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# The effect of capital structure and corruption on economic growth: Empirical evidence from Nigeria

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## ABSTRACT
Corruption thrives in an environment characterized by weak institutions that couldn't enforce economic discipline to engender societal trust among market participants. It affects economic transactions relating to raising capital between corporate managers, shareholders, and members of the public. The extent of the effect of corruption and capital structure on economic growth in emerging economies has not been extensively investigated. This study examined the effect of capital structure and corruption on the economic growth of Nigeria between 2010-2021. The panel quantile regression technique was employed. To check the robustness of the panel quantile results, the technique of ordinary least squares estimations was used. The results show that a 1% increase in the corruption level and inflation reduces the Nigerian economic growth rate by 1.5781% and 0.0162% in the 20th percentile respectively. The significant negative impacts of corruption and inflation are consistent across all the percentiles. However, variables of the capital structure have no impact on the direction of Nigerian economic growth.

**Contribution/Originality:** The article contributes to empirical literature by using panel quantile regression analysis to bring out the effect of capital structure of non-listed financial firms and corruption on economic growth in different percentiles, and shrinking the large individual fixed effects in the firms.

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## 1. INTRODUCTION
According to Chauhan, Jaiswall, and Goyal (2022) societal trust is the fulcrum on which economic transactions in the financial markets of all economies rotate. Societal trust determines the extent to which investors commit economic resources at the disposal of corporate managers without any legal assurance from them, but with the anticipation that the corporate managers will act in their best (Coleman, 1990). Furthermore, Knack and Keefer (1997) opine that market participants in high-trust societies spend less on protecting themselves against exploitation in the financial markets because of stronger formal institutional frameworks. These formal institutional frameworks enforce market discipline and repel misdemeanors in economic transactions. Both formal (e.g., rule of law, industry regulations, political stability, governance effectiveness, etc.) and informal (societal norms, societal customs, culture, religion, etc.) have been found to affect financial markets economic contracting and economic growth (Çam & Özer, 2022; Chauhan et al., 2022; Fan, Titman, & Twite, 2012). Our study is motivated by Chauhan et al. (2022), the study found a negative association between societal trust and capital structure of firms across 46 countries. They found this association more pronounced where the formal institutions were weaker. Our study therefore extends the literature by examining the relationship

between corruption perception index, economic growth, and the capital structure of firms in an emerging economy that is perceived to be among one of the most corrupt countries in the world. Quantitative evidence on the harmful effects of the corruption perception index and the capital structure of listed firms on economic growth is scarce in Nigeria. Hence, this study will fill the gap.

According to the Transparency International Report (2021), Nigeria scored twenty-four percent on the Corruption Perception Index (CPI) and ranked 154th out of 180 countries that were ranked in relation to the CPI. In contrast with the top eight other African countries with the highest Gross Domestic Product in 2021: South Africa (44%, 77th), Egypt (33%, 177th), Algeria (33%, 177th), Morocco (39%, 87th), Kenya (30%, 128th), Ethiopia (39%, 87th), and Ghana (43%, 73rd), Nigeria is ranked and perceived to be the most corrupt. Public sector corruption is perceived to permeate every sector of the economy, including the financial markets (Obamuyi & Olayiwola, 2019). Corruption is responsible for bribery to access public services, money laundering, ghost contract awards, diversion of public funds to private pockets, nepotism, electoral malpractices, public payroll fraud, political instability, and others (Ojeka et al., 2019) which has negatively affected the economic growth and development of various countries around the world e.g., in Vietnan (Anh, Minh, & Tran-Nam, 2016) Pakistan (Abbasi, Jarral, & Saddaf, 2019) Ghana (Amoh, Awuah-Werekoh, & Ofori-Boateng, 2022) Nigeria and India (Obamuyi & Olayiwola, 2019). While these studies are limited to examining the nexus between corruption and economic growth, our study extends to examining the relationship between corruption, capital structure of listed firms and economic growth from Nigeria context.

