work of Jong-Sung and Khagram (2005) explicates the influence of income inequality on corruption by considering cross-sectional data set of 129 countries and concludes that one standard deviation decrease in income inequality causes corruption to diminish by two-third. They argued about the large impact of income inequality on corruption in democratic regimes. Dobson and Ramlogan (2010) suggested a trade-off between corruption and income inequality and figured out that not only corruption affects income inequality but income inequality also causes changes in corruption. In developing countries, public projects are inclined to provide facilities to people to reduce income inequality but it also offers great opportunity to rich elites to perpetuate corruption.

Dobson and Ramlogan (2010) also talked about the indirect channel of how income inequity causes ascendancy in corruption and argued under the example of developing countries that higher income inequality

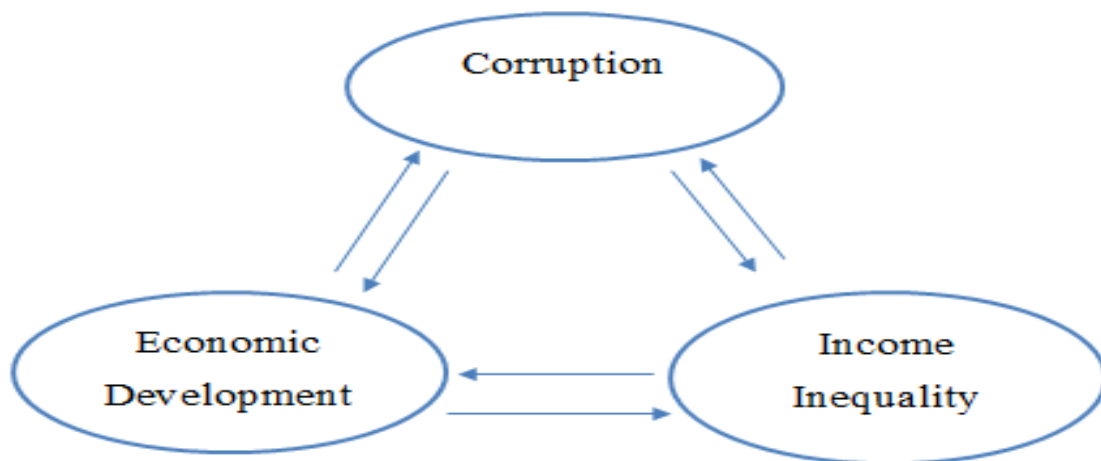
provides rice people with great opportunity and power to get private benefits by bribing politicians and public officials.

## 2.2. Corruption, Income Inequality and Economic Development (Triangular Relationship)

Following the empirical literature, it is theoretically evident the triangular relationship between corruption, income inequality does exist, where; corruption and economic development strongly correlate with high significance and negative direction (Lambsdorff, 1999), similarly corruption and income inequality exhibit positive and significant granger causality association (Gupta, 1998), and lastly inverse and a significant bidirectional association between income inequality and economic development is also illustrated in the existing theory (Mauro, 1997). Although theory suggests the existence of a bidirectional relationship between corruption, income inequality, and economic development as explicated in figure (1), but in the case of Ghana it is not evident and not empirically proved thus this also becomes a novelty of the study to explore the directional association between the prior three important socioeconomic indicators.

Prior review determines the obvious association between corruption and income inequality and bi-casual relation is predetermined in literature but this study re-determine this causality cycle. But the crux of this study lies under the consideration that how the combined association of corruption and income inequality influences economic development. As it is very clear that both corruption and income inequality go hand in hand and both impact economic development to its adversity.

**Figure 1: Corruption, Income Inequality and Economic Development (Theoretical Consideration)**



Inequality is always alarming for a low level of economic development in terms of GDP per capita, while corruption affects economic development directly by lowering GDP per capita and private investment and indirectly by hampering equality. By using panel data for African countries Gyimah-Brempong (2002) estimated that one unit increase in corruption leads GDP per capita (economic development) to reduce by one percent.

Both corruption and income inequality go hand in hand and both impact economic development to its adversity. Inequality is always alarming for a low level of economic development in terms of GDP per capita, while corruption affects economic development directly by lowering GDP per capita and private investments, and indirectly by hampering equality.

