THE ROLE OF INSTITUTIONS IN THE STRUCTURAL TRANSFORMATION OF THE COUNTRIES IN SUBSAHARAN AFRICA

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ABSTRACT: *This article examines the role of institutions in the structural transformation in Sub-Saharan Africa. Given that the industrialization is dynamic, the specified model is estimated with the data from 40 countries over the 2000-2017 period using the Generalized Method of Moments (GMM) in dynamic panel. When the "the nature of political regime" is used as a proxy for institutions, it appears to be harmful to structural transformation. However, when measured by the "quality of public administration" and the "effectiveness of revenue mobilization", institutions are shown to be a powerful locomotive of the process. Elsewhere, the results confirm the crucial role of the "relative productivity of labor", the "credits to the economy", and the "gross formation of capital". By contrast, showing negative and significant elasticities, the "GDP per Capita" and the "size of the market" appeared to be obstacles to the structural transformation.*

Key words: *GDP, GMM, Institutions, Structural change, Dynamic panel*

1. INTRODUCTION

Although structural change studies invoke many variables, all pertinent, they are incomplete, because they fail to account for the important role of institutions. Constituted by organizational structures, formal rules (Constitutions, laws, property rights, contracts, etc.), informal norms (customs, believes, traditions, routines, practices) and the conduct codes that govern political, social and economic interactions, institutions shape behaviors and condition social expectations. They also structure the conception and the content of decisions, motivate change, and determine the results in terms of development (CEA, 2016). Most of all, institutions define the body of constraints that structure human relations (North, 1994) and reduce the inherent uncertainty of their reciprocal interactions. It is the institutions and not the quantitative accumulation of production factors (physical and human capital) that determine the use of productive resources and explain the difference in the level of growth and development level among countries.

Institutions and institutional adjustments have long been recognized as the driving forces of structural transformation (North, 1971; Acemoglu et al. 2001 et 2002; Spolaore and Wacziarg,

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2013). Strong institutions contribute to the accumulation of physical and human capital. They also lead to the development and the adoption of technologies that improve sectorial productivity. By contrast, weak institutions depress investment, discourage innovations, and obstruct the transfer of technology. Although weak institutions negatively impact all sectors, they affect the trade and manufacturing sectors more severely. Aron (2000) showed that strong institutions reduce transaction costs and investment risks and stimulate synergy between sectors. By contrast, weak institutions reduce economic activities to interpersonal exchanges thus, restricting resources in low productivity sectors. When institutions are good, their impacts on economic fundamentals[1] are positive.

Considering the above, whether they are strong or weak, good or bad, institutions are crucial to the development process. Thus, the main objective of this paper is to analyze the effective role that institutions play in the process of structural transformation in a sample of Sub-Saharan African countries over the 2000-2017 period. We use Matsuyama's (1992) model because it is compatible with the major characteristics of the structural transformation process: the decrease of the share of employment and agricultural production (traditional sector) in total employment and the gross domestic product (GDP) and a simultaneous increase of the same share in the industrial sector (modern). This model captures the main sources of structural transformation identified in the literature, namely, the improvement of the allocation of resources and the modification of the economy's sectorial composition.

This theoretical framework is appropriate for assessing the effects of the change in the relative productivity of work, institutions and control variables considered. The analysis is done first on cross-sectional data; then, it is deepened through a dynamic analysis, by applying the generalized method of moments to panel data.

The main results obtained are as follows: cross-sectional analysis showed that in 2015/2016 compared to 2000, institutions, measured by variables capturing the nature of the political regime, were only influential on structural transformation in a minority of countries in sub-Saharan Africa. On the contrary, dynamic analysis confirmed the locomotive role of the relative productivity of labor towards industrialization, a result which is in line with that of Ngai and Pissaradis (2007). The positive impact of trade openness also confirms the result of Matsuyama (1992). However, for the size of the domestic market, our result is out of line with that of Leukhina and Turnovsky (2014).

The main contribution of this paper is to have dissected the "institutions" and to highlight the components favorable to structural transformation and those which are not. The driving forces of structural transformation are found to be "the relative productivity of labor", "credits to the economy" and "gross capital formation". Regarding institutions, the "quality of public administration" and the ''effectiveness of revenue mobilization ' are found to be significant drivers of structural transformation.

The rest of the paper is structured as follows: Section II defines the theory and discusses the empirical framework. Section III is dedicated to the statistical and econometric analysis. Finally, Section IV presents and discusses the empirical findings and their implications.