According to Chauhan et al. (2022) firms in countries with high societal trust have a lower leverage ratio than those in countries with low societal trust. This is because societal trust reduces agency costs and enhances the confidence of equity shareholders to provide more funds to the management of listed firms without much fear of expropriation risks. Also, creditors' willingness to subscribe to debt instruments of listed firms increases as the risks of bankruptcy costs are reduced to the barest minimum. Therefore, conflicts of interest between ownership and management of corporate firms are reduced to the barest minimum in such high-societal countries. However, Nigeria cannot be said to be among countries with high-societal trust countries because of the perception of the country as one of the most corrupt countries. The study therefore extends the literature by examining the effect of the corruption perception index and the capital structure of listed firms in Nigeria on economic growth.

The rest of the study is structured as follows: Section 2 provides the theoretical framework and empirical review of relevant literature. Section 3 provides details of research design, data gathering methods, and data analysis techniques. Section four gives an analysis of the data and discusses the findings, while Section five concludes with recommendations.

## 2. LITERATURE REVIEW

### *2.1. Theoretical Framework*

The heterogeneity nature of the economies of the world in both developed and emerging countries has made the generalization of empirical studies' findings on capital structure across countries unrealistic. This is because there are different country and firm specifics that affect the capital structure of listed corporate firms, apart from differences in the structure of the world economies (Mokhova & Zinecker, 2014). Hence, empirical research on the determinants of the capital structure of corporate firms has been carried out in different countries to show empirical evidence of both firm specifics and macroeconomic factors that influence the listed firm's capital structure in their respective countries (Abdeljawad, Mat-Nor, Ibrahim, & Abdul-Rahim, 2013; Bolarinwa & Adegboye, 2020; Sardo & Serrasqueiro, 2017; Wu & Yeung, 2012). The capital structure is underpinned by two notable theories. The first is pecking order theory, while the second is trade-off theory, as propounded by Myers and Majluf (1984) and Modigliani and Miller (1958), respectively.

Perking order theory is premised on information asymmetry between the owners and management of corporate firms. The management of corporate firms prefers the use of internal sources of financing (equity and retained earnings) to external sources (debts). However, if there is a need to use external financing sources, they prefer debt because of the tax-shield advantage of corporate debt. The trade-off theory, on the other hand, emphasizes an optimal capital structure where the value of a firm is maximized and the weighted cost of capital is minimized as firm's trade-off the benefits and costs of equity and debts. The optimal capital structure is determined by taking into consideration the corporate taxes' advantages, bankruptcy costs (Kraus & Litzenberger, 1973), and agency costs (Jensen & Meckling, 1976). These two capital structure theories have been extensively used in capital structure research to analyze both the internal and external determinants of capital structure of firms.

### *2.2. Internal Determinants of Capital Structure*

These are firm specifics that influence capital structure: profitability, growth opportunities, asset tangibility, corporate tax rates, non-debts tax shields, earnings volatility, liquidity, and size of the firm. There are several empirical studies on the internal determinants of corporate capital structure in both developed and developing countries (Köksal & Orman, 2015; Memon, Md Rus, & Ghazali, 2015). The results of the studies are mixed based on industry and firm specifics. While some firms' capital structures show evidence of pecking order theory i.e., negative relationship between profitability and capital structure (Khémiri & Noubbigh, 2018), others reflect the postulations of trade-off theory, which show positive relationships. However, Khémiri and Noubbigh (2018) find a non-linear (U-shape) relationship between the profitability of firms and the level of their leverage. Gómez, Ángeles Castro, and Flores Ortega (2016) find a negative relationship between growth opportunities and leverage, as trade-off theory indicates, while pecking order theory supports a positive relationship between growth opportunities and leverage. The two theories of capital structure agreed that a positive relationship exists between asset tangibility and leverage. However, Khémiri and

Noubbigh (2018) find a negative relationship between asset tangibility and leverage, contrary to the predictions of the two theories. This implies that firms in the sample countries are called upon to take advantage of tax incentives with a view to reducing the use of debt. In the same vein, trade-off theory suggests a positive relationship between corporate tax and leverage. Memon et al. (2015) find an inverse negative relationship between non-debts-tax shields and leverage in line with the postulations of trade-off theory, while Khémiri and Noubbigh (2018) find a positive relationship between non-debts-tax shields and leverage. However, firms with high liquidity prefer to use their internal sources of financing rather than external sources, in accordance with pecking order theory. This is contrast with the trade-off theory, which supports the idea that firms with high liquidity will incur more debt. The two theories support an inverse relationship between earnings volatility and the leverage of firms.

