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What is the role of the quality of economic institutions in the relationship between external debt and growth? Evidence from the African franc zone

Yann Nounamo
University of Douala

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The objective of this paper is to analyze the role of economic institutions in the relationship between external debt and economic growth in the African Franc Zone. The methodology focuses on Blundell and Blond's (1998) Generalized Moment Method (GMM). The sample includes 12 countries over the period 1985-2015. We adopted the classification of economic institutions proposed by Rodrik (2005) for the empirical analysis. We conclude from this that Economic institutions are a constraint on the economic performance of these countries: (i) The quality of market creation institutions has a negative impact on the link between debt and growth in the region. Similarly, market regulation institutions have a negative impact. ii) Market stabilization institutions have positive effects on the link between debt growth and growth. This means that to stimulate economic growth through debt, better institutions are needed to make external debt profitable for the growth for the African Franc Zone. (iii) For the whole area, we obtain an optimal debt threshold of 50.56% of GDP for the sample considered.

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Nounamo Nguedie yann
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1. Introduction

The idea that accumulable factors in the broad sense, such as physical and human capital, are no longer the only important determinants of economic performance and that other factors such as institutions are relevant for long-term economic development, is certainly the most important proposal emerging from the current economic literature [I]. A substantial literature in economics argues institutions are one of the fundamental explanations for the differences between countries in terms of growth rates. The origin of this idea can be found in the pioneering work of Smith (1776) taken up by North (1981), which show that effective protection of property and civil rights are associated with a high level of economic development.

In parallel with this literature on institutions, there was a broad consensus that, consistent with the thesis of sustainable debt and the assumption of a virtual debt burden, the growth of debt could have adverse effects on growth above a certain threshold (Mensah et *al.*, 2018). However, studies on institutional factors as determinants of debt effectiveness on growth are rare, particularly in countries of the African Franc zone. The choice of the African Franc zone is justified for at least two reasons: firstly, of the 41 heavily indebted poor countries (HIPC), 33 are from Sub-Saharan Africa, including 13 from the economies of the Franc zone. African Franc zone countries received more external financing than other Sub-Saharan African countries, due to monetary cooperation with France (Beah, 2015). Secondly, Bekolo-Ebe (1984) points out that the largest borrowers in the Sub-Saharan Africa region are located in this zone, namely Gabon, Ivory Coast, the Republic of Congo. Moreover, these economies are facing rapid re-indebtedness, as shown in graphs 1 and 2 in appendices, despite weak economic performance (Banque de France, 2017).

This paper attempts to complement the existing literature by focusing on the impact of economic institutions on the external debt-growth relation in the African Franc zone. We propose a comprehensive analysis of the quality of economic institutions by adopting the classification of economic institutions proposed by Rodrik (2005), which distinguishes: market creation institutions, market stabilization institutions, market regulation institutions and market legitimization institutions. Our empirical analysis shows that the direct effect of economic institutions on growth is negative. In addition, we find that the quality of economics institutions modulates the effects of external debt on economic growth. In this vein, the growth effect of debt is negative for low quality of institutions and positive for a high quality of institutions. The rest of the paper is organized as follows. Section 2 describes the theoretical model and variables. Section 3 exposes the results. Section 4 concludes and gives some policy implications.

2. Presentation of the theoretical model and variables of the study

Theoretically, the quality of economic institutions can condition the effect of public debt on growth in a number of ways (Rodrik, 2005; Cadoret et *al.*, 2013): better control over the resources borrowed for growth projects (and therefore less crowding out); better management of debt dynamics; favourable management of risk premiums and, more generally, expectations of economic agents (reduction of uncertainty), who are less inclined to put in place distrust strategies that are unfavourable to growth. The work of Mankiw et *al.*(1992) forms the basis for the theoretical analysis in accordance with the criticisms mentioned concerning the Solow residue. In order to assess the non-linearity of the impact of debt on growth based on the approach adopted, we estimate a quadratic model that takes into account the debt-to-GDP squared ratio in the regression equation. To meet the objectives of the study, 4 models are estimated:

- The model (1) below provides a general analysis of the relation between debt and economic growth in the countries of the African Franc zone. This dynamic panel model is specified as follows:

$$\text{GDP}_{it} = \beta_0 + \beta_1 \text{GDP}_{it-1} + \beta_2 \text{Debt}_{it} + \beta_3 Debt_{it}^2 + \beta_4 \text{expenses}_{it} + \beta_5 \text{Invest}_{it} + \beta_6 \text{Pop}_{it} + \beta_7 \text{Educ}_{it} +$$
$$+\beta_8 \text{Term}_{it} + v_i + \epsilon_{it} \ (1)$$

GDP_{it} is the growth rate of GDP. The other variables are defined in table 1 (Data period and sources, see appendices).

- The model (2) below, which starts from the model (1) to which the quality of economic institutions is introduced, measured by the composite index built for this purpose:

$$\text{GDP}_{it} = \beta_0 + \beta_1 \text{PIB}_{it-1} + \beta_2 \text{Debt}_{it} + \beta_3 Debt_{it}^2 + \beta_4 \text{expenses}_{it} + \beta_5 \text{Invest}_{it} + \beta_6 \text{Popu ratel}_{it} +$$
$$\beta_7 \text{Educ}_{it} + \beta_8 \text{Term}_{it} + \beta_9 \text{InstitEco}_{it} + v_i + \epsilon_{it} \qquad (2)$$

- The model (3) is also based on the model (1) and takes as an additional variable the product of $\text{Dette}_{it} \times \text{InstitEco}_{it}$ in order to measure the joint influence of debt and economic institutions :
$$\text{GDP} = \beta_0 + \beta_1 \text{GDP}_{it-1} + \beta_2 (\text{InstitEco}_{it} \times \text{Debt}_{it}) + \beta_3 debt + \beta_4 \text{expenses}_{it} + \beta_5 \text{Invest}_{it} +$$
$$\beta_6 \text{Pop}_{it} + \beta_7 \text{Educ}_{it} + \beta_8 \text{Term}_{it} + \beta_9 \text{InstitEco}_{it} + v_i + \epsilon_{it} \qquad (3)$$

