Increasing Public Revenues in West African Economic and Monetary Union Countries: Does Human Capital Matter?

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ABSTRACT

The literature on the factors explaining the increase in public revenues, particularly the role of human capital, is less developed. This study contributes to filling this gap by examining the effect of human capital on public revenues in seven (7) WAEMU countries over the period 1995-2018, using the autoregressive distributive lag (ARDL) approach, which is more reliable for studies with small samples. The estimations are carried out the pooled mean group (PMG) error correction technique. To strengthen the robustness of the results, we used the Driscoll-Kraay and Newey–West standard error techniques. Our results suggest that an increase in human capital is associated with increased public revenues. In addition, GDP per capita growth, urbanization and the degree of trade openness have positive and significant effects on government revenues. On the other hand, corruption has a negative effect on the latter. In light of these results, we highlight the need to invest more in improving educational infrastructure to train a skilled workforce adapted to the challenges of the contemporary world. Furthermore, strengthening the capacities of tax administrations to make them more efficient, transparent and resilient to corruption is crucial.

Keywords: Human Capital, Government Revenue, Tax Pressure, PMG Method, WAEMU
JEL Classification: H2, J24, I15, C51

1. INTRODUCTION

In developing countries, increasing public resources is a key issue to ensure the provision of essential public services, finance investments essential to improving people's living standards, and work toward sustainable development. Taxation lies at the crossroads of the provision of public goods, income redistribution, social safety nets, and government accountability (Okunogbe & Santoro, 2023). Tax revenues constitute the bulk of the resources mobilized by the State to carry out its fiscal policy (BCEAO, 2021). Expenditures on infrastructure, public services, health, and education are all dependent on sufficient tax revenue collection (FMI, 2011; Kaldor, 1963). Otherwise, states are forced to resort to borrowing, which leads to an increase in public debt and can, in

the long term, cause budgetary imbalances if the debt/GDP ratio becomes excessive (Piancastelli & Thirlwall, 2020).

To achieve the goal of successful implementation of public policies, it is crucial to develop adequate tax policies to mobilize the necessary resources. Tax policy is defined as the set of regulatory and administrative measures enabling public authorities to collect taxes and duties to finance the production of public goods and ensure their redistribution (Avom, 2011).

In sub-Saharan Africa, the mobilization of additional tax resources remains a priority for most states (Drummond et al., 2012). To improve tax revenue collection, numerous reforms of tax and customs administrations aimed at increasing efficiency have been

undertaken (Geourjon et al., 2017). In the particular case of the WAEMU economies, several reforms have been undertaken and have resulted in the establishment of directives aimed at optimizing tax collection. As a result of these reforms, the tax burden rate in the region increased from 10.4% in 2002 to 11.9% in 2010 and then to 13.2% in 2019 (BCEAO, 2021).

However, this rate remained significantly below the 20% community standard set in 2015 in the Convergence, Stability, Growth and Solidarity Pact (PCSCS) between the Member States of the Union. Given that there is still considerable room for maneuvering in terms of tax pressure compared with this standard, it is essential for WAEMU countries to identify levers to improve the performance of their tax policy (BCEAO, 2021). Human capital, as the foundation of the knowledge, skills and competencies acquired by individuals throughout their lives, is a key factor in stimulating investment, reducing unemployment and poverty, and ultimately increasing income generation (OECD, 2017). Improving the level of knowledge and skills thus contributes to increasing income, reducing poverty, strengthening productivity and reducing inequalities. Furthermore, a fiscally informed population (Pessino & Fenochietto, 2010), qualified tax agents and an effective fight against tax evasion are all elements that strengthen the capacity of States to sustainably mobilize the tax resources necessary to finance public expenditure.

The literature examining the determinants of government revenue mobilization is burgeoning (Ayenew, 2016; Boukbech et al., 2018; Chaudhry & Munir, 2010; Ha et al., 2022; Kaulu & Goodwell, 2023; Kizilkaya et al., 2015; Nwakanma & Nnamdi, 2013; Tsaurai, 2021). However, most of these analyses seem to underestimate the importance of human capital. This study aims to fill this gap by specifically analyzing the contribution of human capital to government revenue mobilization in WAEMU countries. The study examines how these countries can leverage recent advances in human capital to improve public resource mobilization. Our study is one of the first to explore the effect of human capital on government revenues in the WAEMU context.

