

The Impact of Corruption on Tax Revenues: Evidences from Central African Countries*

Yolsuzluğun Vergi Gelirleri Üzerindeki Etkisi: Orta Afrika Ülkelerinden Kanıtlar

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Keywords:

Corruption, Central African countries, Conditional quantile regression.

ABSTRACT

This study investigates the effects of corruption on tax revenues for Central African countries using data for the period 2002-2020. While exploring the possible corrosive effects of corruption on tax revenues, variables such as inflation, income, and industry-added value were also considered. We employed the conditional quantile regression method and performed robustness checks on our findings. Our findings can guide policymakers in making decisions in the field of political economy that potential reforms in the revenue system and administration are expected to yield positive results.

Anahtar Kelimeler:

Yolsuzluk, Orta Afrika ülkeleri, Koşullu yüzdelik regresyon.

ÖZET

Bu çalışma, Orta Afrika ülkeleri için yolsuzluğun vergi gelirleri üzerindeki etkilerini 2002-2020 dönemine ait verileri kullanarak araştırmaktadır. Yolsuzluğun vergi gelirleri üzerindeki olası yıpratıcı etkileri araştırılırken enflasyon, gelir, sanayi katma değeri gibi değişkenler de dikkate alınmaktadır. Araştırmamızda koşullu niceliksel regresyon yöntemini kullandık ve bulgularımızın sağlamlılığını kontrol ettik. Gelir sistemi ve idarede yapılabilecek reformların olumlu sonuçlar vermesinin beklendiği konusundaki bulgularımız politika yapıcılara ekonomi politik alanında karar vermede yol gösterici olabilir.

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1. INTRODUCTION

In all countries where political elections can be held in a free and democratic environment, corruption and poverty, which are two important phenomena that parties claim to prevent or eliminate, directly or indirectly affect a large part of society in developed, developing, or poor countries. It is also noteworthy that corruption plays an important role in the political agenda. It is a common notion that corruption occurs when public power is “inappropriately” used for certain interests. However, poverty may arise when public resources, which are considered the driving force in capitalist economies, are not distributed fairly and equitably.

Although it varies from country to country, 80-90% of public revenue consists of tax revenue. Today, taxes play an important role in financing public expenditures (Noyan and Samancı, 2022). While the ineffective and efficient use of public resources can be considered one of the underlying factors of poverty, corruption in the declaration and collection of taxes can lead to further deepening of poverty.

There are various definitions of corruption, and it should be noted that the acceptance of any phenomenon as corruption varies from society to society, whether small or large. In other words, there are differences in the contexts of social norms. While Tanzi (1998) states that corruption is related to the monopoly and discretion of the state, Stapenhurst (2000) defines it as the abuse of public power for one's own or the group's interests. Sen (2004) defined corruption as the violation of applicable rules for personal profit, and Huntington (2006) defined it as the behavior of public officials outside the generally accepted rules to achieve their personal goals. Finally, according to Berkman (2009), the unlawful use of authority by individuals to obtain financial or personal benefits is corruption.

Various indices have been used to measure the perception of corruption. These are the Global Corruption Barometer (GCB), Bribery Index (BPI), International Country Risk Guide (ICRG), Corruption Perceptions Index (CPI) and Corruption Control (CC) Index. Not all of these indices are based on concrete data and some are scaled as a result of personal perceptions, thoughts, foresights and judgments.

It is difficult to reach a definition that everyone agrees on, and it is controversial which attitude or behavior will be considered corrupt. However, the existence of some corrupt species has been accepted. For instance, extortion occurs when a public official uses his authority to put pressure on the person requesting the service in order to obtain personal benefits. The criminal element is pressure (Kahraman, 2019). Nepotism is defined as

prioritizing members of one's own social group in job placement, contracting, and use of resources (Bramoullé and Goyal, 2016). Although it is accepted as a legal activity in some countries, lobbying, which conflicts with ethical values because of its consequences, can be defined as the competition of individuals or groups to influence public policies for their own interests (Begovic, 2005). Vote trading is basically one type of political corruption; it can be expressed as the support of each other in the bills and proposals that the political parties present to the parliament and protect their own interests (Gür, 2014). Rent seeking is the use of public resources by public officials and politicians by taking into account their personal interests and prioritizing interest and pressure groups in the distribution of public resources (Ata, 2009). Bribery is an extra fee applied by public officials who are obliged to fulfill a certain duty to people who request services to obtain annuity (del Monte and Papagni, 2001). Embezzlement is the unlawful individual use of resources given to public officials to perform their duties (Nye, 1967).