### *2.3. External Determinants of Capital Structure*

The external determinants of capital structure are mainly factors that are outside the control of corporate managers in making financing choices. Nevertheless, knowledge of the direction of these factors, which are prompted by countries' specific monetary and fiscal policies, aids corporate managers in making viable economic decisions on optimum capital structure. Accordingly, Mokhova and Zinecker (2014) investigate the influence of macroeconomic factors on the capital structure of listed non-financial manufacturing firms in seven European countries from 2006-2010: the Czech Republic, Slovakia, Hungary, Poland, Greece, and Germany. The study finds that country-specifics and corporate debt structures across the countries have a great impact on the associations between the capital structure of firms and macroeconomic factors. There is a weak but significant negative association between GDP growth and total leverage in the Czech Republic and Slovakia. While there is weak positive significant relationship between GDP growth and total leverage in Hungary, Germany, France, and Greece, the relationship between GDP growth and total leverage is strong, though not significant. Also, the unemployment rate has strong positive but not significant associations with total leverage in all the countries except in Slovakia, where it is significant. Long-term interest rate and total leverage show strong positive and significant associations in Germany but strong negative associations in Slovakia while in other countries, the associations are not significant. Furthermore, the short-term interest rate and total leverage show a strong positive association only in Germany and France, while in other countries there is no significant relations between the variables. Furthermore, in the Czech Republic, the association between inflation rate and total leverage is negative and significant: it is positive and significant in France and insignificant in other sample countries. Finally, there is no significant association between tax rates and total leverage in all the countries. The inflation rate is negatively and significantly associated with total leverage in France, but with a positive and significant association in France. Several other studies on the influence of macroeconomic and country specifics factors on capital structure of listed firms have also been carried out in developed economies to depict the relationship between macroeconomic factors and leverage (Moradi & Paulet, 2019). However, the studies do not consider macroeconomic factors that influence the capital structure of firms in developing economies, which are characterized by weak institutional and regulatory frameworks and corruption.

In the study of Khémiri and Noubbigh (2018), external determinants of capital structure from the perspectives of African contexts were examined in five African countries: South Africa, Ghana, Nigeria, Kenya, and Zimbabwe. The study uses macroeconomic variables of financial market development measured by the ratio of stock market capitalization to GDP, GDP growth rate measured by industrial production growth rate, inflation rate measured by consumer price index, and nominal interest rate measured by interest rate in the domestic bond market. The study finds negative relationships between financial development, GDP growth rate, and leverage. This implies that capital markets and economic growth impact the growth of firms and reduce their use of debt to finance their viable projects. Besides, the findings of the study reveal positive relationships between the inflation rate, nominal interest rates, and leverage. This implies that the real value of tax savings will increase during high inflationary periods and high loan interest rates, which stimulate the use of debt. Besides, from 46 countries firms' data, Chauhan et al. (2022) find an inverse relationship between societal trust and the capital structures of firms. Countries where societal trust is higher are found to have a lower leverage ratio because the legal systems can protect the interests of equity holders and reduce the role that debt plays in protecting shareholders. The inverse relationship is, however, most pronounced in countries with weaker formal institutional mechanisms and less developed stock markets. They also find the impact of societal trust to be weaker on firms in countries with strong legal institutions, as societal trust substitutes for formal institutions. Also, Çam and Özer (2022) find that countries with stronger corporate governance regulations have firms that reduce their leverage ratio as they increase their debt maturity. The firms reduce their reliance on short-term debt issuance and increase their reliance on long-term debt and equity issuance to finance their capital expenditures. They find that strong governance (monitoring and controlling mechanisms of laws) increases shareholders' confidence to provide funds for firms with fewer expropriation risks and maintains creditors' willingness to offer loans at lower or decreasing costs of bankruptcy. In summary, the extent to which corruption and capital structure of listed firms influence economic growth is understudied in Nigeria: hence, this study extends literature by examining the effects of corruption perception index and capital structure of listed firms on economic growth with a view to contributing to empirical literature.