The remainder of the paper is structured in four sections. The next section presents a literature review of previous studies. The third section details the methodology used for this research, while the fourth section is devoted to the estimation strategy. The fifth section presents and discusses the results obtained. Finally, the sixth section concludes the paper and presents policy implications.

2. LITERATURE REVIEW

In the face of major development challenges, including high unemployment rates, persistent income inequality and deepening poverty, facing developing countries, improving skills and knowledge is recognized as a critical lever to increase the development of these nations (Adeniyi et al., 2021). From this perspective, Trostel (1993) asserted that human capital constituted a crucial element in the creation of wealth and even in the economic prosperity of states. In general, the contribution of human capital to economic growth has gained importance in economic theory, particularly in response to the limitations and criticisms of the Solow (1956) model. Solow set

the goal of identifying the determinants of economic growth and characterizing its long-term evolution. Over time, economists have gradually become aware of the potential importance of human capital in economic analysis. Theories of human capital (Becker, 1964; Mincer, 1981; Schultz, 1961) and endogenous growth (Lucas, 1988; Mankiw et al., 1992; Rebelo, 1991; Romer, 1990) have highlighted the essential role of human capital in economic growth. Therefore, the contribution of human capital to the mobilization of public resources will be at the heart of our analyses. Indeed, a skilled and trained workforce is generally more productive, which translates into higher revenues and profits for companies, thus leading to higher taxes on profits and workers' incomes. Workers with greater human capital generally have access to better-paid jobs because of their skills and greater productivity. Consequently, these workers contribute to increasing tax revenues, particularly income taxes, thus allowing States to mobilize more public resources.

Empirically, the relationship between human capital and government revenues has been of constant interest to the scientific community. For example, Profeta and Scabrosetti (2010) analyzed the determinants of tax revenues over the period 1990-2004 in a sample of 39 countries, including 19 Latin American countries, 11 Asian countries, and 9 members of the European Union. Their results showed that human capital indicators, such as the level of education in Latin American countries and the share of the female workforce, had a positive and significant effect on tax revenues. In Asia, variables related to the high school graduation rate and the proportion of the urban population did not have a significant correlation with tax revenues. In contrast, the proportion of the population over 65 years of age had a significantly negative effect on the latter.

Pessino and Fenochietto (2010) used a stochastic frontier model to determine the tax effort of 96 countries over the period 1991-2006. Their results showed that the tax burden was positively and significantly correlated with public spending on education as a percentage of GDP. By investing in education, states promote the acquisition of skills by their population, which translates into a more skilled and productive workforce. This dynamic stimulates economic growth and increases household income and, consequently, tax revenues. Moreover, by providing educational opportunities to all, public policies contribute to reducing inequalities and broadening the tax base, thus strengthening public finances.

Karagöz (2013) investigated the determinants of tax policy in Turkey, analyzing time series covering the period from 1970 to 2010. In particular, the author studied the impact of the sectoral structure of the economy on tax pressure. His results show that the urbanization rate has a positive and significant influence on tax pressure in Turkey. Indeed, the concentration of economic activities in urban areas, associated with improvements in the skills of the workforce, facilitates tax collection. Cities generally offer easier access to high-quality education, thus promoting the acquisition of skills and increasing productivity. As a result, urban household incomes are higher, which translates into increased tax revenues, particularly in terms of income taxes. According to Castro and Camarillo (2014), investment in human capital is an effective strategy to stimulate economic growth and increase tax revenues. A high level of human capital encourages increased

specialization, which results in the acquisition of more advanced skills and the development of more sophisticated production methods. These factors contribute to boosting economic activity and, consequently, increasing government revenues.

