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The Barriers to Industrial Development in Africa

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Abstract: *The objective of this article is to determine the impact of governance indicators and institutional quality on the industrial development of Africa during the period 2007-2019. This study concerns the manufacturing and extractive industries of African countries. The results show that political instability and corruption hindered the development of the extractive industries during the study period, but fail to demonstrate their role with regard to the manufacturing industries.*

Keywords: Governance, Institutional Quality, Industrial Development, Manufacturing Sector

Introduction

The importance of industrialization as an engine of economic growth and development cannot be overstated. It is generally accepted that a country becomes industrialized when the relative contribution of industries to GDP increases or when the proportion of people employed in the secondary sector increases1 (Ngoa Tabi and Atangana., 2013). In addition, the prices of exports of manufactured products are less volatile and less sensitive to deterioration than those of primary products, which make them particularly strategic in developing countries highly dependent on raw materials. Industries also create jobs and reduce poverty; the secondary sector, for example, has contributed to increased exports and job creation in countries such as Malaysia and China (Athukorala, 1996) and has made Korea, one of the largest producers of ships and microchips (CEA, 2011).

Unfortunately, Africa's industrialization record is rather disappointing despite relatively stable economic growth over the past ten years (Avom, 2011). Despite the global economic crisis (2008), the economic performance of the continent remains quite appreciable. Over 80% of African countries posted growth above the world average of 2.7% in 2012. However, this growth remains very vulnerable to external shocks and has not translated, for most countries, into significant job creation. Africa remains the continent which has experienced the weakest industrial advances.

Despite all its wealth of natural and mineral resources, Africa remains the least industrialized continent in the world. 50 years after the wave of African independence, it turns out that 33 countries among the 48 least developed countries and 36 of the 45 countries with a low level of human development, according to UNDP statistics, are in Africa. In 2012, 389 million out of more than one billion people in sub-Saharan Africa lived on less than $ 1.90 a day (World Bank, 2012).

Besides, Sub-Saharan Africa is proving to be the region of the world with the most inequalities (Kalife, 1999). The marginalization of Africa is compounded by the steady decrease in the amount of official development assistance. Sub-Saharan Africa thus received only $ 16 billion in 1996 out of a world total of $ 55 billion, or only 29%, while 70% of the least developed countries are in Sub-Saharan Africa.

Another obstacle to the industrial development of Africa is also the governance or better the bad governance of the African authorities, Kalife M. (1999). Indeed, the relatively poor performance of African countries is explained by obstacles to industrialization, whether structural, in terms of governance or economic policies (Goujon and Kafando, 2012).

[1] Industrial production creates employment opportunities at high skill levels, facilitates more compact relationships between services and agricultural sectors, between rural and urban economies, but also between consumers, the capital goods industries and the intermediate ones.

The African continent which now accounts for only about 1% of global manufacturing production and cannot objectively hope to reduce poverty if governments do not take effective measures to develop this economic sector (UNCTAD (2011)). African leaders showed commitment to the industrialization of the continent in recent years, and thus took some initiatives in this direction such as the decision to focus on the theme "industrialization of Africa" in 2008.

The industrial backwardness of Africa being thus highlighted, the objective of this study is to identify the variables which hinder the process of industrialization in Africa. Such an exercise is all the more relevant as it not only makes it possible to identify the determinants of industrialization but also because it makes it possible to identify the major challenges of industrial development on the black continent. Indeed, the modernization of the industrial sector then appears clearly as a necessity in the growth and development process of developing countries (Grellet, 1988; LAKHDAR BATNA, 2009). To this end, it is necessary to look for the factors which lower cost, are likely to revive industrial production in Africa.

Research Methodology

In an industrialization perspective, the growth rate of labour productivity is high in the secondary sector, the unemployment rate decreases from one year to another and as a result, per capita income increases (Alderson, 1999). Contrary to certain preconceived ideas that often attribute the success of Western economies to "laissez-faire" and liberalism, history shows that industrial, commercial, and technological policies were the main instruments that made possible their successful structural transformation (Lin and Monga, 2010). Other empirical evidence from developed, newly industrialized or emerging countries has shown that sustainable development cannot be achieved based on industry (Lall et al, 2009). The focus on industry is explained for multiple reasons:

- faster growth
- greater job creation,
- solving the balance of payments problems
- increased savings
- enhancement flexibility of the economy…

Besides, it appears from the economic literature on the subject that there is a link between the level of industrialization, economic growth, and development (Alfaro, 2003; Barrios et al., 2004. It is a growth sustained by the processing industry which has largely contributed to the rapid economic transformation of many countries. Some developing countries such as China, Brazil and South Africa have become emerging countries by the industrialization (Lall et al, 2009; Athukorala, 1996).