The effect of corruption on tax revenues can be evaluated in the context of financial corruption. Fiscal corruption can be associated with three main indicators: tax evasion, tax legislation, and informal economy in tax. According to Bağdigen and Dökmen (2006), the effects of corruption on tax revenues can be listed as follows: i) informality increases, causing a narrowing of the tax base and a decline in tax revenues; ii) reducing investments, negatively affecting economic growth and shrinking the tax base; iii) unwillingness of taxpayers to meet the illegal demands of some malicious public employees, the shift of their commercial activities to the informal, economy or causing it to cease operations and tax revenues may decrease. It can be argued that the complexity of the tax systems (Doğan, 2020) affects the processes mentioned in the third one.

Starting with the objective effects of corruption and the possible theoretical context of poverty, this study investigates the effects of corruption on total tax revenues in selected Central African countries. In this study, we preferred the conditional quantile regression estimator, which has been widely used in panel data methods. Our findings show that increases in control of corruption at low quantile levels increase tax revenue. We strengthened the accuracy of our findings by using non-parametric methods.

The remainder of this paper is organized as follows. In the second part, following the introduction, the literature contains about some studies focusing on corruption and tax revenues. In the third part, information about the data, sample, and method, in the fourth part,

the findings and the robustness check of the findings, and the results are presented and the conclusion section.

2. LITERATURE REVIEW

Many studies have examined the effects of corruption on various economic factors. Much of this work has focused on growth. Other factors considered are foreign direct investments, inflation, exports, imports, government expenditures, government revenues, and tax revenues. Some early studies explored the threshold effect of corruption on tax revenue. For instance, Cerqueti and Coppier (2009) show that the relationship between tax rates and tax revenues changes depending on the level of the “shame effect”. They found a constant increase in fiscal corruption at low shame and an inverted U-shaped relationship at “high shame” levels. Ma et al. (2025) focused on local corruption and firm tax behavior. They found that, as local corruption rates increase, firms’ propensity to avoid taxes increases. Furthermore, CEO characteristics such as gender, foreign experience, and tenure play an important moderating role in this relationship. These characteristics shape a firm’s tax strategy by influencing the CEO’s perception of, and propensity for, bribery.

Previous studies have focused on the effect of corruption on carbon taxes. Nguyen et al (2024) found that most environmental taxes have significant positive effects on the control of corruption and the corruption perceptions index, while they have negative effects on the political corruption index, implying that environmental taxes appear to increase anti-corruption indices in 11 countries. Davidovic (2024) found that increasing perceptions of corruption lead to negative attitudes toward climate taxes, even among individuals with pro-environmental value orientations, environmental concerns, and political value orientations that support government regulations in Sweden and Mexico.

In studies dealing with the corruption-growth relationship, it has been found that the relationship is generally negative (seen for detail Mo (2001), del Monte and Papagni (2001), Neanidis et al. (2017)), and in some (seen for detail Swalehen and Stansel (2007), Podobnik et al. (2008)) concluded that corruption positively affects growth. The general effect of corruption is to harms FDI flows (Zander, 2021). The literacy rate, GDP growth, and economic integration have a negative effect on corruption, whereas inflation has positive effect on corruption (Uroos et. al., 2022). Table 1 lists some study and their findings.

