What are the determining factors of Industrialization in Africa?

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Abstract

In this paper, we run dynamic panel model describing the relationship between industrialization and different socio-economic, financial and institutional determinants for 35 African countries over the period 1970-2012. We conduct also many sub-regional and sub-period analyses in order to check the robustness of the results.

Our main results are the following: (i) as generally found in the literature, financial development, governance and labor market regulation have significant effects on industry; (ii) exchange rate appreciation is detrimental to the industrialization process (iii) financial and institutional factors are the main determinants of industrialization in the northern and eastern countries while socioeconomic factors matter more for the western and southern countries (iv) differences in the power of the industrialization determinants are not likely to emerge.

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1. *Introduction*

It is well documented in various literatures that industrialization has several advantages, especially in the long run, such as economic diversification, unemployment reduction, technology transfer and welfare improvement. This statement seems to be reinforced after the recent economic crisis and the considerable expansion of the financial service sector that brought manufacturing back in the spotlight.

East and South East Asian countries as well as some Latin American ones have experienced remarquable growth linked notably to a switch in their industrial strategy[1]. This switching, manifested by an early mutation from import substituting approach to export promotion one has been accompanied by an extraordinary prosperity of the industrial sector. Indeed, as shown in figure 1, starting from the 80's, GDP per capita growth in East Asian Countries fluctuated between 6 and 10%.

However, in Africa, industrial policies were not linear, starting from import substitution strategy in the 60's, moving to a combination of the latter one with an export substitution approach in the 70' and 80' before choosing a market oriented strategy in the 90'. The results were disappointing given that the changes from one strategy to another was not translated by an economic transformation and then by an industrial take-off of the continent (Kouassi 2008). Indeed, as figure 1 illustrates, GDP per capita growth was always by far inferior from the one registered in the East Asian and Pacific Countries.

Figure 1: GDP per capita growth
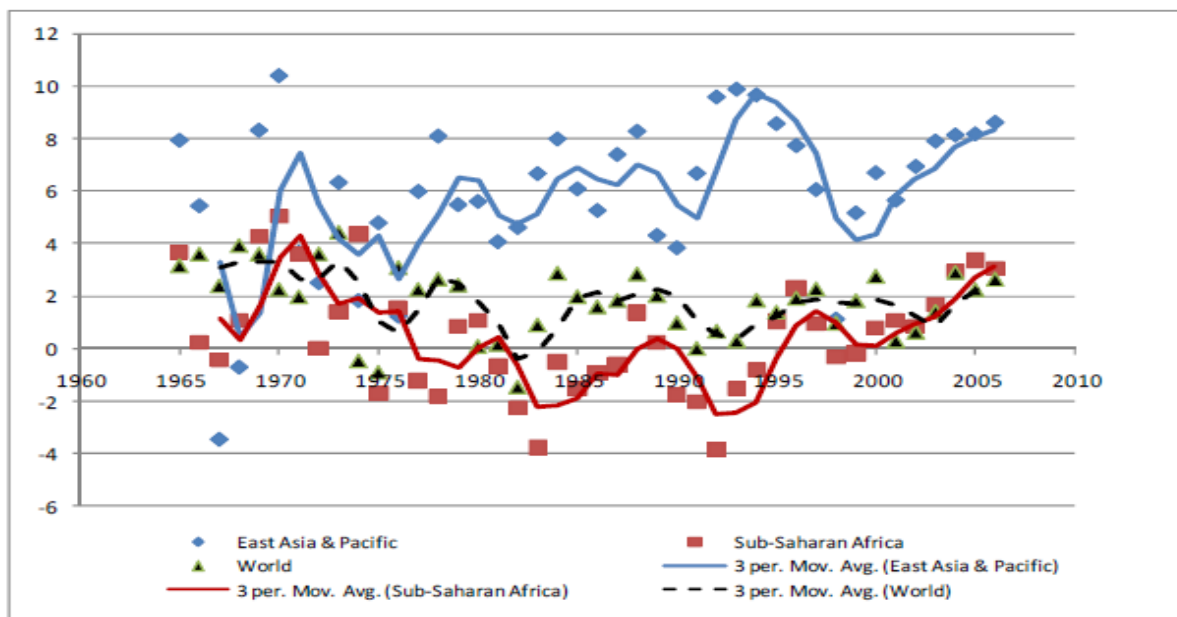
Source: WDI