- Both the model (4) and the model (3) seek to measure the influence of the quality of each type of economic institution. We thus obtain a series of estimates of 4 models, each taking into account the quality of a given economic institution:

$$\text{GDP} = \beta_0 + \beta_1 GDP + \beta_2 (\text{Inst} \times Debt) + \beta_3 Debt + \beta_4 \text{expenses}_{it} + \beta_5 \text{Invest}_{it} + \beta_6 \text{Pop}_{it} +$$
$$\beta_7 \text{Educ}_{it} + \beta_8 \text{Term}_{it} + \beta_9 \text{Instit}_{it} + v_i + \epsilon_{it} \ (4), \text{Where } Inst = \{\text{ICM}, \text{IRM}, \text{ISM}, \text{ILM}, \text{ILM}\}$$

Estimates are made using a composite indicator of economic institutions obtained from a Principal Component Analysis (PCA) of the sub-indicators of economic institutions. In this context, a dynamic panel model using the generalized moment method (*GMM*) seems appropriate. However, one of the conditions for using GMM is that N>T, for this purpose, This study uses the five-year average of each of the variables listed above except for the initial level of real per capita income (first year of five years).

3. Presentation and interpretation of results

A prerequisite is to study their stationarity to avoid problems of false regression. To test the stationarity of variables generally in panel data, we use the tests of Levin, Lin and Chu (2002) or those of Im, Pesaran and Shin (2008). In this study, the analysis of stationarity is based on these two tests (see appendices). In order to assess the effect of institutions on the debt- growth nexus, our estimate is made in two steps. We first identify the singular effect of debt on growth, then we assess the interaction of these institutions with debt, which allows us to measure the joint effect. All estimates were subjected to a Arellano-Bond autocorrelation test that allowed us not to reject the null hypothesis of no second-order autocorrelation.

3.1. Relation between external debt and economic growth in the African Franc zone

The results for our interest variables seem individually interesting. For all African countries in the Franc zone, the external debt ratio is positive and significant, while the external debt squared ratio is negative and significant, which corresponds to the expected signs (Table II). This reflects a non-linear relation between external debt and economic growth. A one-unit increase in the external debt ratio leads to an increase in economic growth of 0.2427 units. But an over-indebtedness, illustrated by the square of the external debt ratio which increases by one unit, leads to a decline of 0.0024 units in growth. There is a threshold at which external debt is less and less profitable for African countries in the Franc zone. Thus, in a small proportion, external debt stimulates economic growth, but above a certain threshold, it leads to a slowdown in the area's economies. This

result is consistent with the Laffer debt curve of Pattillo et *al* (2002). The optimal debt threshold resulting from this method is 50.56%. It is obtained by deriving the GDP per capita growth rate from the weight of debt in equation (1). In the second model, we introduced the composite indicator of economic institutions to assess its effect on economic growth. Our investigations reveal that, overall, economic institutions have a statistically significant but negative effect on economic growth. Mainly, an increase in the scoring index of economic institutions of a unit leads to a decrease of 0.52 economic growth unit in the African Franc zone. This conclusion is explained in line with the work of Barro and Sala-i-Martin (1995), which already showed that there is a possibility that economic institutions may have a negative impact on growth.

Table II: Non-linear relation between debt and growth in African Franc zone countries

VARIABLE	Model (1)	Model (2)
GDP (t-1)	-0.9203*** (0.1695)	-1.1478*** (0.1651)
Debt	**0.2427**** (0.1037)	**0.2852***** (0.1036)
Debt squared	**-0.0024**** (0.0004)	**-0.0011**** (0.0004)
Public expenditure	-0.6497*** (0.2107)	-0.5334** (0.2553)
Investment	0.4158*** (0.1507)	0.3655*** (0.1250)
Population growth rate	-2.2322** (1.0441)	-1.3078 (2.6652)
Education	0.1170 (0.1921)	0.3870* (0.2343)
Terms of trade	3.5750*** (7.3681)	3.2182*** (1.067)
Index of economic institutions		**-0.5219*** **(0.27)**
Constant	-7.900 (7.3681)	-18.5204 (12.986)
Number of countries	12	12
AR(1)	0.003	0.011
AR(2)	0.348	0.276
Sargan Test	0.101	0.176
Robust standard deviation in brackets *** p<0.01, ** p<0.05, * p<0.1		

Source: the author from stata 15

3.2. Interactions between economic institutions and external debt on economic growth

Model (3) assesses the joint interaction of economic institutions and external debt on economic growth. In this model, the debt ratio coefficient alone is no longer sufficient to assess the effects of external debt on economic growth. In fact, the results of the model's estimates (3) show that a one-unit increase in the external debt ratio impacts growth by 0.4737 percentage points[II]. Also, the interaction between debt and the institutions' index is negative and significant (-0.0029), this implies that the quality of economic institutions negatively affects the debt's effect on economic growth. Therefore, if the institutional composite index is low in value, the overall effect of external debt on growth will be small. In other words, in order to stimulate economic growth through external debt, it is necessary to have better economic institutions so that external debt can be used for growth in the countries of the region. In addition, it creates a business environment that is favourable to investment, which in turn strengthens economic growth.

[II] Let's say: 0.4737 = 0.4781-0.0015-0.0029.

