

TAX REVENUES EFFECTS OF CORRUPTION AND GOVERNANCE IN WAEMU COUNTRIES*

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Tax revenue mobilization constitutes one of the major challenges facing African countries in general and those of the West African Economic and Monetary Union (WAEMU) in particular to finance their various development programs. Thus, this article aims to analyse the tax revenues effects of corruption and governance in WAEMU countries. To this end, an econometric model is estimated using three relevant methods, namely, the fixed effects method, fixed effects with sample heteroscedasticity correction and the instrumental variables method on a panel of seven countries over the period 1996-2017. The findings show that governance positively affects tax revenues, while corruption hinders tax revenues from increasing in WAEMU countries. The results obtained have made it possible to suggest concrete actions in terms of economic policy implications with a view to increasing tax revenues in the countries of this area.

Keywords: Corruption, Governance, Tax revenues, WAEMU

JEL Classification: C23, D73, H11, H21

1. INTRODUCTION

Developing countries in general and African countries in particular have experienced significant fiscal imbalances in recent years (Chambas, 2005; Yaru and Raji, 2022), which are at the root of a strong constraint on the supply of public goods and services. The mobilization of public revenues is one of the important factors of imbalances. This observation has led many authors to focus on the determinants of public revenues in countries. Early work highlighted the role of economic variables in determining the level

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of public revenues (Lotz and Morris, 1967; Heller, 1975). Today, there is a growing emphasis on the role of institutional factors that have previously been ignored in various studies. Rent, predation, corruption and the level of governance affect public finances (Hindriks et al., 1999; Ajaz and Ahmad, 2010; Epaphra and Massawe, 2017, Arif and Rawat, 2018, Neog and Gaur, 2020). For African countries, tax revenue mobilization is a matter of urgency in view of the financing requirements for the implementation of development programs. In a context marked by the increasing scarcity of official development assistance and rising debt costs, it is even more pressing for the states of the West African Economic and Monetary Union (WAEMU), whose tax revenues represent barely 15% of their gross domestic product (GDP), i.e., half the level observed in OECD countries (Houngbonon et al., 2017). The level of tax revenues in the WAEMU zone remains low. It is still below 20% of GDP, the minimum level recommended by the UNDP (2010) to finance the Sustainable Development Goals (SDGs). In OECD countries, this level is on average 35%, which makes it possible to finance public infrastructure, social services and public administration operating expenses (Houngbonon et al., 2017).

Looking more closely at each of the countries, it can be seen that between 2000 and 2014, only Senegal and Togo increased their level of tax revenue mobilization to 20% of GDP. In Burkina-Faso and Niger, tax revenues reached 15% of GDP in 2014, compared to approximately 10% in 2000. Conversely, Cote d'Ivoire, Mali and Benin have made very little progress in tax revenue mobilization. Those differences in performance between countries can be explained, among other things, by the levels of corruption and the quality of governance in those countries. When looking at the annual rankings 2017 of the Transparency International Corruption Perception Index, WAEMU countries do not rank higher. For 2017, WAEMU countries scored below 50, which means that corruption remains a real problem in those countries. However, for the 2017 ranking, Senegal performs well by ranking 1st within the WAEMU with an index of 45th and 66th globally. It is followed by Burkina Faso, Benin, Cote d'Ivoire, Niger, Togo and Mali, with an index of 31.

With regard to the level of governance, according to the Mo Ibrahim foundation (2017) ranking of the Ibrahim Index of African Governance (IIAG), within WAEMU, Senegal is in first position with a score of 61.6, followed by Benin with a score of 59.0, and then Cote d'Ivoire, Burkina Faso, Mali, Togo and Niger, which hang last with a score of 50.1.

Through this analysis, we note that there seems to be a link between the quality of governance, the level of corruption and the level of tax revenues in WAEMU countries. What then is the effect of governance and corruption on tax revenues in WAEMU countries?

This article aims to analyse the tax revenues effects of corruption and governance in WAEMU countries to propose actions to increase the mobilization of tax revenues in these countries. The article is part of a theoretical framework dominated mainly by two theories used to analyse the determinants of tax revenue, namely, the Laffer curve

hypothesis and the theory of optimal taxation. Indeed, the theory of the Laffer curve hypothesis suggests that increasing tax rates beyond a certain point lead to lower tax revenues (Kenneth, 2019). The standard theory of optimal taxation postulates that a system should be chosen to maximize a social welfare function subject to a set of constraints (Mankiw, Weinzierl and Yagan, 2009). Thus, several studies have examined some important aspects of the theory of optimal taxation, such as its design in an open economy (Ogawa and Hosoe, 2020), the marginal weighting of social welfare (Saez and Stantcheva, 2016) and accounting for the possibility of tax evasion (Artavanis et al., 2016).

This study contributes to the literature on the subject in two main ways. The first contribution is methodological, unlike other studies that have studied the relationship in a linear specification (Ajaz and Ahmad, 2010; Epaphra and Massawe, 2017), this research deepens the analysis by taking advantage of the limitations of previous studies to deal with the issue of endogeneity that may result from double causality using the instrumental variable estimation method.

The second contribution is practical in the sense that the study provides empirical evidence for understanding the effect of corruption and governance on tax revenues in WAEMU countries. This research is important because it makes it possible to analyse the links between governance, corruption and tax revenues and to propose specific solutions to reduce the harmful effects of the expansion of corruption in the economies of the countries to ensure greater efficiency of public action and better management of public resources in WAEMU countries.