2. FRAMEWORK OF THE THEORY AND EMPIRICAL ANALYSES

This section presents the theoretical framework the empirical analysis.

2.1. Theoretical framework

There is abundant literature that focuses on the fundamental question: What role do institutions play in promoting structural transformation in sub-Saharan African countries?

Specialized institutions such as the CNUCED and the CEA have made attempts at answering this vexing question. Also, authors like North (1971), Hall and Jones (1999), Acemoglu et al. (2001) and LaPorta and al. (1997) have developed new approaches to answering this important question. However, from the beginning, the role of institutions was at the center of controversy. Neoclassical economics viewed institutions as being in a fixed frame and thus excluded them from economic analysis whereas Marxists and Historicists considered them as an integral part of the development process. The lack of interest regarding institutional analyses was overcome in 1990s by the papers of North (1990, 1991) and Fogel et al. (1974).

Refusing to view institutions as « routines » and « crystallized customs », they consider them as rules, norms and values in perpetual change under the impulsion of individual behaviors.

The papers of Coase (1937 et 1991) on transaction cost, of Williamson (2000, 2002; with Ostrom, Nobel Prize in 2009) on social heaviness, of Hernando de Soto (2005) on the role of the property system (private), of Roland (2004) on the aptitude of institutions to change and of North (1993) have largely contributed to spread this heterodox conception of the economy. Confirming an old idea of high correlation between economic development and market development (North, 1990), the perception of institutions reaches a new step: they are the typical determinants of the growth (North, 1994). Because of not being spontaneous, the market requires for its development some prior conditions especially the appearance of institutions that have the role of releasing information on economic agents, prices, currencies, contracts, private property, social and political heaviness, etc. When institutions exist and work efficiently, markets grow and create employment, attenuating poverty. But, in the opposite case, transaction costs increase, limiting exchanges and the specialization gains of the labor division. It is worth noting that institutions are capable of leading to growth or to stagnation because they are not always efficient. Before North (1990), Kuznets (1973a) showed that institutions, beliefs and ideologies play a crucial role in the development process. In the absence of adequate ideological and institutional adjustments, technological progress could be adopted and used in effective and efficient ways. Not only are these adjustments useful for the accumulation of knowledge and the emergence of innovations, the technology coming from these innovations has to be used in a rational and economically profitable way.

The more recent papers that are used in our problematic are from Spolaore and Wacziarg (2013) who investigate the deep roots of economic development and Swiecki (2017) who analyzed the determinants of structural change. The rest of the papers are used in a general perspective centered either on economic growth, the role of agriculture, the role of industry, services or geography in relation with the distribution of revenues.

To date, we are unaware of studies that examine how institutions impact structural

transformation in Sub-Saharan Africa.

To illustrate how institutions affect the process of sectorial allocation of resources and the sectorial composition of the economy, we adopt the two-sector model of Matsuyama (1992) which has fewer drawbacks and questionable assumptions than alternative approaches or models such as those of Laitner (2000), Gollin et al. (2002), Kongsamut et al. (2001), Ngai and Pissarides (2007), Alvarez-Cuadrado and Poschke (2011) or Dennis and Isan (2011).

We assume a major traditional sector, represented by T, which produces exclusively primary goods destined to consumption. Characterized by low productivity, this sector is assimilated to the agricultural sector. The second sector, represented by M, is the modern sector. Covering a small share of the employment and the total product, sector M is characterized by a high level of efficiency, productivity and investment opportunities. Generally, we assimilate it to the manufacturing industry and modern services. Moreover, the economy admits other important properties, precisely properties that are linked to the conditions of production, resources constraints, the role of the institutions, the price system and consumption preferences.

2.1.1. The condition of production

Because the economy has two sectors, we posit that there exist two types of representative production firms, each producing a specific good, traditional and modern. Production requires certain quantities of labor, capital and technology. The process is described by the production function of Cobb-Douglas type as follows:

$$Y_{A,t} = \Phi_A K_{A,t}^{\alpha} (H_{A,t} L_{A,t})^{1-\alpha}$$

$$Y_{M,t} = \Phi_M K_{M,t}^{\alpha} (H_{M,t} L_{M,t})^{1-\alpha} \tag{1}$$

Where $H_{A,t}$ and $H_{M,t}$ are the sectorial effects of the technology related to labor and Φ_A and Φ_M represent the global sectorial efficiency without labor.