Health expenditure, whether borne by individuals or governments, is a critical factor in human capital development. Human capital contributes significantly to sustained economic growth, reduced social costs, increased productivity, and increased aggregate incomes. By preventing diseases and improving the health of the population, health expenditures reduce the social costs associated with absenteeism and lost productivity. A healthy population is more productive, which in turn boosts economic growth and generates additional tax revenues through increased taxable income. Behera et al. (2020) studied the cyclicality of public health expenditures in India, analyzing data from 28 states over the period 2000–2016. Their results revealed a positive and significant correlation between tax revenues and public health expenditures, highlighting the importance of health as a public good in India. The Kenyan government has long sought to implement an effective tax policy to increase government revenues. However, these rates have remained relatively low despite the measures implemented. To explain this evolution, Singoro (021) studied the impact of the Human Development Index (HDI) on tax revenue performance in Kenya. The study, which was based on annual data covering the period from 2003 to 2018, used a linear regression model. The results show a positive correlation between the HDI and tax revenue: a higher level of human development is associated with higher tax revenue. The author concludes that countries with a high HDI generally have more developed economies, more efficient tax systems and a better capacity to mobilize resources.

The following section presents a similar analysis, but this time in the context of the WAEMU economies.

3. METHODOLOGY AND DATA

3.1. Methodology
The recent literature has been enriched by numerous contributions analyzing the performance of tax policy. To assess the impact of human capital on public revenues, we adopt, like the works of Riahi-Belkaoiu (2004), Richardson (2006), Richardson and Lanis (2007), Castro and Camarillo (2014) and Dang et al., (2019), a linear econometric specification.

The model relating human capital to government revenue can be represented as follows:

$$Y = \alpha_i + \sum_{k=1}^{n} \beta_k X_k + n_t + \mu_{it} \tag{1}$$

Y represents government revenue as a percentage of GDP, X a vector of economic, social and institutional factors, β is a vector of coefficients to be estimated, n are unobservable individual effects, specific to each country. The error term μ is assumed to satisfy white noise assumptions, i.e. it is identically distributed with zero mean and constant variance. Unlike previous authors who used a simple

linear regression model, we transform the previous model into an autoregressive staggered lag or distributed lag (ARDL) model.

In this respect, the analysis of the effect of human capital on public revenues in WEAMU is based on the ARDL approach given by:

$$Y_t = \alpha + \sum_{i=1}^{p} \delta_i Y_{t-i} + \sum_{i=1}^{q} \gamma_j X_{t-j} + \varepsilon_t \tag{2}$$

where X is the vector of explanatory variables.

The analysis of the effect of human capital on government revenues requires the existence of a cointegrating relationship between the series. Indeed, the link between human capital development and government revenues is not immediate. Individuals need time to acquire new skills that translate into an increase in their productivity and income. As Lucas (1988) noted, economic growth can be sustainable only in the long run if the stock of human capital increases continuously.

The analysis of the effect of human capital on government revenues assumes the existence of one or more long-term cointegration relationships between these variables. To do this, we use the ARDL approach developed by Pesaran et al. (2001). This method allows us to test for cointegration and to simultaneously estimate long-term relationships and short-term dynamics within an error correction model, which is generally written as follows:

$$\Delta Y_t = \alpha + \sum_{i=1}^{p} \delta_i \Delta Y_{t-1} + \sum_{i=1}^{p} \gamma_i \Delta X_{t-1} + \beta_1 Y_{t-1} + \beta_2 X_{t-1} + \varepsilon_t \tag{3}$$

where δ and γ represent short-term dynamics, β_1 and β_2 are long-term coefficients and t is the error term or white noise.

Using the ARDL approach for long-term studies has many advantages. ARDL modeling does not require that the series in the model be integrated of the same order, I(0) or I(1). Thus, the method is suitable for panel studies of small samples, as is the case for most developing countries. It corrects the problems of correlation and endogeneity between series by increasing the order of the explanatory variables. Finally, the ARDL model offers the possibility of being able to jointly treat short-term adjustments and long-term dynamics.