Hausmann and Rodrik (2006) use the Heckscher-Ohlin theory to explain the failure of the industrial sub-sector in developing countries. According to them, countries export goods whose production requires the use of the inputs they have the most. However, when a country develops, it accumulates a large volume of physical capital, of human capital, and improves the quality of its institutions. The resources thus accumulated can be used to produce goods for export. For this reason, the diversification of exports follows the economic and social development of a State. Poor countries, therefore, export less revalue goods because they have poorly adapted production structures. True industrialization can only begin if the country is better endowed with human capital, in physical capital, and if it is relatively urbanized (Brady et al., 2011). Same, Wood and Mayer (1998) explain the relative deindustrialization observed in Africa by the infrastructural deficit, bad economic policies, and under-education. Indeed, they established a positive correlation between the average number of telephone lines per worker, the production of electric energy per worker, and the density of roads with the exports of manufacturing products. They recognized that the effect of energy production on the performance of the manufacturing industry was more robust.

Elbadawi (1999) tested three generally advanced theses to explain the performance of the manufacturing industry in Africa. This is the thesis of Collier (1997), according to which Africa loses its comparative advantages in the manufacturing sub-sector because of the scale of transaction costs. To this end, Collier offers two solutions to improve the performance of the manufacturing industry in

Africa, integrate African economies into the global economy, and reduce country risk. The second thesis which is defended by Wood (1998) specifies this: in the era of globalization, human resources and natural resources are the main factors that determine the comparative advantage of manufacturing exports. On this subject, Africa cannot develop the volume of its manufacturing exports because it is more endowed with natural resources and not human resources. The third thesis is proposed by Elbadawi and Helleiner (1998). According to these two authors, the economies of the black continent are less efficient and cannot compete with foreign firms. To this end, they must modify their real effective exchange rate to improve the competitiveness of their industries.

However, econometric tests by Elbadawi (1999) have shown that only Collier's thesis is more plausible.

The effects of international trade on the development of manufacturing industries in developing countries are variously perceived by the authors. In some works (Rowthorn and Ken Coutts, 2004; Wood, 1994) North-South trade would be beneficial for manufacturing industries in the South; the deindustrialization observed in developed countries is explained in part by North-South trade (Wood (1994)). According to these authors, poor countries have a comparative advantage over the labor factor (Rowthorn and Ken Coutts, 2004). As a result, the importation of labor-intensive manufacturing products should lead to deindustrialization in developed countries. The net effect of North-South trade on manufacturing jobs is therefore negative (Rowthorn and Ken Coutts, 2004). According to Sung Jin Kang and Hongshik Lee (2011), trade between developed countries and developing countries improves productivity in northern countries not only because it can lead to lower prices. Imported products are more competitive, but also because domestic companies can find other strategies to improve their productivity.

Foreign direct investment (FDI) can be perceived as foreign factors of production which replace those which exist in the host countries. Investors are more interested in tertiary sector activities such as opening banks and transporting goods (Rowthorn et al., 1992).