Table III: Role of economic institutions in the external debt-growth relation (composite index)

VARIABLE	Model (3)
GDP (t-1)	-0.9392***
	(0.1481)
External debt	**0.4781***
	(0.1298)
Debt squared	**-0.0015***
	(0.0005)
Public expenditure	-0.3668*
	(0.2124)
Investment	0.1259**
	(0.0615)
Population growth rate	3.0441
	(1.968)
Education	0.1679
	(0.2767)
Term of the exchange	2.9528***
	(0.9321)
Index x external debt	**-0.0029**
	(0.0013)
Constant	-22.867***
	(7.574)
Number of countries	12
AR(1)	0.004
AR(2)	0.274
Sargan Test	0.280
Robust standard deviation in brackets *** p<0.01, ** p<0.05, * p<0.1	

Source: the author from Stata 15

3.3. Relation between the quality of each type of economic institutions and growth

The results of the estimates reveal that the combined coefficients of debt and quality indices of market creation and regulation institutions are statistically significant and negative at 5% and 10% respectively (-0.0363 and -0.0239). It is recognized in the economic literature that secures property rights contribute significantly to the prosperity of economies (Chavance, 2007). Unfortunately, African Franc zone countries are characterized by weak property rights protection due to complex and costly administrative procedures, weak contract enforcement resulting in high transaction costs. State intervention in the implementation of property rights is not very effective. With regard specifically to market regulation institutions (table IV), in the presence of economies such as those of the African Franc zone, where the majority of which are suffering from corruption, which creates uncertainty and insecurity, and in which policies to combat this scourge are not sufficiently effective, then market regulation institutions cannot stimulate economic performance. On the other hand, the coefficient of market stabilization institutions is positive and significant. These institutions play a beneficial role on growth in the African Franc zone. It should be noted that the investment rate has a positive and significant effect on growth in market creation and legitimization models. Therefore, these countries should seek to improve the quality of both types of institutions (creation and legitimization) in order to stimulate growth directly or indirectly through investment.

However, the results of the estimation of the model (4) reveal that the coefficient of the quality measurement index of market legitimization institutions is negative but not significant (column 4). An improvement in the quality of market legitimization institutions that results in a low score on the political rights scale would stimulate economic growth in the area. With regard to the control variables, we note that their effects differ depending on the introduction of the interest variables. In all models, in accordance with economic theory, education and gross capital formation (investment rate) have a positive influence on economic growth.

In the fourth model, with the introduction of economic institutions, the education coefficient is insignificant and the estimated population growth rate coefficient has a negative sign. All these effects show the importance of economic institutions in a country, corroborating the idea of Acemoglu et *al.* (2004) that these institutions have an influence on human capital. In the various regressions, the coefficient of the lagged endogenous variable (GDP_{t-1}) is statistically significant and has a negative sign. This confirms Barro's (2003) conditional convergence assumption for countries in the African Franc zone.

Table IV: Role of economic institutions (specific indicator)

VARIABLE	(1) ICM	(2) ISM	(3) MRI	(4) ILM
GDP (t-1)	-0.9590*** (0.1489)	-0.8724*** (0.1609)	-0.9765*** (0.1539)	-1.013*** (0.1753)
External debt	**0.4631*** (0.1285)	**0.2004*** (0.1212)	**0.2846** (0.1109)	**0.2402** (0.095)
Debt squared	**-0.0022*** (0.0006)	**-0. 0013** (0.0006)	**-0.0016*** (0.0005)	**-0.0014*** (0.0005)
Public expenditure	-0.3155 (0. 2150)	-0.3430 (0.2136)	-0.3925 (0.2584)	-0.2055 (0.2499)
Investment	0.1458** (0.0621)	0.1606** (0.0661)	0.1321** (0.0582)	0.1697** (0.0704)
Population growth rate	2.3136 (1.8735)	1.839 (1.635)	1.3501 (1.7417)	-0.8455 (1.7088)
Education	0.2124 (0.2823)	-0.0768 (0.4048)	0.6322 (0.2514)	0.0736 (0.3651)
Term of the exchange	3.3242*** (0.9491)	2.7542*** (0.9944)	2.5769** (1.0298)	3.251*** (1.130)
Creation x debt	**-0.0311** (0.0128)			
Stabilization x debt		**0.0111*** (0.0065)		
Regulation x debt			**-0.0239*** (0.0144)	
Legitimation x debt				**-0.0114** (0.0103)
Constant	-23.314*** (7.709)	-19.8175*** (6.7406)	-17.153** (8.3197)	**-10.**526 (7.4271)
Number of countries	12	12	12	12
AR(1)	0.002	0.002	0.001	0,005
AR(2)	0.707	0.609	0.709	0,712
Sargan Test	0.190	0.221	0.113.	0,130
Robust standard deviation in brackets *** p<0.01, ** p<0.05, * p<0.1				

Source: the author from Stata 15

4. CONCLUSION

The objective of this paper was to analyse the role of economic institutions in the relation between external debt and economic growth in the African Franc zone. We have adopted the classification of economic institutions proposed by Rodrik (2005) which distinguishes four categories of economic institutions. We carried out empirical investigations to determine the overall effect (composite indicator) and the effect of each category of economic institutions on the links between external debt and growth in the African Franc zone. The results obtained generally indicate that the influence of the quality of economic institutions on the relation between external debt and growth differs according to the economic-institutional component considered. First, the quality of market creation institutions negatively affects the debt-growth nexus in the zone. Similarly, the coefficient of the quality measurement index of market regulatory institutions is negative and significant. On the other hand, market stabilization institutions have positive effects. These institutions therefore play a

beneficial role on growth in the zone. It should be noted that the investment rate has a positive and significant effect on growth in models of market creation and legitimization. When we look at all the proxies collectively through the composite indicator of economic institutions, we notice that the interaction of these institutions with debt, reveals that economic institutions constitute a brake on economic performance in this zone. To stimulate growth through debt, it is necessary to have strong institutions. For the whole area, we obtain an optimal debt threshold which is 50.56% of GDP for the sample considered.