### III. ESTIMATION METHODOLOGY

Based on the theoretical considerations, it can be stated that both corruption and income inequality are strongly correlated with the level of economic development, having a significant effect with negative relation. And to test this hypothesis in a case-study for Ghana, regression analysis is carried out by taking data from (1998-2019). But first, it is interesting to find the existence of a bidirectional association between corruption, income inequality, and economic development through the Granger Causality test. The baseline equation for the Granger Causality is mention in the following. Where “Y”, “X” and “D” are the desirable variables with their lagged values, here in this case we consider the data set of three variables for 21 years.  $\epsilon_t$  is the idiosyncratic error term, reflecting the time and period effect in the equation.

$$Y_t = \sum_{j=1}^m \alpha_j Y_{t-j} + \sum_{i=1}^n \beta_i X_{t-i} + D_t + \epsilon_t$$

To address economic development, corruption, and income inequality; GDP per capita, corruption perception index, and Gini coefficient are used as proxy variables respectively. In the second part of the analysis we see the individual and combined effect of corruption and income inequality on economic development, an endogenous growth model is utilized, which states that growth and development depend upon human and physical capital. So here in this study, this model is augmented by the addition of corruption and income inequality. To represent the impact of human and physical capital on growth, the labor force (*LF*), foreign direct investment (*FDI*), and literacy rate (*LR*) are utilized. GDP per capita is taken in its logarithmic form. The baseline regression equation is as followings;

$$LGDP_{pc} = \alpha + \alpha_1 LF + \alpha_2 FDI + \alpha_3 LR + \alpha_4 CPI + \alpha_5 Gini + \alpha_6 CPI * Gini + \epsilon$$

The dependent variable “GDP per capita” expressed in logarithm form will give the percentage effect of the explanatory variables. Here “ $\alpha_4$ ” and “ $\alpha_5$ ” gives the individual effect of corruption and income inequality on economic development, respectively. But to see the combined effect of corruption and income inequality we use interaction term and  $\alpha_6$  is the coefficient of interest in this case. To estimate the regression model using the Stata software and the model is estimated through the Ordinary Least Square (OLS) technique. In the following part, we state and provide the analysis part of the research study.

#### IV. EMPIRICAL ANALYSIS AND RESULTS

In the results, first, we provide and discuss the Granger Causality outcome. These results indicate that corruption and income inequality both cause each other, while inequality is responsible for low per-capita income. As we talk about the relationship between corruption and per-capita income there exists no direct causality but corruption affects per-capita income indirectly by affecting income inequality. This is important and shocking evidence which is not explained by the theory and existing literature related to developing and underdeveloped countries. The results of the Granger Causality test are given in table (1).

**Table 0-1: Granger Causality Wald Test Results**

Null Hypothesis ( $H_0$ )	F-Statistic	Prob.
Corruption does Granger Cause Income Inequality	2.70422	0.01806
Income Inequality does Granger Cause Corruption	1.9794	0.12416
Economic Development does not Granger Cause Income Inequality	0.02414	0.90218
Income Inequality does Granger Cause Economic Development	0.63418	0.00582
Economic Development does not Granger Cause Corruption	1.00533	0.39476
Corruption does not Granger Cause Economic Development	0.46465	0.6392

Results of regression analysis are stated in table 2 and the predicted model is also provided in followings;

$$LGDP_{pc} = 18.77 + 0.05LF + 0.14FDI + 0.004LR - 0.03CPI - 0.07Gini - 0.11CPI * Gini$$

According to these results, corruption and income inequality are statistically significant to affect economic development in inverse direction at a 10% level of significance. One unit decrease in corruption and income inequality leads to economic development to increase by three and seven percent respectively. As far as the combined effect of corruption and income inequality is concern we see a significant influence on economic development at a 1% level of significance. The magnitude of this combined effect is more strengthen as compare to individual impact, whereby curbing both at the same time by one unit leads economic development to increase by eleven percent. Thus it implies that it is very important to address both factors parallel to get more effective results.

The magnitude of this combined effect is stronger as compared to individual impact, whereby curbing both at the same time by one unit leads economic development to increase by 11 percent. Thus it implies that in the presence of both corruption and inequality economic development behaves more adversely. Furthermore, the labor force, foreign direct investment, and education (literacy rate) are also significant in explaining the positive change in GDP per capita.