Thus, the empirical specification of the model for analyzing the effect of human capital on public revenues in the context of this research is as follows:

$$\Delta üüüüüüüü = \alpha_0 + \sum_{i=1}^{p} \gamma \Delta \qquad {}_{t-i} + \sum_{i=1}^{p} \theta \Delta \qquad {}_{t-i} +$$

$$\sum_{i=1}^{p} \varnothing_i \Delta Corrup_{üüü} + \sum_{i=1}^{p} \beta \, \Delta Trade_{\_} + \sum_{i=1}^{p} \pi_i \Delta Urban_{\_} +$$

$$\sum_{i=1}^{p} \vartheta_i \Delta Inf_{üüü} + \alpha \, Caphum_{\_} + \alpha \, GDPt - 1 + \alpha \, Corrupt - 1$$

$$+\alpha_4 Tra\,de_{t-1} + \alpha_5 Urban_{t-1} + \alpha_6 Inf_{t-1} + \delta ECT_{t-1} + \varepsilon_t \tag{4}$$

where γ, θ, $\emptyset$, β, π and ϑ represent the short-term dynamics of the model, while α_1., α_6 represent the long-term relationship, δ the error correction term parameter, ε_t the error term and ECT_{t-1} the error correction term. where Pubrev represents tax revenue as a percentage of GDP, Caphum represents the level of human capital, GDP indicates the growth rate of domestic product per capita, Corrup refers to the level of corruption, Trade refers to the degree of trade openness of countries, Urban represents the share of the urban population in the total population, and Inf represents inflation measured at the general price level.

3.2. Data and Variables

For this study, we used annual data from seven WAEMU countries (Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal and Togo) covering the period of 1995-2018. These data come mainly from the World Bank databases: the World Governance Indicators (WGI) and the World Development Indicators (WDI). We also supplemented these data with those from the Foundation for International Development Studies and Research (FERDI).

Figure 1 describes the evolution of human capital and the level of tax revenues as a percentage of GDP in WAEMU from 1996 to 2018.

The analysis of the evolution of tax revenues as a percentage of GDP in WAEMU between 1996 and 2018 reveals a notable improvement in the mobilization of public resources in the region. The tax pressure rate thus increased from 9.72% in 1996 to 15.3% in 2018, in parallel with an increase in the human capital index from 23.54 to 49.26 over the same period. However, these overall results mask significant disparities between Member States.

From 1996 to 2018, Benin had an average tax burden rate of 11.04% and an average human capital index of 39.28. Burkina Faso recorded an average tax burden rate of 12.80%, with notable improvement in recent years, reaching 17.4% in 2017 and 17.2% in 2018. Its average human capital index stands at 26.73. Finally, Côte d'Ivoire had an average tax burden rate of 12.08% and an average human capital index of 41.41.

Over the same period, Mali recorded an average tax burden of 12.44% of GDP, with an increase to 13.43% on average between 2013 and 2018. Its human capital index was 34.16 on average. In Niger, the average tax burden rate was 9.19%, with a human capital index of 26.43. Senegal recorded an average tax burden of 14.04%, with a slight increase in recent years, reaching 15.21% on average between 2013 and 2018. Its average human capital index is 43.94. Finally, Togo recorded an average tax burden of 14.04%, even exceeding the WAEMU convergence criterion in 2017, with a rate of 20.30%. Its average human capital index is 50.24.

The descriptive analysis of the previous data provides us with a first approach to the evolution of the variables studied (Table 1). However, establishing a long-term relationship between the indicators within the WAEMU is not sufficient. It is therefore necessary to use specific econometric methods to confirm or refute this hypothesis.

4. ESTIMATION STRATEGIES

Before proceeding with the analysis of panel data, it is essential to carry out preliminary tests to select the most appropriate estimation