The connotation which considers Africa as an agriculture and mining continent remains given the inability of the governments to build up a structural transformation of their economies. Even countries that achieved macroeconomic stability and evidenced good governance seemed unable to attract much investment outside of the extractive sector.

Obviously, despite the gap of industrial performances between Africa and the other emerging countries, industrial development seems to be given less weight than deserved in African countries. Most political leaders have indeed underestimated the real potential of industrialization for the continent. At the same time, only few researchers have dealt with the reasons that lie behind the delayed emergence of Africa as an industrialized bloc. Therefore, understanding the underdevelopment of industry in African countries and paving the way for an appropriate industrial policy to them seems challenging.

The aim of this paper is twofold. It first tries to fill the aforementioned void by emphasizing the main determinants of the (de) industrialization process in a sample of African countries. It subsequently tries to use the results to address the implications for the continent and map out the way for a genuine emergence of Africa.

The rest of the paper is structured as follows: Section 2 reviews the theoretical determinants of Industrialization and points out some findings in the literature related to these determinants in developing countries, African countries in particular. Section 3 highlights the empirical methodology. Section 4 presents the main estimation results. Section 5 tries to carry out some robustness analysis. Finally, Section 6 concludes and offers some policy recommendations.

2. Industrialization vs. De-Industrialization: the main factors

Basically, many factors could promote or hinder industrialization process. Some of them are socio-economic, others are financial while others are institutional. Though the literature is extensive in this frame, we consider here only some of the important determinants of industrialization while stating each time, the mainly empirical approach used in this frame.

Internal vs. external demand

There is a significant positive relationship between manufacturing expansion and internal demand so that, other things being equal, larger countries tend to have a higher manufacturing share. In others words, as incomes per capita raise, share of manufacturing in national income increases.

However, small countries are often open, so, level of economic activity in developed economies could have a major impact on growth prospects in developing countries, particularly through changes on export demand. Therefore, changes in formers economies' GDP could influence industrial activity in the latter ones.

Guadagno (2012), basing on Cornwall (1977) model in order to estimate a manufacturing growth equation for a sample of developing countries, shows that the size of the domestic market as well as trade openness are a constant determinants of industrialization.

Economic openness

Following outward-looking industrial strategy allow access to large markets and a growing demand which encourage a large scale industrialization programs (case of East Asian New Industrialized Economies such as Hong Kong, Singapore, Taiwan and Korea). Moreover, trade liberalization allows access to imported inputs at free trade prices, access to technology and capital as well as a more competitive exchange rate which boost industry growth. This is the case for developing countries in so much as closer integration with the world economy in the second half of the last century was associated with higher economic growth, disapproving

predictions of the emergence of stagnationary global forces holding back their material progress (Weiss 2002).

In the other hand, flow of FDI, especially in manufacturing, by transferring capital, technology, management, stable financing and marketing techniques could act positively on growth and exports and then reinforce the industrialization process for the host country. Inversely, in a relatively closed or protected economy, enterprises will be both less aware of technical change internationally and will have less incentive to adopt best practice innovation. Fostering obsolete technology and high cost activities lead to low attractiveness of FDI and hamper the opening to the world markets which affects negatively the industrialization process.

Babatunde (2009), basing on a panel least squares estimation as well as time/series cross-section techniques in a large sample of Sub-Saharan Africa (SSA) find that trade liberalization can stimulate export performance albeit marginally and indirectly.