If the economy was competitive, perfect mobility of factors would insure the equality of the marginal rates of transformation in the two (2) sectors. This can be written as follows:

$$\frac{K_{A,t}}{H_{A,t} L_{A,t}} = \frac{K_{M,t}}{H_{M,t} L_{M,t}} \tag{2}$$

2.1.2. The constraints of resources

We state the hypothesis that the produced goods by the sector T are all destined to households' consumption while the goods and services of sector M are in part consumed and in part appropriated as capital and invested in the two (2) sectors.

The constraints of resources are written as:

$$K_{A,t} + K_{M,t} \leq K_t \quad et \quad L_{A,t} + L_{M,t} \leq L_t$$
$$I = K_{t+1} - K_t = Y_{M,t} - C_{M,t}$$

$$C_{A,t} \leq Y_{A,t} \tag{3}$$

The earliest two inequalities show that all the resources in capital and labor of the two (2) sectors are at most equal to the economy's endowments. The second equation is the expression of the investment and the last member of the equality indicates its origin. The third relation shows the fact that the traditional sector consumes what it produces.

2.1.3 The role of institutions

Institutions influence the economy in two ways: the incentive to invest and the efficiency. Institutions impact incentives by ensuring transparency, respect of property rights and the obligation to implement the rules of law. Ensuring the mobility of resources in and between the two (2) sectors, institutions make the process of production and exchange more efficient since resources are allocated to the best productive and profitable uses. To capture these effects, we introduce institutions in the theoretical model by making the hypothesis that the global efficiency of the two (2) sectors, manufacturing and agricultural, is an increasing function of institutions (represented by I). Mathematically, this is written as follows:

$$\frac{\Phi_M}{\Phi_A} = \Theta(I) \quad with \quad \Theta'(I) \succ 0 \tag{4}$$

2.1.4. The system of prices

We assume that the price of the agricultural goods is equal to 1. By the fact that the markets are competitive, the relative price of manufacturing goods is given as follows:

$$p_t = \frac{\Phi_M}{\Phi_A} \frac{H_{M,t}}{H_{A,t}} = \Theta(I)h_t \tag{5}$$

Where $h_t = \dfrac{H_{M,t}}{H_{A,t}}$ is a measure of the relative productivity of labor.

2.1.5 The preferences of consumers

We hypothesize that thousands of homogeneous consumers exist in the economy. The living conditions are measured by the utility coming from the consumption of two types of goods, agricultural and manufacturing. In the shape of linear-log and no-homothetic, this utility is defined as:

$$u(C_{A,t}, C_{M,t}) = \lambda \log(C_{M,t} + \mu) + (1 - \lambda) \log(C_{A,t} - \gamma) \tag{6}$$

λ : Parameter that measures the relative importance of the manufacturing goods to households;

$(1 - \lambda)$ is the relative importance of agricultural goods;

μ : Initial endowment of manufacturing goods;

γ : Level of agricultural goods consumption required to survive (consumption of subsistence level).

We assume that the income-elasticity of agricultural goods is less than 1 and the income-elasticity of manufacturing goods is greater than 1. If income increases, consumption of the two goods also increases, but it the increase is less than proportional for the agricultural goods and more than proportional for the manufactured goods.

The first order condition of maximization of the intertemporal utility function is as follows:

$$p_t = \frac{\lambda}{1-\lambda} \frac{C_{A,t} - \gamma}{C_{M,t} + \mu} \tag{7}$$

By considering $\varphi = \dfrac{1-\lambda}{\lambda}$, equation (7) becomes:

$$\varphi p_t (C_{M,t} + \mu) + \gamma = C_{A,t}$$

Combining with equation (5), this relation shows that the demand for manufacturing goods and agricultural goods are all a function of the relative productivity of labor, relative efficiency of the two sectors, and of the quality of institutions in the economy. Assuming that the economy is small and closed and combining equations (1), (3), (5) and (7), we obtain the following relation:

$$\varphi\Theta(I)h_t(\Phi_M(K_{M,t} - K_{A,t})^\alpha (H_{M,t}(1 - L_{A,t}))^{1-\alpha} - I + \mu) + \gamma - \Phi_A K_{A,t}^\alpha (H_{A,t}L_{A,t})^{1-\alpha} = 0 \tag{8}$$

This relation defines an implicit function $F(I, h_t, L_{M,t}, p_t, K_{M,t}) = 0$. By using this function and the comparative statistic, we can show that the share of labor and capital in the manufacturing sector (structural transformation) is an increasing function of the quality of institutions and the relative productivity of labor. It follows also that the share of the productivity of the manufacturing sector in the total product is a function of institutions and the relative productivity of labor.