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Appendices:

Graph 1: Evolution of external debt (on GDP) in the African Franc zone
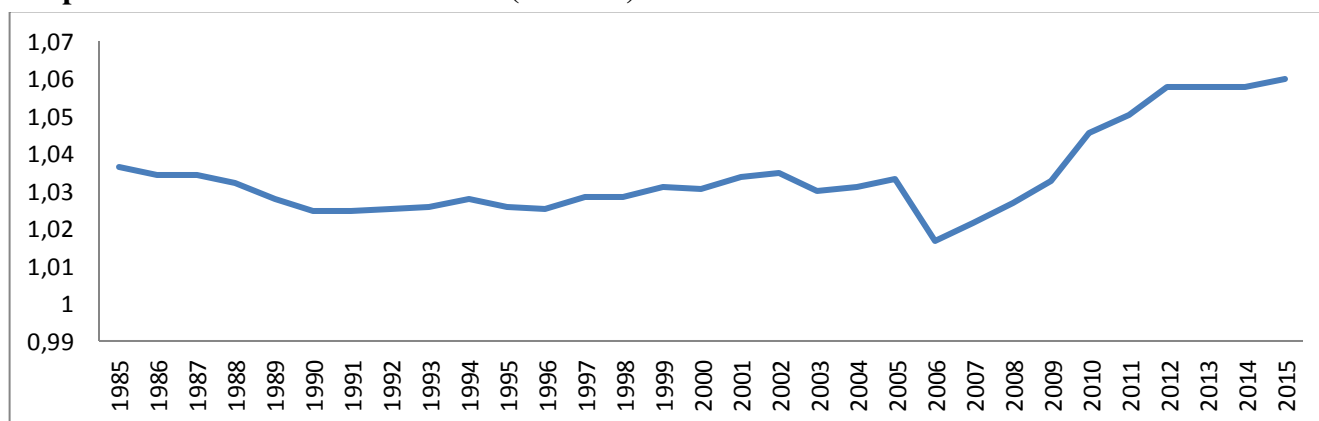
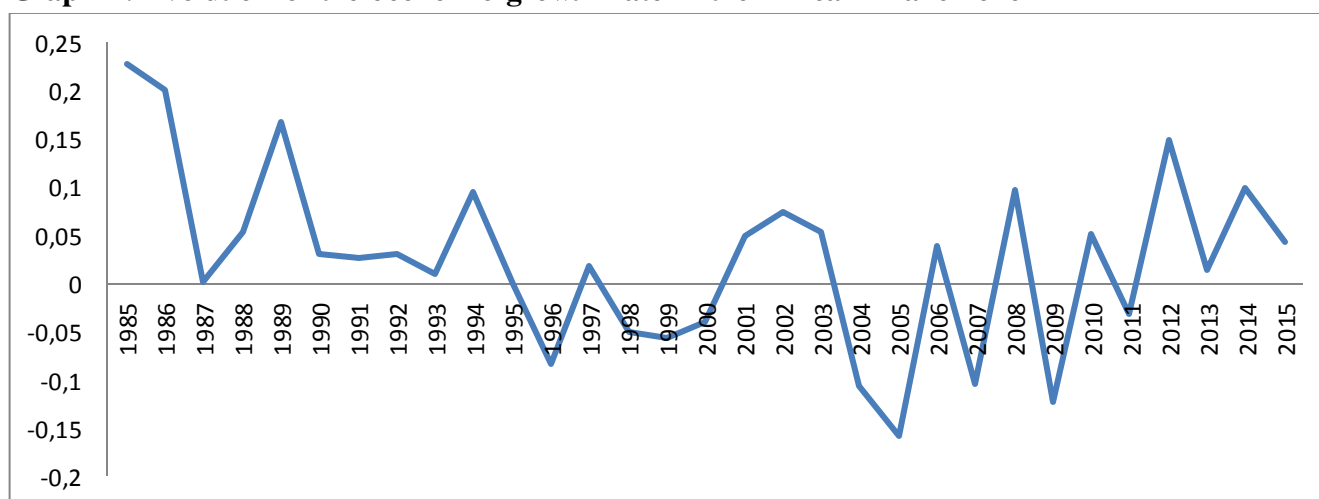**Graph 2: Evolution of the economic growth rate in the African Franc zone**

Table V : stationary tests

variables	Stats -IPS	Trend or cste	P-value	decision	Stat-Levin lin	Trend or cste	P-value	decision
GDP	-1.22	Trend	0,10	stationary	-4.85	None	0.0000	stationary
debt	-0.28	Trend	0.38	No stationary	-4.47	Trend	0.0000	stationary
debtsq	-0.43	Trend	0.33	No stationary	-4.88	Trend	0.0000	stationary
Gov	-3.24	Trend	0.0006	stationary	-2.92	Trend	0.0017	stationary
Invest	-2.39	Trend	0.008	stationary	1.030	None	0.848	No stationary
Pop	-0.34	Trend	0.365	No stationary	0.440	Trend	0.6703	No stationary
Edu	-1.55	Trend	0.059	stationary	-5.015	Trend	0.0000	stationary
Term	-2.99	Trend	0.0014	stationary	-3.07	None	0.0011	stationary
IntEco_ compo	0.33	Trend	0.62	No stationary	-4.45	Trend	0.000	stationary

