

Financial Development and Its Impact on Tax Revenue in Côte d'Ivoire

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Abstract

Increasing domestic revenue mobilization remains a challenge for many governments, generally in low-income countries and in Côte d'Ivoire in particular. This work aims to assess the effects of financial development on the mobilization of tax revenues in Côte d'Ivoire during the period 1985-2020. The Granger Causality techniques were applied to data, revealing that there is a one-way relationship between financial development and tax revenue and between export and tax revenue. The results of the estimation of the two-step cointegration model of Engle-Granger (1987) show a cointegration relationship between taxes and their variables in the long term as in the short term. The improvement of financial development and the good quality of national institutions lead to better mobilization of tax revenues. However, the contributory capacity of exports to national wealth positively and significantly influences the mobilization of income in the short term, in the long term, exports become harmful but not significant. The results reflect the non-negligible role of the quality of national institutions in the relationship between the financial sphere and the real sphere.

Keywords: tax revenue to GDP ratio, financial development, quality of the institutions, Engle and Granger

1. Introduction

Given the need to mobilize additional financial resources to meet the growing needs of its population, Côte d'Ivoire has carried out numerous reforms in order to boost its system for collecting fiscal resources. However, since the 2000s, the country has suffered from a deterioration of its institutional framework. This could be explained by the many socio-political instabilities that have hit the nation, in particular the military coup of 1999, the armed rebellion of 2002, and the post-electoral crisis of 2010. This degradation of the institutional environment hinders internal resource mobilization.

Nowadays, there is a contradictory debate about the link between taxation and economic growth. Some authors such as Garba (2014) and Egbunike et al. (2018) believe that there is a positive relationship between tax revenue and economic growth. Others support the hypothesis of a non-linear relationship between these two variables (Keho, 2009; Laffer, 1981). However, there are few studies that highlight the transmission channel of the effect of tax revenues on economic growth. In other words, according to his studies, there was a tax threshold beyond which tax revenues become negatively affected by economic growth.

Nowadays, the literature on the link between tax revenue and financial development without being neglected. The concept of «financial development» has evolved a lot over time. Indeed, financial development is the accumulation of financial assets at a faster rate than the accumulation of non-financial assets (Shaw, 1973). On the other hand, authors like Okon (2018) argue that financial development improves tax revenue by promoting good tax tracking and collection. The theory supports both a direct and indirect link between financial development and tax revenue. The indirect channel operates via economic growth based on three hypotheses from the literature. First, the predominant supply hypothesis states that in the long term, financial development improves economic growth because it promotes a good allocation of resources, better accumulation of capital, and good diffusion of technology. Then, according to the demand attraction hypothesis, economic growth induces financial development. Finally, according to the feedback hypothesis, there is a complementary effect between financial development and economic growth.

Tsaurai (2020) examined the link between tax revenue on financial development on the one hand and the

complementary effect between tax revenue and foreign direct investment (FDI) on the financial development of emerging economies on the other hand. The period 2001 to 2007. The results obtained through generalized dynamic nonlinear momentum (GMM) methods argue that financial development is positive and significantly influenced by its own lag. Still, according to the results, tax revenues influence financial development, while the influence of FDI on financial development remains sensitive to the type of financial development indicator used. Also, the complementary of tax revenues and FDI has a positive and significant effect on the financial development of emerging economies. One year later, our author analyzed the effects of taxation on economic growth in emerging markets using generalized dynamic moment methods (GMM), fixed effects, ordinary least squares (OLS) methods, and random effects methods with data from panels from 2008 to 2018. Its results reveal that financial development has been shown to be a channel through which taxation improves economic growth in emerging markets (Tsaurai, 2021).

Gnangnon (2019) analyzed the effect of financial development on the performance of non-resource tax revenues in developing countries, including through international trade and economic growth channels in a sample of 104 developing countries. The results obtained after estimating a dynamic Bayesian model show the existence of a positive and significant influence of financial development on tax revenues.