The study runs from 1996 to 2017 due to data availability constraints for all the countries of the sample. Moreover, our main variables corruption and governance index are provided from the Transparency International and Worldwide Governance Indicators datasets, respectively. These datasets have been available since 1996. For all these reasons, the study takes into account the period 1996 – 2017.

The remainder of this article is organized as follows. Section 2 presents a literature review on the effect of corruption and governance on tax revenues. Section 3 describes the tax policy and the evolution of tax revenues in WAEMU countries. Section 4 provides the methodology and data. Section 5 analyzes the empirical results obtained and Section 6 includes the conclusion and some policy implications.

2. LITERATURE REVIEW

This review is devoted to examining the determinants of tax revenue. From this perspective, we analyse the institutional factors and macroeconomic variables that influence tax revenues in economies based on previous studies carried out by many researchers.

Several studies have looked at the institutional factors that influence tax revenue

mobilization in countries. In developing countries, corruption is widespread, and its consequences for revenue mobilization are negative. Corruption reduces revenue, which prevents the state from fulfilling its sovereign functions. Many authors have shown that in developing countries, more than 50% of tax revenues fail to be collected because of tax corruption and tax evasion (Bird, 1992; Krugman et al., 1992). The loss of revenue is enormous compared to the amounts paid in bribes. Another consequence of corruption is that it reduces the redistributive function of the state and thus contributes to increasing income inequality. Some authors explain that the collection of tax revenues is one of the activities that leads to a strong increase in corruption (Tanzi, 2000; Fjeldstad and Tungodden, 2001; Teera, 2003). Factors contributing to corruption in tax collection are diverse. The complexity of the payment process leads users to corrupt agents. Another factor that encourages corruption is high taxes, which increases tax evasion. Individuals engage in corrupt acts when they believe that the gain to obtain from such acts is high and that the risk of detection and punishment is low. The low salary levels of tax collectors and the low standard of living of taxpayers encourage corruption. The impact of corruption and tax evasion on tax revenues is not a new approach in the field of public finance analysis. In a series of articles, Tanzi and Zee (2001) highlighted that countries with high levels of corruption tend to have low levels of tax revenues relative to their GDP. The implication of such an outcome is that a portion of the taxes paid by taxpayers is distracted from government cash registers. In the area of public service, the temptation to engage in corrupt acts is high both for public officials who can become rich by accepting bribes and for corruptors who want to obtain undue services such as contracts. Hwang (2002) shows that corruption is negatively and significantly related to domestic tax revenues as well as total government revenue relative to GDP. Sandmo (2004) defines tax evasion as a violation of the law. When the taxpayer does not wish to declare his income from labor and capital, he engages in an illegal activity that binds him with the collecting agents. Hadi (2006) analysed the relationship between corruption and tax evasion. The author analyses how corruption can affect tax evasion. The results show that the level of corruption negatively affects tax evasion. Gbewopo et al. (2009), using panel data econometric analysis, find a negative effect of corruption on the level of government revenue collection. Those authors show that corruption does not affect the different components of public resources in the same way. Corruption distorts the structure of tax revenues in favor of customs duties. While some authors have sought to examine the effect of corruption on tax revenues, other authors have focused on the contribution of governance to tax revenue mobilization. It is now accepted that good governance is a prerequisite for a good tax and revenue collection system. There are three factors that make for a good taxation system, namely, the legitimacy of the State, the willingness of taxpayers to pay taxes and the efficiency of the tax administration. Phillips and Sandall (2008) study the relationship between governance and tax reform. The authors show that three key elements characterize the relationship between governance, taxation and business climate. First, a good tax system depends on good governance. Second, a fair tax system leads to good governance because an efficient tax

system encourages people to pay taxes honestly. Third, tax revenue mobilization is positively dependent on a well-organized administration, trust in government and political stability. It is theoretically demonstrated that high political instability reduces the efficiency of the tax system. Ajaz and Ahmad (2010) analyse the effect of institutional variables on tax revenues in twenty-five developing countries over the period 1990-2005. Using the generalized moment's method in a dynamic panel, the authors show that institutional variables have a significant effect on tax revenues. The results highlight that governance and corruption are two main determinants of tax revenue mobilization. Several authors have shown that corruption has a negative effect on tax revenues, while good governance contributes to better performance in tax collection (Potanlar et al., 2010; Ghosh and Neanidis, 2010; Baskaran and Bigsten, 2013 and Imam and Jacobs, 2014). In the same perspective as Ajaz and Ahmad (2010), Mohammad (2014) analyses the effect of institutional quality on public revenues using a panel of fifty-five developed and developing countries over the period 2002-2012. The results show that the quality of governance positively influences the mobilization of public revenues. Furthermore, the author establishes that the willingness of citizens to pay their taxes depends on the quality of governance. Ultimately, the author concludes that institutional quality and low levels of corruption improve public revenue mobilization. Epaphra and Massawe (2017) examine the effects of institutional and structural variables on fiscal resources over the period 1996-2016 using a panel of 30 African countries. The authors find that corruption and governance are two major determinants of public revenue mobilization in Africa. Furthermore, the results indicate that tax rates negatively affect total tax revenues on the one hand and positively affect tax revenues from foreign trade on the other. Finally, the analysis shows that trade openness improves tax revenues in the countries making up the used. Arif and Rawat (2018) analyse the effect of corruption and governance on tax revenues using panel data from ten emerging economies over the period 2001 to 2015. The results show that the quality of governance reduces the level of corruption on the one hand and increases tax revenues on the other. Liu and Mikesell (2019) find a positive relationship between corruption and tax revenues. They conclude that a state with a higher level of corruption also has a more complex tax system and that the resulting tax illusion allows that state to collect higher tax revenues. Guillamon et al. (2021) find that the corruption variable has a positive and significant effect on municipal income in Spain. Thus, municipalities with higher levels of corruption have higher tax revenues per capita. The authors justify their result by asserting that when municipalities are corrupt, they have higher public expenditures and they also need higher revenues to finance these expenditures. Yaru and Raji (2022) examine the impact of corruption and five other indicators of governance on tax revenue performance in Sub-Saharan African countries. The findings show that out of the governance indicators considered, only corruption has a significant impact on tax revenue performance, while the effects of the other indicators (political stability and absence of violence, rule of law, government effectiveness, regulatory quality and voice accountability) are not statistically significant.