Table I: Description of the study variables (1985-2015)

| Variable code	Variable labels	Sources	Expected sign
Log GDP *Initial*	Logarithm of initial GDP	WDI (2017)	-
Debt	External debt	WDI (2017)	+
Debt^2	External debt squared	WDI (2017)	-
ICM	Market creation institution: Security of property rights, protected by the rule of law, provides the foundation for both economic freedom and the efficient operation of markets. Freedom to exchange, for example, is fatally weakened if individuals do not have secure rights to property, including the fruits of their labor. When individuals and businesses lack confidence that contracts will be enforced and the fruits of their productive efforts protected, their incentive to engage in productive activity is eroded. Perhaps more than any other area, this area is essential for the efficient allocation of resources. Countries with major deficiencies in this area are unlikely to prosper regardless of their policies.	Fraser Institute	-
MRI	Market regulation institution: When regulations restrict entry into markets and interfere with the freedom to engage in voluntary exchange, they reduce economic freedom. This index focuses on regulatory restraints that limit the freedom of exchange in credit, labor, and product markets.	Fraser Institute	-
ISM	Market stabilization institution: Money oils the wheels of exchange. An absence of sound money undermines gains from trade. As Milton Friedman informed us long ago, inflation is a monetary phenomenon, caused by too much money chasing too few goods. Similarly, when the rate of inflation increases, it also tends to become more volatile. High and volatile rates of inflation distort relative prices, alter the fundamental terms of long-term contracts, and make it virtually impossible for individuals and businesses to plan sensibly for the future. Sound money is essential to protect property rights and, thus, economic freedom. Inflation erodes the value of property held in monetary instruments. When governments finance their expenditures by creating money, they are, in effect, expropriating the property and violating the economic freedom of their citizens.	Fraser Institute	+
ILM	Market Legitimisation Institutions (ILMs) are those that ensure redistribution, conflict management (economic and social), provide social protection and assurance regarding the occurrence and extent of shocks.	Freedom House	-
Term	Terms of trade	WDI (2017)	+
Invest	Total investment	WDI (2017)	+
Taux popul	Population growth rate,	WDI (2017)	-
Educ	Secondary school enrolment rate	WDI (2017)	+
expenses	Public expenditure	WDI (2017)	-

List of countries: Senegal, Benin, Mali, Niger, Burkina Faso, Ivory Coast, Guinea-Bissau, Togo, Cameroon, Gabon, Central African Republic, Chad, Republic of Congo.

Quality of economic institutions in African Franc zone (WAEMU and CEMAC)

i) Situation of market creation institutions (Fraser Institute)
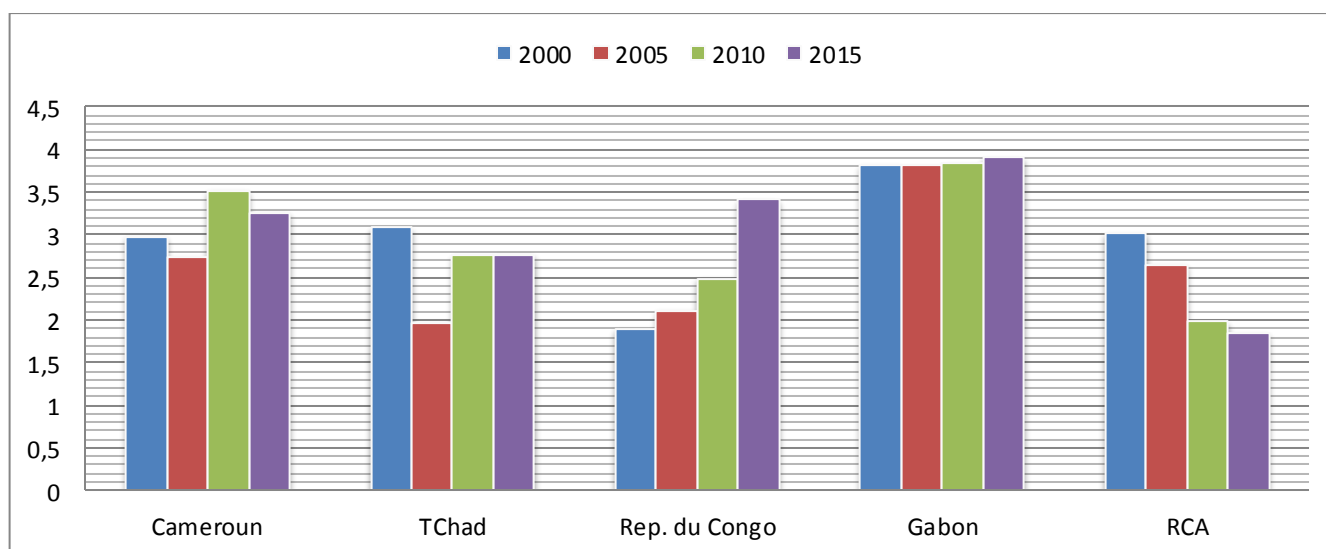
- **In the WAEMU**