Figure 1: Trends in the level of human capital and tax revenues as a percentage of GDP in the WAEMU from 1996 to 2018
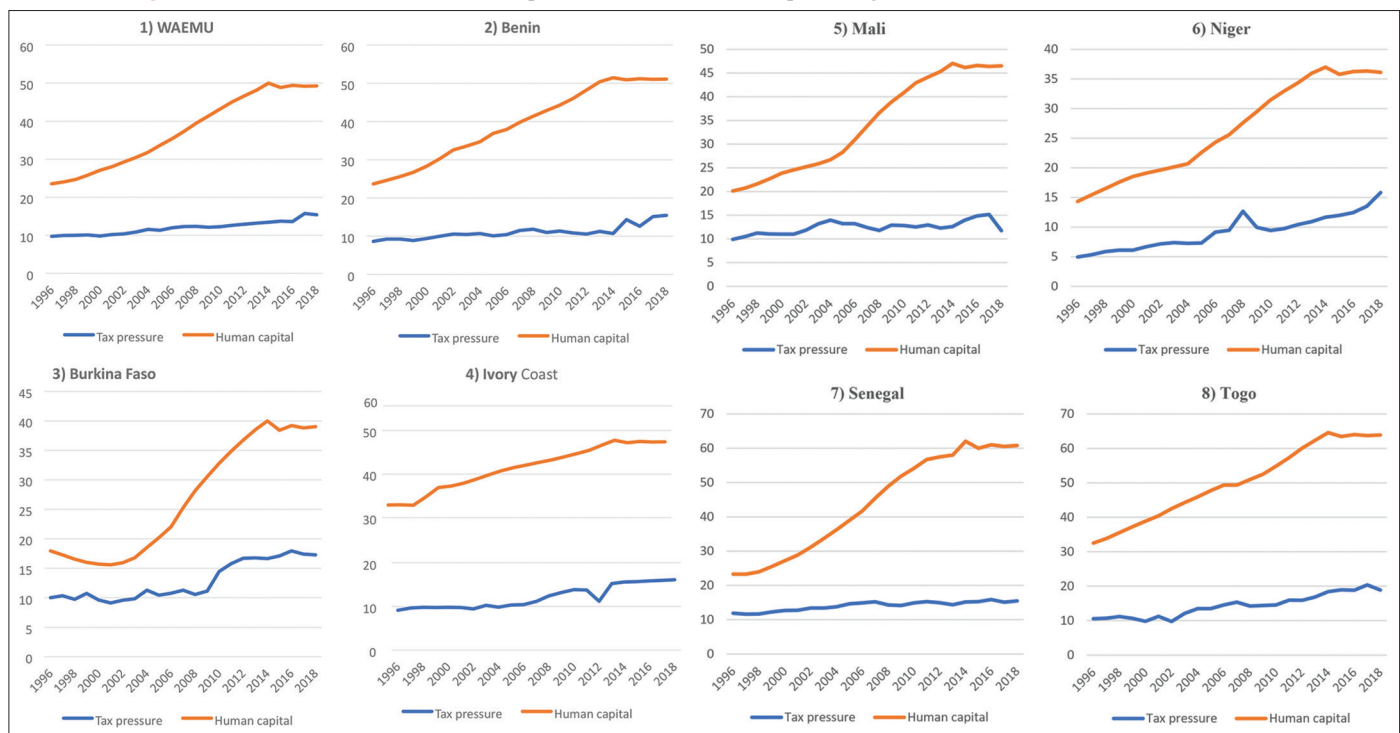
Source: Compiled by the author

Table 1: Descriptive statistics

Variables	Observations	Averages	Standard deviation	Min	Max
Public revenue	168	11.70	2.55	4.95	20.30
Human capital	168	36.85	12.99	13.25	64.58
GDP per capita growth	168	1.67	2.89	−6.64	12.05
Corruption	168	2.34	0.76	1	4
Trade openness	168	59.23	18.06	30.36	112.76
Urbanization	168	33.96	10.81	15.13	50.32
Inflation	168	3.09	3.58	−7.59	16.28

Source: Authors

method. Commonly used tests include those of correlation between variables, cross-sectional dependence, stationarity and cointegration. The results of these tests are detailed below.

4.1. Dependency Tests

Failure to account for the possible presence of interdependence between individuals can lead to bias in the estimates. Under the assumption that individuals are independent, we have zero covariance. Given this, this study examines the existence of cross-sectional dependence between countries to determine whether it is crucial to apply estimation methods that take this dependence into account. We test for cross-sectional dependence using the methods of Breusch and Pagan (1980), Baltagi et al. (2012), and Pesaran (2004). The test proposed by Pesaran (2004) is as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}} \left(\sum_{i=1}^{n-1} \sum_{j=i+1}^{n} \hat{\rho}_{ij} \right) \tag{5}$$

where N is the sample size, T is the period and the term represents the cross-sectional correlation.