Likewise, Seetanah and Khadaroo (2007), by extending Cobb Douglas production function whereby investment is disaggregated into its different types and employing both static and dynamic panel data estimates, found that FDI is an important element in explaining economic performance in these countries, though to a lesser extent as compared to the other types of capital.

However, one cannot necessarily deduce from this evidence support for the generalization that outward-looking trade strategies and complete liberalization of FDI represent the most effective policy for all developing countries at all times[1]. State policy intervention, notably in favor of infantile industry seems to be inevitable in so much as it offers a protection from hard competition, especially during the earlier period of industrialization. In Taiwan and Korea for instances, import-substitution strategy (import quotas, tariffs, export taxes…) has not disappeared with the shift toward export intensive industries. Likewise, the state constantly intervened with inducements to encourage international capital to move up the industrial ladder (Stein 1995).

Shafeddin (2005) prove that, on the contrary to the NIEs, trade liberalization has led to de-industrialization of low income countries that has not adopt selective protection policies, particularly the Sub-Sahara African countries. Indeed, industrialization has been accompanied by increased vulnerability of the economy, particularly the manufacturing sector that relayed heavily on imports.

In the same frame, Agosin and Mayer (2000), by testing the effect of FDI on domestic investments for three developing regions (Africa, Asia and Latin America), found that this effect is various. In particular, FDI are crowding-in for Ivory Coast, Ghana and Senegal, neutral for Gabon, Kenya, Niger, Morocco and Tunisia while it is crowding-out for Central African Republic, Nigeria, Sierra Leone and Zimbabwe. So, evidently, FDI are by no means always favourable and simplistic policies for this kind of investments are unlikely to be optimal.

Macrostability

Generally, a stability of the macro environment encourages growth given that it leads firms to act in a rational manner. That's because, in a context of low inflation, suitable deficit and public debt, more risk-averse investment behavior is limited and access to financial and

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[1] See Boone (1994) for example.

capital markets is less difficult. This is especially important in African countries where there may be a dearth of entrepreneurship[1].

In the other hand, maintaining stable exchange rates prove to be important insofar as it affects long run growth. Indeed, avoiding exchange rate misalignments could protect exporters from an overvaluation phenomenon that affects competitiveness as well as importers from undervaluation that affects purchases and investment programs. Moreover, exchange rate volatility makes difficult and expensive for developing countries to hedge their exchange rate risks, especially small and medium sized firms.

Rodrik (2008), by using both inflation and terms of trade as additional exogenous covariates in a panel model explaining economic growth in manufacturing, finds a negative and significant relationship between growth and inflation in developing countries.

In the same way, Greenwald and Stiglitz (2006) prove that, in developing countries, low exchange rates help export sectors like manufacturing to compete, especially sectors which have higher learning elasticities and generate more learning externalities. That's way many countries have managed to lower their real exchange rate for an extended period of time, and have done so at the same time that they have promoted growth.

Human capital

Human capital development in the form of sufficient technically and scientifically qualified personnel allows coping with the increase of demands and industrial development. Indeed, creating immobile national assets, notably through education, training and healthcare spending could provide the base for competitive industrial sector and improve the attractiveness of investments. Therefore, increasing government support to education, improving vocational training and guaranteeing access to healthcare are prerequisites for any form of industrialization.

Zelleke et al. (2013), by using growth accounting approach to identify the sources of economic growth and by resorting to Pritchett (2001) and Weil (2013) conceptual frameworks, show that human capital have positive effects in SSA countries (they account for 22% of real GDP) but much lower than in high-income countries.

Governance

The presence of institutions capable of guaranteeing better rule enforcement, transparency, absence of corruption and government stability could improve doing business climate and stimulate entrepreneurial spirit. On the contrary, the existence of significant governance deficiencies could render difficult the building up of a solid industrial sector and complicate the leading of appropriate industrial policy[2].