## 3. METHODS

### *3.1. Data Descriptions*

The research design is longitudinal, and the population of the study is the listed non-financial firms on the Nigeria Exchange Group from 2010−2021. The 15 sample firms are purposefully selected based on the availability of their annual reports (data) for the research period. Total debt to equity, total debt to assets, and long-term debt to equity ratios are used to proxy capital structure (financial leverage), as suggested by Rajan and Zingales (1995). The

Corruption Perception Index (CPI) is used to measure corruption index, which was extracted from Transparency International, and Gross Domestic Product (GDP) per capita is used to proxy economic growth and inflation proxy by consumer price index, were extracted from the World Bank Data Indicators (WDI) database, 2022.

### *3.2. Quantile Regression*

To investigate the relationship between corruption, capital structure, and economic growth in Nigeria, this study employs the panel quantile regression estimation technique. According to the work of Singh and Kannadhasan (2020), the panel quantile regression estimation method assists in providing a better understanding of the relationship between capital structure, corruption, and economic growth. The quantile regression approach was first introduced by Koenker and Bassett (1978) to estimate quantile regression. Equation 1 presents the conditional quantile version according to Koenker and Bassett (1978).

$$Q_{ji} = (\gamma|X_i) = X_i^{\gamma}\varphi_{\gamma} \quad (1)$$

Using firms' data, the major challenge with firms' data is usually the issue of the incidental parameter problem, which arises due to the presence of a substantial number of fixed effects in the estimation (Singh & Kannadhasan, 2020). Meanwhile, the quantile regression approach is suitable to account for the individual unobserved heterogeneity fixed effects in firms' data. Following the work of Zhang, Jin, Chevallier, and Shen (2016) to determine the relationship between capital structure, corruption, and economic growth and to check the individual firm fixed effect heterogeneity, Therefore, Equation 2 presents the quantile regression model employed in this study.

$$Q_{GDP_{it}}(\tau_k|\alpha_i,X_{ii}) = \alpha_i + \beta_{1\gamma}TDE_{it} + \beta_{2\gamma}TDA_{it} + \beta_{3\gamma}LDE_{it} + \beta_{4\gamma}CPI_{it} + \beta_{5\gamma}INF_{it} + \beta_{6\gamma}U_{it} \quad (2)$$

Where:

$Q_{GDP_{it}}(\tau_k|\alpha_i,X_{ii})$ = Economic growth proxy by the gross domestic product per capita.
$TDE$ = Total debt to equity.
$TDA$ = Total debt to assets.
$LDE$ = Long-term debt to equity ratios.
$CPI$ = Corruption perception index.
$INF$ = Inflation proxy by consumer perception index.
$\beta_{1\gamma} - \beta_{6\gamma}$ = Coefficients of the independent variables and error term.
$U_{it}$ = Error term.

Equation 3 presents the coefficients for the $\tau$-th quantile of the conditional distribution. This is in line with the work of Koenker and Bassett (1978) as shown below:

$$\hat{\beta}(\tau) = arg\ \min \sum_{i=1}^{n} \varphi_{\tau}(y_i = X_i^{\gamma}\varphi_{\gamma}) \quad (3)$$

From Equation 3, we can discover that quantile regression is a weighted regression, by setting $\tau$ and $\tau - 1$ into positive and negative, $\alpha_i$ does not take into account the unobserved heterogeneity of different fixed effects of the firms. Since $\alpha_i$ is part of the estimation parameters, it must be considered in our estimation. To address this issue, we employ the estimation method by Koenker (2004) in Equation 4, which includes $\alpha_i$ as part of estimation parameters.

$$arg\min \sum_{k=1}^{K}\sum_{t=1}^{T}\sum_{n=1}^{N} Z_k \varphi_{T_k}(y_{it} - \alpha_i - X_{it}^{\gamma}\varphi(T_{\gamma})) + \mu \sum_{i=1}^{N} |\alpha_i| \quad (4)$$

Where $Z_k$ is the weight of the $\tau$-th quantile. According to Zhang et al. (2016), we set our weight in this paper as $Z_k = \frac{1}{K}$, $\mu$ is the tuning parameter for individual fixed effect (Koenker, 2004). The $\mu = 1$ according to Damette and Delacote (2012) and Zhang et al. (2016).