4.2. Stationarity Tests

Many tests can be used to assess the stationarity of time series. In this study on the impact of human capital on WAEMU tax revenues, we opt for the second-generation unit root test developed by Pesaran (2007). This choice is justified by the presence of interdependence between the countries in the zone. The Pesaran test specifically takes into account this cross-sectional dependence within the panel. The equation of the model is written as follows:

$$Y_{it} = (1-\varphi_i)\mu_i + \beta_i Y_{i,t-1} + \mu_{it}, \ i = 1, \dots N, t = 1, \dots, T \ \mu_{it} = \gamma_i \tau_t + \varepsilon_{it} \tag{6}$$

The null and alternative hypotheses of the panel test are presented as follows:

- The null hypothesis: Presence of a unit root from which the series is nonstationary, against
- The alternative hypothesis: Absence of a unit root; hence, the series is stationary.

Pesaran (2007) averages the t statistic over the lagged value of the cross-sectionally augmented Dickey–Fuller test $CADF_i$ to obtain the cross-sectionally augmented IPS (CIPS) statistic as follows:

$$CIPS(N,T) = N^{-1} \sum_{i=1}^{N} CADF_i \tag{7}$$

4.3. Westerlund Cointegration Test (2007)

After determining the degree of integration of the variables, we test for the existence of a long-run cointegration relationship between the series. This step is crucial to avoid the spurious regression bias frequently encountered in panel analyses. Here, we present different panel cointegration tests, focusing on those of Pedroni (1999) and Kao (1999), which are considered first-generation tests. However, owing to the cross-sectional dependence problem often present in panel data, these tests can lead to biased results. To overcome this limitation, we also use the Westerlund (2007) test, which explicitly takes this dependence into account. The Westerlund test proposes four test statistics on the basis of structural dynamics: G_t, G_a, P_t et P_a. Statistics G_t et G_a are constructed under the null hypothesis of the absence of cointegration while allowing heterogeneity of error parameters between individuals. The statistics P_t et P_a are based on the assumption of homogeneity of the error correction parameters. The rejection of the null hypothesis indicates the existence of a cointegration relationship for the entire panel.

5. RESULTS AND DISCUSSION

5.1. Results

The first step of this analysis is to present the results of the preliminary tests. Tables 2-4 reveal significant results for the correlation, stationarity and cross-sectional dependence tests, respectively. These results indicate the existence of correlations between the variables, nonstationary of the series and dependence between the individuals in the panel. Furthermore, the results of the cointegration tests presented in Table 5 strongly suggest the existence of a long-term relationship between the variables studied. Indeed, the null hypothesis of no cointegration is rejected at the 1% and 5% levels, which indicates strong evidence in favor of cointegration.

Table 6 presents the long-term results of the effect of human capital on government revenue in WAEMU.

5.2. Discussion

In this study, we opted for the pooled mean group (PMG), mean group (MG) and dynamic fixed effects (DFE) error correction estimators of Pesaran et al. (1999). This choice is explained by the nature of our panel data. However, given that WAEMU countries form an economic and monetary union, one can expect some convergence of their economies and similar shocks affecting their economic policies (Da & Diarra, 2024). Therefore, our analysis will focus mainly on long-term relationships.

Table 2: Correlation test

	Urban	Caphum	Ratepf	Corrupt	Inf	Open	GDPH
Urban	1.0000						
Caphum	0.6843*	1.0000					
Pubrev	0.3555*	0.7592*	1.0000				
Corrupt	−0.0363*	−0.1633*	0.0186*	1.0000			
Inf	−0.0763	−0.2531	−0.2718*	−0.0281	1.0000		
Trade	−0.6071*	0.6025*	0.3425*	−0.3652*	−0.0250	1.0000	
GDP	−0.0037*	0.0253*	0.2022*	0.2606*	−0.1082	−0.0390*	1.0000