Also, we see that African countries continue to export raw materials and less manufactured products. Morrissey and Mold (2006) explain this reality by inefficiencies and the lack of appropriate investment in production techniques within manufacturing companies. In the same vein, Elbadawi (1999) demonstrated that the states of the black continent have failed to derive much benefit from trade liberalization because their companies do not have a comparative advantage in technology. UNCTAD (2009) explains this delay by the characteristics of the LDC manufacturing sub-sector. Indeed, according to this institution, most LDCs have very few large national industries. Trade liberalization has even exposed local industries in LDCs to competition for which they were ill-prepared. In short, this liberalization was premature in the LDCs, given their level of development (UNCTAD, 2010). The only form of openness that can boost the production of the manufacturing industry in developing countries is regional integration. Brady et al. (2011) argue that regional integration should boost industrial production in developing countries. However, the effect of integration on employment in the manufacturing sub-sector can be negative, since it exposes young companies, once protected, to competition from more competitive regional firms. given their level of development (UNCTAD, 2010). The only form of openness that can boost the production of the manufacturing industry in developing countries is regional integration. Brady et al. (2011) argue that regional integration should boost industrial production in developing countries. However, the effect of integration on employment in the manufacturing sub-sector can be negative, since it exposes young companies, once protected, to competition from more competitive regional firms. given their level of development (UNCTAD, 2010). The only form of openness that can boost the production of the manufacturing industry in developing countries is regional integration. Brady et al. (2011) argue that regional integration should boost industrial production in developing countries. However, the effect of integration on employment in the manufacturing sub-sector can be negative, since it exposes young companies, once protected, to competition from more competitive regional firms.

In short, good industrial policy must support new industries, research, and development being at the heart of technological innovations (Sung Jin Kang and Hongshik Lee, 2011). It should also attract FDI which can play a crucial role during the period of deindustrialization.

Methodology

We are working in this study to identify the factors that are delaying the industrial development of African countries. To reach our objective, we seek to measure the impact of corruption, regulation as well as that of political instability in the industrial backwardness of Africa. To this end, we take into account the geographic delimitation, the data source, the study period, and the model.

Data sources and period of the study

The sample used is forty-eight (48) Africain States[2]. For our study, we use macroeconomic, financial, and institutional data from secondary sources. These come from different databases: WDI, African Development Indicators, and Governance Indicators.

To collect consistent data obtained continuously and constantly, our study concerns the observations of African countries covering the period from 2007 to 2019.

Econometric Modelling

We are looking to see if governance variables and institutional quality could lead to the underperformance of the industrial sector in Africa. There are several ways to estimate both economic and industrial development. Without always being exhaustive, we can cite the models with simultaneous equations (*Shrieves and Dahl, 1992)*or regression models (Short, 1979). We are therefore inspired by the initial model of economic development formulated by Levine and Zervos (1996) and specified as follows:

$$Y_{it} = \beta X_{it} + \varepsilon_{it} \quad \text{t} = (1, \dots 11)$$

With Y_{it} the X_{it} variables likely to explain industrial development, θ_i the country fixed effect, δ_t the time-setting effect, and ε the error term.

In the terminology of UNCTAD (2008), the secondary sector is made up of several categories of industries: the extractive industries (mining, hydrocarbons, companies that produce services such as water and electricity), manufacturing industries and companies involved in construction (buildings and public works). It will then be a question of identifying the factors which explain the contribution of the secondary sector to the GDP by introducing the indicators of governance, in particular corruption, political instability and regulation.

The variables traditionally used are: schooling (sch) and urbanization (urb) (Brady et al, 2011), and the level of trade openness in% of GDP (com). To these variables, we add the governance indicators like goujons and Kafando (2012): notably, the low level of corruption (cor), regulation (reg) and political stability (inst) apprehended according to Cieslik and Tarsalewska (2011) by the average duration of the war in five years

$$vam_{it} = \alpha_0 + \alpha_1 sch_{it} + \alpha_2 tir_{it} + \alpha_3 com_{it} + \alpha_4 \inf_{it} + \alpha_5 pibt_{it} + \alpha_6 urb_{it} + \alpha_7 inst_{it} + \alpha_8 cor_{it} + \alpha_9 reg_{it} + \vartheta_i + \delta_t + \varepsilon_{it} \quad (2)$$

$$vas_{it} = \alpha_0 + \alpha_1 sch_{it} + \alpha_2 tir_{it} + \alpha_3 com_{it} + \alpha_4 \inf_{it} + \alpha_5 pibt_{it} + \alpha_6 urb_{it} + \alpha_7 inst_{it} + \alpha_8 cor_{it} + \alpha_9 reg_{it} + \vartheta_i + \delta_t + \varepsilon_{it} \quad (3)$$

With vam_{it} : the industrialization rate of manufacturing industries measured by the value-added of manufacturing industries in% of GDP.

