# Institutional Governance and Oil Rents: Evidence from the Republic of Congo

## Cyriaque MBINGUI[1]

**Abstract**

This article analyzes the effect of Institutional Governance on Oil Rents in the Republic of Congo over a period from 1996 to 2021, using the Auto Regressive Distributed Lags (ARDL) model. The study finding shows that, in the short run, institutional governance has a positive and significant effect on oil rents. However, in the long run, the effect of corruption on oil rents is significantly negative. These results have enabled us to formulate two (2) economic policy implications. The first is a policy geared towards institutional governance by strengthening corruption control and transparency, and by giving full power to the EITI, the body empowered to control oil revenues. The second is a policy based on the fight against impunity. To achieve this, governments must define and apply punitive methods for rogue administrators, encourage optimality in the mobilization of oil revenues, and prioritize the general interest by combating the remarkable inequalities in the distribution of oil revenues.

**Keywords:** Institutional governance, Oil rents, ARDL, Congo.

## 1. Introduction

The issue of oil rents has received considerable attention from institutionalists and economists (EITI, 2022), since the International Monetary Fund (IMF, 2018) highlighted the lack of transparency in the management of oil revenues in developing countries. The International Energy Agency (IEA, 2021) asserts that oil revenues are one of the main factors driving economic growth in Africa's oil-producing countries. According to EITI (2022), oil revenues are an important source of funding for development programs. Thus, Cameron and Stanley (2017) corroborating the above assertions, have shown the importance of oil revenues in the state budget through the financing of various public projects essential to achieving the Sustainable Development Goals (SDGs).

However, reports of the IMF (2015) and the IEA (2015) reveal that the share of oil revenues continues to decline in exporting countries, despite the establishment of institutions in charge of governance issues. These reports also reveal that the Persian Gulf countries recorded a revenue loss of $287 billion, compared with $444 billion in the countries of the Organization of the Petroleum Exporting Countries (OPEC). However, the oil-exporting countries of the Central African Economic and Monetary Community did not remain on the sidelines of this reality, their losses amounting to 1181.2 billion XAF in 2016. This situation has worsened in the sub-region, with 2,700 billion XAF lost in oil revenues (BEAC, 2020). The Republic of Congo during the same period recorded losses of 131.1billion XAF. This is attributable to poor governance. According to International Transparency (2016), the Republic of Congo ranks 159th out of 176 countries with a governance score of 20/100. According to IGRN (2017), the Republic of Congo ranks 58th out of 86 countries with a governance index of 39/100.

Indeed, the relationship between institutional governance and oil rents has been the subject of controversy in the economic literature. Theoretically, the economic literature highlights two approaches. The first approach stipulates that institutional governance deteriorates the oil rents. This approach validates the natural resource curse theory, which evokes all kinds of negative effects (corruption, civil wars and conflicts) that develop in oil-producing countries because of poor or bad governance of oil rents (Auty, 1993; Tanzi and Zee, 2001; Collier and Hoeffler, 2003; 2004; O'Higgins, 2006). Also, in the current of public choice, the theories of the electoral cycle and bureaucracy show that politicians and rulers use the State and the Administration to satisfy their egoistic interests to the detriment of the general interest (Buchanan and Tullock, 1962; Nordhaus, 1975; Niskanen, 1971).

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[1]Faculty of Economics, Marien NGOUABI University, Republic of Congo, Laboratory of Research for Economic and Social Studies(LARES), Email: mbinguic@gmail.com

In contrast, the second approach reveals that institutional governance improves oil rents. This approach is based on institutional theory (North, 1990), which emphasizes the efficiency of revenue mobilization, the Ramsey rule (1927) and optimal taxation theory (Mirrlees, 1971). For the latter two, revenue optimization requires the compulsory levying of taxes.

The empirical literature on the relationship between institutional governance and oil revenues shows two axes: the axis of studies with negative results (Donwa and al, 2015; Izekor and Okaro, 2018; Gbewopo et al, 2011; Hwang, 2002) and the axis of studies with positive results (Soro, 2020; Abdoulaye, 2018; Epaphra and Massawe, 2017; Rotimi et al, 2013). It is important to remember that some empirical studies have considered all composite governance indicators. In addition, several studies highlight only the link between governance and public revenues.

The Congolese economy is heavily dependent on oil, which currently accounts for over 70% of gross domestic product and gross fixed capital formation, over 90% of Congo's exports, and over 80% of government revenue. This dependence on oil has adversely affected the Congolese economy as a whole during periods of sluggish oil prices, such as the COVID pandemic. More structurally, dependence on oil affects the performance of other sectors of activity, and reinforces the weak integration of the various branches (World Bank, 2015). Despite significant oil revenues (58.84% in 2000 and 57.42% in 2011), Congo's economic performance is disappointing compared, to the robust performance of other developing countries over the past decade. Its development indicators are estimated at 0.495 and 0.557respectively, in 2000 and 2011 with 70% of the population living below the rural poverty line (in 2017) and very remarkable inequality in income distribution (World Bank, 2015).

The Republic of Congo ranks 58th out of 86 countries with a governance index of 39/100; 159th out of 176 countries with a score of 20/100 (IGRN, 2017; International Transparency, 2016), and achieved institutional governance scores of -1.41 (Control of corruption) and -1.14 (Rule of law) in 2019 (WGI, 2023). Taking in account these scores and ranks, the Republic of Congo is an interesting field in analyzing the relationship between institutional governance and oil rents.

This choice is justified by the insignificant contribution of oil rents to improving living standards in Congo and oil-producing Sub-Saharan African countries (Gary and Karl, 2003).Our research question is as follows: **What is the effect of institutional governance on oil rents in the Republic of Congo**?

The answer to this question enables us to highlight the relationship between institutional governance and oil rents in the Republic of Congo. This study argues that institutional governance has a positive influence on oil rents in the Republic of Congo. This hypothesis is based on the theory of optimal taxation developed by Mirrlees (1971) and on the studies of Rotini (2013), who showed that transparency, has a positive effect on oil revenues in Nigeria.

