

# Institutions, Economic Structure and Tax Revenue in UEMOA Countries: A Pool Mean Group Analysis

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## Abstract

This study contributes to the empirical analysis on the determinants of tax revenue in UEMOA countries by paying particular attention to the role of institutional factors and economic structure. Using the Pool Mean Group method, it shows that the poor quality of institutions and the high share of agriculture and unrecorded economy are among the factors explaining the low tax performance of UEMOA countries. In these countries, the unrecorded economy is sizable and revenue losses through tax evasion are substantial and growing over time. Results also reveal that per capita income and trade positively affect tax revenue. From these findings, the study provides a number of policy recommendations that can help improve domestic tax revenues.

**Keywords:** Tax revenue, Institutions, Tax evasion, UEMOA.

**JEL Classification:** H20, H26, C33, O55.

## 1. Introduction

In recent years, many African countries have benefited from a substantial reduction in their external debt stock after reaching the Initiative for Heavily Indebted Poor Countries (HIPC) completion point. This opportunity raises key challenge: how to strengthen domestic revenues mobilization to help create fiscal space and avoid debt accumulation in the next 10 or 20 years? Several studies indicate that developing countries have the potential for greater domestic revenue mobilization. The United Nations Millennium Project (2005) estimated that these countries could increase their domestic revenue by about 4 % of GDP over the next 10 years. Similarly, the Commission on Macroeconomics and Health (World Health Organization, 2002) concluded that most countries could raise an additional 1–2 % of GDP for financing additional health spending.

In this paper we analyze this challenge for the member countries of the West African Economic and Monetary Union (UEMOA). Faced with the vicious circle of persistent budget deficits, UEMOA member countries have embarked on economic and fiscal reform programs. These reform programs have usually included measures to raise tax revenues and to restructure tax systems. In addition, they have adopted convergence criteria aiming at explicit targets for public debt and deficits to monitor their fiscal situation. According to these criteria, the tax revenue to GDP ratio should be greater than or equal to 17%. Despite reforms and various adjustments of the individual taxes, tax systems fail to generate sufficient revenue. Over the period 2005-2009, only Senegal met this criterion out of the eight members of the Union. In Côte d'Ivoire, tax ratio decreased over the period and averaged to 15.2%. Why UEMOA countries fail to improve their tax yield? What are the factors explaining their tax performance? The consistent failure in raising revenues is a serious handicap for the implementation of homegrown development strategies. It constraints them to an excessive reliance on external borrowing and made their economies vulnerable to financial crises.

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The objective of this study is to analyze the determinants of tax performance in UEMOA countries by focusing on the effects of institutional factors and economic structure. An important hypothesis we made is that the poor tax performance in UEMOA countries is positively linked to the weakness of institutions. Our second important hypothesis is that the growing unrecorded economy results in considerable losses in tax revenue and competes with the activities of official firms leading to low tax performance.

The remainder of the study is organized as follows. The next section gives a preliminary analysis of tax performance in UEMOA countries. Section 3 reviews the empirical literature regarding the determinants of tax yield. Section 4 outlines the econometric methodology. Section 5 describes the data used in the study. Section 6 discusses the empirical results while Section 7 summarizes the major findings of the study and gives some policy implications.

### **Tax Performance in UEMOA Countries and Other African Countries**

#### **• Tax Ratio in UEMOA Countries**

Table 1 presents the share of tax revenues in GDP for the UEMOA member countries and other African countries. As can be seen, tax revenue performance varies across the UEMOA member countries. Senegal is the only country satisfying the convergence criteria regarding tax ratio, it enjoys tax revenue over 17% of GDP. Because of the conflict, Côte d'Ivoire fails to increase tax revenue share during the sample period. The share of tax revenue in GDP averages about 15.08% in Benin and 10% in Niger. Compared with other African countries, UEMOA countries lag behind Cameroon, Kenya and Namibia. The failure of the UEMOA countries to generate sufficient revenue to finance recurrent expenditure has led to large budget deficits. The area initiated tax reforms with diverse objectives. Unfortunately, the reform process began at a time when the macroeconomic environment was unstable and Côte d'Ivoire underwent a political crisis.

**Table 1: Tax Revenue Ratio in UEMOA and Some African Countries, 2000-2010**

*(in percent of GDP)*

<b>Countries</b>	<b>Total taxes</b>	<b>Direct taxes</b>	<b>Indirect taxes</b>	<b>Trade taxes</b>
<b>UEMOA</b>				
Benin	15.08	3.84	3.24	8.01
Burkina Faso	11.39	2.85	6.14	2.40
Cote d'Ivoire	14.98	4.24	3.21	7.53
Mali	14.73	3.00	2.21	9.52
Niger	10.00	2.56	1.92	5.53
Senegal	17.61	4.18	9.52	3.90
Togo	12.12	3.79	1.26	7.07
<b>African Countries</b>				
Cameroon	16.32	3.08	5.57	7.67
Kenya	19.14	6.69	8.55	3.89
Madagascar	10.53	2.22	2.87	5.44
Malawi	15.69	6.81	6.87	2.01
Namibia	25.68	9.71	5.90	10.07
Tanzania	11.34	3.20	4.22	3.93
Tchad	12.71	2.71	0.93	9.07

Source: Perspectives Economiques en Afrique (2010) et Banque Mondiale (2010).