[2] *Algeria,Angola ,South Africa ,Benign ,Burkina,Burundi,Cameroon ,Green cap,central Africa,Democratick , Congo,Congo Ivory Coast ,Djibouti ,Egypt ,Ethiopia ,Gabon ,The Gambia,Ghana ,Guinea ,Guinea Bissau Equatorial, Mauritius, Kenya,Liberia,Libya,Madagascar,Malawi,Mali,Morocco,Mozambique, Namibia,Niger,Nigeria,Rwanda,Sao,Senegal,Sierra,Somalia,Sudan,Tanzania,Chad,,Tunisia,Uganda,Zambia,Zimbabwe*

vas_{it} : the rate of industrialization of the extractive industries measured by the added value of the extractive industries in% of GDP.

These equations can be estimated by several techniques (MCO, 2MC, 3MC) but measurement errors on the dependent variable and the fact that it and certain exogenous variables can be determined simultaneously can lead to estimation bias since under these conditions the regressors and the residuals of the equation to be estimated are potentially correlated. It is therefore necessary to use instrumental variable techniques to correct endogeneity biases. We will then adopt the Generalized Moments (GMM) method. This was first developed by Arellano and Bond (1991). The latter proposes to move from the reference equation (1) to a primary difference equation to eliminate the country fixed effects. But their method is problematic insofar as the error term is by construction, correlated with the delayed endogenous variable and the instruments are less relevant if the autoregressive process goes beyond order 1. We will therefore adopt the approach of Blundell and Bond (1998), Arellano and Bover (1995) which allows the use of delayed but differentiated variables as instruments.

So;

$$vam_{it} = \alpha_0 + \alpha_1 \Delta lsch_{it} + \alpha_2 \Delta 1tir_{it} + \alpha_3 \Delta lcom_{it} + \alpha_4 \Delta l\inf_{it} + \alpha_5 \Delta lpibt_{it} + \alpha_6 \Delta linst_{it} + \alpha_7 \Delta lcor_{it} + \alpha_8 \Delta lurb_{it}$$
$$+\alpha_9 \Delta lreg_{it} + \alpha_{10} \Delta lvam_{t-1} + \vartheta_i + \delta_t + \varepsilon_{it}$$
$$vas_{it} = \alpha_0 + \alpha_1 \Delta lsch_{it} + \alpha_2 \Delta ltir_{it} + \alpha_3 \Delta lcom_{it} + \alpha_4 \Delta l\inf_{it} + \alpha_5 \Delta lpibt_{it} + \alpha_6 \Delta linst_{it} + \alpha_7 \Delta lcor_{it} + \alpha_8 \Delta lurb_{it}$$
$$+\alpha_9 \Delta lreg_{it} + \alpha_{1O} \Delta lvas_{t-1} + \vartheta_i + \delta_t + \varepsilon_{it}$$

Results and Discussion

The estimates of our equations present the determinants of the contribution of the manufacturing and extractive industries to the gross domestic product. Before presenting the results it is necessary to present the descriptive statistics.

Preparation of Figures and Tables

Table 1: Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
go	417	45.90669	14.26813	2.302656	80.42901
GDP per capita	466	3178.434	4716.882	249.1482	31968.62
vam	399	10.00845	5.290823	2.276127	22.53507
ruralpop	480	58.92743	17.01091	13.8522	87.4516
inst	528	-.5939887	.9256584	-3.323904	1.186454
horn	527	-.6692476	.5421593	-1.924046	.8685279
sch	300	78.37306	17.2794	29.64535	99.94653
inf	463	11.67044	56.46971	-9.797647	1096.678
shoot	307	11.69728	33.77574	-42.31018	508.7408
reg	527	.875306	.56674394	2.32734	5.186454
com	464	33.74781	19.35264	4.685804	118.8642

Source: Authors' construction from WDI data (2014)

The results of the statistics show that the average levels of the contribution of the extractive and manufacturing industries to the GDP are respectively 49.9% and 10%. These results thus reflect the importance of extractive activities on manufacturing activities.