Our article includes five (5) points, namely: Introduction (section 1); Institutional governance and Oil rents in the Republic of Congo (Section 2); Review of economic literature (Section 3); Methodological approach and results (Section 4), and Conclusion and policy implications (Section 5).

## 2. Institutional governance and oil rents in the Republic of Congo

This section presents the trends evolution of institutional governance and oil rents in the Republic of Congo.

### 2.1 Institutional Governance

Institutional governance is considered as, the respect accorded by governors and governed to the institutions that govern their interactions.

According to the UNDP (2002), governance is" the exercise of economic, political and administrative authority to manage a country's affairs at all levels. It includes the mechanisms, processes and institutions, through which citizens and groups express their interests and differences, exercise their rights and fulfill their obligations. Governance includes the state, but it also includes the private sector and civil society organizations". This means that governance is the management of public affairs encompassing all economic players: the state, the private sector and civil society. Referring to the studies of Kaufmann et al (2005) and Boutaleb (2004), governance takes into account political, economic and institutional governance. Political governance is the process by which rulers are selected and replaced. Economic governance, on the other hand, corresponds to the ability of rulers to formulate and implement public policies and provide public services to citizens.

Two indicators taken from the six (6) World Bank indicators (Kaufmann et al, 2005) measure each governance component:

- Political governance is measured by Voice and Accountability (Vr), and/or Political Stability (Sp);
- Economic governance is measured by Regulatory Quality (Qr) and/or Government Efficiency (Eg);
- Control of Corruption (Cc) and/or the Rule of Law (Ed) (Konate, 2014) measure institutional governance.

Referring to Konate (2014), our study focuses on institutional governance that, for our case, takes into account only the Control of Corruption indicator. This variable weighs most heavily in governance. Corruption control takes into account perceptions of the extent to which elites and private interests (WGI, 2023) exercise public power for private ends, including small and large forms of corruption, as well as the «capture» of the state. The estimate gives the country's score on the global indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to +2.5.

To analyze the evolution of institutional governance in the Republic of Congo, we refer to Kaufman et al (2005), who measured the Control of Corruption variable (Cc) on the one hand, and the Rule of Law variable(Ed) on the other, in a range from -2.5 to +2.5. Note that:

- If Cc is in the range -2.5 to 0 (-2.5 < Cc ≤ 0), the country is in poor or bad institutional governance;
- If Cc is in the range 0 to +2.5 (0 < Cc ≤ +2.5), the country has good institutional governance.
- If Ed is in the range -2.5 to 0 (-2.5 < Ed ≤ 0), rules are not respected and are not trusted in the country;
- If Ed is in the range 0 to +2.5 (0< Ed ≤ +2.5), rules are followed with confidence in the country;

Graph1: Evolution of corruption control and rule of law in Congo (from 1996 to 2021)
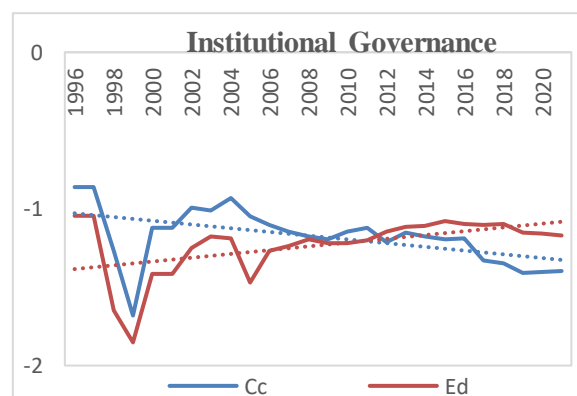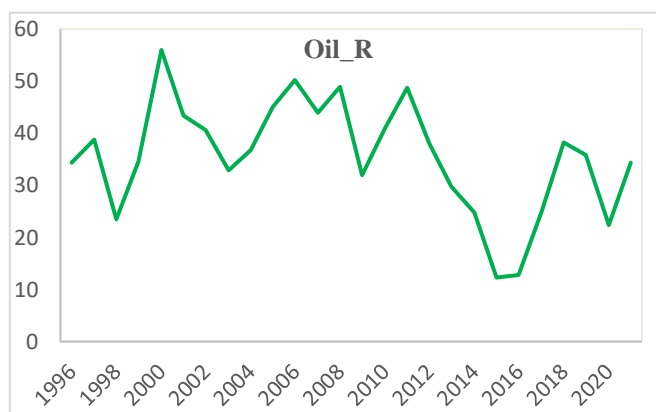


Source: author, WGI (2023)

This graph shows the evolution of institutional governance (captured by the Corruption Control and Rule of Law indicators) in the Republic of Congo over the period 1996 to 2021.The above graph shows a downward trend for Corruption Control and an upward trend for Rule of Law in the Republic of Congo over the entire period. The evolutions show recurrent and alternating oscillations over time for both Corruption Control and Rule of Law. The lowest scores for institutional governance indicators were recorded in 1999 (Cc: -1.68 and Ed: 1.85), before improving again. These low scores can be explained by the various internal wars and socio-political troubles that the Congo experienced between 1997and 1999. In general, the scores are negative (below zero), reflecting poor institutional governance throughout the period from 1996 to 2021.

## 2.2 Oil Rents

According to Chevalier (1975), oil rents is defined as the difference between the price of a unit measure of a natural resource, sold to consumers in the form of refined products, and the average total cost incurred to extract, transport, refine and distribute that same unit measure of the resource. For Ikama (2014), oil revenues refer to the part of the oil surplus resulting from the characteristics of the oil field and various factors that influence the price of oil. They are still called oil rents when they generate extraordinary profits during production.

According to the OECD (2017), oil revenues represent the share of the operating surplus derived from the extraction and sale of crude oil, generally after recovery of investments and operating costs. They are of various origins i.e. they come from, exports (sales), production shares, royalties, taxes/taxes, dividends and discovery bonuses.