Sources: Authors. Note: The symbol * indicates significance at the 10% threshold

Table 3: Results of stationarity tests

Variables	IPS	CIP	LLC	Decision
Human capital	−2.28**	−2.98**	−2.466***	I (1)
Public revenue	−2.474***	−8.00***	−8.777***	I (0)
GDP per capita	−3.7937***	−6.77***	−18.041***	I (0)
Corruption	−4.663***	−4.89***	−5.085***	I (1)
Urbanization	−5.411***	−2.5***	−18.029***	I (1)
Inflation	−3.711***	−5.07***	−59.560***	I (0)
Commercial opening	−2.532***	−1.32***	−43.533***	I (0)

Sources: Authors note: ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Table 4: Results of cross-sectional dependency tests

Variables	CD test	P value
Human capital	2.213	0.028
Public revenue	−1.783	0.367
GDP per capita	2.451	0.003
Corruption	2.950	0.000
Urbanization	2.781	0.000
Inflation	2.867	0.000
Commercial opening	2.610	0.017
Model		
Breusch–Pagan LM	5.632	0.001
LM at Pesaran scale	3.455	0.000
LM at bias-corrected scale	3.5	0.000
CD Pesaran	4.488	0.000

Sources: Authors

Table 5: Results of the Westerlund (2007) cointegration test

Statistics	Value	Z value	P value
Gt	−3.102	−1.818	0.035
Ga	−26.902	−4.816	0.000
Pt	−8.198	−2.320	0.010
Pa	−28.044	−6.539	0.000

Sources: Authors

The results show that the error correction term (ECT_{t-1}) is negative and statistically significant at the 1% level for all the estimated models, which confirms the existence of a long-run cointegration relationship between the variables. In addition, the Hausman test favors the pooled mean group (PMG) estimator. To take into account the cross-sectional dependence and ensure the robustness of the estimates, we used the variance–covariance corrections of Driscoll and Kraay (1998) and Newey and West (1987).

The results presented in Table 6 show that human capital has a positive and statistically significant effect on government revenues, expressed as a percentage of GDP, in WAEMU countries. In other words, an improvement in the level of human

Table 6: Econometric results of the effects of human capital on public revenues in WAEMU

Variables	Public revenue (%GDP)		
	(PMG)	(MG)	(DFE)
	(1)	(2)	(3)
Human capital	0.1509***	0.1884	0.2640***
	(0.0229)	(0.1214)	(0.0526)
GDP per capita growth	0.2444***	0.2578**	0.5173***
	(0.0567)	(0.1058)	(0.1337)
Corruption	−1.105***	−3.8718	−1.1516
	(0.2902)	(2.7740)	(1.8941)
Urbanization	0.5944***	1.0435	0.3121**
	(0.0931)	(0.7073)	(0.1578)
Inflation	0.1030	0.1195	0.1357
	(0.0479)	(0.0435)	(0.1155)
Trade Openness	0.0756***	0.0978	0.0717**
	(0.0160)	(0.0653)	(0.0301)
Error correction	−0.4735***	−0.8965***	−0.4134***
	(0.0917)	(0.10091)	(0.0648)
Constant	−8.4430***	−32.5829**	−5.3449***
	(2.4228)	(15.0827)	(1.8228)
Number of observations	168	168	168
Hausman test	(MG, PMG) = 5.05 (0.494); (DFE, MG) = 9.97 (0.157)		

NB: Values in parentheses represent standard errors, whereas ***, **, and * represent the significance of the coefficients at 1%, 5% and 10%, respectively

capital is associated with an increase in tax revenues in the region. These results are in line with the work of Ghura (1998), who established a positive link between the level of human capital and the tax rate. Similarly, Pessino and Fenochietto (2010) highlighted a positive and significant correlation between tax pressure and the level of education of citizens. Indeed, a high level of education contributes to training a skilled workforce. Skilled employees are generally more productive and have a better chance of finding stable and well-paid employment. These higher incomes allow individuals to increase their ability to contribute and thus increase tax revenues. Furthermore, the increase in productivity leads to growth in corporate profits, which translates into an increase in corporate taxes. Thus, improving human capital promotes the broadening of the tax base and strengthens the mobilization of public resources.