Apart from the institutional factors, several macroeconomic variables determine the level of tax revenues. Aizenman and Jinjark (2005) show that the efficiency of value added collection is determined by the structure of the economy that increases collection costs. Collection efficiency is reduced with less urbanization, low trade openness and a large share of agriculture. As for Gupta (2007), several structural factors can explain the increase in tax revenues, namely, GDP per capita, the share of agriculture in GDP, trade openness, foreign aid, foreign debt and institutional variables such as corruption and political stability. Mbaye and Benjamin (2012) highlighted that the informal sector in WAEMU countries is a determinant of the low level of tax revenue mobilization. Castro and Carmarillo (2014) research the explanatory factors of tax revenue in thirty-four countries of the Organization for Economic Cooperation and Development (OECD) over the period 2001-2011. They find that GDP per capita and the size of the industrial sector positively influence tax revenue, while foreign direct investment, agriculture, the civil liberties index and life experience negatively influence tax revenue. Moreover, Imam and Jacob (2014) show that inflation has a positive influence on income taxes, while GDP per capita has a negative effect on these taxes in twelve Middle Eastern countries over the period 1990 to 2003. Ayenew (2016) studies the determinants of tax revenue in Ethiopia from 1975 to 2013. The results show, on the one hand, that the industrial sector, economic growth and foreign aid have a positive effect on tax revenue and, on the other hand, that inflation has a negative effect on tax revenue. Epaphra and Massawe (2017) show that trade openness improves tax revenues in thirty African countries. Rodriguez (2018) examines on a panel of developed and underdeveloped countries the factors that affect revenue and explain the disparities in tax collection performance. The author finds that revenues are strongly influenced by historical and structural factors such as the business climate and dynamics in other sources of public revenue such as inflation. Amoh and Adom (2017) show that foreign direct investment inflows contribute to an increase in overall tax revenue collection in the economy in two ways. First, economic growth and economic expansion activities should be strengthened. Second, thanks to an increasing formalization of economic activities and the competitiveness of the economy. From the same perspective, Ade et al. (2018) and Andrejovska and Pulikova (2018) show that tax reforms, foreign direct investment inflows, employment and economic growth have positive impacts on tax revenue. Furthermore, Terefe and Teera (2018) show that economic growth, trade openness, agricultural growth, service industry growth, foreign aid and manufacturing industry growth have a significant positive effect on the tax revenues of East African countries. The exchange rate, urbanization and inflation have a significant negative impact on all the countries in the region. Boukbech et al. (2019), Anuah (2019) and Piancastelli and Thirlwall (2020) find that agriculture, industrial growth and economic growth have a significant positive influence on tax revenue. However, for Boukbech et al. (2019), trade openness has no significant effect on tax revenue, while for Anuah (2019), trade openness has a deleterious effect on tax revenue, and for Piancastelli and Thirlwall (2020), trade openness positively influences tax revenue. For Awasthi et al. (2020), an increase in population is associated with an

increase in demand and consumption of goods and services, thereby increasing the size of the tax base and hence improving tax revenue in the economy. Neog and Gaur (2020) analyse the determinants of tax performance in BRICS countries (Brazil, Russia, India, China and South Africa) for the period 1996-2017, with a focus on economic and political variables. The findings showed that economic development, trade openness and control of corruption are factors for improving revenues for the BRICS, while the agricultural sector discourages tax revenue performance. Kunofiwa (2021) studies the determinants of tax revenue and explores the impact of the interaction between foreign direct investment (FDI) and financial development on tax revenue in upper middle-income countries over the period 2007-2017. The author finds that tax revenue lag, financial development, FDI, economic growth, urbanization, human capital development, population growth and the interaction between FDI and financial development have a significant positive impact on tax revenue. The exchange rate and trade openness have a negative effect on tax revenues. Using the same approach as Kunofiwa (2021) but on a different sample countries, Ihuarulam et al. (2021) empirically study how tax revenue is related to some macroeconomic variables in ECOWAS countries over the period 2005-2019. The results show that inflation and economic growth are positively related to tax revenue and statistically significant. However, an increase in unemployment reduces tax revenue. Nguyen et al. (2022) identify the determinants of tax revenue in Southeast Asia on a panel of eight countries over the period 2000-2016. Using various econometric estimation methods, such as fixed effect, random effect model and system generalized method of moments, the authors find that trade openness, foreign direct investment, external debt, and the share of added value in industry to GDP have a positive impact on tax revenue, while official development assistance has a negative effect on tax revenue.