Graph2: Oil rents evolution in Congo (from 1996 to 2021)



Source: author, WDI (2023)

The graph above shows the evolution of Congo's oil rents over the period from 1996 to 2021. Overall, the oil rents show a downward evolution with recurring and alternating oscillations overtime, reaching its lowest oil rents (12.275) in 2015. An upward recovery was observed until 2018, before declining again. The highest rents dependency (55.95) was recorded in 2000. Falling oil prices or production disruptions may explain the downward trend in recent years. In general, oil rents evolutions are volatile (Global Witness, 2017).

## 2.3. Cross Evolution of Institutional Governance and Oil Rents

This sub section presents the cross evolution of the institutional Governance and Oil Rents indicators.

Graph3: Cross Evolution of institutional governance and oil rents in Congo (1996-2021)
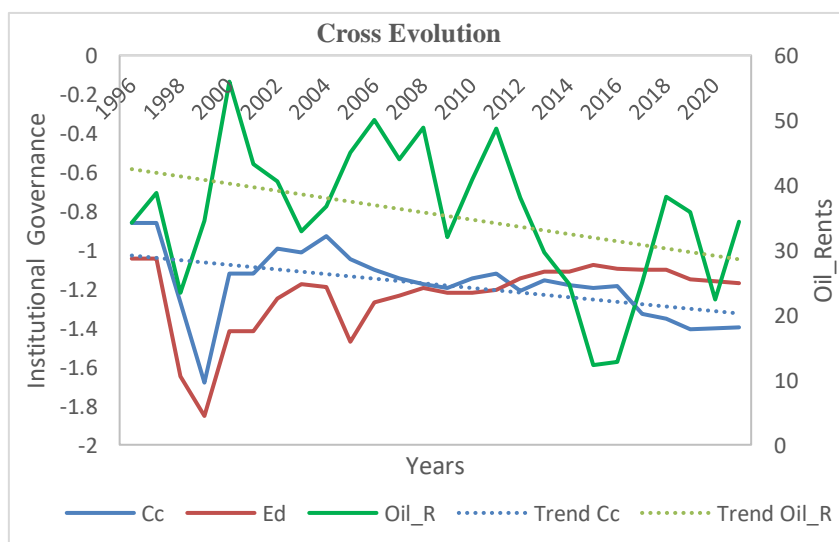


Source: Author, WGI (2023) and WDI (2023)

This cross-evolution graph of institutional governance (captured by the Control of Corruption and Rule of Law indicators) and oil rents shows downward trends for the Control of Corruption and Oil Rents variables, with oscillating, alternating and recurring variability. This trend is upward for the rule of law, showing an ambiguous correlation with the first two variables.

## 3. Review of economic literature

This section presents the theoretical and empirical literature on the relationship between institutional governance and oil rents.

**3.1 Theoretical Literature**

Two theoretical approaches emerge from the literature on the relationship between institutional governance and oil rents: approach "A", which states that institutional governance worsens oil rents, and approach "B", which reveals that institutional governance improves oil rents.

**3.1.1. Approach A: "Institutional governance worsens the oil rents"**

In this approach, the theoretical literature highlights the following theories: the natural resource curse theory (Auty, 1993); the electoral cycle theory (Nordhaus, 1975) and the bureaucracy theory (Niskanen, 1971) developed in the public choice movement (Buchanan and Tullock, 1962).

- **Natural Resource Curse Theory**

The natural resource curse theory developed by Auty (1993) is seen as the root of all natural resource problems. The main reason is weak institutions and mismanagement of resource revenues. For this theory, the mobilization of transmission channels is necessary to explain the effects of the natural resource curse in producer countries. Rent-seeking is one of the channels that encourage corruption, political instability, conflict and so on.

Auty (2001) believes that rent-seeking behavior leads to corruption and discourages investment. In addition, Lane and Tornell (1999) argue that rent-seeking behavior is frequent in resource-rich economies with weak political and judicial institutions, calling into question the type of economic policy applied and the legitimacy of these actors. Karl (1999) reveals that rent distribution is not very transparent. It favors "clientelism" networks and the behavior of political and military elites in the pursuit of rents. These predatory interest groups are sometimes more powerful than political parties and/or the government. The result is petromania, inefficient public spending and budgetary and economic crises. Such rent-seeking behavior is common in the issuing of permits or operating licenses to extractive companies (O'Higgins, 2006). Sala-i-Martin and Subramanian (2003) argue that oil booms exacerbate rent-seeking behaviour, leading to corruption and inefficient government spending.

On the other hand, Collier and Hoeffer (2003) and Ross (2004) believe that mining rents, if poorly managed, can also lead to autocratic government and civil strife, weakening state structures and encouraging the capture of rents. According to Fearon and Laitin (2003), deteriorating governance increases the risk of war and conflict. In fact, natural resources represent a substantial source of funding that attracts the covetousness of many rebel groups and organizations. The plundering of natural resources by these fledgling groups can be used to buy weapons, form and train militias and challenge government forces. For Copinsh i(2003), natural resources generate tensions between neighboring states. In many parts of the world, border disputes are linked to natural resources: Iraq's invasion of Kuwait in 1990, the 1995 war between Peru and Ecuador over a border territory reputed to be rich in oil and the border dispute between Nigeria and Cameroon over oil-rich Bakassi.

- **Public Choice Current**

In the wake of rent-seeking behavior and the various forms of corruption that surround oil revenues, one of the many questions that recur in the economic sector is that of state failure, which is the anchor of the public choice movement developed by economists (Buchanan and Tullock, 1962). The public choice movement is an economic analysis of state failure based on the gap between "what governments can do and what governments do". It does not explain how the economy works, but uses economic methods and tools to explore how politics and the state function. The conceptual framework proposed by Buchanan and Tullock (1962) explains why individuals act together rather than individually in certain situations, and shows the possibility of rigorously relating the advantages and disadvantages of various rules in collective decision-making. Buchanan and Tullock (1962) see the political system and the evolution of constitutions as a process whereby individuals seek to protect their own interests, rather than striving to achieve the "general interest". This approach challenges the prevailing argument that extensive state intervention is necessary to improve social welfare by correcting cases of "market failure". However, state failure remains the problem.