From 2000 to 2015, the situation of market creation institutions improved significantly. Although we have a decline in the quality of these institutions from 2010 to 2015, in countries such as Benin, Burkina Faso, Mali and Niger, their quality has improved remarkably compared to 2000. In 2015, Côte d'Ivoire and Senegal lead the way in the WAEMU zone; while countries such as Benin, Burkina Faso and Mali had a better situation in previous years (2005, 2010).
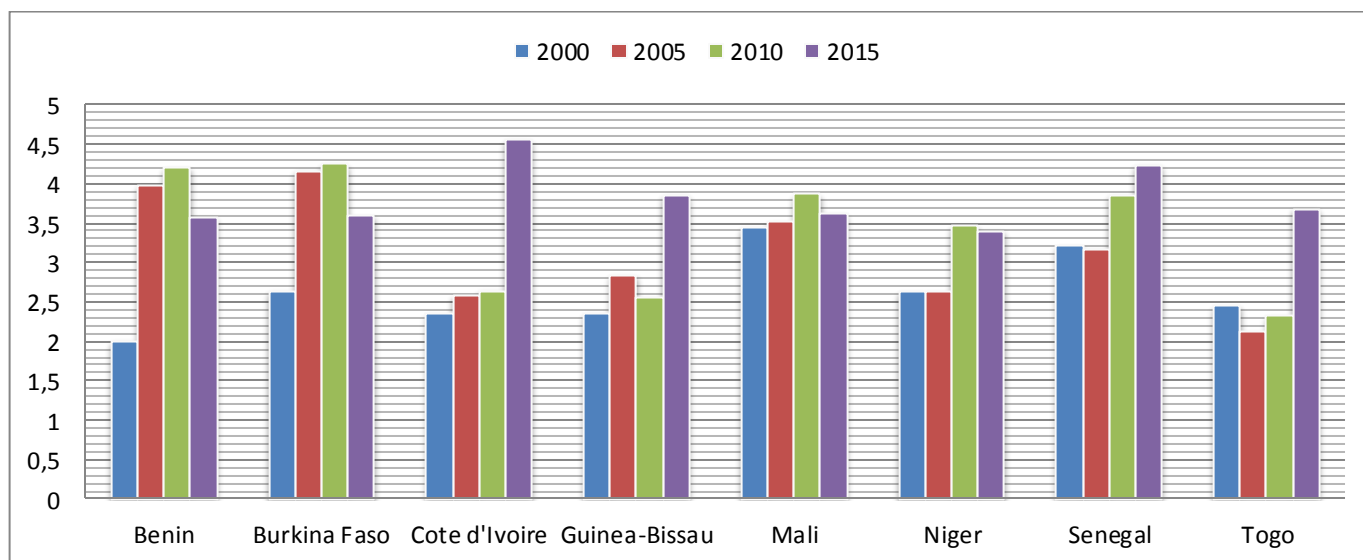
- **In CEMAC**

Gabon, in addition to being the country with the best situation as a market creation institution, is the only country in the region that has kept a virtually constant evolution from 2000 to 2015. In 2015, it is followed by the Republic of Congo, which has made much more effort in recent years, and Cameroon. Unlike other countries, the Central African Republic saw the quality of its market creation institutions deteriorate from 2000 to 2015.

ii)   **Situation of market stabilization institutions (Fraser Institute)**
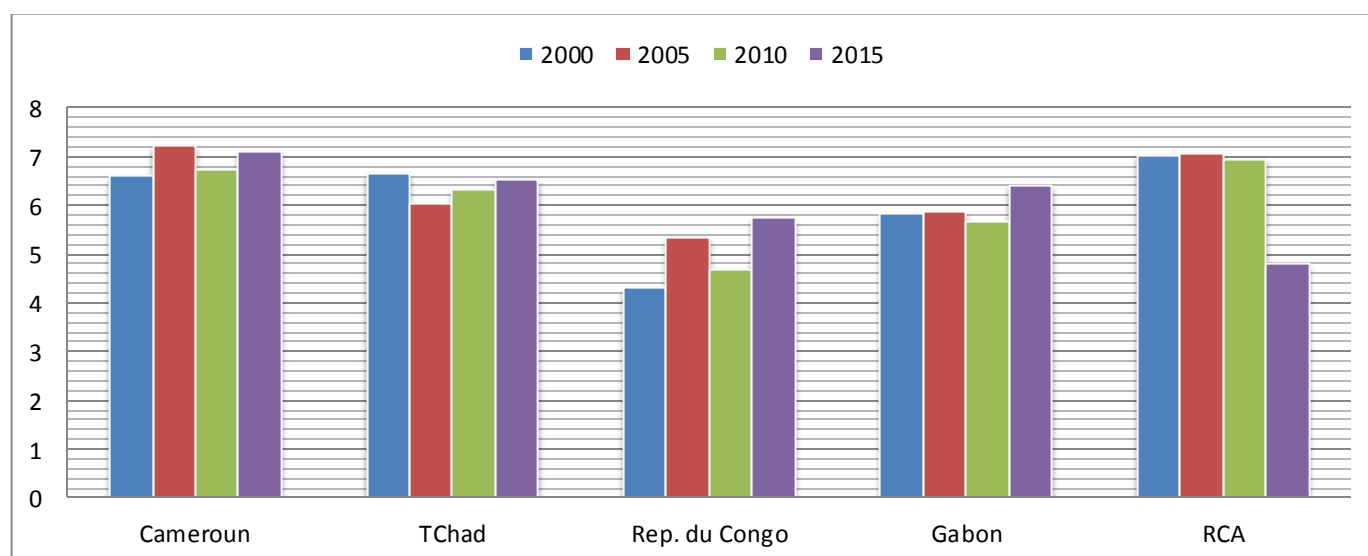
- **In the WAEMU**