Looking at the tax structure, we observe that commodity taxation dominates most African countries tax system. International trade taxes account for the highest share in total tax revenues in most countries. This is because trade taxes are easier to collect than other taxes. However, countries such as Senegal and Burkina Faso rely mainly on indirect taxes including VAT.

### • Tax Buoyancy in UEMOA countries

To assess the productivity of tax systems, we compute the income elasticity of individual taxes for each of the UEMOA member countries over the period 1996-2010. A desirable property of a tax system is that income elasticity be equal or greater than unity. Tax systems of UEMOA countries have undergone major restructuring over that period. The tariff slabs have been revised over time and maximum tariff rate has been reduced to 20% whereas the number of tariff slabs has also been reduced to four.

Results from Table 2 show that the overall tax system is not buoyant in two countries (Côte d'Ivoire and Mali). Estimates for Côte d'Ivoire suggest that for every 1% increase in GDP, tax revenue grows by 0.67%. A comparison of the tax handles reveals that trade taxes are not elastic in four countries. Clearly, the low tax-to-income elasticity of trade taxes adversely affects the overall elasticity of the tax system in these countries. In Burkina Faso, direct taxes are not buoyant because of the low base-to-income elasticity while the low elasticity of trade taxes is due to the low tax-to-base elasticity. In Mali, the low buoyancy of trade taxes is attributable to the low base-to-income buoyancy. In Côte d'Ivoire, the low performance of indirect taxes and trade taxes adversely affects the overall tax system's yield. The low buoyancies of trade and indirect taxes are due to the low tax-to-base and base-to-GDP elasticities, indicating that despite the increase in imports and GDP, import taxes are not being collected accordingly. This low performance reflects the combined effect of tax evasion and weak overall tax administration.

**Table 2: Estimates of Tax Buoyancy in UEMOA countries, 1996-2010**

(with reference to GDP)

	<b>Total Taxes</b>	<b>Direct Taxes</b>	<b>Indirect Taxes</b>	<b>Trade Taxes</b>
Benin	1.249 (48.665)	1.024 (21.491)	1.437 (28.789)	1.296 (24.919)
Burkina Faso	1.098 (22.742)	0.989 (16.924)	1.413 (44.827)	0.621 (3.911)
Côte d'Ivoire	0.677 (7.222)	1.044 (5.425)	0.625 (4.968)	0.493 (2.860)
Mali	0.906 (15.552)	1.317 (10.662)	1.116 (11.819)	0.718 (8.913)
Niger	1.658 (34.294)	2.328 (17.608)	1.729 (13.710)	1.342 (13.416)
Senegal	1.367 (43.030)	1.419 (25.333)	1.719 (12.369)	0.775 (4.313)
Togo	1.458 (6.704)	1.142 (3.317)	-0.921 (-1.989)	2.094 (11.758)

Note: Figures in parentheses are t-ratios.

The existence of generous tax exemptions is also a factor to be accounted for. Indeed, many African countries grant tax exemptions, most of which being unnecessary or ineffective. In Côte d'Ivoire, customs exemptions on goods amounted between 0.8% and 1.2% of GDP over the period 2000–2010. This means that tax yield could be increased by about 1% of GDP if customs exemptions are removed. In Mali, tax exemptions account for 1.5% of GDP over the period 2000–2009. The mining sector has been granted for 1% of GDP. While the fiscal cost of these exemptions is substantial, little is known about their social and economic impacts.

## 2. Literature Review

The empirical literature has identified a number of variables as important determinants of tax performance. The most traditional explanatory variables are those controlling for a country's economic

structure. Per capita income is typically considered as a proxy for the level of development of a country. A higher level of development goes together with a higher capacity to pay and collect taxes, as well as a higher relative demand for income elastic public goods and services (Chelliah, 1971; Bahl, 1971). In general, a higher level of per capita income is expected to have a positive effect on the tax ratio.

Other structural variables hypothesized to influence tax ratio include the sectorial composition of output, the degree of trade openness, the urbanization ratio and the financial deepening. Madhavi (2007) points out that some structural characteristics of developing economies impede their abilities to raise revenues from certain taxes. One such characteristic is a large share of the agricultural sector. In developing countries, this sector is characterized by a large number of small producers who sell their output in informal markets, either to exchange for other goods, or for self-consumption. Thus a higher agricultural share is expected to have a negative effect on tax ratio. Unlike the agricultural sector, a higher degree of trade openness is expected to generate a higher tax ratio. The trade sector has been traditionally a base that is easier to tax, accordingly, it is a major source of tax revenues for most African countries.

Following an interesting argument developed in Toggler (2007), tax compliance is influenced by the benefits received from government in the form of quantity of public sector services, in relation to the amount paid by individuals in taxes. Thus, if individuals feel that they are in an unfair contract and that taxes are not spent adequately, they are less likely to comply. Therefore, to proxy for tax compliance, the degree of urbanization as measured by the share of the urban population is used to reflect a country's demand for public services. Higher urbanization is expected to have a positive effect on tax ratio. Another interesting argument suggests that tax collection is easier in urban areas than in rural areas.