- **Electoral Cycle Theory**

For this theory, rent-seeking is important for many governments that depend on it, as it helps finance their electoral process (Nordhaus, 1975). It reveals that governments spend more in the months leading up to elections. This spending would enable the government to offer potential voters goods and services that would improve their quality of life, while leading them to evaluate the incumbent government positively. However, this increase in public spending is seen as a financial boondoggle that weakens public revenues, hence the questioning of the electoral cycle theory (Ascher, 1999). As a result, politicians and civil servants use public revenues to finance their personal projects, to the detriment of the general interest. At election time, governments take demagogic measures to bribe the electorate, thereby increasing public spending. This is contrary to the deontological and ethical notions of the benevolent and neutral state found in the Keynesian and classical approaches. Politicians and rulers use the state

and its administration to serve their own interests by seducing voters and maintaining a certain influence over bureaucrats.

- **Theory of Bureaucracy**

    Weber (1905) developed this theory of bureaucracy. It highlights state failure as a problem to be taken seriously. According to Niskanen (1971), political and administrative authorities must not put their own interests ahead of the collective interest. Increased public spending on thieve of elections to woo voters, poor investments and wage bill reforms all take their toll on the country's economy, leading to corruption and impunity.

### 3.1.2 – Approach B:"Institutional Governance Enhances Oil Rents".

In this approach, the theoretical literature is based on optimal taxation theory (notably the Ramsey rule and optimal revenue taxation), New Public Management theory and New Institutional Economics (NIE) theory.

- **The Theory of Optimal Taxation**

    This theory is based, on the one hand, on the Ramsey rule and, on the other, on optimal income taxation:

Ramsey's rule (1927), considered as the first theory of optimal revenue taxation, was developed in the context of an efficiency-maximizing tax system under the assumptions of competitive markets. It recommends taxing different goods in inverse proportion to the compensated elasticity of the law of supply and demand. It encourages the application of low tax rates to goods with elastic demand, and high rates to those with inelastic demand. To minimize the dead weight loss (increase efficiency), tax where supply and demand are least price-sensitive. The aim is to create as few mismatches as possible. This inverse elasticity rule increases the tax burden on poor households. Thus, such a tax system is unfair, because it taxes more those who are less responsive to taxes: labor more than capital, health spending and every day consumer goods. For our purposes, Ramsey's rule can be applied to the oil sector, where supply and demand are less price-sensitive. In other words, raising taxes will not affect market demand for petroleum products, but will increase government revenues. On the other hand, this tax increase will have repercussions on the price of fossil fuels, and consequently on transport consumption costs.

Optimal income taxation, developed by Mirrlees (1971), is a model of optimal taxation based on taxes and distributive income. Taxation modifies the primary distribution of revenues through compulsory levies and transfers. The aim of redistribution is to tax individuals with the highest marginal productivity. This encourages individuals with high marginal productivity to reduce their labor supply, resulting in lower tax revenues. The effect of redistribution on social well-being must then, be weighed against the effect on the labor supply of high-productivity individuals and on lost tax revenues. These trade-offs make it possible to find an optimal tax rate. This threshold rate must not, be exceeded. Threshold effect models can determine it. The theory of optimal income taxation aims to clarify the determinants of an optimal tax rate. The scale is progressive when the tax rates increase with income levels, leading to gains in terms of equity. It can also distort labor supply by discouraging individuals from making greater efforts. Such discouragement can be, circumvented by the practice of tax avoidance. This type of behavior is manifested in tax evasion and tax optimization. The two types of behavior are similar in that they both result in tax revenue losses. However, they differ in that tax evasion is a violation of tax law, whereas tax optimization is the circumvention of tax law by taking advantage of loopholes in tax law or legal loopholes.

- **New Public Management Theory**

    New Public Management (NPM) is a management style that aims to introduce the values and operating methods of private enterprise into public administration (Fayol, 1918). For this theory, the public sector, organized according to Weberian bureaucratic principles, is inefficient. It is desirable to transpose private-sector management methods to the public sector. The rigidity of a centralized bureaucratic administration focuses on its own development. The NPM reveals that the public sector relies on the 3E" approach (Economy, Effectiveness and Efficiency) to meeting the expectations of citizens, who have become customers, at the lowest possible cost. To boost performance, improve governance and overcome bureaucratic dysfunctions, public administrations need to consider organizational restructuring, adopt new management techniques and use new information and communication technologies.

- **New Institutional Economics (NIE)**

    The New Institutional Economics (NIE) is based on, a development of neoclassical tools for analyzing the role of institutions in coordinating and carrying out economic activities (North, 1990; Williamson, 2000). The literature on the institutional channel is particularly abundant, in contrast to Williamson (2000), whose work on the firm is focused on a country's economic development process. For North (1990), institutions are considered

all forms of constraint established by human beings with a view to framing and structuring human interactions. He distinguishes between two types of institutions: formal and informal.

Formal institutions include economic institutions and political institutions. Economic institutions define the rules governing human interactions in the economic realm, such as property rights and many others, while political institutions define the rules in the political realm (Acemoglu et al. 2005). The New Institutional Economics brings out the argument that effective institutions make the difference in the success of market reforms by asserting that institutions are an essential long-term element. Kaufmann, Kraay and Mastruzzi (2005), Knack and Keefer (1995) and Alesina and Perotti (1996) support this argument. They believe that effective institutions contribute to improved economic performance and successful reform. Similarly, Acemoglu et al (2003) argue that effective institutions (a functioning judicial system, absence of corruption) create a good business climate. This suggests that good governance is a necessary condition for the success of market economies. They argue that resource-rich countries need "strong institutions" to better, manage the revenues generated by these resources. To avoid the resource curse and reduce the various problems associated with the mismanagement of these revenues, they demonstrate, through the experience of Botswana, the importance of institutional quality both for long-run growth and for the diversification of resource-rich economies. Botswana is a shining example of how to manage oil revenues and fight corruption.