Nnyanzi (2019) similarly examines the effect of financial development on tax revenues for a sample of East African countries. The results of the dynamic panel of the estimation approach of the GMM system indicate an important role in financial development in general and in financial institutions and financial markets in particular.

However, studies have shown that financial development improves in a system that allows creditors to obtain full repayment of their loans in the event of bankruptcy (Beck et al., 2000). This is why Levine (1997) defines institutions as “third kind” factors that provide an important structure without which improvements in the financial system could not take place. Yahyaoui and Rahmani (2009) show that the quality of institutes is a good channel for transmitting the impact of financial development on economic activity.

However, it is indisputable that the financial system improves the efficiency of tax mobilization. So, for an economy marked by a lot of instability like the Ivory Coast, what could be the effect of financial development on tax revenues?

However, in the majority of work, both theoretical and empirical, financial development and institutions emerge separately as fundamental determinants of tax revenue. Therefore, we try in this paper to show the complementary between these two factors to explain tax revenues in Côte d'Ivoire during the period 1985 to 2020, as well as the causal relationship. Therefore, our objective is to determine how the quality of institutions and good governance are considered as key factors in the relationship between financial development and tax revenue. Hence, the main question of this research is to know what are the triggers of the expansion of the financial system, and what really consists of notions of institutions.

To answer these questions, we will adopt the following approach in our work. First, we will show the econometric approach to adopt to achieve our objective.

Secondly, we empirically test an ECM model, dealing with the relationship between financial development, institutions, and tax revenues, before analyzing the causal relationship between tax revenues and endogenous variables. This allows us to show the indirect effects (by the quality of institutions) of financial development on revenue mobilization. This section will therefore be devoted to the results of the various estimates and their interpretations. Finally, the last part will focus on concluding our study and then proposing implications for economic policies.

2. Methodology

The objective of this section is to study the effects of financial development and institutions on tax revenue in Côte d'Ivoire. To do this, we opted for the estimation methodology of an error correction model proposed by Engle and Granger (1987) which follows a two-step procedure.

In the first step, we determine the order of integration of all the variables. The estimation method requires that the variables be integrated in the same order. In practice, we use two tests, namely the Dickey-Fuller Augmented (ADF) and Phillips Perron (PP) tests. Next, we estimate the cointegration equation $Y_t = \alpha + \beta x_t + e_t$ using the ordinary least squares method, and then test the stationarity of the estimated residue e_t .

In the second step of our analysis, we first estimate the long-term relation and secondly, the short-term relation.

✚ Estimation of the long-term relationship by the method of ordinary least squares (OLS):

$$Y_t = \hat{\beta}_0 + \hat{\beta}_1 X_t + \dots + \hat{\beta}_k X_{kt} + e_t \quad (1)$$

The residual of the estimate of the long-term relationship which represents the adjustment term for the deviation of the dependent variable from its long-term equilibrium value is calculated as follows:

$$e_t = Y - \hat{\beta}_0 - \hat{\beta}_1 X_t - \dots - \hat{\beta}_k X_{kt}$$

Estimation of the short-term relationship by the method of ordinary least squares (OLS):

$$DY_t = \hat{\alpha}_0 + \hat{\alpha}_1 DX_{1t} + \dots + \hat{\alpha}_k DX_{kt} + \gamma e_{t-1} + \mu_t \quad (2)$$

With γ the coefficient of the restoring force towards equilibrium must be significantly negative. The error correction model is reconciled in our study by the variables determined by the literature review.

$$TAX_i = \alpha_0 + \sum_{i=1}^k \alpha_i X_i - v_i - \mu_i \quad (3)$$

With: TAX which designates the tax revenue to GDP ratio; X_i which designates the vector of explanatory variables of the tax revenue to GDP ratio; α_i designates the parameters to be estimated; v_i designates the component assumed to be independently distributed and follows the exponential law and μ_i which designates the random component. Indeed, this component follows a normal distribution.