In the other hand, government interventions in an inconvenient way could create distortions and lead to economic inefficiency. Maintaining rigid rules, such as considerable labor market regulation for example, could hinder the well-functioning of the markets and deter industrialization efforts.

Clague et al (1997), using a cross-country regression model, prove that differences across countries in property relations and contract enforcement lead to high transaction costs and thus have a negative impact on growth.

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[1] See Reinhart and Rogoff (2003) for more details.
[2] For deep analysis, see among others Collier (2000), Curry and Weiss (2000) and Williamson (2000).

Similarly, by employing a structural regression model similar to that used by Sachs and Warner (1998) for analyzing the sources of economic growth in Africa, Ng and Yeats (1999) found that governance regulations (plus national trade) explain over 60 percent of the variance in some measures of economic performance and thus, country's own national policies shape its rate of development, industrialization, and growth.

Financial development

The presence of financial institutions insuring better allocation of resources could affect the industrialization process. In particular, existence of efficient banking system insuring careful financing to firms, notably small and medium sized firms, reinforce domestic entrepreneurship capabilities[1].

Much attention could also be given to the functioning of financial markets and the ability of firms to obtain adequate financing. Generally, a well-developed system of financial institutions could transfer efficiently funds from savers to investors and monitor the effectiveness of investments.

Ghirmay (2004) for instance, provide evidence of the existence of a long-run relationship between financial development and economic growth in almost all (12 out of 13) of SSA countries using a Vector autoregression (VAR) framework based on the theory of cointegration and error-correction representation of cointegrated variables.

3. Empirical Methodology

Basic Objective

In this paper, we try to verify if the aforementioned determinants matter for the industrialization process in Africa. To do that, we run panel model for 35 African countries[2] over the period 1970-2012, describing the relationship between an industrialization index and different regressors which include a variety of socio-economic indicators (GDP per capita, importance of foreign direct inflows, degree of openness to trade, financial deepening and human capital development) as well as institutional ones (magnitude of labor market rigidity and good governance).

We estimate a model of the form:

$$\text{INDUSTRY}_{it} = \gamma_0 + \gamma_1 \, \text{INDUSTRY}_{it-1} + \gamma_2 \, \text{FIN}_{it} + \gamma_3 \, \text{FDI}_{it} + \gamma_4 \, \text{LAMRIG}_{it}$$
$$+ \gamma_5 \, \text{GOV}_{it} + \gamma_6 \, \text{REER}_{it} + \gamma_7 \, \text{GDP}_{it} + \gamma_8 \, \text{TRADE}_{it} + \gamma_9 \, \text{HUMAN}_{it} + \text{U}_{it} \qquad (1)$$

With : $\text{U}_{it} = \mu_i + \varepsilon_t + \nu_{it}$ where $\nu_{it} \rightarrow \text{N}(0, \, \sigma_\nu^2)$ (i.i.d)

Baltagi et al. (2009) stipulate that the inclusion of the lagged dependent variable in the empirical model implies that there is correlation between the regressors and the error term since lagged INDUSTRY depends on U_{it-1} which is a function of the μ_i, the country specific effect. Because of this correlation, dynamic panel data estimation of (1) suffers from the

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[1] See among others Liedholm and Mead (1999).

[2] Our sample contains: Algeria, Angola, Botswana, Burkina Faso, Cameroon, Congo Republic, Congo Democratic Republic, Côte d'Ivoire, Egypt, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Liberia, Libya, Malawi, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia and Zimbabwe.

Nickell (1981) bias, which disappears only if T tends to infinity. The preferred estimator in this case is GMM suggested by Arellano and Bond (1991), which basically differences the model to get rid of country specific effects or any time-invariant country specific variable[1].

For a better use of the GMM system method, Roodman (2006) suggests the introduction of time dummies variables. Moreover, for the endogenous variables, only their lagged values of at least 2 periods are considered as valid instruments. The number of instruments should not exceed the number of groups, so, the p-value of the Sargan test of overidentifying restrictions as well as the Arellano-Bond test for serial correlation in the second-differenced errors should be above 0.1[2].