2.2 Framework of the empirical analysis

The specified model of industrialization is estimated using cross-sectional data and panel data. The endogenous nature of the institutions and the dynamical characteristic of the industrialization process are taken in account when choosing the estimation techniques.

I.   Econometric and statistical analyses

This section is dedicated to the statistical and econometric analyses which consist of two estimations, the first in cross-sectional and the second in dynamical panel.

3.1. Statistical analysis

The sub-Saharan Africa economies are among the least developed economies in the world. Because of unfavorable international environment, domestic politics little inclined to good governance, they have been stagnant for a long time. However, over the last decade or so, the

situation has begun to change slowly, particularly in Nigeria, Rwanda and Ethiopia. Still, the general situation is still dire and critical. While the GDP has increased significantly in some of these sub-Saharan countries, it has mostly stagnated or decreased in most of these countries. The best performances are recorded in countries rich in raw materials because raw material prices have increased substantially during 2000-2014. Industrial and manufacturing activities have not contributed meaningfully to this performance; the manufacturing's value added has stagnated or decreased in most of the sub-Saharan countries. This evolution is caused by the absence of structural transformation that we study here through two (2) indicators: the sectorial shares of product and employment. The data used come from the « International Labour Organization », ILOSTAT database (2017), and the « World Development Indicator » (2017) over the periods 2000/2005 and 2016/2017. The analysis shows that during these periods, the share of agricultural product in the GDP has increased only in a few countries. It is the same for the industrial and manufacturing sectors. The shares of industrial and agricultural employment follow the same trend. These evolutions suggest that industrial and manufacturing activities are marginal in Sub-Saharan Africa. It is true that there is a decreasing trend of the agricultural employment as a percentage of the total employment and an increase of the industrial employment, but this phenomenon is, until now, manifested in a minority of countries. This is probably related to the quality of institutions measured here with two indicators: the first, the arithmetic average of 5 indicators[1] and the second, Polity2 score which captures the nature of the political regime (democratic versus autocratic). The data are from the World Development Indicators (2017) and the Polity IV dataset version 2017 of the Center for Systemic Peace (CSP).
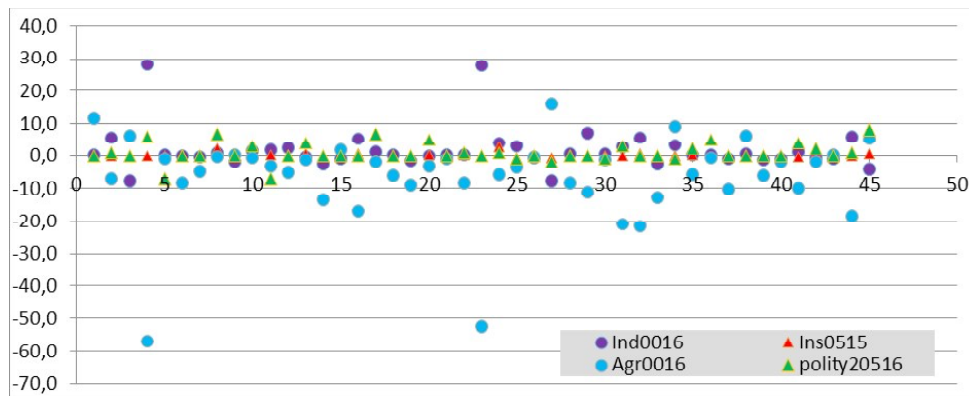
Graphic 1: shares of agricultural and industrial employment and the institutions, variations.

Above, we compare the variations of institutions (Polity2 score and composite index, green and red markers), the shares of industrial employment (pink points) and the shares of agricultural employment (blue points). Between the two (2) periods, the shares of agricultural employment have decreased in most of the countries, while the shares of industrial employment have increased. Measured by polity2 score, the institutions are more located over the axis than below moving in the same direction as the industrial employment. This similarity is a premise of the beginning of structural transformation.

3.2 Econometric Analysis

According to our implicit function, structural transformation is an increasing function of the quality of institutions and the relative productivity of labor. In addition to these factors, control variables are included. The model is presented as follows:

1)   the dependent variable: the share of the industrial product/manufacturing in the GDP or the share of employment/ manufacturing in total employment;

2)   the independent variables:

   a)   the quality of institutions,

   b)   the relative productivity of labor from the industry to agriculture.

3)   the control variables:

   a)   GDP per capita,

   b)   gross formation of capital in percent of GDP,

   c)   trade openness measured by the logarithm of the sum of import and export over the GDP,

   d)   financial development measured by the logarithm of the credits to the economy reflecting the access to the international market,

   e)   the size of the domestic market measured by the logarithm of the population.