A number of empirical studies have attempted to assess the importance of these structural features. Lotz and Morss (1969) found that per capita income and trade share are important determinants of the tax share. Chelliah *et al.* (1975) related the tax share in GDP to various combinations of explanatory variables, using a sample of 47 countries averaged over the 1969-1971 period. They obtained that mining is positively related to the tax share while agriculture is negatively related and the export ratio is significant. Tait and Gratz (1979) used the same sample of 47 developing countries with data averaged over the 1972-1976 period, and did not find the share of agriculture to be significant. Tanzi (1987) examined, for a sample of 86 developing countries, how the share of tax revenue in GDP is related to per capita income. He found a positive and significant relationship between these two. In a subsequent study, Tanzi (1992) extended his analysis to incorporate a sample of 83 developing countries over the period 1978-1988. He found that half of the variation in the tax ratio is explained by per capita income, import share, agriculture share and foreign debt share. The share of agriculture in GDP is strongly inversely related to the tax share and its explanatory power is greater than per capita income.

Several regional studies have been conducted to look into determinants of domestic tax mobilization. For sub-Saharan Africa, Tanzi (1981) found that shares of mining and non-mineral export in GDP positively affect the tax ratio. Leuthold (1991) used panel data to obtain a positive impact from trade share, but a negative one from the share of agriculture. In a similar study, Stotsky and Wolde Mariam (1997) found that both agriculture and mining share are negatively related to the tax ratio, while export share and per capita income have a positive effect. Ghura (1998) obtained a similar result for per capita income, degree of openness, and the share of agriculture in GDP. He also found that other factors like structural reforms and human capital development affect the tax performance. An increase in the level of human capital and structural reforms are associated with an increase in tax ratio. In a study of 16 Arab countries for the period 1994-2000, Eltony (2002) obtained that the main determinants of the tax share in the GDP are the per capita income, the share of agriculture in GDP and the share of mining in GDP. Mining share has a negative impact on the tax ratio for oil exporting countries, but a positive impact for non-oil exporting countries. Other variables that are also important determinants are the share of exports and imports and in only the non-oil Arab countries, the outstanding foreign debt was found significant and positively related to the tax share.

Recently, some studies have looked at the importance of institutional factors as determinants of tax performance. North (1990) defines institutions as "the rules of the game in a society or, more formally, the

humanly devised constraints that shape human interaction”. He examines the nature and consequences of institutions for economic performance. In his study, Ghura (1998) observed that a rise in corruption leads to a decline in tax ratio. Bird *et al.* (2008) found that factors such as corruption and rule of law play key roles in explaining tax performance variation across countries. A country with good institutions would have a better tax system hence a higher tax ratio. In a series of papers, Tanzi and Davoodi (2000), as well as Friedman *et al.* (2000) have provided evidence that countries with higher levels of corruption tend to have lower collection of tax revenues in relation to GDP. Gupta (2007) found that structural factors such as per capita GDP, share of agriculture in GDP, and trade openness are strong determinants of revenue performance. He also found that although foreign aid improves revenue performance, foreign debt does not have a significant effect. Among the institutional factors, He found that corruption is a significant determinant of a country’s revenue performance. Political and economic stability matters as well, but this finding is not robust across specifications. Finally, He also observed that those countries that depend on taxing goods and services as their primary source of tax revenue, have relatively poor revenue performance. On the other hand, countries that rely more on income taxes, profit taxes, and capital gains taxes, perform much better. Bird *et al.* (2008) postulated that if taxpayers both perceive that their interests are properly represented in political institutions and that the governance is good, their willingness to contribute by paying taxes increases. Using cross-section data, they found that corruption and voice and accountability play a significant role in the determination of tax performance (Raza *et al.*, 2011).

Another strand of the literature suggests a negative relationship between the size of the underground economy and tax performance. As underground economy grows, tax evasion also increases and tax revenue decreases. The unrecorded economy, also referred to as the “underground economy”, “shadow economy” or “black economy”, remains difficult to appraise and its size is expected to increase with increasing taxation and regulation. According to Schneider and Enst (2000), unrecorded activities represent between 40 and 80% of GDP in developing economies. Evidence for African countries shows sizable unrecorded economy. For instance, at the beginning of the nineties the non-agricultural unrecorded sector in Senegal represented more than 50% of the GDP (Fall, 1997). Underground economic activity in the form of tax evasion poses a serious threat for public finance. It represents a deadweight loss on the economy and distorts taxation equity by shifting the taxation burden towards honest firms and individuals. In a study in Tanzania, Osoro (1995) found an inverse relationship between revenue productivity and the existence of the underground economy. That is, as the size of underground economy grows, tax elasticity is expected to fall. This is because its growth erodes the tax base. He also showed that measuring tax elasticity based on official GDP data in an economy in which the size of the underground economy is significant tends to overestimate these measures of revenue productivity.