Therefore, the tax potential determined by long-run *equation* (3) is the predicted value of the dependent variable. This predicted value allows us to determine the residual of the equation (3) which, once delayed is used as an explanatory variable in the following model called the short-term tax pressure model :

$$DPF_i = \theta_0 + \sum_{i=1}^k \theta_i DX_i + \delta Residus_{t-1} + v_i - \mu_i \quad (4)$$

With: $Residus_{t-1}$ which designates the vector of the delayed values of the residuals of the model (3); θ_i denotes the estimated coefficients represent the parameters of the short-term model (4); δ designates the speed of adjustment in the event of an impact. Indeed, this coefficient assigned to the lagged residue must be negative and significant to conclude that the long-term relation (3) is valid.

Thus, the specification of the model is as follows:

$$TAX_t = \alpha_0 + \alpha_1 FDI_t + \alpha_2 LAW_OR_t + \alpha_3 ETH_TEN_t + \alpha_4 X_t + e_t \quad (5)$$

T= 1985-2020.

With: TAX_t : tax revenue of GDP ratio is our dependent variable; FDI_t : the financial development index; LAW_OR_t : Law an order variable will be used as an indicator of the quality of the judicial system; X_t : the export rate as a percentage of GDP will be used as an indicator of international trade or trade openness and ETH_TEN_t : the ethnic tension variable. The exam of the effect of financial development on tax revenues taking into account the quality of institutions during the period 1985-2020 required institutional data from the International Country Risk Guide (ICRG). As for the data on the endogenous variable and on financial development, they come from the World Development Indicator (WDI, 2021) of the World Bank.

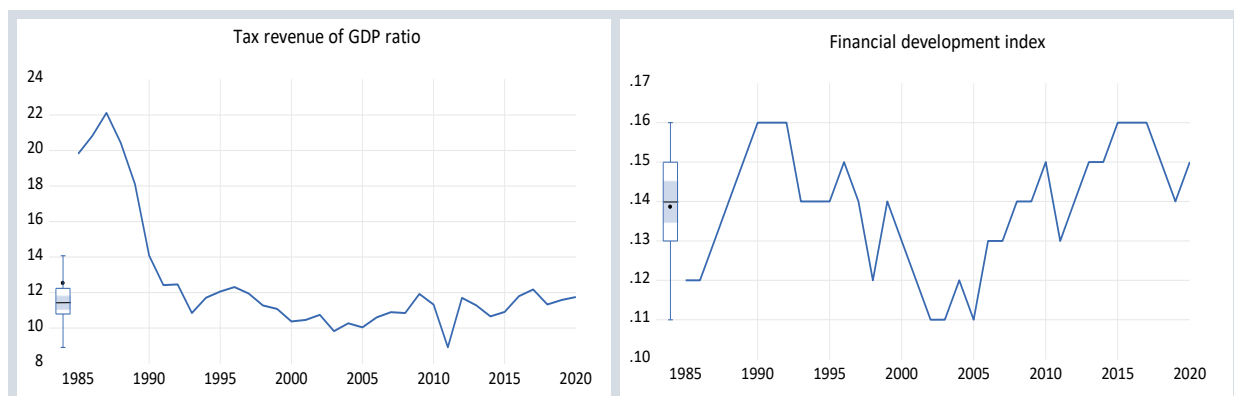


Figure 1. TAX and FDI evolutions

Source : Authors, from Eviews12.

3. Empirical Results

Before any statistical analysis, it is important to ensure the quality of the data to be analyzed. To do this, two tests are essential in the context of a time series study: the test for measuring multicollinearity and the descriptive statistics of the variables.

3.1 Preliminary Test

Table 1. Descriptive statistics of the variables

	TAX	FDI	LAW_OR	ETH_TEN	X
Mean	12.523	0.138	2.858	2.543	32.697
Median	11.456	0.140	2.500	2.000	32.634
Maximum	22.112	0.160	4.000	4.000	44.745
Minimum	8.918	0.110	2.500	2.000	22.624
Std. Dev.	3.312	0.015	0.513	0.690	6.540
Jarque-Bera	28.252	1.650	12.583	5.034	1.586
Probability	0.000	0.438	0.001	0.080	0.452
Observations	36	36	36	36	36

Source : Authors, from Eviews12.