Looking carefully at the literature reviewed, it is evident that there is no consensus on the results and that there is a gap in the literature. Furthermore, the number of studies that examine the impact of institutional and macroeconomic variables on tax revenue with specific reference to WAEMU countries is limited. This study thus aims to fill the existing gap in the literature by carrying out an empirical analysis of the effect of institutional and macroeconomic variables on tax revenues in the countries of the West African Economic and Monetary Union.

3. TAX POLICY AND EVOLUTION OF TAX REVENUES IN WAEMU

We present tax policy through the reforms implemented in WAEMU to increase tax revenues and then the evolution of tax revenues.

3.1. Tax policy implemented in WAEMU

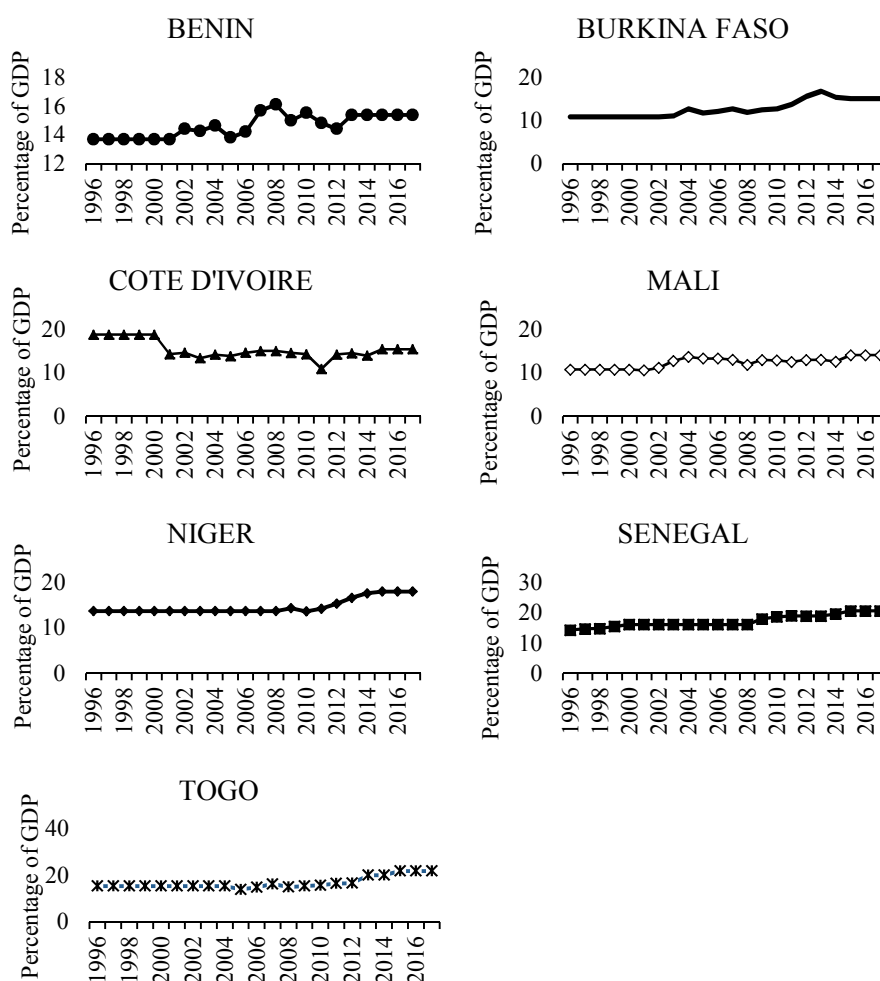
Article 43 of the WAEMU Treaty establishes the list of five types of community acts (regulations, directives, decisions, recommendations and opinions). The application of the regulations is direct, immediate and mandatory in all member countries. On the other hand, directives and decisions must first be transposed into the national legislation of the member states and therefore offer a certain degree of flexibility and adaptation to national contexts. Recommendations and opinions are not binding. WAEMU directives and regulations are at the heart of tax policies in member countries. WAEMU's prerogatives include economic, fiscal, monetary and external policies. WAEMU directives and regulations require the coordination of the rates and bases of the main taxes, the harmonization of national investment codes as a prerequisite for the adoption of a single investment code and the coordination of tax policy on taxes on goods and services (value added tax and excise duties). More than 80% of the tax revenues of WAEMU member countries (including customs duties) are collected from taxes and duties subject to community directives and regulations (World Bank Report, 2019). In 2015, WAEMU revised its tax revenues to GDP ratio target upwards from 17% to 20%, the achievement of which was set for 2019. Thus, achieving the revenue level targeted by WAEMU at 20% of the GDP in 2019 will require significant tax mobilization efforts for most member countries. Only Senegal met this convergence criterion in 2016. Togo is the one that comes closest. For other countries, significantly raising revenue requires reforms that go beyond recent improvements in tax administration. Many reforms, in particular the digitization of tax declaration and payment procedures, have facilitated the mobilization of tax revenues in some WAEMU countries. WAEMU tends to favor the harmonization of tax policies rather than their standardization. The use of directives rather than regulations to define common national tax bases, frame the applicable rates and ensure a uniform application of the agreed rules suggests a political will to go beyond a simple coordination of national tax policies while avoiding the undue constraints that standardization of policies would bring.