### 3. Econometric Methodology

#### • Empirical Model

Based on the literature review presented above, we describe the tax revenue performance relationship as follows:

$$Tax_{it} = \alpha_0 + \alpha_1 y_{it} + \alpha_2 y_{it-1} + \alpha_3 Agr_{it} + \alpha_4 O_{it} + \alpha_5 Sb_{it} + \alpha_6 Urb_{it} + \alpha_7 \pi_{it} + \alpha_8 Ind_{it} + \alpha_9 Tax_{it-1} + \alpha_{10} Ins_{it} + \alpha_{11} UE_{it} + \mu_{it} \quad (1)$$

where :

*Tax* is the tax revenue-GDP ratio; *y* is the GDP per capita (in log) ; *Agr* is the share of agriculture in GDP; *O* is trade openness, measured as ratio of exports plus imports of goods and services to GDP; *Sb* is the budget balance in percent of GDP; *Urb* is the share of the urban population in a country’s total population;  $\pi$  is the inflation rate; *Ind* is the share of indirect taxes in total tax revenues; *Ins* is the institutional quality and *UE* is a measure of the unrecorded economy in percent of GDP.

• **Estimation Technique**

Until recently, many empirical models for panel data generally impose parameter homogeneity across countries, an assumption that can hardly be defended because of differences in geographical, institutional, social and economic structure among countries. By grouping countries that are at different stages of economic development, these studies fail to address the country-specific effects of explanatory variables on the dependent variable. If a variable is tax inducing in certain countries and tax retarding in others, forcing a single coefficient on the entire sample may result in inconsistent and fragile results (Pesaran and Smith, 1995). Another major concern with previous studies is about the possible endogeneity stemming from some right-hand side variables, notably per capita GDP, underground economy and institutions. To deal with the problem of endogeneity, most studies use instrumental-variable estimation methods like the GMM method or the two stage least square method. However, the choice of suitable instruments is often problematic and may deteriorate the quality of estimates.

To overcome these shortcomings and taking advantage of the panel dimension of data, we use recently developed panel data methods that accommodate heterogeneous dynamic adjustment around the long-run equilibrium relationship, namely the Pooled Mean Group (PMG) estimators proposed by Pesaran *et al.* (1999). This method allows the short-run coefficients and speeds of adjustment to vary across countries, but impose common long-run coefficients. This hypothesis holds for the countries under study. Indeed, member countries of UEMOA work to converge in the long-run towards common criteria, but in the short-run each country can diverge from these long-run criteria.

Following Pesaran *et al.* (1999), Eq.(1) is viewed as an autoregressive distributive lag (ARDL) dynamic panel model which can be written as follows:

$$y_{it} = \sum_{j=1}^m \lambda_{ij} y_{it-j} + \sum_{j=0}^n \delta_{ij}' x_{it-j} + \mu_i + \varepsilon_{it} \quad (2)$$

Where  $x_{it}$  is a  $k \times 1$  vector of explanatory variables;  $\delta_{ij}$  are the  $k \times 1$  coefficient vectors;  $\lambda_{ij}$  are scalars; and  $\mu_i$  represents the country-specific effect. From this model, we derive the long-run relation as follows:

$$y_{it} = \theta_i' x_{it} + \mu_{it} \quad (3)$$

If the variables are cointegrated, then the error term  $\mu_{it}$  is an I(0) process for all  $i$ , and Eq.(2) can be reparameterized in the form of an unrestricted error correction model in which the short-run dynamics of the variables are influenced by the deviation from the long-run relationship:

$$\Delta y_{it} = \phi_i (y_{it-1} - \theta_i' x_{it}) + \sum_{j=1}^{m-1} \lambda_{ij}^* \Delta y_{it-j} + \sum_{j=0}^{n-1} \delta_{ij}^* \Delta x_{it-j} + \mu_i + \varepsilon_{it} \quad (4)$$

where  $\Delta$  is the first difference operator defined as  $\Delta z_{it} = z_{it} - z_{it-1}$ . The error-correction speed of adjustment parameter,  $\phi_i$ , and the long-run coefficients,  $\theta_i$ , are of primary interest. One would expect  $\phi_i$  to be significantly negative under the prior assumption that the variables exhibit a return to long-run equilibrium. The main interest of ARDL models is that the long run relationship and the short run parameters are estimated jointly. They also allow to deal with variables that are possibly of different order of integration, namely I(0) and I(1), and not simply I(1). In other words, this procedure allows inferences to be made in the absence of any *a priori* information about the order of integration of the series under investigation. This property is extremely useful, given the low power of panel unit root tests in short samples. Under the restriction  $\theta_i = \theta$ , the PMG estimators are consistent and asymptotically normal irrespective of whether the underlying regressors are I(1) or I(0).