**Table 1.** Summary statistics.

| S.no. | Variables | N | Min. | Max. | Mean | SD |
|---|---|---|---|---|---|---|
| 1 | GDP | 180 | 5655.86 | 8222.19 | 6766.57 | 0.40 |
| 2 | CPI | 180 | 24.00 | 28.00 | 26.20 | 0.24 |
| 3 | INF | 180 | 8.06 | 16.52 | 11.99 | 0.50 |
| 4 | LDE | 180 | −30.99 | 118.54 | 21.10 | 0.87 |
| 5 | TDA | 180 | 0.03 | 82.71 | 20.74 | 0.16 |
| 6 | TDE | 180 | 0.05 | 350.84 | 71.01 | 0.16 |

## 4. EMPIRICAL RESULTS

### *4.1. Results*

#### *4.1.1. Descriptive Statistics*

Table 1 shows the descriptive statistics for all the variables employed in the study. From the table, the mean, minimum, maximum values are shown for the variables tested in the study. The standard deviation (SD) shows that the firms may have similar characteristics.

*4.1.2. Panel Quantile Regression Results*

Table 2 presents the results of panel quantile regression between corruption, financial leverage, and economic growth. We employ 20th, 30th, 40th, 50th, 60th, 70th, 80th, 90th percentiles for the analysis. To check the robustness of panel quantile regression model, we also included Ordinary Least Square (OLS) estimate results in Table 2. At 5 per cent level of significance, the coefficients of the variables corruption index and inflation show a negative relationship with economic growth while the variables of financial leverage show an insignificant relationship with economic growth. The negative relationship between the corruption index and inflation is in line with the existing studies (Barro, 2013; Gyimah-Brempong, 2002; Mo, 2001; Valdovinos, 2003). The findings reveal, for instance, that a 1% increase in the corruption level in quantile 20th and 30th reduces the growth rate by about 1.5781% and 1.8591% respectively. Similarly, a 1% increase in the rate of inflation reduces economic growth by about 0.0162% and 0.0125% in quantile 20th and 30th as well. These relationships are consistent across the quantiles. From Figure 1, the coefficients of the variables inflation and corruption have a negative relationship with the gross domestic product per capita while other variables show no significant relationship.

**Table 2.** Financial leverage, corruption, and economic growth: Panel quantile regression result.

| Variable | Quantiles | | | | | | | | OLS |
|---|---|---|---|---|---|---|---|---|---|
| | 20th | 30th | 40th | 50th | 60th | 70th | 80th | 90th | |
| CPI | -1.5781 (0.001)* | -1.8591 (0.004)* | -1.6816 (0.004)* | -1.7908 (0.002)* | -1.5795 (0.001)* | -1.8581 (0.001)* | -1.8581 (0.001)* | -1.8581 (0.001)* | -0.8595 (0.000)* |
| TDA | -11.1780 (0.8901) | 12.8201 (0.104) | -1.1081 (0.604) | 2.1838 (0.202) | 1.4785 (0.401) | 11.7821 (0.891) | 10.2341 (0.760) | -1.8081 (0.441) | -0.8712 (0.230) |
| TDE | -0.0080 (0.790) | 2.0291 (0.194) | 1.9001 (0.404) | 0.2328 (0.301) | 0.1218 (0.711) | 1.1297 (0.781) | 9.1421 (0.210) | -2.9009 (0.341) | -1.7812 (0.331) |
| LDE | -1.8012 (0.190) | 11.1151 (1.101) | 3.2181 (0.514) | 3.0891 (0.231) | 0.2285 (0.454) | 1.6821 (0.451) | 0.1211 (0.898) | -1.9011 (0.471) | 0.2212 (0.260) |
| INF | -0.0162 (0.001)* | -0.0125 (0.004)* | -0.0816 (0.004)* | -0.7008 (0.002)* | -0.1755 (0.001)* | -0.0580 (0.001)* | -0.1081 (0.001)* | -0.0581 (0.001)* | -0.8092 (0.000)* |

**Note:** Gross Domestic Product (GDP) per capita is the dependent variable. while the financial leverage and corruption represent the independent variables. *The probability values are reported in parenthesis at 5% significant level.