Other authors instrument endogenous variables with fewer lags because, they consider that, if all the lags are used, the number of instruments surpasses the number of groups and this makes Sargan test weak and estimations unreliable.

In equation (1) the coefficients γ_1, γ_2, γ_3, γ_4, γ_5, γ_6, γ_7, γ_8 and γ_9 measure the long-run response of INDUSTRY respectively to changes in INDUSTRY lagged variable by one period, financial system development (FIN), foreign direct investment net inflows as share of GDP (FDI), labor market rigidity (LAMRIG), governance index (GOV), real effective exchange rate (REER), GDP per capita (current$) (GDP), trade openness (TRADE) and human capital indicator (HUMAN). The instrumental variables for the linear model in (1) are FIN{1}, FDI{1}, LAMRIG{1}, GOV{1}, REER{1} HUMAN{1}, GDP{2} and TRADE{2} where {1} and {2} denote the lag-length of a variable. GDP and TRADE were instrumented by 2 lags variables since they are considered as endogenous. In panel data, regressors in other periods are considered valid instruments for period-t regressors if the latter are either endogenous or introduced in the model as lags of the dependent variable. These instruments permit consistent estimation even if the assumption of strict exogeneity fails[3].

Definition of variables and Data

The variables used in our regression are the following:

INDUSTRY: Industry value added as share of GDP. It comprises value added in mining, manufacturing, construction, electricity, water, and gas. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

FIN: Financial development. This indicator is approximated by the share of domestic credits provided by the financial sector. It includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations. Examples of other financial corporations are finance and leasing companies, money lenders, insurance corporations, pension funds, and foreign exchange companies.

FDI: Foreign Direct Investment in net inflows as share of GDP. Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the

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[1] An additional advantage of the GMM estimator is the following: by differencing, it helps ensuring the stationnarity of all the regressors.

[2] Sargan test indicates whether the instruments are jointly valid, i.e. if they are not correlated with the error term. So, if these tests are weakened, it is hard to gauge the validity of the instrumental estimation.

[3] Hossain and Mitra (2013): "A Dynamic Panel Analysis of the Determinants of FDI in Africa", *Economics Bulletin*, 33(2), p. 1608.

sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) from foreign investors, and is divided by GDP.

GDP: GDP per capita in current dollar is a proxy for the economic development. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars.

TRADE: Trade openness indicator. This indicator expresses the sum of exports and imports as a share of GDP.

HUMAN: Human capital indicator. It is approximated by the gross secondary school enrollment ratio. It is the share of number of actual students enrolled at secondary school by number of potential students enrolled.

LAMRIG: Labor Market Rigidity Index. This index captures the rigidity of employment protection legislation. LAMRIG is high when the labor market is rigid and vice versa.

GOV: Governance index which measures the political and institutional development. The indicator encompasses 5 other sub-indicators: Bureaucracy quality, Corruption, Democratic accountability, Government stability and Rule of law. However, the problem with the construction of this indicator stems from the heterogeneous scale of the sub-indicators. Indeed, corruption, rule of law and democratic accountability are scaled between 0-6, whereas bureaucratic quality and government stability are scaled respectively between 0-4 and 0-12. Therefore, we unified all the proxies to obtain a sub-indicator scaled between 0-6. To do that, we multiplied the proxies scaled between 0-4 by 3/2 and divided by 2 those scaled between 0-12.

REER: Real effective exchange rate. It measures the development of the real value of a country's currency against the basket of its trading partners. It is calculated from the nominal effective exchange rate and the relative CPI (Consumer Price Index) between the country and its trading partners.

All variables are extracted from World Development Indicators database (2014) except LAMRIG, GOV and REER variables which are respectively extracted from Campos and Nugent (2012), International Country Risk Guide (2013) and International Financial Statistics (2013) databases.