In 2000, Mali and Niger were the two countries in the area with very good market stabilization institutions, while Guinea-Bissau lagged behind. But in the following years, the latter improved the quality of its institutions to a level almost similar to that of the area. In 2015, Burkina Faso, Senegal, followed by Côte d'Ivoire and Togo succeeded in achieving a better situation for stabilization institutions in the WAEMU. In addition, it should be noted that market stabilization institutions in Senegal experienced a very slight deterioration in their situation over the period. Indeed, from a score of 7.28 in 2000, Senegal is down to 7.06 in 2015.
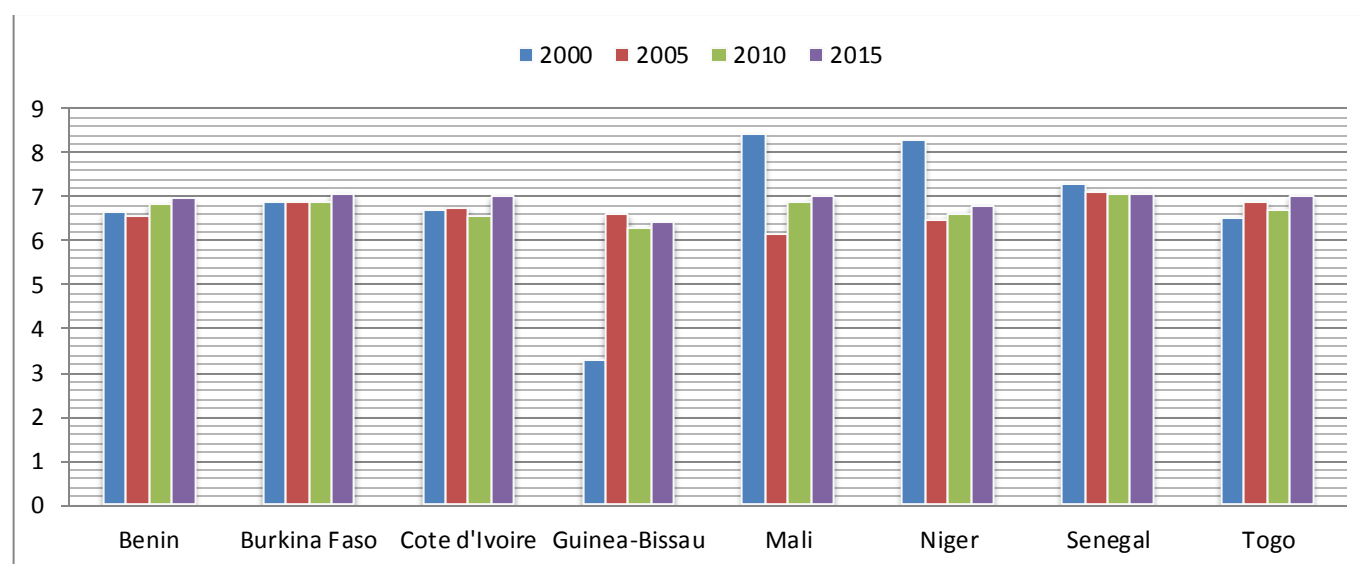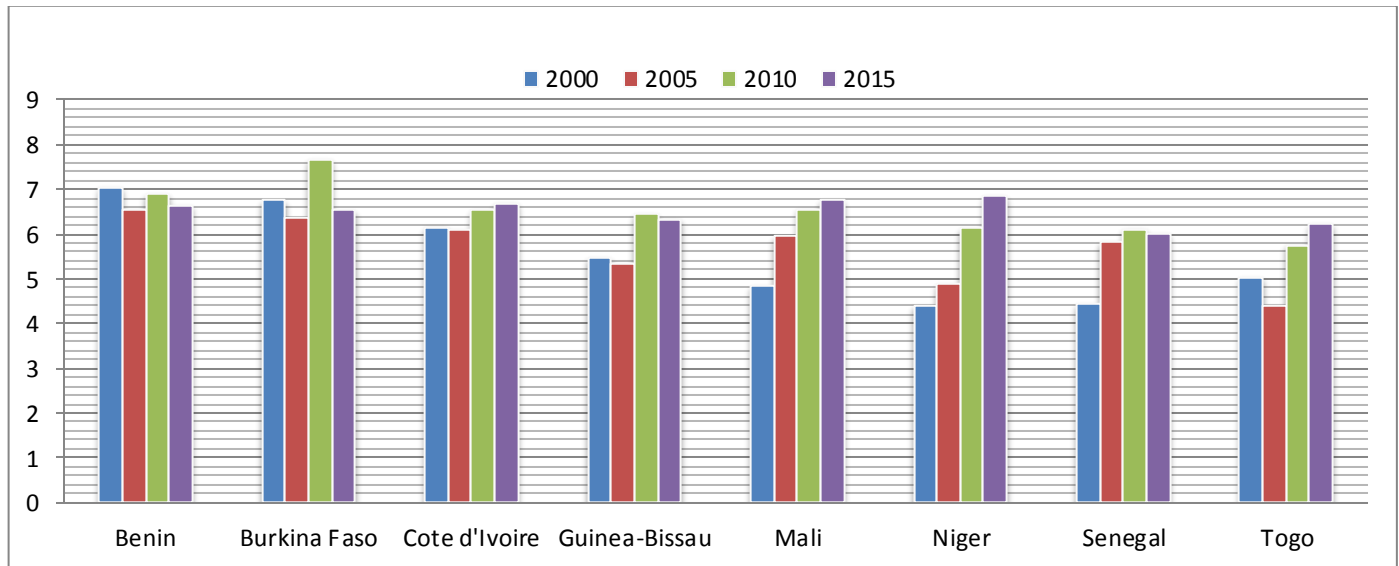

- **In CEMAC**

From 2000 to 2010, the Central African Republic and Cameroon led the ranking in terms of the good quality of market stabilization institutions in CEMAC. However, RCA lost its place to Cameroon and Chad in 2015. The Republic of Congo is last in the ranking, but efforts are to be noted during the period; from 4.29 in 2000, it rises to 5.74 in 2015.