3.2. Evolution of tax revenues in WAEMU countries

We analyse the evolution of tax revenues in WAEMU countries through the figure below.

The figure below shows the evolution of the level of tax revenues in relation to GDP in WAEMU countries over the period 1996-2017. The figure shows that the level of tax revenues in the WAEMU zone remains low. It can be seen that the level of tax revenues in relation to GDP remained stable and below 20% until 2012 for all countries. However, notable improvements were recorded between 2000 and 2017. During this period, Senegal and Togo significantly increased their level of tax revenue mobilization to exceed 20% of GDP. Benin, Burkina Faso, Mali and Niger made slight progress in tax revenue mobilization between 1996 and 2017. Conversely, Cote d'Ivoire recorded a drop in tax revenues. From 18% in 1996, the level of tax revenues in Cote d'Ivoire fell to its lowest level at 10.93% in 2011 before rising to 15.44% in 2017.

The low level of tax revenues can be explained by several factors, including corruption, tax evasion, governance problems and the preponderance of the informal sector in WAEMU countries. Corruption and tax evasion are inherently difficult to measure. The existence of tax evasion and corruption of collection agents is a social phenomenon that can significantly reduce tax revenues and seriously impede growth and pose governance problems.



Source: Author's computations (2019).

Figure 1. Tax revenues in WAEMU countries

The quality of governance is an essential determinant for the development of a country. An analysis of the levels of levies applied to different categories of enterprises in the WAEMU countries reveals a strong imbalance in favor of large enterprises and against the informal sector. Mbaye and Benjamin (2012), in a study on the informal sector in three WAEMU countries, namely, Benin, Burkina Faso and Senegal, show that large companies contribute more than 95% of tax revenues, while informal sector enterprises contribute less than 3% of tax revenues. The harmonization of tax regulations and the implementation of value added tax by WAEMU countries in the late 1990s led to significant tax and customs changes.

To better understand the relationship between corruption, governance and tax revenues, it is necessary to define a relevant theoretical framework and describe the methodology.

4. METHODOLOGY AND DATA

We first present the model and then the econometric estimation method.

4.1. Model Specification

Several empirical studies have explored the factors that can determine the growth of tax revenues in both developed and developing countries. Thus, from this perspective, several variables were identified. Gupta (2007) finds that several structural factors determine tax revenue mobilization performance, namely, GDP per capita, the share of agricultural production in GDP, trade openness, external aid and institutional variables such as corruption and political stability.

Following Gupta (2007), Gbewopo et al. (2009), Ajaz and Ahmad (2010), Ihuarulam et al. (2021), Yaru and Raji (2022) and Nguyen et al. (2022), from a different perspective, we add other institutional variables that may influence tax revenue mobilization. Thus, in this analysis, we use the econometric model that highlights the determinants of tax revenues. The selected model is as follows:

$$TaxRevenue_{it} = f(Institution_{it}, Trade_{it}, GDP_{it}, Inflation_{it}, Inf\ sector_{it}, Aid_{it}). \quad (1)$$

In linear form, Equation (1) becomes:

$$TaxRevenue_{it} = \alpha_0 + \alpha_1 Institution_{it} + \alpha_2 Trade_{it} + \alpha_3 GDP_{it} + \alpha_4 Inflation_{it} + \alpha_5 Inf\ sector_{it} + \alpha_6 Aid_{it} + \varepsilon_{it}, \quad (2)$$

where $TaxRevenue_{it}$, $Institution_{it}$, $Trade_{it}$, GDP_{it} , $Inflation_{it}$, $Inf\ sector_{it}$, Aid_{it} represent the tax revenues to GDP ratio, the corruption index or the governance

indicator, trade openness, GDP per capita, inflation, the informal sector approximated here by the share of agricultural value added and Aid to GDP ratio, respectively. We include these six explanatory variables in the model because through the economic literature, these variables appear to be major determinants of tax revenue mobilization in a country.

4.2. Econometric Estimation Method

Before estimating our model (Equation 2), it is important to present the descriptive statistics on the different variables of the model. After performing all the necessary preliminary tests, the model is estimated.

Considering the specification adopted in this work, it is necessary to start the estimation with traditional estimation methods on panel data (fixed effects model, random effects models). The outcome of the Hausman test leads us to retain the fixed effects model. Moreover, given the relatively large time dimension compared to the cross-sectional dimension of our sample, we may be confronted with time series problems. To remedy this eventuality, we estimate the model using the estimation method of a fixed-effects model with heteroskedasticity correction and the estimation method of a fixed-effects model with instrumental variables. The latter method takes into account endogeneity problems that may be due to measurement errors on the explanatory variables, double causality and omitted variable bias.

4.3. Data

Data on economic variables are drawn from a variety of sources, including the World Development Indicators (2019), the World Bank's Worldwide Governance Indicators (2019) and Transparency International's Corruption Perceptions Index (2019). The study runs from 1996 to 2017 and takes into account seven WAEMU countries: Benin, Burkina Faso, Cote d'Ivoire, Mali, Niger, Senegal and Togo. Guinea Bissau was not included in the analysis for constraints related to the availability of data over the entire study period.