## Data Description

The empirical investigation uses annual time series data for a sample countries including six member countries of the West African Economic and Monetary Union, namely Burkina Faso, Cote d'Ivoire, Mali, Niger, Senegal and Togo<sup>2</sup>. Variables under study include tax revenue as share of GDP, per capita GDP, the share of agriculture in GDP, the trade openness measured as ratio of exports plus imports of goods and services to GDP, the budget balance as share of GDP, the share of the urban population in a country's total population, the rate of inflation, the share of indirect taxes in total tax revenues, the currency holdings, the broad money and the institutional indicators. Data cover the period 1984 to 2010. Macroeconomic variables are from the World Development Indicator. Budget balance is from the BCEAO website.

### • Measurement of Institutional Quality

We follow previous studies and consider six indicators to capture institutional factors, namely: (i) Quality of bureaucracy, (ii) Corruption, (iii) Rule of law, (iv) Democratic accountability, (v) Investment profile and (vi) Government stability. The first indicator ranges from 0 to 4, the following three indicators are scaled from 0 to 6, whereas the last two variables are scaled from 0 to 12. All data are collected from the International Country Risk Guide dataset (ICRG, 2009) compiled by the Political Risk Services (PRS Group). These indicators rely exclusively on polls of experts. To enable comparability variables are rescaled, so that they range from 0 to 10. Higher values of any institutional variable correspond to better institutional quality, with the exception being the corruption variable.

As indicated in the guide, bureaucratic quality represents autonomy from political pressure, strength, and expertise to govern without drastic changes in policy or interruptions in government services, as well as the existence of an established mechanism for recruitment and training of bureaucrats. Corruption reflects the likelihood that officials will demand illegal payment or use their position or power to their own advantage. Rule of law reveals the degree to which citizens are willing to accept established institutions to make and implement laws and to adjudicate dispute. Democratic accountability measures how responsive government is to the demand of its people, on the basis that the less responsive it is, the more likely it is that the government will fall, peacefully in a democratic society, but possibly violence in a non-democratic one. Investment profile is an assessment of factors affecting the risk to investment that are not covered by other political, economic and financial risk components.

Table 3A and 3B give an overview of the descriptive statistics of all institutional variables used for countries of the sample. As can be seen, all countries have done effort to reduce corruption. In particular, in Niger corruption index decreased from 6.67 to 1.67. A similar trend is observed in Togo. However, corruption remains relatively high in Cote d'Ivoire and Senegal. Quality of bureaucracy exhibits a decreasing picture and it is particularly low in Côte d'Ivoire, Mali and Togo over the period 2000-2005. Some countries have substantially increased their investment profile in recent years while others such as Côte d'Ivoire have experienced a marked decline.

**Table 3A: Quality of Institutions in UEMOA Countries**

	Bureaucracy			Investment profile			Corruption		
	84-89	90-99	00-10	84-89	90-99	00-10	84-89	90-99	00-10
Burkina Faso	5.00	2.63	2.50	3.52	5.21	7.33	6.67	4.92	3.33
Côte d'Ivoire	7.50	6.90	0.07	5.36	5.37	4.38	4.79	5.31	4.19
Mali	0.00	0.00	0.00	2.71	5.08	6.39	1.81	3.90	3.77
Niger	7.50	3.38	2.50	3.55	4.01	6.45	6.67	3.53	1.67
Senegal	5.00	4.40	2.50	5.67	5.25	6.49	5.00	5.00	4.44
Togo	2.50	1.90	0.00	4.93	4.79	5.99	3.33	3.33	2.89
<b>Panel</b>	<b>4.58</b>	<b>3.20</b>	<b>1.26</b>	<b>4.29</b>	<b>4.95</b>	<b>6.17</b>	<b>4.71</b>	<b>4.33</b>	<b>3.38</b>

<sup>2</sup>Benin and Guinea-Bissau are excluded because of lack of data.

**Table 3B: Quality of Institutions in UEMOA Countries (continued)**

	Democracy			Rule of law			Gouv. Stability		
	84-89	90-99	00-10	84-89	90-99	00-10	84-89	90-99	00-10
Burkina Faso	1.67	3.58	6.52	5.00	5.99	6.13	4.28	5.43	7.72
Côte d'Ivoire	5.00	5.00	2.85	6.57	4.93	4.40	4.07	5.15	7.06
Mali	1.67	4.31	5.69	3.33	4.50	5.00	3.83	5.48	7.19
Niger	6.67	4.14	8.04	6.67	3.53	3.33	4.27	4.80	7.48
Senegal	3.73	7.18	6.63	3.33	4.11	5.00	6.32	5.94	8.15
Togo	1.67	3.24	3.31	3.33	4.24	5.00	4.18	5.06	7.58
<b>Panel</b>	3.40	4.57	5.51	4.71	4.55	4.81	4.49	5.31	7.53

Using all of these measures in an econometric model may cause problems of multicollinearity and over-parameterization since the underlying variables may be highly correlated. On the other hand, using them individually may also lead to omitted variables bias. To deal with these econometric problems, we conduct of principal components analysis (PCA) to determine whether these indicators can be measured by a single index<sup>3</sup>. PCA is traditionally used to reduce a large set of correlated variables into a smaller set of uncorrelated synthetic factors called principal components that capture most of the information from the original dataset (for technical details, see Lebart *et al.*, 1995).