3.2.1. Cross-sectional estimation

The analysis applies to 2005, the initial year and 2016, the final year. The equation to estimate is the following: $y_i = \beta_0 + \beta_1 I_i + \beta_2 X_{1i} + \beta_3 X_{2i} + \varepsilon_i$

Where

y_i :   Share of the production industrial/manufacturing in total employment,

I_i :   Polity2 score, democratic regime, autocratic regime and the 5 indicators defined above,

X_{1i} : Relative productivity of labor from industry to agriculture,

X_{2i} :   Vector of control variables: GDP per capita, proxies of trade openness, of financial development and the size of domestic market.

The empirical results, presented in Table 1, show that in 2005 and 2016, institutions had a significant impact on the process of structural transformation in Sub-Saharan Africa. The political regime had a negative impact on the process in 2005. It was negative but not significant in 2016. The transparency, the accountability and the absence of the corruption in the public sector were expressed in 2005 by a negative impact. That was the opposite for the quality of public administration in 2005 and 2016. The results also confirm the importance of the relative

productivity of labor from industry to agriculture. Its coefficient is positive and significant particularly for the models that use the share of the industrial productivity in the GDP as dependent variable (MOD.1, 2, 4 and 5); elsewhere, it is negative (MOD.2 and 6).

Table 1: Results of the cross-sectional analysis

Independent variables	Label	Share of industrial production in GDP 2005 (MOD.1)	Share of industrial production in GDP 2005 (MOD.2)	Share of industrial employment in total employment 2005 (MOD.3)	Share of industrial production in GDP 2016 (MOD.4)	Share of industrial production in GDP 2016 (MOD.5)	Share of industrial employment in total employment (MOD.6)
Log of relative productivity of labor from industry to agriculture	LXRTIA2005	9.33 (2.59)***	11.87 (2.78)***	-3.45 (1.75)*	8.94 (2.71)***	11.83 (3.24)***	-3.32 (2.53)
Log of GDP per capita	LPIBH05	26.25 (4.54)***	24.24 (4.30)***	13.12 (4.10)***	10.62 (3.94)**	12.58 (6.52)*	16.96 (5.13)***
Log of the size of domestic market	LPOP2005	10.88 (2.81)***	14.71 (2.98)***	1.34 (1.64)			
Log of the credits to the economy	LCE2005	-13.56 (3.83)***	-10.69 (3.94)**				
Log of trade openness	LOC2005	20.91 (8.49)**	30.84 (8.37)***	6.72 (7.03)	25.99 (8.02)***	31.39 (8.77)***	20.10 (6.93)***
Quality of public administration	QPA2005		11.02 (4.54)**			13.52 (6.36)**	
Transparency, accountability and absence of corruption in public sector	TACP2005		- 1.64 (412)**	-4.06 (1.91)**		-5.129 (4.06)	-1.10 (2.23)
Quality of the budget and financial management	QBFM2015					-5.39 (4.53)	
Democratic regime versus autocratic regime	POLITY2	-0.57 (0.27)**		0.08 (0.23)	-0.36 (0.31)		
Constant		-151.11 (34.45)***	-195.39 (34.95)***	-32.07 (20.26)	-61.12 (16.80)***	-87.10 (28.89)***	-67.52 (20.80)***
Obs. Number		29	24	26	32	28	28
Adjusted R²		79.89%	85.95%	79.89%	58.50%	45.73%	35,67%
F-statistic		16.89***	18,19***	4.99***	11.92***	4.79***	4.74***

(*), (**) and (***): Significant coefficients respectively at 10%, 5% and 1% levels. The estimates in parenthesis are standard deviations.

3.2.2. Estimations in dynamic panel

In the dynamic model, the individual particularities are modeled as specific effects that are unobservable variables, constant over the time and capable of influencing the behaviors. They are represented by α_i. These sources of unobservable heterogeneity are completed by the heterogeneity from the observable variables I_i, X_{1i} et X_{2i}.