5. EMPIRICAL RESULTS

Before presenting and analysing the results of our estimations, we examine the descriptive statistics of the variables used in the study. Table 1 below summarizes the descriptive statistics on all the variables.

This table highlights large differences in the values of some variables. This is the example of variables such as corruption, government effectiveness, GDP per capita, and tax revenues. The figures show a difference of approximately 0.38; 0.52 and 2.47 as the

values of the standard deviation for the variables government effectiveness, corruption and tax revenues, respectively. This means that WAEMU countries have different characteristics with regard to the effectiveness of public governance, the level of corruption and the evolution of tax revenues. Statistics show that the average value of tax revenues for WAEMU countries is 14.82%. The minimum tax revenue value (10.58) was recorded in Mali in 2001. The maximum value of tax revenues (21.79) was recorded in Togo in 2015. These rates show that these countries have efforts to make to reach the 20% target as set by the WAEMU Commission in terms of tax revenue mobilization as a percentage of GDP as a convergence criterion. For the other variables of interest, the statistics show that the average value of corruption is 7.01. In addition, the minimum value of the corruption indicator (5.60) is recorded in Senegal in 2015. The maximum value of the corruption indicator (8.10) is recorded in Cote d'Ivoire in (2005). We used four indicators for the governance variables, namely, government effectiveness, political stability, voice and accountability and regulatory quality. Statistics show that their minimum values (-1.59; -2.28; -1.71; -1.15) are obtained in Togo (2004), Cote d'Ivoire (2005), Niger (1996) and Niger (1996), respectively. Their maximum values (0.02; 0.97; 0.39; -0.06) are obtained in Senegal (1996), Benin (1997), Mali (2005) and Senegal (2013), respectively.

Table 1. Data Descriptive Statistics on the Variables

Variables	Mean	Std. Dev	Min	Max	Observations
Tax revenues	14.828	2.474	10.585	21.792	154
Corruption ¹	7.017	0.528	5.600	8.100	154
Government Effectiveness	-0.760	0.382	-1.590	0.020	154
Political Stability	-0.414	0.697	-2.280	0.970	154
Voice and Accountability	-0.386	0.550	-1.710	0.390	154
Regulatory Quality	-0.477	0.250	-1.150	-0.060	154
GDP per capita	712.838	317.977	325.836	1491.664	154
Informal sector (Agriculture value added)	26.858	8.409	12.245	42.523	154
Inflation	2.423	2.849	-6.730	16.044	154
Trade	65.291	18.961	30.732	125.027	154
Aid	9.096	3.853	0.533	18.051	154

Source: Author's computations based on data from WDI (2019), Worldwide Governance Indicators (2019) and Transparency International (2019).

¹ The corruption variable was transformed on a scale of 0 to 10 according to the formula: $\hat{X} = X_{max} - X$, with X_{max} is maximum value of the corruption index and X is initial value of the corruption index. This new variable \hat{X} is between 0 and 10 such that 0 represents a low level of corruption and 10 represents a high level of corruption.

The results of the various estimations are analysed in the following section.

5.1. Effects of Corruption and Governance on Tax Revenues

The effects of corruption and governance on tax revenues are presented in table 2 below.

Table 2. Estimation Results of the Fixed Effects Model

Variables	(1) Tax revenues	(2) Tax revenues	(3) Tax revenues	(4) Tax revenues	(5) Tax revenues
Corruption	-1.883*** (6.33)				
Inflation	-0.001 (0.03)	-0.061 (1.56)	-0.054 (1.42)	-0.048 (1.26)	-0.050 (1.27)
GDP per capita	3.968*** (5.23)	5.181*** (6.50)	7.255*** (8.41)	5.495*** (7.10)	5.684*** (7.17)
Trade	0.563 (0.77)	2.560*** (3.48)	3.090*** (4.23)	2.016*** (2.74)	2.456*** (3.31)
Aid	0.125 (0.47)	0.281 (0.95)	0.107 (0.37)	0.238 (0.82)	0.450 (1.57)
Informal sector	-0.163*** (5.84)	-0.161*** (5.25)	-0.121*** (3.78)	-0.161*** (5.31)	-0.178*** (5.70)
Government Effectiveness		1.490*** (2.92)			
Political Stability			1.059*** (4.10)		
Voice and Accountability				1.392*** (3.56)	
Regulatory Quality					1.682** (2.32)
Constant	4.131 (0.57)	-24.283*** (4.24)	-41.343*** (6.57)	-24.614*** (4.41)	-27.353*** (4.85)
R^2	0.61	0.53	0.56	0.54	0.52
N	154	154	154	154	154

Source: The estimation method is fixed effects. Absolute value of t-statistics in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% confidence levels, respectively. Source: Author's computations based on data from WDI (2019), Worldwide Governance Indicators (2019) and Transparency International (2019).

The results summarized in Table 2 above show that the corruption index and governance indicators (government effectiveness, voice and accountability, political stability and regulatory quality) have a significant effect on tax revenues. Corruption negatively affects the tax collection rate in all five variants of the estimated model. For the governance indicators, the results show that they positively affect tax revenues. For the control variables of the model, it appears that GDP per capita and trade openness positively affect tax revenues, whereas inflation and foreign aid have no significant effect on tax revenues.