Table 1. Empirical Literature

Author(s)	Country(s) / Years	Variables	Result
Ajaz and Ahmad (2010)	Developing countries (25) 1990-2005	Cor, Gov, Tr	Cor has a negative impact on Tr.
Potanlar et. al. (2010)	Developing countries (27) 2002-2006	Cor, Tr	Cor has a negative impact on Tr.
Monteiro et. al. (2011)	EU countries (27) 1998- 2009	Ctr, Unp, Cor, debt, Trade	Cor has a negative impact on Ctr.
Dökmen (2012)	OECD countries (25) 1984-2007	Cor, Tr	Cor has a negative impact on Ctr.
Binaj (2015)	50 countries 1995-2011	Cor, tax burden, Gdp, Tae	The vicious circle between tax evasion and political corruption is often seen in developing and sometimes developed countries.
Huňady and Orviská (2015)	OECD and Latin America countries (46) 1998-2013 45 countries	Cor, Tr	Cor has a negative impact on Tr.
Litina and Palivos (2015)	1994-1999/2005-2007 and 16 countries 1972-2012	Pcor, Te	Cor has a positive impact on Te.
Timmons and Garfias (2015)	Brazilian municipalities 2001-2008	Cor, Audit, Pop, Ptr	Cor has a negative impact on Ptr.
Özmen (2016)	BRIC-T 1996-2013	Ctr, Cor, pGDP per capita, Trade, Ef	Cor has a negative impact on Tr.
Arif and Rawat (2018)	10 EAGLE countries 2001-2015	Cor, Gov, Tr	Corruption has a positive and significant impact on the tax revenue collection of the emerging economies.
Tunç (2018)	EU Member Transition Economies 2003-2015	Cor, Tr	There is a bidirectional causality relationship between tax revenues and corruption.
Dramane (2022)	WAEMU Countries 1996-2017	Cor, Gov, Tr	Cor has a negative impact on Tr.

Notes; Corruption: Cor, Govern: Gov, Tax revenue: Tr, Corporate tax revenues: Ctr, Property tax revenue: Ptr, Unemployment: Unp, Trade: Tr, Tax administration efficiency: Tae, Political corruption: Pcor, Tax evasion: Te, Population, Pop, Inflation: Cpi, Economic freedoms: Ef, Gross domestic product: GDP, GDP per capita: pGDP

3. SAMPLE, DATA AND METHODOLOGY

3.1. Sample and Data

As mentioned in the introduction, we investigated the effects of corruption on tax revenues in selected Central African Countries. We argue that it is important to follow the traces of corruption in Africa, where authority changes hands frequently and transitions between plutocracy and militocracy (Bayram, 2019) are common (military coups are common). In such cases, tax revenues may be affected for various reasons and public authority may be used for personal interests. Although there are many countries in this geographical definition

accepted by the United Nations (Wikipedia, 2023), we chose seven countries from which we could access the dataset to create a balanced panel among them. Table 2 lists these countries.

Table 2. Countries List

Angola	Gabon*
Burundi	Republic of the Congo (or Congo Rep. (in WDI))
Cameron	Rwanda
Chad	

* We obtained the 2021 Cpi value for Gabon from “<https://www.economy.com/gabon/consumer-price-index-cpi>”

To investigate the effect of corruption on tax revenues, we start with the panel model suggested by Arif and Rawat (2018). Based on the following functional definition, we set up the model given in Equation 2:

$$Tr = f(GDP, CC, Ind, CPI) \quad (1)$$

$$\ln Tr_{it} = \alpha_0 + \beta_1 \ln GDP_{it} + \beta_2 CC_{it} + \beta_3 \ln Ind_{it} + \beta_4 \ln CPI_{it} + \varepsilon_{it} \quad (2)$$

Where Tr represents total tax revenues (% GDP) from IMF (2023), GDP indicates gross domestic per capita income (constant, 2015 US\$), Ind indicates Industrial value-added (including construction), value added (% of GDP), CPI is the consumer price index (2010 = 100) from WDI (2023). CC represents control of corruption first developed by Kaufman et al (2011) and ε is the error term.