The initial model becomes: $y_{it} = \theta y_{it-1} + \alpha_i + \beta_1 I_{it} + \beta_2 X_{1it} + \beta_3 X_{2it} + \varepsilon_{it}$

If the effect of recurrence y_{it-1} is excluded, the equation becomes: $y_{it} = \alpha_i + \beta_1 I_{it} + \beta_2 X_{1it} + \beta_3 X_{2it} + \varepsilon_{it}$. The control of heterogeneity is accomplished by using the model with fixed effects (α_i is considered as a parameter) or by the model with random effects (is considered as random variable). If, in contrast, the effect is admitted, we obtain the following dynamic model:

The presence of   among the independent variables suggests using the Generalized Method of Moments (GMM) as the technique of estimation. This is, either in differences (Arellano et Bond, 1991), or in system (Blundell et Bond, 1998). Combining the variables at level and first differences as instruments, the second method is more effective. It allows the control of the individual and temporal effects to prevent the problems of endogenous bias of the variables in presence of one or many lags of the dependent variables, the problems of simultaneity, the inverse causality and the omitted variables.

We applied the Akaike information criterion to determine the optimal lag which is found to be equal to 2. Before the estimation, the variables are tested for correlation and stationarity**.** The first test leads to the exclusion of the "trade openness" variable because it is highly correlated with the "GDP per capita" variable. The test of Im-Pesaran-Shin shows that the "GDP per capita", the "relative productivity of labor" and the "credits to the economy" are integrated of order 1 while the "size of domestic market" and the "gross formation of capital" are stationary. Models with fixed effects and random effects are estimated. However, all are invalidated based on the tests of normality and the Ramsey-Reset. Even if they were conclusive, they would not be validated because of the endogeneity of the "size of domestic market". Admitting the recurrence effect, the model is estimated with the GMM. The results are presented in table 2.

Table 2: Results of the estimation by the system of generalized method of moments

Independent variables	Label	Dependent variables : Log of the share of manufacturing production in GDP (PRODMAN)				
		MOD.11	MOD.12	MOD.13	MOD.14	MOD.15
Log of the independent variable lagged order 1	LPRODMAN1	0.7 (0.02)***	0.68 (0.01)***	0.61 (0.03)***	0.59 (0.07)***	0.62 (0.05)***
Log of the independent variable lagged order 2	LPRODMAN2	-0.02 (0.006)**	-0.02 (0.01)	-0.04 (0.01)***	-0.06 (0.01)***	-0.04 (0.01)***
Democratic regime versus autocratic regime	POLITY2	-0.004 (0.001)***				
Autocratic regime	AUTOC		-0.001 (0.0001)***			
Democratic regime	DEMOC			-0.001 (0.0001)***		
Quality of public administration	QPA				0.21 (0.07)***	
Effectiveness of revenue mobilization	ERM					0.13 (0.06)**
Log of relative productivity of labor from industry to agriculture	D(LXRTIA)	0.03 (0.02)*	0.02 (0.01)***	0.02 (0.01)	0.03 (0.04)	0.002 (0.03)
Log of GDP per capita	D(LPIBH)	-1.15 (0.25)***	-1.54 (0.20)***	-1.40 (0.11)***	0.13 (0.63)	-0.73 (0.55)
Log of the size of domestic market	LTMD	-0.33 (0.11)***	-0.34 (0.06)***	-0.38 (0.07)***	-0.61 (0.28)**	-0.69 (0.25)***
Log of credits to the economy	D(LCE)	0.16 (0.04)***	0.22 (0.01)***	0.19 (0.03)***	0.20 (0.10)*	0.19 (0.14)
Log of gross capital formation	LTFBC	0.05 (0.007)***	0.03 (0.01)***	0.01 (0.01)	0.06 (0.03)*	0.06 (0.03)**
Constant	CONS	2.61 (0.75)***	2.96 (0.45)***	3.52 (0.51)***	4.48 (.05)**	5.03 (1.78)***
Number of observations		452	452	452	225	225
Number of countries		38	38	38	28	28 GMM système
Fisher/Wald Statistic		Chi2(8)***	Chi2(8)***	Chi2(8)***	Chi2(8)***	Chi2(8)***
Arellano-Bond Test	AR(1)	-1.27 Pr=20.26	-1.28 Pr=19.90	-1.28 Pr=19.91	-1.28 Pr=19.97	-1.26 Pr=20.47
Arellano-Bond Test	AR(2)	0.77 Pr=43.71	1.09 Pr=27.55	0.99 Pr=32.27	1.01 Pr=31.40	1.01 Pr=31.36
Test of over-identification of Sargan		Chi2(192)=26.8 Pr=1.0000	Chi2(291)=27.8 Pr=1.0000	Chi2(300)=25.4 Pr=1.0000	Chi2(155)=16.2 Pr=1.0000	Chi2(160)=17.8 Pr=1.00

(*), (**) et (***): Significant coefficients respectively at 10%, 5% and 1% levels. The estimates in parenthesis are standard deviations.