**Table 4: Principal Component Analysis Results**

	Principal component					
	PCA 1	PCA 2	PCA 3	PCA 4	PC5	PC6
Eigenvalues	2.244	1.966	0.747	0.460	0.338	0.244
% of variance	37.40	32.77	12.45	7.67	5.63	4.07
Cumulative %	37.40	70.17	82.62	90.29	95.92	100.00
Variable	Correlation coefficients					
	PCA 1	PCA 2	PCA 3	PCA 4	PC5	PC6
Bur	-0.505	0.661	0.385	0.279	-0.192	0.214
Deac	0.399	0.672	0.434	-0.438	0.054	-0.072
Law	0.098	0.746	-0.589	-0.116	-0.272	-0.011
Corrup	-0.594	0.646	-0.179	0.114	0.418	-0.102
InvestP	0.824	0.277	0.113	0.398	-0.045	-0.266
Gov.	0.888	0.166	-0.137	0.075	0.218	0.334

Notes: Bur=Quality of bureaucracy, Deac=Democratic accountability, Law=Rule of Law, Corrup=Corruption, InvestP.=Investment profile, Gov=Government stability.

The results reporting in Table 4 indicate that the first principal component explains 37.40% of the variance; the second principal component explains another 32.77% and so on. Following the Kaiser criterion, we extract the first two principal components which explain together 70.17% of the information from the original variables. Next, we compute a weighted average of these components by adjusting the percentages of variance to make their sum equal to one. The overall index of institutional quality is obtained from the expression  $F_t = \omega_1 P_{1t} + \omega_2 P_{2t}$ , where  $P_j$  is the  $j$ -th principal component and  $\omega_j$  the corresponding

<sup>3</sup>Before applying PCA, we test for factorability of the data. Bartlett's test of sphericity and Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) are carried out to give an indication concerning the suitability of the data for PCA. The results justify the use of factor analysis and suggest that the data may be grouped into a smaller set of underlying factors.



weight. This index has been rescaled to assume values between 0 and 10, with higher values indicating better institutional quality.

- **Measurement of the Unrecorded Economy and Tax Evasion**

Different techniques are used to estimate the size of the underground economy. In this study, we rely on the currency-money ratio method proposed by Tanzi (1983). This method has been used successfully in the context of other developing countries, especially in Africa (see Scheneider and Enste, 2000; Chipeta, 2002; Saunders and Loots, 2005; and Ocran, 2009, for technical details). Results are reported in appendices.

As can be seen from Tables 5A, the unrecorded economy is sizable in Cote d'Ivoire, where its share in the official GDP averages about 45%. In Senegal, the unrecorded economy represents about 58% of GDP over the same period. In Niger, Mali and Togo, it averages around 14%, 28% and 43% of GDP respectively. The Table also gives the estimates of tax evasion in absolute terms and as a percentage of GDP. Tax evasion was determined by multiplying the GDP of the unrecorded economy by the average tax rate in the official economy. Tax evasion in Cote d'Ivoire is substantial and growing over time due to the growth of unrecorded economy. Tax evasion varies between 400 and 770 billion and average tax evasion stands at about 6.7% of official GDP. Therefore, the potential tax revenue is beyond FCFA 2 300 billion, which represents around 23% of GDP. In the other countries, revenue loss through tax evasion is also substantial and growing over time. In Senegal, uncollected taxes are equivalent to about 10.4% of the GDP and range between FCFA 400 and FCFA 500 billion. This is larger than the total health expenditure. If all the taxes are collected, countries such as Cote d'Ivoire, Senegal and Togo will reduce greatly their dependence on external aid.

In this study, estimation of the size of the unrecorded economy is not an end in itself. The results of this exercise will be used to estimate the impact of unrecorded economy on tax performance. Size of unrecorded economy will be used as proxy for tax morale and willingness to pay. A high unrecorded economy is shown to be correlated with low tax moral, partly through lower moral cost of tax evasion and otherwise weaker motivation to pay taxes. Thus, we expect countries with a large unrecorded economy to have smaller levels of tax performance.

#### 4. Empirical Results

**Table 5: Estimates of tax Ratio Determinants in UEMOA Countries**

<b>Variables</b>	<b>Coefficient</b>	<b>S.E.</b>	<b>z-ratio</b>
Real income per capita (log)	31.86*	2.53	12.58
Trade openness	0.17*	0.04	3.76
Budget balance (%GDP)	0.33*	0.08	3.99
Inflation	0.01	0.03	0.16
Urbanisation	-0.67*	0.17	-3.81
Share of agriculture in GDP	-0.11	0.05	-2.20
Share of indirect taxes in total taxes	-0.42*	0.08	-4.99
Institutional quality	1.41*	0.60	2.34
Unrecordedeconomy (% GDP)	-0.02*	0.01	-2.11

We estimate the tax ratio model using the Pooled Mean Group estimators as explained in the section on econometric methodology<sup>4</sup>. The results are given in Table 6. As shown by this Table the coefficient on per capita GDP is significantly positive supporting the view that the capacity to collect and pay taxes increases with the level of development. We find a negative relationship between agriculture share and revenue

<sup>4</sup>Before proceeding with the estimation we test for the order of integration of the series. The results indicate that all the variables are non-stationary in their level, but achieve stationary status after first differencing. Next, we test whether there is a long-run relationship between the variables. Tests statistics significantly reject the null of no cointegration.

performance. In UEMOA countries, a large part of the agriculture sector is subsistence and then are hard to tax. Increasing the tax performance will necessitate a structural transformation towards industrial sector which contributes more to tax revenue relative to its value added. A positive relationship is obtained between openness and revenue performance. One explanation for this finding is that trade-related taxes are easier to impose because the goods enter or leave the country at specified locations.