CC index estimated by the World Governance Indicator (WGI) (2023). The index value interval was -2.5 to 2.5. The value indicates improvement as it moves towards the positive, that is, corruption is taken under control, and the corruption increases as it moves towards the other side, that is, the negative. We used logarithms for all variables, except control of corruption. $\ln$ is the natural logarithm of the series. The data consisted of 140 observations from seven countries between 2002-2021.

3.2. Methodology

To estimate Equation 2, we employ the Conditional Quantile regression (CQR) estimator developed by Koenker and Bassett (1978). With this estimator, we used the Bofinger bandwidth method proposed by Koenker (2005). One of the main advantages of quantile regressions is that the effects in different quantiles can be interpreted differently at various points in the conditional distribution of the dependent variable. In a bivariate model, such as α and b , quantile regression parameterizes the quantiles of the distribution of α conditional on the independent variables b as βb , where β is a vector of the estimated parameters. The CQR estimator optimization estimate is as follows:

$$\min_{\beta} \sum_{i=1}^n \delta_{\tau}(\alpha_i - b_i' \beta) \quad (3)$$

where α_i is the vector of the dependent variable, b_i is a matrix of independent regressors, β is the estimated vector of parameters and δ_{τ} is the absolute value function that yields the τ^{th} sample quantile as its solution.

For the linear model of ∂^{th} quantile ($0 < \partial < 1$) as is;

$$\min_{\beta} \frac{1}{n} \left\{ \sum_{i: \alpha_i > b_i' \beta} \partial |\alpha_i - b_i' \beta| + \sum_{i: \alpha_i < b_i' \beta} (1 - \partial) |\alpha_i - b_i' \beta| \right\} \quad (4)$$

Accordingly, as one keeps increasing α_i from zero to one, we can be traced the entire conditional distribution of the α_i , conditional on the set of regressors (Koenker, 2001; Foster, 2008). The main contribution of CQR to our research is that the entire conditional distribution of the dependent variable can be characterized using different values of τ . The coefficient signs of the total tax revenues of the variables are as follows:

- H₁: In a fair taxation system, an increase in income increases the total tax revenue (+),
H₂: Increasing industrial production increases total tax revenue (+),
H₃: Consumer price index increases/decreases total tax revenues (+/-),
H₄: Control of Corruption increases total tax revenues (+).

4. EMPIRICAL FINDINGS AND ROBUSTNESS CHECK

Table 3 presents some pioneering statistics for our variables. The GDP means are higher than the others. The standard divisions of Ind and CPI are higher than the rest. Skewness shows that each variable is positively skewed.

Table 3. Descriptive Statistics

	Mean	Max.	Min.	Std. Dev.	Skewness	Kurtosis	J-B
Tr	24.39	48.43	10.37	8.77	0.76	2.85	13.64 ^a
GDP	2083.57	7357.56	261.09	2132.21	1.47	3.90	55.82 ^a
Ind	32.85	66.17	9.23	18.79	0.37	1.53	15.75 ^a
CPI	116.52	583.67	15.34	67.74	4.00	24.11	2976.50 ^a
CC	-0.97	0.77	-1.58	0.56	1.78	5.33	106.39 ^a

Notes: ^a indicate 5% statistically significant.

Moreover, the kurtosis value revealed that Tr is mesokurtic (normal distribution), GDP, CPI, and CC are leptokurtic (T-distributions), and Ind is platykurtic (uniform distributions). Accordingly, it is difficult to say that the variables have a normal distribution. Therefore,

nonparametric methods may be more effective for our estimation. Table 4 presents the findings for the CQR and OLS, NKR estimators.

Table 4. CQR estimator and OLS, NKR results

	OLS	NKR	CQR			
			Q10	Q25	Q50	Q75
lngdp	-0.21 ^a	-0.22 ^a	-0.16 ^c	-0.24 ^a	-0.28 ^a	-0.24 ^a
lnInd	0.56 ^a	0.58 ^a	0.44 ^a	0.62 ^a	0.69 ^a	0.61 ^a
lnCpi	-0.03	-0.02	0.08	-0.008	0.02	-0.07
CC	0.06	0.06 ^c	0.25 ^a	0.21 ^a	0.07	-0.01
Constant	3.00 ^a	---	2.31 ^a	2.87 ^a	2.82 ^a	3.43 ^a
Pseudo R ²	0.3192	0.6469	0.1632	0.2260	0.1833	0.2784

Notes: Q indicate quantile. a, b, c indicates %1, %5 and %10 respectively. R² results for NKR and OLS have been reported.