The estimations of the model concerned the three (3) dependent variables, but only the regressions relative to the manufacturing production are found to be relevant. That's why it is the only variable to appear in table 2. All the models (11 to 15) are variants of the same model. The difference between them is the indicator used to measure the quality of institutions. The models that are considered are: "the democratic regime versus autocratic regime" (MOD.11); the autocratic regime (MOD.12); the "democratic regime" (MOD.13); the "quality of public administration" (MOD.14); and the "effectiveness of revenue mobilization" (MOD.15). Other indicators are tested, but they are not reported in the table because their elasticities are not significant. To insure the robustness of the results, two tests are conducted: the test of Sargan and, the test of Arellano and Bond (AR(1) and AR(2)).The first shows that the instruments used (lagged variables at level and first differences) are good. And, the second reveals the absence of autocorrelation either of first or second order. Therefore, we conclude our empirical results are globally satisfactory.

I.   Interpretation, discussion, and implications of the results

The economic validation of the results is based on the interpretation of the signs of independent variables considering economic theory.

4.1. Interpretations and discussions of the results

The results obtained by the GMM challenge some beliefs and generally accepted ideas. In fact, contrary to widely held beliefs, institutions don't play the locomotive role for the structural transformation in Sub-Saharan Africa. It is believed that a country needs only to adopt the democratic system to improve its economic and social standing and transform its economy. Our results show the opposite. In the regressions done where the quality of institutions is measured by the nature of the political regime, the coefficients have negative signs and are significant at 1 percent level. We are not surprised by the sign of the autocratic regime because more autocracy is synonymous with restrictions, deprivations, complaisance and increased opacity, which collectively lead to instability and less competitiveness. We are not also surprised by the negative sign of polity2 score which indicates that the political situation is gradually autocratic. And knowing the African regimes, this is not a surprise. However, we are surprised by the negative sign of the variable "democratic regime", most of the regimes having the label democratic. The fact that these three variables have the same sign is proof that the nature of the political regime doesn't matter. In reality, it has little to do with a rigorous and orthodox management of public affairs. The political regimes labelled "democratic" are in many instances, greater destroyers of the precious resources needed for development than the regimes called autocratic. More of democracy doesn't imply increased accountability and rigor in management on the part of leaders. Also, more democracy does not mean that leaders pay more attention to the needs of the populations. Emptied of its content, democracy means simply that governments emanate from "regular" elections, meaning elections accepted by the international community. The rights contained in the Constitutions are accepted only if they don't constitute a threat to the government; The Constitution is often being ignored and even violated. For being deeply the same, democracy and autocracy describe the same reality and then produce the same effects on the economy and on the life of populations. So, it is logic that their coefficients are negative

and significant. But, the results relative to the other two indicators confirm the leading role of institutions in favor of structural transformation. In fact, their coefficients are positive and significant, respectively at the 1 percent and 5 percent levels. These results confirm what we already knew and that is, the development of sub-Saharan Africa depends on the will and the commitment of its intellectual elite that leads its public administration. From its will and capability of organizing, creating, innovating and stimulating the public actions will drive the development of these countries. Knowing the competencies that Sub-Saharan Africa has, there is no problem of capability. But the problem is their utilization. This elite is known to serve developed countries aptly through massive brain drain. However, when the same elite remains in their home countries, it exhibits apathy, recklessness and a little sense of general interest. The elite lacks goodwill and engages in corruption locally. To restore confidence in the public administration the elite must changes its behavior. It is enough to reorganize and stimulate the public administration to improve the quality of services of interest particularly to the initiators of innovative and industrializing projects. It is in this context that must understand the positive and significant sign of the variable "effectiveness of revenue mobilization". Sub-Saharan Africa faces one of the most severe financial constraints that we could imagine. Given that its internal resources are moderate, the financing of its growth depends on external capital.

The literature has also considered the relative productivity of labor from industry to agriculture as the locomotive of industrialization. Our results confirm this intuition and line up with the results of Ngai and Pissaradis (2007). The elasticity of this variable is positive and significant at 10 percent level in model 11 and at 1 percent level in model 12. An increase of 1 percent of this variable leads to a growth of the process from 0.02 to 0.03%. The "credits to the economy" and the "gross formation of capital" are presented also as determinant factors of structural transformation. It is appropriate to add the "trade openness" confirming thus the results of Matsuyama (1992), even if the related regressions do not appear in the summary table 2.