Table 1 shows us that the mean and the median are very close, which implies that the data does not suffer from an “aberrant” problem. Table 1 also shows us that all the variables are normally distributed, except for Tax revenues and Law and order whose P-value is less than 5%.

Table 2. Correlation matrix of variables

(Probability)	TAX	FDI	LAW_OR	ETH_TEN	X
TAX	1.000				

FDI	-0.016	1.000			
	(0.924)	----			
LAW_OR	0.890	-0.134	1.000		
	(0.000)	(0.434)	----		
ETH_TEN	0.3661	0.138	0.592	1.000	
	(0.028)	(0.420)	(0.000)	----	
X	-0.274	-0.444	-0.235	-0.284	1.000
	(0.105)	(0.006)	(0.166)	(0.092)	----

Source: Authors, from Eviews12.

The correlation matrices show us that institutional variables such as ethnic tension and law and order are positively and significantly correlated with tax revenues. However, the financial development index and exportation are negatively and not significantly correlated with the tax revenues. This result suggests that the exogenous variables are not strongly correlated. Indeed, the correlation coefficients are less than 0.75. This implies for the rest of our analysis that all the variables selected can be taken into account.

At the end of the increased Dickey-Fuller (ADF) and Philippe-Perron (PP) stationarity tests applied to the variables, it appears that all the variables are integrated of unit order (stationary in first difference) that is - i.e. I (1).

We then apply the unit root tests on the series of residuals deduced from the long-term relation (equation (5)). The results from the application of the ADF and PP tests are reported in the following table :

Table 3. Unit root test on the series of residuals of the long-term equation

	Unit root test	
	ADF	PP
t-Statistic	-5.356	-5.387
Test critical value: 5% level	-2.948	-2.948

Source: Authors, from Eviews12.

The results of these two tests support the null hypothesis. Thus, it clearly emerges that the linear combination between the integrated variables resulted in a stationary process (the residues are stationary) in level according to the ADF and PP tests. We can then say, in this case, that the series are cointegrated (Note 1). It is then possible to estimate the error correction model (ECM). Having confirmed the presence of a cointegrating relationship between the variables, it may be interesting to analyze the detailed results of the long-term relationship, as well as the dynamics of the variables in the short term.

3.2 Estimation Results

The ordinary least squares (OLS) method provides non-robust estimators, so we used the error correction model (ECM) for error correction, in order to have stable elasticities. Note that the binary variables were removed from the model because of their insignificance.

Long-term estimate

The results of the long-term estimate are shown in Table 4 below.

Table 4. Long-term estimate of the error correction model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Financial development index	33.671*	17.150	1.963	0.058
Law and order	7.001***	0.571	12.260	0.000
Ethnic tension	-1.480***	0.414	-3.576	0.001
Exportation	-0.018	0.040	-0.464	0.645
Constant	-7.783*	3.854	-2.019	0.052
Adjusted R-squared	0.843	Durbin-Watson stat		1.847

Note. ***: P-value <0.01; **: P-value <0.05; *: P-value <0.1. The values in parentheses are the p-values.

Source: Authors, from Eviews12.

Let the long-term equation :

$$TAX_t = 33.67FDI_t + 7.00LAW_{OR_t} - 1.48ETH_{TEN_t} - 0.01X_t - 7.78 \quad (6)$$

We consider Certurus paribus :

Financial development significantly and positively affects the tax burden. In other words, a 1% increase in the financial development index leads to a 33.67% increase in the tax rate. This high elasticity can be explained by the development of mobile money financial services over the past decade. Otherwise, in the long run, taxes affect the different components of the financial service in the same way.

In the long term, the law and order institutional variable generates a positive and significant effect on the mobilization of tax revenue, insofar as, an increase of 1% of this institutional variable generates a 7.00% increase in the tax rate. This strong elasticity is effectively explained by the fact that any policy of mobilizing tax revenue is effective in a rule of law. As for the second institutional variable “Ethnic tension”, the long-term results confirm a negative and significant effect at the 1% level. Thus, it is clear that an improved institutional framework reflects good fiscal performance.