Similarly, Gylfason (2010) reveals that the quality of governance and institutions has become an important condition for better management of oil rents. For example, Mehlum et al (2006) show that governance has a positive impact on natural resource revenues and economic growth in countries with "strong institutions". The latter exert a decisive influence on the way natural resources are managed, and determine economic growth. Brunnschweiler and Bulte (2008) make a similar point, showing that abundant natural resources generate significant revenues that positively affect economic growth if institutions are strong.

## 3.2. Empirical literature

This sub-section presents studies on the relationship between institutional governance and oil revenues. These studies are divided into two axes: the axis of studies with negative results and the axis of studies with positive results.

### 3.1.1. Studies with Negative Results

In the first axis, the study carried out by Worlu and Ordu (2020) on the relationship between corruption in the oil and gas industries and oil revenues in Nigeria, covering the period from 1994 to 2017 and using the ARDL model showed that corruption has a negative effect on oil revenues. Similarly, Abebe and Fikre (2020) analyzed the effects of corruption on tax revenues in developed and developing countries, covering the period from 2002 to 2017. Using the Lagrange (ML) method, the results reveal that corruption reduces tax revenues.

The studies of Izekor and Okaro (2018) analyzed the effect of corruption on crude oil revenues in Nigeria over the period from 1996 to 2015. Using the error correction mechanism and the ordinary least squares (OLS) method. The results reveal that corruption has a negative and insignificant effect on crude oil revenues. Similarly, Gbewopo et al (2011) studied the effect of corruption on public revenue mobilization using an econometric analysis on panel data (125 countries of all levels of development), and using the quasi-generalized least squares (QGM) and generalized method of moments (GMM) over a period from 1980 to 2002. The results showed that corruption has a negative effect on public revenues.

The studies of Imam and Jacobs (2007) analyzed the effects of corruption on tax revenues in the Middle East on a sample of 12 countries covering the period from 1990 to 2003. Using the method of generalized Moments (GMM) and Sargan's test, the results showed that corruption has negative effects on tax revenues. Similarly, Hwang (2002) analyzed the impact of corruption on government revenues in 66 countries over the period from 1980 to 1995, using the Seemingly Unrelated Regression Equation (SURE) model. The results show that corruption has a negative and significant effect on government revenues. Corruption distorts the composition of government revenues.

### 3.2.2. Studies with Positive Results

In the second axis, Hassan et al.'s (2021) work on governance and the source of tax revenues in Pakistan covering the period from 1976 to 2019, used the ARDL model. The results show that governance has a positive and significant impact on tax revenues. Similarly, Soro (2020), analyzing the main determinants of tax revenue in Côte d'Ivoire, conducted a study of institutional quality and tax revenue over the period from 1984 to 2016. Using the ARDL (Autoregressive Distributive Lag) model, the results showed that institutional quality plays a decisive role in tax revenue mobilization.

Arif and Rawat (2018) focused their study on corruption, governance and tax revenues in ten (10) Emerging Growth Economies countries over the period from 2001 to 2015. By estimating a Pooled Mean Group (PMG), the results showed that governance has a positive and significant impact on tax revenues and that the quality of governance reduces corruption.

Abdoulaye (2018) analyzed the effect of governance on tax revenues in seven (07) countries of the West African Economic and Monetary Union, covering the period from 1996 to 2015. Using the fixed-effects model, the results show that governance has a positive impact on tax revenue mobilization in WAEMU countries, and the fight against corruption constitutes a channel through which governance can positively affect tax revenue mobilization in Union countries. Similarly, Epaphra and Massawe (2017) analyzed the effects of institutional and structural variables on fiscal resources covering the period from 1996 to 2016 in a panel of 30 African countries using fixed- and random-effect models. The results show that governance indicators increase tax revenues from foreign trade. This explains the positive effect of governance on tax revenues.

Following the same logic, Mohammed et al (2017) analyzed the link between natural resource abundance and institutional quality in Algeria, over the period from 1984 to 2013 using the VAR model. Considering corruption and democratic accountability as the measure of institutional quality, and oil rents as the measure of natural resources, the results showed that democratic accountability has a statistically significant and positive effect on oil rents. They conclude that democratic institutions can reduce corruption.
In addition, Rotimi et al (2013) analyzed the impact of transparency on oil revenues in Nigeria, covering the period from 1999 to 2004. Using regression analysis, the results show that transparency has a positive effect on oil revenues. Transparency reduces the level of corruption. Ajaz and Ahmad (2010) analyzed the effect of institutional variables on tax revenues in 25 developing countries over the period from 1990 to 2005. Using Generalized Method of Moments (GMM), the results indicate that governance has a positive and significant effect on tax revenues.

Theoretical and empirical controversies emerge from this literature review. In the theoretical literature, we have, on the one hand, the approach oriented towards the theory of the curse of natural resources (Auty, 1993); the theory of the electoral cycle (Nordhaus, 1975) and the theory of bureaucracy (Niskanen, 1971) developed in the public choice current (Buchanan and Tullock, 1962). On the other hand, we have the approach based on the theory of optimal taxation, the theory of new public management and the theory of New Institutional Economics (NEI). Empirically, the controversial results is explained by the various fields of studies, and the models used.

## 4. Methodological Approach and Results

This section summarizes the study's methodological approach, presents and interprets the results.

### 4.1. Methodological Approach

This subsection presents the theoretical model, the empirical model and the variables in the relationship between institutional governance and oil rents.