In addition, we have included in the analysis the share of agricultural value added in GDP as a proxy for the informal sector. The results show that this variable has a negative effect on tax revenues. This shows that the preponderance of the informal sector in WAEMU countries is a handicap on the increase in tax revenues. The results above highlight that corruption contributes significantly to the reduction of tax revenues in WAEMU countries. It is clear that corruption is detrimental to the mobilization of public resources. Thus, significant budgetary resources escape WAEMU countries because of corruption. For the governance variable, we used four indicators: government effectiveness, political stability, voice and accountability and regulatory quality. Each of the indicators has a positive and significant effect on tax revenues. This result highlights that improving the functioning of institutions, i.e., good governance, has beneficial effects on tax revenue mobilization. The effects of corruption and the effects of governance achieved are consistent with theoretical predictions and corroborate the findings of Gbewopo et al. (2009), Ajaz and Ahmad (2010), Mohammad (2014), Epaphra, and Massawe (2017) and Arif and Rawat (2018).

We extend the analysis by controlling for heteroskedasticity, and the results are reported in Table 3 below.

When we control for heteroscedasticity, the results are broadly similar to those found previously, particularly with respect to the signs of the variables of interest, namely, corruption and governance. Corruption has a negative and significant effect on tax revenues. Governance indicators have a positive and significant effect on tax revenues. Our results corroborate several previous studies, such as Phillips and Sandall (2008), Baskaran and Bigsten (2013), and Neog and Gaur (2020), who show the positive effect of governance on tax revenue. However, our findings contradict those of Liu and Mikesell (2019) and Guillamon et al. (2021), who found that corruption has a positive effect on tax revenue. The authors justify their result by claiming that when states are corrupt, they have higher public expenditures and they also need higher revenues to finance these expenditures. Yaru and Raji (2022) find that governance indicators have no effect on tax revenue, while our results show that governance has a positive and significant effect on tax revenue. We think that good governance begets a good tax system and, in turn, a fair and efficient tax system encourages people to pay their taxes honestly. Furthermore, the mobilization of tax revenue is positively dependent on a well-organized administration, trust in government and political stability.

Table 3. Results of Heteroskedasticity Robust Estimates

Variables	(1) Tax revenues	(2) Tax revenues	(3) Tax revenues	(4) Tax revenues	(5) Tax revenues
Corruption	-0.706*** (5.650)				
GDP per capita	0.313*** (9.130)	0.362*** (8.650)	6.953*** (8.700)	5.304*** (8.730)	5.476*** (8.570)
Trade	0.055 (1.090)	0.169*** (3.690)	2.916*** (4.270)	1.857** (2.520)	2.300*** (3.040)
Inflation	0.000 (0.060)	-0.004* (1.750)	-0.056* (1.760)	-0.052 (1.590)	-0.054 (1.550)
Aid	0.012 (0.730)	0.012 (0.770)	0.142 (0.490)	0.236 (0.810)	0.445 (1.590)
Informal Sector	-0.311*** (5.890)	-0.308*** (5.480)	-3.921*** (3.530)	-5.102*** (4.850)	-5.546*** (4.790)
Government Effectiveness		0.122*** (3.910)			
Political Stability			0.959*** (3.670)		
Voice and Accountability				1.374*** (4.290)	
Regulatory Quality					1.612** (2.230)
Constant	2.783*** (5.100)	0.602* (1.680)	-29.325*** (4.030)	-10.522* (1.890)	-12.218** (2.010)
R^2	0.83	0.81	0.77	0.77	0.76
N	154	154	154	154	154

Source: The estimation method is AREG with sample heteroscedasticity correction. Absolute value of t-statistics in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% confidence levels, respectively. *Source:* Author's computations based on data from WDI (2019), Worldwide Governance Indicators (2019) and Transparency International (2019).

Regarding the control variables, our results reveal that GDP per capita and trade openness exert a positive effect on tax revenue. Indeed, the sign of the coefficients of the GDP per capita and trade variables is in line with our expectations. An increase in GDP is associated with an increase in the demand and consumption of goods and services, thereby increasing the size of the tax base and therefore improving tax revenue in the economy. High trade openness increases exposure to outside influences; governments are called upon to strengthen measures to protect their citizens and national production, such as raising taxes and imposing quotas. Moreover, when trade expands, economic formalization and competitiveness increase, so tax collection and, therefore, tax revenue

also increase. Our results are consistent with those of Gupta (2007), Terefe and Teera (2018), Piancastelli and Thirlwall (2020), Neog and Gaur (2020), Nguyen et al. (2022). However, our results invalidate those of Imam and Jacob (2014) with regard to the effect of GDP per capita on tax revenue and those of Boukbech (2019), Anuah (2019), Kunofiwa (2021) with regard to the effect of trade on tax revenue. According to our results, inflation and the informal sector negatively influence tax revenues. Inflation highlights the level of macroeconomic instability. When inflation rises, it reduces the purchasing power and ability of taxpayers to pay taxes. Therefore, they react to “tax increases” caused by inflation by engaging in informal economic activities and tax evasion. Inflation and the informal sector therefore have a negative impact on tax revenues. Our results confirm those of Mbaye and Benjamin (2012), Ayenew (2016), and Terefe and Teera (2018) but invalidate those of Imam and Jacob (2014), Anuah (2019), and Ihuarulam (2021), who demonstrated that inflation positively influences tax revenue. Finally, and contrary to our expectations, foreign aid has no significant effect on tax revenue. Indeed, according to our expectations, foreign aid should help boost national production and thus increase the tax base. This will increase tax revenue. However, the results obtained are not statistically significant, indicating that foreign aid does not affect tax revenue in WAEMU countries. This result contradicts those of Gupta (2007), Terefe and Teera (2018) and Nguyen et al. (2022). Indeed, for Gupta (2007) and Terefe and Teera (2018), foreign aid has a positive effect on tax revenue, while for Nguyen et al. (2022), foreign aid has a negative effect on tax revenue.