The contributory capacity of exports in GDP negatively affects the tax burden. However, this influence remains insignificant. That is to say an elasticity of export with respect to the tax rate -0.01%. This could be explained by the fact that Ivorian exports are mainly cash crops (coffee and cocoa). Hence, the agricultural added value remains low. Moreover, for decades, the trade balance has remained in deficit. Thus, exports remain detrimental to the dynamism of the mobilization of tax revenue.

In short, the results of the estimation of the long-term equation show us that if we consider that all things being equal, financial development and the quality of institutions significantly influence the tax burden in the long term to export exception which is not significant.

Short-term estimate

The results of the short-term estimates are shown in the table below.

Table 5. Long-term estimate of the error correction model (ECM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (Financial development index)	44.479***	15.929	2.792	0.009
D (Law and order)	3.523***	0.756	4.655	0.000
D (Ethnic tension)	-0.178	0.594	-0.299	0.766
D (Exportation)	0.068	0.049	1.403	0.171
RESID01(-1)	-0.569***	0.160	-3.546	0.001
Constant	-0.110	0.161	-0.685	0.498
Adjusted R-squared	0.431	Durbin-Watson stat		1.302

Note. ***: P-value <0.01; **: P-value <0.05; *: P-value <0.1. The values in parentheses are the p-values.

Source: Author, from Eviews12.

Let the short-term equation:

$$D(TAX)_t = 44.47D(FDI)_t + 3.52D(LAW_{OR})_t - 1.17D(ETH_{TEN})_t + 0.06D(X)_t - 0.56Residus_{t-1} - 0.11 \quad (7)$$

If we consider *Ceteris paribus*, the results of the estimation of the short-term equation show us that only the institutional variable «ethnic tension» has a negative influence on tax revenue-to-GDP ratio burden with a decrease in the elasticity in absolute value compared to the model of long term.

In addition, contrary to the long-term estimate, in the short term, the contributory capacity of export in the GDP positively and significantly affects the tax burden. Thus, a 1% increase in exports reflects a 0.06% increase in tax revenues.

The speed of adjustment towards equilibrium has fulfilled the condition of the validation of the error correction model ($-0.56Residus_{t-1}$), it means that following a shock, the response variable fiscal pressure regains its equilibrium according to the frequency of 56.95%. In other words, following a shock, the structural variables explain the tax levy of 56.95% in the long term, and that the shock is fully absorbed after two years ($1/0.56=1.76$).

In multiple linear regression, the assumptions of heteroskedasticity of disturbances and auto-correlation of errors, and of the normal distribution of residuals, should be checked.

Table 6. Summary of diagnostic tests

Object	Test	Test statistics	P-value	Conclusion
Autocorrelation	Breusch Godfrey Serial LM Test	nR ² = 0.4266	0.6567	Not autocorrelation
Heteroskedasticity	Breusch-Pagan-Godfrey	nR ² = 0.6947	0.6013	Not heteroskedasticity
Normality	Jarque Bera	JB = 0.8888	0.6413	Normal distribution

Source: Authors, from Eviews12.

The p-values of the various tests are above the significance level of 5%. This state that all the tests performed were important. Therefore, it seems reasonable to conclude that the residuals satisfy the assumptions of the classical normal linear regression model.