4. Empirical results

Before moving to empirical results, we show, hereafter, some main descriptive statistics for all the model variables.

Table 1. Summary Statistics (1970-2012)

Variables	Observations	Mean	Standard Deviation	Min	Max
INDUSTRY	1313	28.49	14.43	1.88	78.51
Lagged INDUSTRY	1290	28.44	14.46	1.88	78.51
FINANCE	1302	33.36	35.7	-79.09	319.53
FDI	1296	2.72	7.65	-82.89	91
HUMAN	1086	27.35	21.75	1.05	112.62
LAMRIG	1016	1.48	0.37	0.6	2.45
GOVERNANCE	863	2.78	0.77	0.38	5.04
TEER	536	170.11	222.2	37.97	3579.12
GDP	1402	1047.24	1570.85	62.93	15853.46
TRADE	1338	66.07	28.74	6.32	179.12

As shown in table 1, the majority of our regressors show evidence of important volatility except the institutionnel ones (Governance and Labor market regulation). It is an expected result since these variables vary very little in time. The standard deviation of GDP is very large which attests the heterogeneity of our sample.

Table 2. Empirical Results

		(1)
	Expected sign	**Coefficients**
L.INDUSTRY	(-)	0.75 (0.00)***
FINANCE	(+)	0.025 (0.08)*
FDI	(+) or (-)	-0.013 (0.87)
HUMAN	(+)	-0.051 (0.15)
LAMRIG	(-)	-8.46 (0.00)***
GOVERNANCE	(+)	-1.07 (0.04)**
REER	(-)	-0.005 (0.09)*
GDP	(+)	0.001 (0.11)*

TRADE	(+) or (-)	0.023 (0.27)
Intercept	(+)	22.09 (0.00)***
AR(2)		1.02 (0.308)
Sargan Test		150.38 (0.43)

Figures in parentheses are robust standard errors, except for Sargan test and autocorrelation errors test of Arellano-Bond (AR2) which are p-value. For AR(2) and Sargan test, null hypotheses is respectively absence of second order autocorrelation and validity of lagged variables as instruments. ***, ** and * denote significant at 1%, 5% and 10%, respectively.

Following Baltagi et al. (2003), Jacob and Osang (2007) and Szirmai and Verspagen (2011), we separately inspected each single explanatory variable of the panel model adopted by means of endogeneity tests (not reported here) in order to identify which variables are endogenous. Tests showed that Trade Openness and GDP per capita are both endogenous. We also found that for the region taken as a whole, financial development (FINANCE), Labor Market Rigidity (LAMRIG), Governance Index (GOV), Real Effective Exchange Rate (REER) and GDP per capita (GDP) are clear determinants of industrialization. However, Governance Index is significant with an unexpected sign. Campos et al. (2010) and Méon and Weill (2011) give a plausible explanation by considering that corruption facilitates economic activity and trade that may not have happened otherwise. Then, it promotes efficiency by allowing private sector agents to circumvent cumbersome regulations and restrictions. Indeed, we have encompassed a corruption sub-indicator in the construction of the Governance index which could explain the obtained result. Trade openness (TRADE) is positive but not significant. FDI and Human capital index (HUMAN) are not significant with unexpected signs.

5. Robustness Analysis

We conduct here sub-regional and sub-periods analysis in order to check the robustness of the results. We subdivided the time span into 2 sub-periods: 1970-1990 and 1991-2012. We also subdivided the sample into 5 sub-samples: North Africa (Algeria, Egypt, Libye, Morocco and Tunisia), West Africa(Burkina Faso, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, Togo), Central Africa (Cameroon, Congo Dem Rep, Congo Rep, Gabon), East Africa (Ethiopia, Kenya, Sudan, Uganda) and South Africa (Angola, Botswana, Mozambique, Malawi, Namibia, Tanzania, South Africa, Zambia and Zimbabwe)