Results also indicate that countries that rely more on taxes on goods and services as a source of revenue have lower revenue performance. Although easier to imposed, taxes on goods and services are subject to evasion, especially VAT and import taxes. This is particularly true for Cote d'Ivoire where revenue loss on VAT exceeds FCFA 100 billion. Moreover, most of indirect taxes tend to be regressive in nature and this exacerbates the inequality in income distribution and reduces the tax base (Yéo, 2009).

Contrary to expectations strong and negative effect is obtained for the rate of urbanization. This outcome could reflect to some extent that the nature of these economies largely informal. Informal economy increases with urbanization and this sector is largely under-taxed. The results indicate that quality of institutions is positively and significantly related to the tax ratio while the unrecorded economy is negatively related. High share of unrecorded economy and poor institutions are detrimental to taxes mobilization in UEMOA countries. As seen above, countries of this area are located at the lowside of institutional quality, which suggests that further improvement of institutional quality is crucial to increase their tax performance. A well-functioning institutional environment represents a source of comparative advantage for a country in better mobilizing taxes and in promoting economic performance.

The tax evasion of unrecorded activities results in substantial losses in tax revenue and threatens the official tax collection system. In various sub-Saharan African countries including UEMOA countries, the official trade for products such as second-hand cars, textiles, cigarettes or alcohol suffers unfair competition from unrecorded sector, and the tax potential is highly concentrated at the level of the largest and most honest firms. Tax evasion associated with the unrecorded economy and ignorance of tax procedure are among major societal factors hindering effective taxation in Côte d'Ivoire and Senegal. Despite liberalization and tax reforms, the unrecorded economy remains sizable and growing, meaning that as yet these reforms were not captured the evaded tax. Tax enforcement of large-scale unrecorded activities should allow collection of indirect tax revenues, especially at the borders.

## **5. Conclusion**

In this paper we looked at some important determinants of tax performance of UEMOA countries paying particular attention to institutional and economic factors. Results suggest that unrecorded economy, poor quality of institutions, high share of agriculture and unrecorded economy are among the most important determinants of the low tax performance of these countries. The unrecorded economy is sizable and revenue losses through tax evasion are substantial and increasing over time in many countries. Like most previous studies, the important role played by per capita income and trade openness in improving the tax ratio is confirmed in the case of UEMOA. We also found that greater reliance on taxing goods and services lower tax performance. This is because taxes on goods and services are more subject to evasion than income taxes.

Overall, the results provide a number of policy relevant implications. First, to enhance the tax-generating capacity of their economies, UEMOA countries should make efforts to remove administrative and tax barriers to entry into the formal economy and reduce the share of under-taxed economy. Tax procedure and related administrative formalities should be popularized. For tax fraud can be caused by the ignorance of tax procedure. Second, efforts should be done to broaden tax bases and improve the tax collection by: i) reducing exemptions and ineffective tax incentives, ii) improving efficiency of VAT, iii) reducing fraud and tax evasion and iv) improving tax administration. Third, governments should also try to improve some institutional aspects such as the rule of law and governance as well as the responsiveness of governments to the demand of their people. Governments should demonstrate to the public that tax revenues are being used to provide high quality public infrastructure. These strategies could help gain the trust of the tax-paying

public and boost tax morale and trust in the tax system, all of which will entail reducing the willingness to stay in the informal and unrecorded economy and widening the tax base.

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## Appendices

**Table 5A: Estimates of Unrecorded Economy and Tax Evasion in Côte d'Ivoire (in FCFA billion)**

<b>Year</b>	<b>Unrecorded Economy as % of official GDP</b>	<b>Tax evasion</b>	<b>Actual total tax revenue</b>	<b>Tax evasion as % of official GDP</b>
1985	39.76	246.88	621.00	7.88
1990	39.67	204.74	516.07	6.97
1993	38.95	169.50	435.20	5.42
1994	34.31	232.79	678.50	5.04
1995	36.64	328.81	897.40	5.99
1996	46.54	542.16	1040.70	8.73
2000	39.12	414.29	1077.50	5.59
2002	57.39	722.22	1259.30	9.02
2003	51.89	617.53	1190.10	7.73
2004	47.14	585.14	1241.35	7.15
2005	46.03	576.49	1251.10	6.68
2006	45.42	620.92	1364.00	6.84
2007	35.61	512.37	1438.90	5.40
2008	41.59	662.34	1592.60	6.32
2009	40.46	769.80	1888.70	7.00