Can the different results interpreted above be considered robust? We have carried out robustness checks to determine this.

5.2. Robustness Checks

Analysis of the robustness results involved estimating several variants of the model with different estimation methods. To this end, we estimated five variants of Equation 2 presented above using the instrumental variable method to address potential endogeneity problems that could affect the model. The results of these robustness checks are presented in Table 4 below.

The five estimations using the instrumental variables method indicate that corruption has a significant negative effect on tax revenues. The governance indicators used in this paper, namely, government effectiveness, political stability, voice and accountability and regulatory quality, have a positive and significant effect on tax revenues. These findings confirm that corruption and governance have a significant effect on tax revenue in the countries of the West African Economic and Monetary Union. Concerning the control variables, the results are consistent with the previous ones except for the inflation variable. Inflation has a negative and significant effect on tax revenues in the previous estimations when we control for heteroscedasticity. Here, using the instrumental variables method, although inflation has a negative effect on tax revenues, it is not significant.

Table 4. Results of Robustness Check

Variables	(1) Tax revenues	(2) Tax revenues	(3) Tax revenues	(4) Tax revenues	(5) Tax revenues
GDP per capita	0.327*** (0.047)	0.386*** (0.047)	0.485*** (0.052)	0.407*** (0.046)	0.420*** (0.048)
Trade	0.056 (0.044)	0.160*** (0.042)	0.175*** (0.043)	0.123*** (0.043)	0.156*** (0.043)
Corruption	-0.666*** (0.123)				
Inflation	1.46e-06 (0.002)	-0.003 (0.002)	-0.002 (0.002)	-0.002 (0.002)	-0.002 (0.002)
Aid	0.003 (0.016)	0.002 (0.017)	-0.003 (0.018)	-0.000 (0.017)	0.016 (0.017)
Informal sector	-0.334*** (0.050)	-0.330*** (0.053)	-0.284*** (0.057)	-0.343*** (0.053)	-0.352*** (0.055)
Government Effectiveness		0.127*** (0.033)			
Political Stability			0.094*** (0.031)		
Voice and Accountability				0.092*** (0.025)	
Regulatory Quality					0.126** (0.062)
Constant	2.700*** (0.559)	0.568 (0.388)	-0.338 (0.464)	0.619 (0.390)	0.378 (0.400)
Observations	147	147	147	147	147
Number of idstate	7	7	7	7	7

Source: The estimation method is fixed effects (within) IV regression. Standard errors in parentheses. ***, ** and * denote significance at the 1%, 5% and 10% confidence levels, respectively. Source: Author's computations based on data from WDI (2019), Worldwide Governance Indicators (2019) and Transparency International (2019).

6. CONCLUSION AND POLICY IMPLICATIONS

Tax revenue mobilization has thus become one of the most pressing challenges facing West African Economic and Monetary Union (WAEMU) countries. All countries in the zone are striving to increase their resources to make progress toward achieving sustainable development objectives while preserving the sustainability of public finances. The objective of this paper was to analyse the tax revenues effects of corruption and governance in WAEMU countries. The econometric analyses use a panel of seven countries with data running from 1996 to 2017. The findings show that the institutional

variables, namely, the corruption index and the four governance indicators (government effectiveness, political stability, voice and accountability and regulatory quality), significantly affect tax revenues in WAEMU countries. It appears that governance positively affects tax revenues, while corruption has negative effects on tax revenues. Regarding the control variables, our results reveal that GDP per capita and trade openness exert a positive effect on tax revenue, while inflation and the informal sector negatively influence tax revenue in WAEMU countries. Foreign aid has no significant effect on tax revenue.

The results and lessons learned from this study pave the way for proposals for actions to be implemented to increase tax revenues in WAEMU countries. It is thus necessary to intensify the fight against corruption in all countries of the Union. The fight against corruption must start by carefully improving and regulating systems and institutions. Discretionary powers must be delineated and accountability must be promoted. The second area of action is to improve governance and transparency in the management of public affairs. The main objective is to strengthen government effectiveness, political stability, voice and accountability and regulatory quality in each country. Public authorities need to improve their performance in terms of the provision of social public goods and services to increase incentives for people to meet their tax obligations.

APPENDIX

Table A1. Data and Sources

Variables	Sources
Tax revenues	WDI, World Bank (2019)
Corruption	Transparency International (2019)
Government effectiveness	Worldwide Governance Indicators (2019)
Political Stability	Worldwide Governance Indicators (2019)
Voice and Accountability	Worldwide Governance Indicators (2019)
Regulatory quality	Worldwide Governance Indicators (2019)
GDP per capita	WDI, World Bank (2019)
Informal Sector (Agriculture value added)	WDI, World Bank (2019)
Inflation	WDI, World Bank (2019)
Trade	WDI, World Bank (2019)
Aid	WDI, World Bank (2019)

Sources: Author's compilation, 2022.

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