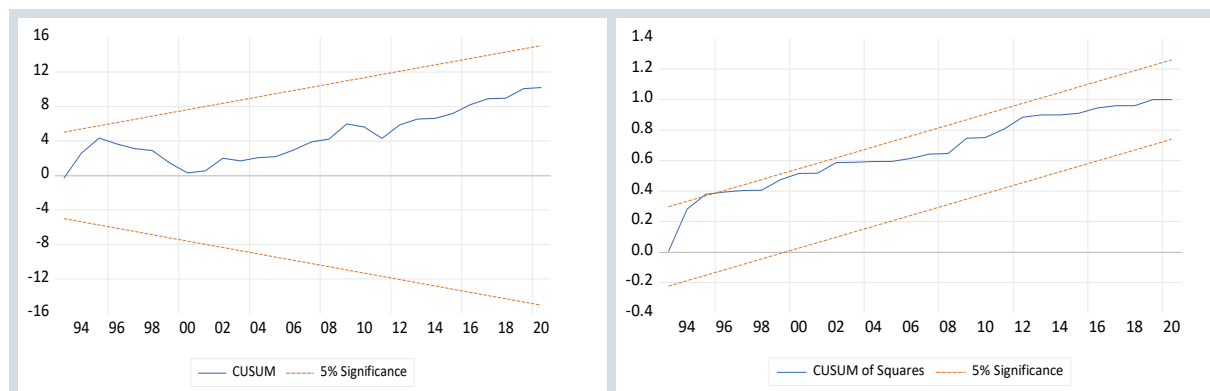


Figure 2. Cusum and Cusum of squares tests

Source: Authors, from Eviews12.

The Cusum and Cusum SQ tests applied in this study are tests proposed by Brown et al. (1975). The Cusum test aims to verify the stability of the short-term model while the Cusum SQ test is used to assess the stability of the long-term model. Finally, the stability tests of the estimated model make it possible to confirm this. Indeed, the two versions of this test, namely the Cusum, based on the cumulative sum of the recursive residuals, and the Cusum SQ, based on the cumulative sum of the square of the recursive residuals, are conclusive. In Chart 2, the recursive residuals (in blue) are very close to zero, it is well inside the confidence interval (in red). We can therefore conclude that there is no instability of the parameters over time. Similarly, Figure 2 shows that the solid line curve (blue) always remains between the two dotted lines (red) and that regardless of the observation time, the residual variance is stable at the 5% threshold.

4. Conclusion

This study examines the effect of financial development on tax revenues in Côte d'Ivoire while drawing on theoretical studies. The study required an estimation of an error correction model (ECM).

In terms of results, said estimates reveal the existence of a short-term and long-term relationship. The opening of the economy to the outside improves revenue mobilization in a positive and significant way in the short term. In the long term, this impact becomes negative and not significant.

Indeed, in the short term, as in the long term, the quality of institutions improves the link between financial development and revenues. However, financial development has a positive and significant impact on tax revenue. There are several reasons for this. First, financial development leads to an expansion of taxable economic activities, which in turn increases tax revenues. Second, economic growth resulting from financial development brings prosperity and stimulates demand for goods and services, hence stimulating investment. Consequently, financial development leads to an increase in the income tax base and, in turn, an increase in tax revenue. Third, financial development and economic growth could discourage the spread of the informal economy. Finally, financial development positively influences tax revenues because it facilitates the monitoring and collection of taxes.

In addition, despite the continuous efforts of the Ivorian State in the context of the implementation of effective policies to fight against poverty, the strategies for mobilizing tax revenues remain an advantage for the financing of the expenditure of the economy. This paper provides further evidence of the importance of the policy and institutional environment in orchestrating the role of financial systems in tax revenue. This suggests that the promotion of democratic governance through political rights and national reconciliation are no longer matters of choice but should be at the heart of government programs if the capacity for tax mobilization in Côte d'Ivoire is to be improved to drive the process. Economy towards a harmonious level of growth. Thus, economic policies must take into account a comprehensive set of policies that focus on financial development as a key driver of tax revenue, coupled with practical strategies to increase the economy's openness to the outside world.

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Note

Note 1. Two series $X_{1t} \rightarrow I(d)$ and $X_{2t} \rightarrow I(d)$, are cointegrated if the two conditions below are true: They are affected by a stochastic trend of the same order of integration d . A linear combination of these series makes it possible to reduce to a series of lower order of integration. Let $x_t \sim I(d)$ and $Y_t \sim I(d)$ such that $a_1 x_t + a_2 Y_t \sim I(d-b)$. We denote it by $X_t, Y_t \sim CI(d, b)$, where (a_1, a_2) is the cointegrating vector.

NB: In the general case with k variables, there is a cointegration vector.

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