Table 2: Determinants of Africa's manufacturing and extractive industries

	dlvam[3]	dlvas[4]
Ldlvas		0.181
		(0.132)

[3] Contribution of manufacturing industries to GDP
[4] Contribution of extractive industries to GDP

Ldlvam	-0.0204	
	(0.155)	
dlsch	0.420	0.481 **
	(0.409)	(0.221)
DlGDP per capita	-1,065 **	-1.213 ***
g2	(0.492) 5.894053 (0.368)	(0.271) 4.176651 (0.230)
dlcom	-0.0579	0.0478
	(0.128)	(0.0740)
dlurb	5.106	7.424
	(14.66)	(9.025)
dltir1	0.203 ***	0.0986 ***
	(0.0756)	(0.0366)
dlinst1	0.102	-0.0615
	(0.241)	(0.160)
dlinf1	0.0812	-0.0238
	(0.0571)	(0.0311)
dlcor1	0.0871	-0.151 *
dlreg	(0.146) 0.189 ** (0.076)	(0.0898) 0.0895 (0.195)
Observations	484	517
Number of countries Sargan test First order autocorrelation test First order autocorrelation test	44 56.34 (0.112) 0.000 0.132	47 48.52 (0.118) 0.002 0.397

Notes: standard deviation in brackets ***: significance at 1%, **: significance at 5%, *: significance at 10%.
Source: Authors' construction from WDI, African Development Indicators and Governance Indicators

Industrialization factors can be understood differently depending on whether they are manufacturing or extractive industries.

The determinants of the manufacturing industries development

Our estimates show that a priori there is no significant relationship between the level of governance and the rate of industrialization in manufacturing industries. That said, regulation has a positive and significant influence on the contribution of industries with a coefficient of0.189. It can,, therefore,, be said that institutional quality can boost the development of the manufacturing industry in Africa.

The development of Africa's manufacturing industry is essentially determined by the gross domestic product per capita and the maximum interest rate of the countries. Therefore, there is a positive and significant relationship between manufacturing development and the level of interest rate. A variation of 1% of the latter translates into an appreciation of the manufacturing industries of around 20.3%. The attractiveness of the gain has an incentive effect on the behavior of investors, which will stimulate industrial activity.

The level of income per capita deteriorates the level of industrial development about the manufacturing industries. This deterioration is around 1.06 percentage points. This result supports the paradox of Africa. Indeed, we observe deindustrialization in certain African countries even before these countries have reached the optimal level of income per capita. This calls into question the U-shaped relationship postulated by Clark (1957) between the rate of industrialization and GDP per capita.

- Also, the rate of industrialization tends to increase with the level of urbanization and schooling. This observation then attests to the thesis that human capital constitutes a determinant favorable to industrial development in Africa. This result also confirms the thesis of modernity according to which the industrializing countries have previously reached a certain level of development in terms of urbanization, education and the formation of physical capital.

The determinants of the extractive industries development

About the extractive industries, the estimate presents the following results:

- The level of corruption in African countries has a significant and negative influence on the development of the extractive industries. Thus, an increase in the 1point indicator of poor governance leads to a deterioration of mining development by 15.1%. In addition, political instability acts in the same direction with a decrease of 6.15%. Also, a change of 1% in the level of regulation would lead to an increase in the productivity of the extractive and mining industries by around 8.9%. These results show us that the industrial development of African countries requires improving the quality of their governance.

- With regard to human capital, the level of education positively influences the level of industrialization in Africa by boosting industry by 48.1%. The same is true for the level of urbanization in the region of 7.4%.

- The maximum interest rate and trade openness also improve the performance of the extractive industries by 9.8% and 4.7% respectively.

-As far as per capita income is concerned, the effect on the performance of the extractive industries is the same as that of the manufacturing industries. It leads to a de-industrialization of 1.21 percentage points.

Conclusions

This work consisted, after all, in identifying the determinants of industrial development in Africa to be able to explain its delay. the industrial backwardness of African countries can also be explained, as pointed out by Okhun (1970), by the fact that the latter have not yet reached the minimum level of gross domestic product from which an industrial advance could truly be observed; The analyzes highlight the role of the authorities in terms of governance. States must become real catalysts in the industrialization process. It is also a question of the need to rebuild states following the period marked by their political instability. They must be directly or indirectly involved in the industrialization process through investment, the regional integration process, regulation, and governance.

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