**Table 5B: Estimates of Unrecorded Economy and Tax Evasion in Burkina Faso (in FCFA billion)**

<b>Year</b>	<b>Unrecorded Economy as % of official GDP</b>	<b>Tax evasion</b>	<b>Actual total tax revenue</b>	<b>Tax evasion as % of official GDP</b>
1985	28.91	14.82	51.26	2.12
1990	41.37	31.62	76.43	3.75
1993	41.41	30.07	72.60	3.32
1994	42.51	44.29	104.20	4.21
1995	57.17	73.15	127.95	6.16
1996	49.82	74.17	148.87	5.61
2000	42.74	86.72	202.92	4.66
2002	23.07	55.59	240.90	2.42
2003	45.72	123.50	270.09	4.98
2004	39.14	121.47	310.35	4.50
2005	30.53	100.72	329.94	3.52
2006	30.43	110.26	362.38	3.65
2007	31.93	129.40	405.20	3.99
2008	29.39	130.70	444.70	3.63
2009	34.29	160.69	494.60	4.18

**Table 5C: Estimates of Unrecorded Economy and Tax Evasion in Mali (in FCFA billion)**

<b>Year</b>	<b>Unrecorded Economy as % of official GDP</b>	<b>Tax evasion</b>	<b>Actual total tax revenue</b>	<b>Tax evasion as % of official GDP</b>
1985	24.43	17.16	47.00	2.91
1990	38.54	25.40	65.90	3.85
1993	36.63	30.66	83.70	4.04
1994	23.12	23.86	103.20	2.44
1995	25.95	34.12	131.50	2.77
1996	26.76	51.87	193.80	3.87
2000	35.78	93.49	261.30	5.42
2002	27.28	83.48	306.00	3.58
2003	24.64	86.01	349.10	3.39
2004	26.34	103.61	393.30	4.02
2005	26.01	116.06	446.20	4.15
2006	26.10	122.70	470.20	4.00
2007	26.88	130.97	487.20	3.82
2008	26.12	135.76	519.80	3.48
2009	25.93	136.48	624.30	3.21

**Table 5D: Estimates of Unrecorded Economy and Tax Evasion in Niger (in FCFA billion)**

<b>Year</b>	<b>Unrecorded Economy as % of official GDP</b>	<b>Tax evasion</b>	<b>Actual total tax revenue</b>	<b>Tax evasion as % of official GDP</b>
1985	10.56	6.30	59.60	0.97
1990	13.20	7.06	53.50	1.05
1993	12.55	5.18	41.30	0.82
1994	9.91	4.62	46.60	0.53
1995	10.94	6.79	62.10	0.72
1996	11.47	7.86	68.49	0.77
2000	13.19	13.55	102.74	1.06
2002	10.19	14.73	144.63	0.97
2003	12.86	19.57	152.12	1.23
2004	13.99	23.45	167.60	1.45
2005	13.78	24.98	181.30	1.39
2006	13.46	27.47	204.00	1.44
2007	14.82	34.56	233.20	1.70
2008	14.10	38.61	273.80	1.61
2009	14.27	41.24	343.00	1.62

**Table 5E: Estimates of Unrecorded Economy and Tax Evasion in Senegal (in FCFA billion)**

<b>Year</b>	<b>Unrecorded Economy as % of official GDP</b>	<b>Tax evasion</b>	<b>Actual total tax revenue</b>	<b>Tax evasion as % of official GDP</b>
1985	82.94	157.66	190.10	11.85
1990	83.28	182.39	219.00	11.72
1993	86.16	189.73	220.20	11.80
1994	85.91	230.07	267.80	10.69
1995	72.63	239.90	330.30	9.85
1996	62.99	232.64	369.30	8.98
2000	63.90	343.32	537.30	10.30
2002	48.97	308.15	629.20	8.29
2003	63.42	429.33	677.00	10.77
2004	61.57	454.70	738.50	10.72
2005	64.47	548.48	850.80	11.97
2006	54.58	503.25	921.98	10.27
2007	55.09	573.76	1041.43	10.58
2008	64.43	700.44	1087.21	11.80
2009	51.43	578.67	1084.60	9.58

**Table 5F: Estimates of Unrecorded Economy and Tax Evasion in Togo (in FCFA billion)**

<b>Year</b>	<b>Unrecorded Economy as % of official GDP</b>	<b>Tax evasion</b>	<b>Actual total tax revenue</b>	<b>Tax evasion as % of official GDP</b>
1985	40.19	30.58	76.09	8.93
1990	61.94	46.63	75.28	10.52
1993	16.45	4.69	28.54	1.34
1994	41.77	22.43	53.69	4.11
1995	36.02	29.60	82.16	4.53
1996	43.08	40.80	94.71	5.44
2000	32.00	33.24	103.87	3.51
2002	52.63	63.36	120.39	6.16
2003	58.23	74.59	128.10	7.30
2004	46.34	64.41	139.00	5.92
2005	58.42	90.11	154.25	8.10
2006	43.82	75.01	171.19	6.47
2007	43.51	82.82	190.37	6.92
2008	30.31	50.72	211.20	3.91
2009	22.62	30.17	229.10	2.24