The results show that GDP per capita has a positive and statistically significant effect on government revenue. In other words, economic growth translates into an increase in tax revenue. This finding is in line with the work of Yi and Suyono (2014), who highlighted a positive correlation between tax revenue and GDP. Indeed, sustained economic growth improves corporate profitability, which translates into an increase in corporate taxes. Furthermore,

Table 7: Analysis of the robustness of the effects of human capital on public revenues

Variables	Estimates	
	(Driscoll-Kraay)	(Newey–West)
Human capital	0.120***	0.120***
	(0.010)	(0.012)
GDP per capita growth	0.121***	0.123***
	(0.030)	(0.046)
Corruption	−0.771**	−0.771***
	(0.255)	(0.189)
Urbanization	0.014	0.015
	(0.064)	(0.020)
Inflation	−0.025	−0.26
	(0.017)	(0.038)
Trade openness	0.024**	0.025***
	(0.007)	(0.008)
Constant	6.962***	6.962***
	(1.727)	(0.592)
Number of observations	168	168
R-squared	0.625	
RMSE	1.594	

NB: Values in parentheses represent standard errors, whereas ***, **, and * represent the significance of the coefficients at 1%, 5% and 10%, respectively

the increase in household income, following dynamic economic growth, helps increase tax revenues related to consumption.

Furthermore, urbanization, measured by the urbanization rate, has a positive and statistically significant effect on WAEMU government revenues. This finding is in line with the work of Bird and Zolt (2008), who highlighted that urbanization increases demand for public goods and services and broadens the tax base by concentrating formal economic activities. Indeed, high urbanization is associated with an increase in tax revenues as a percentage of GDP. This dynamic is explained by the creation of new economic opportunities for businesses and households in urban areas. Businesses are thus subject to local taxes on sales and profits, whereas households contribute to tax revenues through consumption taxes, particularly through the development of retail trade in urban areas. Similarly, trade openness has a positive and statistically significant effect on government revenues. An increase in international trade results in an improvement in the tax burden in the region, thus confirming the work of Gupta (2007). This relationship can be explained by several mechanisms. First, trade openness generates additional customs revenues. Second, it attracts foreign direct investment, thus creating new jobs and stimulating economic growth. This dynamic leads to an increase in the income of businesses and households and, consequently, tax revenues from corporate and income taxes. In short, international trade helps to broaden the tax base and strengthen the mobilization of public resources.

In contrast, corruption has a negative and statistically significant relationship with tax revenue mobilization at WAEMU. The estimates show that a decrease in the level of corruption is associated with an increase in the share of tax revenue in GDP. These results are in line with the work of Epaphra and Massawe (2017) and Hunady and Orviska (2015). Indeed, by reducing the misappropriation of public funds, the fight against corruption strengthens citizens' trust in public institutions. This increased

trust encourages taxpayers to fulfill their tax obligations, which contributes to increasing public revenue.

Table 7 presents the robustness results obtained using the Driscoll and Kraay (1998) and Newey and West (1987) standard error estimation techniques. The results of these estimations are relatively similar to those presented in Table 6 in terms of the size, sign, and significance of the coefficients.

6. CONCLUSION AND POLICY IMPLICATIONS

In developing countries, increasing public resources is a major challenge to ensure the provision of public services essential for sustainable development. Public revenues play a crucial role in financing these services, redistributing income and implementing social policies. This study analyzed the impact of human capital on public revenues in seven WAEMU countries between 1995 and 2018 the pooled mean group (PMG) error correction technique. Robustness tests were conducted the Driscoll–Kraay and Newey–West techniques. The main results show that human capital has a positive and significant effect on public revenues. In addition, GDP per capita, the urbanization rate and trade openness are positively associated with public revenues, whereas corruption has a negative and significant effect.

In terms of recommendations, this study suggests that WAEMU countries should invest more in health and education infrastructure. To do this, states could allocate larger budgets to improve the quality of education and train a skilled workforce. Furthermore, it is essential to strengthen the capacities of tax administrations to ensure efficient and transparent tax collection and to combat corruption. These long-term investments will improve human capital and strengthen the tax base of WAEMU countries.

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