The CQR findings show that for lngdp are -0.16 and -0.28 and negative and significant in all quantiles, implying that per capita income (lngdp) leads to a decrease in total tax revenue. lnInd coefficients are 0.44 and 0.69. These are positive and significant in all quantiles, implying that lnInd leads to an increase in the total tax revenue. Our main findings relate to the control of corruption (CC) coefficients. CQR findings show that CC are 0.25 and 0.21. These are positive and significant in the 10th and 25th quantiles, respectively.

Graphical representation can be useful, as the results for the quantiles can be presented in a graph. Figure 1 displays graphs of the quantiles, with the x-axis ordered from 0. to 100, and the vertical axes representing the effect of variables that lnGdp, lnInd, lnCpi and CC. The red line indicates a negative coefficient for lnGdp across all quantiles, while the purple line lnInd has a possitive effect on the all quantile.

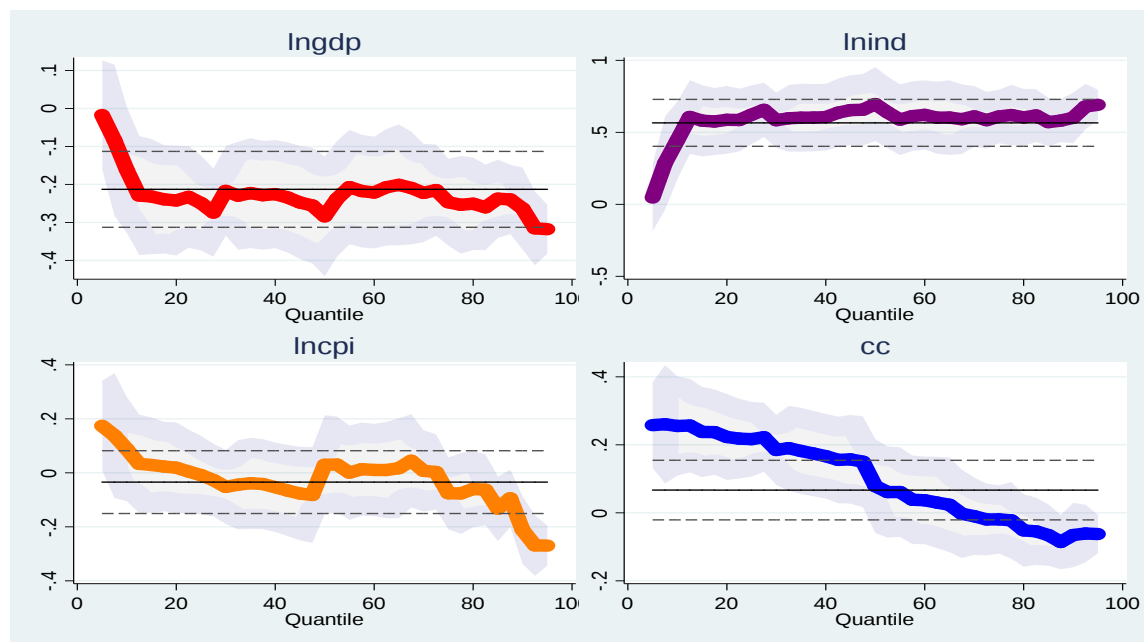


Figure 1. CQR estimations plots

All coefficients for $\ln Gdp$ are negative and below -0.2, and this effect persists on average across all quantiles. For $\ln Ind$, the trend is similar, but the coefficients are positive and larger. We did not find a meaningful coefficient for $\ln Cpi$. Finally, the CC findings interval is 0.20 to -0.20. These findings indicate the existence of a threshold value for the sample.