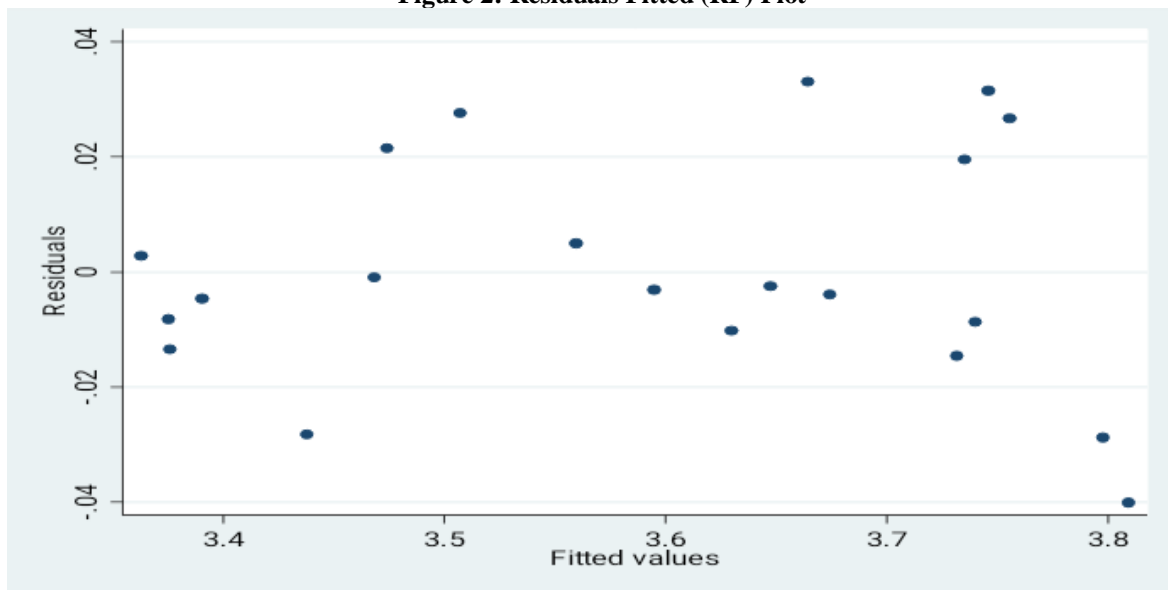
**Table 2: Regression Analysis**

Dependent Variable: LGDP_pc	
Data: 1998-2018 (No of Observations:21)	
Variables	Coefficients

Constant	18.77600 (0.063)*
CPI	-0.038331 (0.061)*
Gini	-0.079995 (0.087)*
CPI*Gini	-0.113833 (0.001)***
LF	0.052081 (0.000)***
FDI	0.144110 (0.002)***
LR	0.004677 (0.710)*
R-Square	0.9823
F-Statistics	Prob. 0.0000 (F-value: 129.77)

\* p < .10, \*\* p < .05, \*\*\* p < .01  
(Note: Due to word limit brief analysis are reflected)

**Figure 2: Residuals Fitted (RF) Plot**



As far as the determination power of this model is concern it is estimated that 98 percent of the variations in economic development are explained by the stated variables, furthermore, the overall model is also statistically significant. For robust analysis regression, diagnostic graphic representation is utilized and provided in figure (2) which shows that the error term is not correlated with the estimated regression line, showing consistency of the model.

**V. CONCLUSIONS AND RECOMMENDATIONS**

Corruption and income inequality go hand in hand and directly negatively impact economic development. According to the results from the estimation of the econometric model, highlighting the individual and combined effect of corruption and income inequality on economic development, it is derived that both corruption and income inequality show significant and negative individual effects on economic development, in case of Ghana. Meanwhile, the magnitude of this combined effect is stronger as compared to individual impact, whereby curbing both at the same time by one unit leads economic development to increase by 11 percent. Thus it implies that in the presence of both corruption and inequality economic development behaves more adversely. According to Transparency International, Ghana ranks at 80<sup>th</sup> place out of 180 countries (2019) on the Corruption Perception Index. The population of the country was calculated as 29.77 million in 2018 but out of these, 23.4 percent of the population is living under the poverty line (World Bank Database). Roughly 46% of the population earn and live on less than \$1.25 per day. As per Oxfam’s report between 1960 and 2005 about \$20 trillion was lost to corruption by Public Office Holders. The majority of the corruption taking place in Ghana is carried out by people who have economic resources due to which they have the opportunity to bribe for economic gains, leading to further income inequality and direct effects Ghana’s GDP.

The basic idea behind public sector rent-seeking and power prevention corruption provision is internal diversity in Ghana, which experiences a contrast between kin-based and institutional-based trust. The relationship between kin-based and institutional-based trust is a zero-sum game, where a social structure conducive to the maintenance of strong kinship and ethnic ties almost inevitably leads towards lesser individual

ties to public institutions. The individual is therefore more prone to exploit the institutional system to obtain gains for his or her kinship network. We propose Ghana to adopt practices accordingly to UN guidelines to tackle corruptive tendencies. Such practices display on multiple policy levels and thus require consistent institutional efforts. Corruption prevention should be the top policy priority, whose management would be demanded to specifically-instituted governmental transparency bodies. Criminalization of corruption should be targeted at strengthening legislative means to fight such practices, and to hold private citizens and public officers accountable for their actions. International cooperation and asset recovery should go hand in hand: as most of the corruption and its magnitude occurs mostly at top levels of public sectors, especially in such an oil-rich country, Ghana should seek international cooperation to achieve a double goal: first is one of policing and criminal justice, establishing transnational bodies to target actors of corruption in the case they are located outside of the country, or foreigners living abroad; second is the operation of asset recovery, which could constitute huge amounts of black money which flew outside of the country to be laundered. Outside of UN guidelines, we believe that adult men are, overall, the outcome of their upbringing and their education: strengthening national unity and overcoming cross-ethnic boundaries could increase the social value of public institutions, and people's concern with their efficiency and good operation.

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