### 4.1.1. Theoretical Model

The review of previous works presents a variety of explanatory models for public revenues, including oil revenues. To analyze the relationship between institutional governance and oil Rents in the Republic of Congo, we draw on the theoretical model borrowed from Abdoulaye (2018) in his work studying the relationship between governance and tax revenues. Ajaz and Ahmad (2010) used other institutional variables that can mobilize public revenues in their work. This model is represented by the equation:

$$(RP/Pib)_{it} = f(GOUV_{it}, CORR_{it}, COM_{it}, Ytete_{it}, INF_{it}, APD_{it}) \qquad (1)$$

In linear form, the equation becomes:

$$(RP/Pib)_{it} = \alpha_0 + \alpha_1 GOUV_{it} + \alpha_2 CORR_{it} + \alpha_3 COM_{it} + \alpha_4 Ytete_{it} + \alpha_5 INF_{it} + \alpha_6 APD_{it} + \varepsilon_{it} \qquad (2)$$

With:
- $\alpha_0$: the constant; $\varepsilon$ : the error term ; $t$ : time ; $i$ : the country ;
- $(RP/Pib)_{it}$ : Public revenue as a percentage of GDP ;
- $GOUV_{it}$ : the governance indicator;
- $CORR_{it}$ : the corruption index;
- $COM_{it}$ : trade openness; $Ytete_{it}$ : per capita income;
- $INF_{it}$ : inflation ; $APD_{it}$ : official development assistance;

- $\alpha_i$ ( $i: 1, 2, 3, 4, 5, 6$) : the elasticities associated with the respective parameters

### 4.1.2. Empirical Model

The empirical model, in the relationship between institutional governance and oil rent in the Republic of Congo, is adapted and inspired from the studies of Abdoulaye (2018). Taking into account the variable "Corruption Control" for institutional governance (Kaufman et al, 2005); the empirical model of our study is as follows:

$$Oil\_R = f(Cc, Pibh, CCf)_t \tag{3}$$

Linearly, the model becomes:

$$Oil\_R = \alpha_0 + \alpha_1 Cc + \alpha_2 Pibh + \alpha_3 CCf \tag{4}$$

For estimation purposes, the specific model is as follows:

$$Oil\_R_t = \alpha_0 + \beta_1 Cc_t + \beta_2 Pibh_t + \beta_3 CCf_t + \varepsilon_t \tag{5}$$

With:

$Oil\_R_t$ : Oil Rents;

$Cc_t$: Control of Corruption;

$CCf_t$ : Fossil fuel consumption;

$Pibh_t$: Gross domestic product per capita;

$\alpha_0$ is the constant; $\beta_i(i: 1, 2\ et 3)$ represents the elasticities associated with the respective parameters; $\varepsilon_t$: the error term d'erreur ; $t$ : study period. Our specified model comprises one endogenous variable and three (3) exogenous variables presented in the following point.

### 4.1.3. Variables Presentation

The variables used in this study are presented in the table below:

Table 1: Presentation of variables

| Variable | Description | Expected signs | Source |
|---|---|---|---|
| **Variables of interest** | | | |
| **Oil_R** | The Oil_R variable represents the oil rent captured by oil profits (in % of GDP). It corresponds to the difference between the value of crude oil at international market prices and the total cost of production. This variable was used in the studies of: Adekunle, 2023; Alsagr and Almazor, 2020; mbingui et al, 2021. This is the endogenous or dependent variable | | WDI (2023) |
| **Cc** | The "control of corruption (Cc)" variable captures perceptions of the extent to which elites and private interests exercise public power for private ends, including both petty and grand forms of corruption, as well as the «capture» of the state. This indicator that captures institutional governance (Kaufman et al, 2005; Konate, 2014) is the main exogenous variable | +/- | WGI (2021) |
| **Additional exogenous variables** | | | |
| **CCf** | CCf is the variable that measures the level of fossil fuel consumption in the country. Fossil fuels include coal, petroleum, rock oil and natural gas products. This variable was used in the studies of Hassan et al (2021) | + | IEA (2023) |
| **Pibh** | Gross Domestic Product per capita is one of the factors influencing the level of public revenue. Economic theory states that the share of public revenue increases with the level of economic development, and the natural resources area factor in economic growth, (Stiglitz, 1974; Solow, 1974). | + | WDI (2023) |

Source: author

The data are drawn from the WDI (2023), WGI (2023) and AIE (2023) databases. The study covers the period from 1996 to 2021. The choice of this period is dictated by data availability.

### 4.2. Results

This sub-section presents the descriptive statistics, and analyzes and interprets the estimation results.

### 4.2.1. Analysis of Descriptive Statistics

For descriptive analysis of the variables, we use the Coefficient of Variation (CV), which is simply the standard deviation divided by the mean. When the CV is below 17%, there is little dispersion of the data around the mean. When the CV is greater than 17%, there is a strong dispersion around the mean. Descriptive analysis of the variables shows that some series have a high dispersion (coefficient of variation greater than 17%) around the mean value. The following table shows the descriptive statistics for the variables under study.

Table-2: Descriptive Statistics

| Variables | $Oil\_R$ | $Cc$ | $Pibh$ | $CCf$ |
|---|---|---|---|---|
| Average | 35.51 | -1.17 | 2009.94 | 12.54 |
| Maximum | 55.95 | -0.86 | 3753.86 | 24.19 |
| Minimum | 12.27 | -1.68 | 663.72 | 5.31 |
| Standard deviation | 10.84 | 0.18 | 982.17 | 4.12 |
| Observations | 26 | 26 | 26 | 26 |
| Coeff of Variation | 0.30 | -0.15 | 0.48 | 0.32 |

Normality test
( Doornik-Hansen test ) Chi2=14.69**

Source: author, on stata 15. ***,**and* denote significance at the 1%, 5% and 10% thresholds, respectively.

The Doornik-Hansen normality test shows significance at 5%. In conclusion, the distributions tend towards a normal distribution (with a sample of 26 observations, i.e. a study period running from1996 to 2021), which enables us to carry out stationarity tests.

### 4.2.2. Results Presentation and Analysis

This point presents the results of the various tests and model estimation.

### 4.2.2.1. Presentation and Analysis of Test Results

The results of the various tests are presented and analyzed as follows:

- **Stationarity Analysis**

The estimation of an econometric model depends on the stationarity of the variables. In other words, the variables must be integrated in the same order. In this study, the variables are examined using two stationarity tests: the Improved Dickey and Fuller test (ADF) and the Philips and Perron test (PP). The use of the latter is conditional on the variables under study being normally distributed, following a normal distribution. The results of the stationarity tests are presented in Table 3 below.