Subregional analysis

Table 3a. Empirical Results

		North Africa	West Africa	Central Africa	East Africa	South Africa
	Expected sign	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**	**Coefficients**
L.INDUSTRY	(-)	0.75 (0.00)***	0.77 (0.00)***	0.7 (0.00)***	0.36 (0.07)*	0.51 (0.00)***
FINANCE	(+)	0.02 (0.08)*	-0.02 (0.72)	0.025 (0.75)	0.34 (0.007)***	0.03 (0.00)
FDI	(+) or (-)	-0.01 (0.87)	-0.1 (0.45)	0.023 (0.92)	-1.82 (0.01)**	0.22 (0.00)***
HUMAN	(+)	-0.05 (0.15)	0.23 (0.02)**	0.14 (0.21)	0.2 (0.44)	0.04 (0.03)**
LAMRIG	(-)	-8.46 (0.00)***	-10.86 (0.001)***	-4.05 (0.66)	dropped	-10.27 (0.00)***
GOV	(+)	-1.07 (0.04)**	-1.36 (0.24)	0.69 (0.6)	9.52 (0.00)***	0.04 (0.84)
REER	(-)	-0.005 (0.09)*	-0.013 (0.04)**	-0.003 (0.75)	-0.017 (0.4)	0.04 (0.00)***
GDP	(+)	0.001 (0.11)*	0.005 (0.09)*	0.006 (0.74)	0.019 (0.06)*	-0.001 (0.00)***
TRADE	(+) or (-)	0.023 (0.27)	-0.0008 (0.97)	0.13 (0.017)**	dropped	0.02 (0.01)**
Intercept	(+)	22.09 (0.00)***	36.69 (0.003)***	11.42 (0.44)	-20.04 (0.00)***	17.83 (0.00)***
AR(2)		1.02 (0.308)	0.32 (0.747)	-0.74 (0.46)	-1.55 (0.121)	2.64 (0.008)
Sargan Test		150.38 (0.43)	23.35 (0.666)	13.11 (0.72)	8.88 (0.031)	18.93 (0.00)

Figures in parentheses are robust standard errors, except for Sargan test and autocorrelation errors test of Arellano-Bond (AR2) which are p-value. For AR(2) and Sargan test, null hypotheses is respectively absence of second order autocorrelation and validity of lagged variables as instruments. ***, ** and * denote significant at 1%, 5% and 10%, respectively.

Basing on the results, we show that the under-development of the industrial sector and consequently the under-achievement of growth vary between regions. While the southern African countries are making use of their human capital high quality to attract FDI and enhance their industrial dynamics, the north ones are suffering from an institutional deficit which hinders them to rely on the positive effect of governance quality. The last political and social turmoil experienced by the region's countries should be an opportunity to reform the institutions and establish democratic and participative legal and political frameworks. The Central African countries are sharing the same institutional and political features as North African ones. The civil war happened in Congo Democratic Republic and the frictions with its neighborhood cannot be considered as an ideal context for an industrialized take-off. The high quality of the human capital also seems to play a crucial role in the promotion of manufacturing and industrial activities among western African countries. We can especially

call to mind the experiences of Nigeria and Ghana in promoting education and vocational training to raise their economies. These two countries detain the highest shares of school and university graduates among the region's countries. It explains the positive and significant effect of HUMAN to jump-start industry growth in that region.