*iii)*   **Situation of market regulation institutions (Fraser Institute)**

- **In the WAEMU**

In 2000, Benin had the best market regulation institutions in the Union, but in 2015, it gave way to Niger. In 2015, all WAEMU countries have a relatively similar rating for market regulation institutions (around 6.5). Even though countries such as Benin and Burkina Faso have tried to remain at the peak of the 2000-2015 ranking, there has been a significant improvement in regulatory institutions in countries such as Mali, Niger and Senegal, which were at the bottom of the scale in 2000.
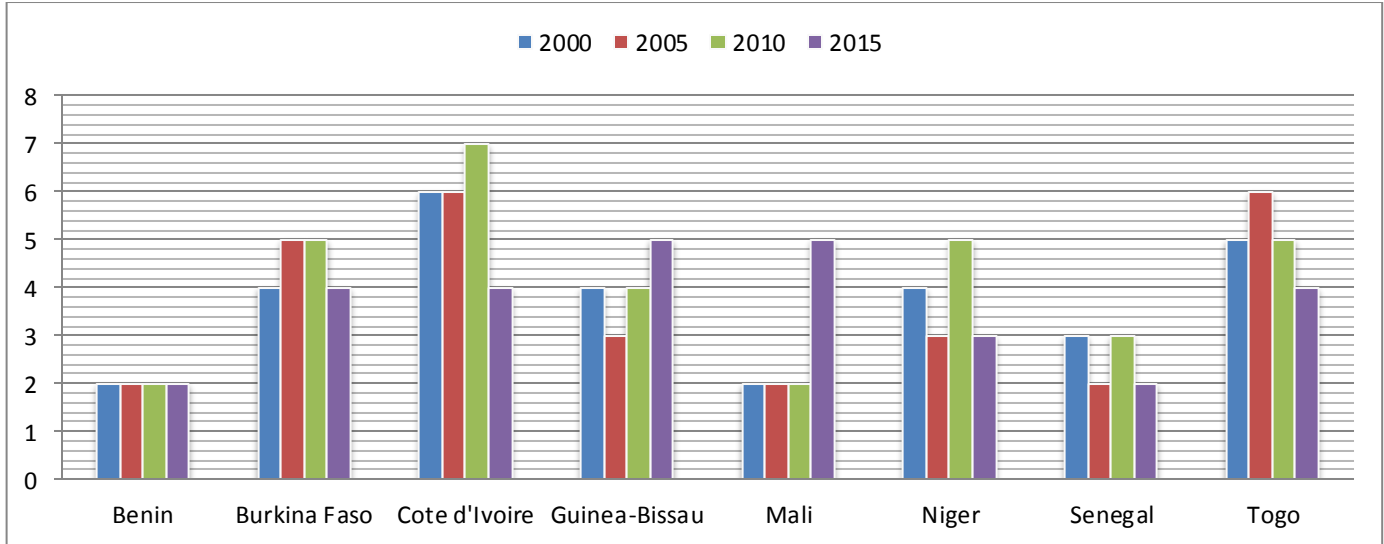

- **In CEMAC**

From 2005 to 2015, Gabon reached the top of the ranking, it has the best market regulation institutions in CEMAC. However, in 2000, Cameroon was first in the zone. The quality of institutions in Chad, declining from 2000 to 2005, seems stagnant until 2015. In Central Africa, the situation of market regulation institutions improved very slightly from 2000 to 2015.

iv) **Situation of market legitimization institutions (Freedom House)**
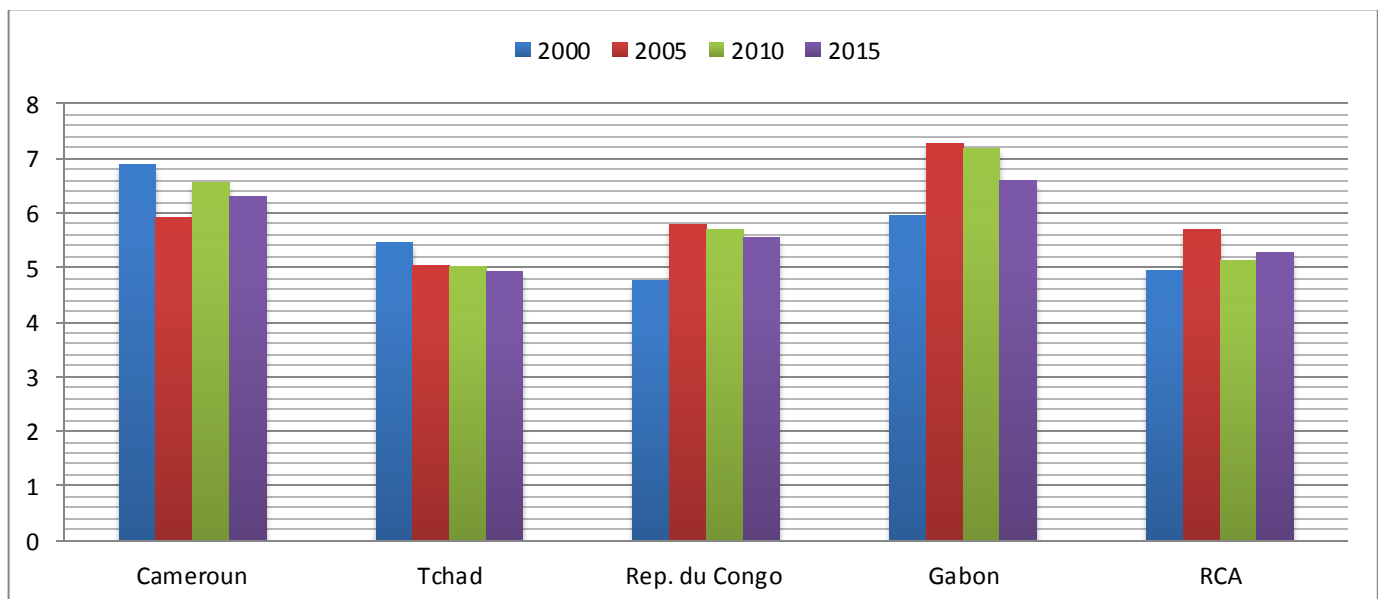
- **In the WAEMU**

Benin and Mali have a fairly good score in the area in terms of market legitimization institutions, but Mali stands out in 2015 with a poor score, as does Guinea-Bissau. From 2000 to 2010, Côte d'Ivoire had poor ratings from WAEMU market legitimization institutions.

- **In CEMAC**

In CEMAC, countries have practically the same situation regarding their market legitimization institutions; moreover, these ratings are on average higher than those of WAEMU countries. Tchad and the Central African Republic have the highest CEMAC scores in 2015.