Table-3: Stationarity tests

| Variables | ADF test | | Test PP | | Decision |
|---|---|---|---|---|---|
| | Trend | Noconstant | Trend | Noconstant | |
| **Oil_R** | -2.93*** | -0.68*** | -2.93*** | -0.68*** | I(0) |
| **Cc** | -3.17** | 0.23*** | -3.17** | 0.23*** | I(0) |
| **Pibh** | -1.18** | -0.015** | -1.18** | 0.015** | I(0) |
| **CCf** | -4.00*** | -0.88** | -4.00 | -0.88** | I(0) |
| | | | | | |
| **Oil_R** | -2.91** | -0.70*** | -3.00*** | -0.65*** | I(1) |
| **Cc** | -3.61 | 0.32 | -3.21 | 0.28*** | I(1) |
| **Pibh** | -1.42* | -0.07** | -1.30** | -0.038** | I(1) |
| **CCf** | -3.93 | -0.74** | -3.99*** | -0.80** | I(1) |

Source: author, on stata 15. ***, ** and * denote significance at 1%, 5% and 10% levels respectively. I(1) and I(0) explain stationarity in first difference and at level, respectively.

The results show that the variables are stationary in level and in first difference. However, a variable that is stationary at a lower level is also stationary at a higher level. This shows that all variables are stationary of order one (1)

- **Cointegration analysis**

Having determined the order of integration of the different variables, we estimate the ARDL or Black Box approach to determine the long-run relationship between the variables. To do this, we perform the Bounds Test (Pesaran et al, 2001), which determines the F-statistic and the t-statistic. In this study, the F-statistic and t-statistic are equal to 41.85 and -7.48 respectively. These are compared with critical values below and above the significance threshold of 10%; 5%; 2.5% and 1%. The results show that the F-statistic is greater than all the critical values of the upper bound I(1). These results verify a long-run cointegration relationship between the variables, and are reported in the following table.

Table-4: Bounds test results

| **F-statistics** | 41.85 | |
|---|---|---|
| | **Critical values** | |
| Significance threshold | I(0)Bound | I(1)Bound |
| 10% | 2.72 | 3.77 |
| 5% | 3.23 | 4.35 |
| 2.5% | 3.69 | 4.89 |
| 1% | 4.29 | 5.61 |
| **t-statistics** | -7.48 | |
| | **Critical values** | |
| Significance threshold | I(0)Bound | I(1)Bound |
| 10% | -2.57 | -3.46 |
| 5% | -2.86 | -3.78 |
| 2.5% | -3.13 | -4.05 |
| 1% | -3.43 | -4.37 |

Source: author, on stata15.

### 4.2.2.2. Analysis of model Estimation Results

This point presents and analyzes the model estimation results. They are summarized in Tables 5 and 6 (for the short and long run respectively) below.

Table5: Estimation results (short-run)
Endogenous variable: Oil rents (Oil_R)

| Variable | Coefficient | t-statistics | Probability |
|----------|-------------|--------------|-------------|
| D(Cc) | 52.330 | 8.29 | 0.004 |
| D(Cc)(-2) | 32.972 | 4.67 | 0.019 |
| D(Pibh) | 0.024 | 17,72 | 0.000 |
| D(Pibh)(-3) | 0.010 | 4.85 | 0.017 |
| D(CCf) | -2.429 | -8.54 | 0.003 |
| D(CCf))(-2) | -1.961 | -8.24 | 0.004 |

Source: author, on stata15.

Table-6: Estimation results (Long run)
Endogenous variable: Oil rents (Oil_R)

| Variable | Coefficient | t-statistics | Probability |
|----------|-------------|--------------|-------------|
| Cc | -161.64 | -4.61 | 0.019 |
| Pibh | -0.005 | -2.99 | 0.058 |
| CCf | 5.46 | 5.36 | 0.013 |
| C | -139.80 | -6.46 | 0.008 |
| Recall force | -0.62 | -7.48 | 0.005 |
| %$R^2$ | 99.89 | | |

Source: author, on stata15.

The estimation results, after processing and model validation, show that the exogenous variables selected for this study explain the endogenous variable to the tune of 99.89% (R2 = 99.89%). The estimation results show a negative and significant coefficient of recall at the 1% level (-0.62 [-7.48]), confirming the application of an ARDL model (see Appendix 1).

In the short run, institutional governance (control of corruption) in relation to oil rents showed a positive coefficient (52.33). This relationship is significantly positive at the 1% threshold. The other exogenous variables, Pibh and CCf in relation to oil rent, respectively showed positive (0.024) and negative (-2.429) coefficients at the 1% threshold.) Thus, a one-point increase in institutional governance (control of corruption), the Pibh and the CCf leads to an increase of 52.33 and 0.024 respectively, and a decrease of 2.429 in oil rents. These increases and decreases are significant at the 1% level, all other things being equal.

In the long run, institutional governance (control of corruption), Pibh and CCf, in relation to oil rents, showed negative (-161.64 and -0.005) and positive (5.46) results respectively. As a result, a one-unit increase in institutional governance and per capita (Pibh) led to a significant decrease of 116.64 (at the 5% threshold) and 0.005 (at the 10% threshold) in oil rent, respectively, all other things being equal. On the other hand, a one-unit increase in CCf leads to a significant 5.46 increase (at the 5% threshold) in oil rents.

### 4.2.3. Interpretation of Results

Two Lessons are drawn from these Results:

- **Institutional governance (Control of Corruption): a factor of oil Rents in the Republic of Congo.**
  This lesson corroborates the results of Hassan et al.'s (2021) work in Pakistan covering the period from 1976 to 2019 that, using the ARDL model showed that governance has a positive and significant impact on tax revenues. Similarly, the results of work by Epaphra and Massawe (2017) showed that governance has a positive effect on tax revenue mobilization. Thus, our result finds its explanation in the theory of optimal taxation developed by Mirrlees (1971) and on the studies of Rotimi (2013) who showed that transparency has a positive effect on oil revenues in Nigeria.
- **Corruption has a negative effect on oil Rents in the Republic of Congo**

This lesson corroborates the findings of Izekor and Okaro (2018) who, studying the case of Nigeria, showed that corruption has a negative effect on oil rents. These results can be explained by Auty's (1993) natural resource curse theory, which shows that mismanagement of natural resource revenues leads to corruption, conflict, rent-seeking and political instability. In the Republic of Congo, poor governance of public revenues can explain this result.