By contrast, two variables emerge as being at odds with structural transformation. These variables are the "size of the domestic market" and the "GPD per capita". The idea appears first unlikely, because it is difficult to understand how the economy could get poorer because of an increase in the size of its market or how an increase of its GDP per capita is a disadvantage or an obstruction to its growth and to its development. But, by looking closely, we see that the idea doesn't lack originality and relevance, even if the results contradict the conclusion of Leukhina and Turnovsky (2014).

Regarding the "size of market", it should be remembered that the population size has served as proxy to measure it. Yet, no one ignores the extent of the demographic phenomena in Sub-Saharan Africa. Most of the countries, without starting their demographic transition, are subject to a rapidly growing population. The explosion of the social demand that follows is confronted to the moderate resources of investment.

Concerning the "GDP per capita" variable, it's obtained by dividing GDP by the size of the population. If it seems logic to consider that the rise of GDP would stimulate structural transformation, we would not have difficulty understanding that this stimulation would get weak progressively when the population increases. Another reason is that the rise of GDP per capita would not be in favor of structural transformation. In fact, in the actual conditions, GDP

per capita is the product of "windfall economy", an economy based essentially on the export of raw materials. Yet, structural transformation, like industrialization, implies and pleads in favor of the locally transformation of these raw materials. These variables with different foundations are not complementary but antagonistic; this is what explains the sign of the elasticity of this variable.

4.2 Implications of the results

The results relative to the quality of institutions have two principal implications. First, the debate on the nature of political regime is likely a sterile debate which has little or no interest for structural transformation. Second, the results relative to the two other variables indicate the priority axis on which the countries of sub-Saharan Africa must to concentrate their efforts and resources. The public administration is not the only institution, but it is the parent institution, the one that has more material, financial and human resources to influence the formal and informal private administrations. The results relative to the productivity show that to accelerate the process of structural transformation, the countries of sub-Saharan Africa must stimulate the productivity of labor in the industrial and manufacturing sectors. Incentive systems will be necessary not only to encourage investments in this sector but also to improve the regulation and legal framework in favor of workers. The institutional arrangements on employment, contracts, regulations, etc. will be the major issues regarding this question.

Regarding the "credits to the economy", the results suggest paying attention to the needs of credits of the potential investors. This implies an active and voluntarist policy, which while being favorable to the financial development remains attentive to the needs of micro-entrepreneurs who are the animators of the economy in Sub-Saharan Africa. Concerning the "gross formation of capital", the countries of Sub-Saharan Africa must build adequate infrastructures to help uplift them and get remote regions out of isolation. They must follow the efforts of structuring investments in the energy, real state, insurances, communication, warehouses, industry, manufacturing sectors, etc. By improving productivity, this accumulation of capital will create employment and appropriate response to the chronic unemployment problem. For the "size of the domestic market", if the demographic transition could be accelerated in all the countries, the demographic dividend could be the solution. However, its implementation could be confronted to the opposition of African populations that don't accept it but adopt it without knowing because the education system that should explain them is very selective, expensive, and ineffective and excludes most of them.

Finally, regarding the "GDP per capita", the solution depends on the capability of the countries to create a competitive economic environment that is based on the new logic of accumulation and will produce more values and employment. Keeping the raw materials for their own companies, the manufacturing activities will substitute the gross exports that lack significant value added.

Conclusion and perspectives

We started from the hypothesis that institutions are the powerful engine of the structural transformation process. To check this assertion, we specified the industrialization's function in

which the share of the manufacturing production in the GDP, the dependent variable, is an increasing function of the quality of institutions, the relative production of labor from industry to agriculture, and control variables. Given that the industrialization is dynamic, the model is estimated with the data from 40 countries over 2000-2017 period with the GMM in dynamic panel. This analysis follows the analysis on cross-sectional data for 2005 and 2016 that showed the signs of structural transformation in a minority of countries. Measured by the "nature of political regime", institutions are shown to be harmful. But, measured by the "quality of public administration" and the "effectiveness of revenue mobilization", they appeared as essential determinants. Also, the results reveal the positive and significant influence of the "relative productivity of labor", the "credits to the economy" and the "gross formation of capital". Showing negative and significant elasticities, the "GDP per capita" and the "size of domestic market" appear oppositely as obstructions to the structural transformation of the countries in sub-Saharan Africa.

This study does have a notable and significant shortcoming worth mentioning. Because institutions are very diverse, it should have been necessary to try and disentangle the formal sector from the informal one. This dichotomy is especially important in the context of sub-Saharan Africa where almost the entire economy may be reasonably regarded as an informal sector.

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