4.1. Robustness check

We also employed the nonparametric kernel (Gaussian) regression (NKR) and OLS estimator to robustness check of our CQR findings. NKR has 100 bootstrap replications and an *imaic* option is employed. This instrument, along with the improved AIC proposed by Hurvich et al. (1998). The NKR approach minimizes the trade-off between bias and variance.

NKR findings confirmed the results of CQR. The coefficient signs of $\ln Gdp$, $\ln Ind$, and CC are positive and consistent with CQR, and the $\ln Cpi$ finding for NKR is statistically insignificant, as in CQR.

5. DISCUSSION

We can say that, like Binaj (2015), the vicious circle between tax evasion and corruption is not only in developing, undeveloped, but also in developed countries. We examined the effect of corruption on tax revenue from Central African Countries. To discover the effect of control corruption on tax revenue, we used data on the control of corruption, per capita income, inflation, and industrial value-added (% GDP). We employ several econometric methods and find our findings robust. Our empirical findings show a significantly positive relationship between CC and tax revenue. This result is not surprising and conforms to those of previous studies conducted on the same subject.

Potans et al (2010) showed that the higher the corruption, the lower the tax revenue based on the corruption perception index (CPI). Ajaz and Ahmad (2010) also obtained similar results for developing countries. Litina and Palivos (2015) also stated that corruption is a phenomenon that not only has an erosion effect on tax revenues but also feeds itself. Timmons et al. (2015) showed that corruption negatively affects local government revenue. Özmen (2016) shows that corruption hurts tax revenue. Arif and Rawat (2018) also find that the CPI has a positive impact on tax revenue in emerging and growth-leading economies. Dramane (2022), African countries, findings show that governance positively affects tax revenues, while corruption hinders tax revenues from increasing in WAEMU countries (Benin, Burkino Faso, Cote D' Ivoire, Niger, Togo, Burkina Faso, Mali, Senegal). The findings on the corruption variable rescaled by Dramane (2022) are also consistent with ours.

Most studies have used standard regression estimates, whereas the impact of corruption on tax revenues may have different effects at different levels of tax revenue or different levels of corruption. This means that the relationship between the two variables may not always be linear. Our study, unlike the ones above, focuses on exactly this point. Quantile methods are highly effective estimators in this regard. However, quantile estimators may also be disadvantageous when the dataset is short.

6. CONCLUSION AND POLICY IMPLICATIONS

In this study, we investigated the effects of corruption on total tax revenues in seven Central African countries span to 2002-2021. We add several variables to strengthen the research model and monitor the robustness of the findings. In addition, we robustly validated our findings by using different estimators.

We categorized our findings into four headings. While the first relates to the control of corruption findings, the others belong to all three variables.

i) According to the conditional quantile regression findings, a decrease in corruption in low quantiles increases total tax revenue, but this positive effect disappears in high quantiles. This finding was confirmed using a nonparametric kernel regression estimator. ii) Contrary to expectations, increases in per capita income reduce total taxes. This phenomenon can be explained in two ways. If there is no tax tariff with increasing rates in a tax system, the increase in this income may not affect the total tax revenue, but a second scenario is also possible, which is the high level of loss or evasion in the tax system in question. Thus, the higher the earnings, the easier it is to get out of the tax. This is more likely in systems with high levels of corruption. iii) As industrial value-added increases, total tax revenues increase, and these findings are valid for all quantiles. iv) Inflation has no statistically significant effect on the total tax revenue.

All three findings were confirmed using a nonparametric kernel regression estimator. While hypotheses H_2 and H_4 are valid for the selected Central African country, hypothesis H_1 is invalid. Finally, H_3 could not be confirmed or falsified. Further research should focus on the effects of corruption on indirect and direct tax revenues rather than on total tax revenues. In addition, the samples of the studies can be investigated using comparative sampling, as well as different country groups, different income and development levels, and whether the effects vary according to the development levels of the countries.

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