## 5. Conclusion and Policy Implications

This study analyzed the effects of institutional governance on oil revenues, using the ARDL approach. To achieve the results, annual frequency data spread over 26 years, from 1996 to 2021, were mobilized and combined with a multi-stage procedure: from stationarity analysis (ADF and PP tests) to ARDL estimation, via cointegration testing (Bounds test for ARDL) and model stability testing (CUSUM test). The ADF and PP unit root tests show that the variables or series are stationary in level, and they are all stationary in first difference. These variables are integrated of the same order (1) or stationary and significant in first difference.

After analyzing the stationarity of the series or variables, we performed the Bounds test. According to its criteria, the variables are cointegrated. This enabled us to estimate an ARDL, after testing for heteroscedasticity and model stability (see Appendix 2). The estimation results confirmed the hypothesis of a positive and significant short-run relationship between institutional governance and oil revenues in the Republic of Congo. On the other hand, the impact of institutional governance on oil revenues is significantly negative in the long run. The lessons drawn from the results enable us to formulate two (2) economic policy implications. The first is a policy geared towards institutional governance, by strengthening the control of corruption and transparency, and by giving full power to the EITI, the body empowered to control oil revenues. The second is a policy based on the fight against impunity. To achieve this, governments must define and apply punitive methods to rogue administrators, encourage optimality in the mobilization of oil revenues, and prioritize the general interest by combating the remarkable inequalities in the distribution of oil revenues.

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# Appendices

## Appendix-1

Ardl Oil_R Cc Pibh CCf, lag ()ec btest ARDL(4,3,4,4) regression

Sample: 2000 - 2021 Number of obs = 22
R-squared = 0.9989
Adj R-squared = 0.9926
Log likelihood = -7. 0013551
Root MSE = 0.9008

| D.Oil_R | Coef. | Std. Err. | t | P>\|t\| | [95% Conf. | Interval] |
|---|---|---|---|---|---|---|
| **ADJ** | | | | | | |
| **Oil_R** | | | | | | |
| L1. | -.6255112 | .0835999 | -7.48 | 0.005 | -.8915635 | -.3594588 |
| **LR** | | | | | | |
| **Cc Pibh CCf** | -161.6496 | 35.0626 | -4.61 | 0.019 | -273.2344 | -50.06475 |
| | -.0054298 | .0018161 | -2.99 | 0.058 | -.0112094 | .0003497 |
| | 5.467285 | 1.019671 | 5.36 | 0.013 | 2.222238 | 8.712332 |
| **SR** | | | | | | |
| **Oil_R** | | | | | | |
| LD. | .3085553 | .1728434 | 1.79 | 0.172 | -.2415096 | .8586201 |
| L2D. | -.7765314 | .1853615 | -4.19 | 0.025 | -1.366435 | -.1866283 |
| L3D. | -.0728694 | .0693492 | -1.05 | 0.371 | -.2935694 | .1478306 |
| **Cc** | | | | | | |
| D1. | 52.33054 | 6.309571 | 8.29 | 0.004 | 32.25067 | 72.41042 |
| LD. | .0246609 | 3.804657 | 0.01 | 0.995 | -12.08345 | 12.13278 |
| L2D. | 32.97239 | 7.058473 | 4.67 | 0.019 | 10.50918 | 55.4356 |
| **Pibh** | | | | | | |
| D1. | .0248933 | .0014049 | 17.72 | 0.000 | .0204223 | .0293642 |
| LD. | .0074948 | .002907 | 2.58 | 0.082 | -.0017566 | .0167462 |
| L2D. | .0116173 | .0029695 | 3.91 | 0.030 | .0021671 | .0210676 |
| L3D. | .0108573 | .0022383 | 4.85 | 0.017 | .0037339 | .0179807 |
| **CCf** | | | | | | |
| D1. | -2.429867 | .2846609 | -8.54 | 0.003 | -3.335785 | -1.523949 |
| LD. | -1.435252 | .371927 | -3.86 | 0.031 | -2.61889 | -.2516147 |
| L2D. | -1.96111 | .238088 | -8.24 | 0.004 | -2.718813 | -1.203408 |
| L3D. | -.2453836 | .2243003 | -1.09 | 0.354 | -.9592071 | .4684399 |
| _cons | -139.8093 | 21.65533 | -6.46 | 0.008 | -208.7262 | -70.89235 |

Note: estat btest has been superseded by estat ectest
as the prime procedure to test for a levels relationship (click to run)

**Appendix-2**

**Pesaran/Shin/Smith (2001) ARDL Bounds Test**

H0: no levels relationship                    F =   41.851t =
                                              -7.482

Critical Values (0.1-0.01), **F-statistic**, Case 3

|       | [I_0] L_1 | [I_1] L_1 | [I_0] L_05 | [I_1] L_05 | [I_0] L_025 | [I_1] L_025 | [I_0] L_01 | [I_1] L_01 |
|-------|-----------|-----------|------------|------------|-------------|-------------|------------|------------|
| k_3   | 2.72      | 3.77      | 3.23       | 4.35       | 3.69        | 4.89        | 4.29       | 5.61       |

accept if F < critical value for I(0) regressorsreject if F
> critical value for I(1) regressors

Critical Values (0.1-0.01), **t-statistic**, Case 3

|       | [I_0] L_1 | [I_1] L_1 | [I_0] L_05 | [I_1] L_05 | [I_0] L_025 | [I_1] L_025 | [I_0] L_01 | [I_1] L_01 |
|-------|-----------|-----------|------------|------------|-------------|-------------|------------|------------|
| k_3   | -2.57     | -3.46     | -2.86      | -3.78      | -3.13       | -4.05       | -3.43      | -4.37      |

accept if t > critical value for I(0) regressorsreject if t <
critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationshipCritical
values from Pesaran/Shin/Smith (2001)

. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticityHo:
          Constant variance
          Variables: fitted values of D.Oil_R

          chi2(1)        =        0.25
          Prob > chi2    =     0.6153