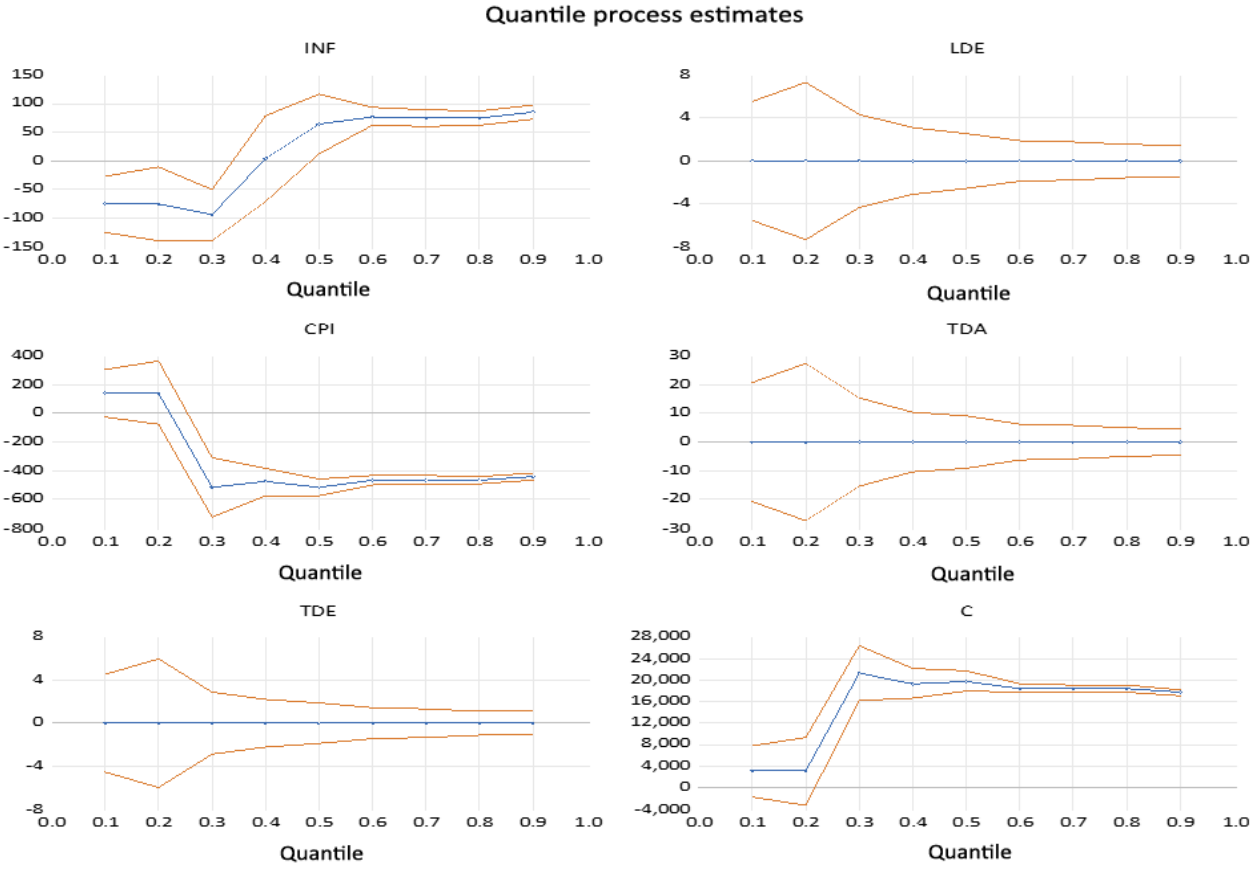


**Figure 1.** Represents the panel quantile regression coefficients with 95% confidence interval.

## 5. CONCLUSION

The purpose of the study is to examine the effect of capital structure and corruption on the economic growth of Nigeria spanning from 2010–2021. The study covers a sample of 15 listed non-financial firms on the Nigeria Stock Exchange. The econometric technique of panel quantile regression was employed. This is to bring out the relationships

between capital structure, corruption, and economic growth in different percentiles, and to assist in shrinking the large individual fixed effects in the listed non-financial firms considered in this study. To achieve this aim, the study estimated from $20^{th} - 90^{th}$ percentile respectively. Findings from the results are consistent in all the percentiles. Overall, corruption and inflation reflect a significant negative impact on economic growth. However, the variables of capital structure have no impact on the economic growth of Nigeria. Hence, conscientious efforts by the government to reduce the level of corruption and inflation in Nigeria, especially by strengthening the monetary and anti-graft institutions in the country, are recommended.

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