Subperiod analysis

Table 3b. Empirical Results

		(1970-1990)	(1991-2012)
	Expected sign	**Coefficients**	**Coefficients**
L.INDUSTRY	(-)	0.86 (0.00)***	0.66 (0.00)***
FINANCE	(+)	0.07 (0.06)*	0.04 (0.07)*
FDI	(+) or (-)	-0.055 (0.563)	0.06 (0.77)
HUMAN	(+)	0.06 (0.39)	-0.14 (0.4)
LAMRIG	(-)	-4.88 (0.02)**	-15.82 (0.003)***
GOVERNANCE	(+)	-1.41 (0.057)*	-0.2 (0.83)
REER	(-)	-0.006 (0.13)	-0.021 (0.16)
GDP	(+)	0.002 (0.11)*	0.002 (0.00)***
TRADE	(+) or (-)	0.054 (0.09)*	0.035 (0.19)
Intercept	(+)	9.9 (0.11)*	34.93 (0.004)***
AR(2)		0.84 (0.4)	0.07 (0.94)
Sargan Test		29.38 (0.96)	68.9 (0.78)

Figures in parentheses are robust standard errors, except for Sargan test and autocorrelation errors test of Arellano-Bond (AR2) which are p-value. For AR(2) and Sargan test, null hypotheses is respectively absence of second order autocorrelation and validity of lagged variables as instruments. ***, ** and * denote significant at 1%, 5% and 10%, respectively.

The above-mentioned results prove that the decomposition of the time span into two sub-periods: 1970-1990 and 1991-2012 do not alter the main results found over the whole period. Indeed, from table 3b, it is clear that before the 1990's, Financial Development, Labor Market Rigidity, Governance Index and TRADE explain significantly the industrial dynamism in the whole Africa. What it worth noting here is about the financial development effect. Indeed, the global wave of financial modernization experienced by the developing countries at the end of the 1980's had as a foremost goal: the promotion of growth and economic catching-up by upgrading the financial systems. Our results for this sub-period show that financial sectors

had an active role before adopting the "new" directives of liberalization and recommendations of financial integration. Those results bolster the concern put on finance to achieve the transition to a large movement of industrialization. The same observation is applicable for the labor market legislation. LAMRIG index is significant with the expected sign for the 1970-1990 and 1991-2012 sub-periods. The subdivision of our time span reveal that labor market flexibility is determinant before and after adopting the "Structural Adjustments" by developing economies. Those policies aimed to insert more flexibility to the labor markets in order to enhance employment and then provide the adequate labor needed for the industrialization shift.

6. Conclusion and some policy implications

In Africa, the industrial landscape continues to be poor. This gives the problematic of industrialization a very important interest. In fact, globalization and deep integration offers African countries considerable potential for future growth via industrialization.

This paper sheds some light on the main factors that helped or hindered the realization of such potential and the way for Africa to emerge. Thus, we run a dynamic panel model describing the relationship between industry and the main determinants found in the literature. We found that for the whole region, financial development, economic development, the labor market flexibility and the real effective exchange rate are clear determinants of industrialization. These results remain valid even after dividing the countries into five subregional samples (North Africa, West Africa, Central Africa, East Africa and South Africa) and two subperiod (before and after 1990).

It goes without saying that things have to be changed, especially given the low capacity of the extractive sector to offer enough jobs in Africa. Put it differently, to increase hopes for an effective industrialization and so for a real emergence of Africa, African countries should improve the resilience of their financial system in order to reap the benefits of financial openness. Moreover, they should implement more measures to streamline FDI inflows. Finally, they have to keep basic macroeconomic fundamentals at sensible levels such as inflation and exchange rates.

However, basing on sub-regional results, eastern countries should improve good governance while southern ones should introduce more flexibility in their labor markets as well as improve good governance. FDI attractiveness seems to play a crucial role in boosting industrialization in southern African countries. The FDI ratio is positive and significant solely in that sub-region. It might be explained by the high level quality of human capital which contributes actively and exclusively to the industrialization transition among southern African countries. Moreover, northern countries should deepen their trade openness while western ones should enhance human capital.

In all, African countries have to build modern industrial sector through good conception, execution and steering of industrial policies. This means essentially better mobilizing resources, improving business environment, building sound macroeconomic stability, insuring good governance and enhancing human capital to attract the adequate foreign direct investment from abroad (not just targeting the FDI based on the low wages in developing countries) which is an intermediate goal to achieve industrialization.

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