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THE EFFECTS OF FOREIGN DIRECT INVESTMENTS ON INDUSTRIALIZATION: A COMPARATIVE APPROACH BETWEEN THE FRANC AND THE NON-FRANC ZONE

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ABSTRACT

The aim of this paper is to contribute to literature by showing explicitly the direct and the indirect effect of foreign direct investment on industrialization by comparing the franc and the non-franc zone countries in Africa. Our empirical evidence has made use of data from 12 countries of the franc zone and 11 countries of the non CFA zone making a total of 23 African countries spanning from 1990-2017. After carrying out preliminary test to permit us choose the appropriate method, we employed the Pooled Mean Group estimation technique for both groups of countries, which is appropriate for drawing conclusions from dynamic heterogeneous panels by considering long-run equilibrium relation. The results show that FDI has a significant positive effect on industrialization within the franc zone countries mean while it has a negative but significant effect on industrialization within the non-zone franc countries. In other words, the results reveal that within the franc zone, industrialization is more favored when compared to the non-franc zone countries. Practical and theoretical implications are discussed.

Contribution/ Originality: The paper contributes the first logical analysis by examining how differences in the use of currencies among African countries contribute to the effect of foreign direct investment on industrialization. It is one of the few studies that have investigated on this issue in Africa using the pool mean group approach.

1. INTRODUCTION

African countries for the past decades have been exporting sizeable quantities and values of raw materials and commodities. They have generally failed, however, to diversify their international trade and their economy (Armah, 2013). It is recognized that this type of trade does not generate significant value added or enough jobs and that it increases countries' exposure to international exogenous shocks. One solution to the above mentioned issues could be industrialization (UNECA, 2016). If we look at the history of capitalism, few countries have developed their economy without a strong industrial base such that the term 'industrialized country' is used interchangeably with 'developed country' (UNECA, 2016).

In Africa, Industrialization is considered a major tool for their economic development (Sulser et al., 2015). It contributes in a significant manner to reduce poverty and create more jobs (Cadot, De Melo, Plane, Wagner, &

Woldemichael, 2016). It ameliorates human capital (Young, 2012) and improves economic diversification and domestic investment (Duarte & Restuccia, 2010).

Despite all these advantages, we still experience low level of industrialization in Africa in general and Sub-Sahara Africa in particular (Page, 2010). For example, in 1980, the industrial contribution in total gross domestic product (henceforth GDP) stood at 37, 96%. In 2015, it felt to 26, 5%. Many reasons could account for this fall: Lack of infrastructures such as energy and transport (Rodrik, 2015) low level of human capital (Devarajan, 2013) poor formulation of agricultural policies for industrial growth (Page, 2012) and political and managerial deficiencies (Qobo & Le Pere, 2018).

Base on the above constrains, African countries would require additional financial and technical resources. At this level, foreign direct investment (henceforth FDI) would play an important role to catalyze industrialization [1] in Africa. Two reasons can support this assumption. On the one hand, FDI into Africa has been on increase. It has moved from 20 billion US dollars in 2001 to 54 billion US dollars in 2014 (CEA, 2016a). According to the united nation conference on trade and development (UNCTAD, 2015), 21% of FDI was allocated for industrial sector; 31% for agricultural sector and 48% for the service sector. This improvement at the industrial level has undergone a net increase because in 1990, it stood at 18% (UNCTAD, 2008).On the other hand, previous works in East Asia concluded that FDI has a positive effect on industrialization. You and Solomon (2015) and Dahlman (2009) showed clearly that during the period of transformation of their economy, China, India, Japan, Taiwan, and Singapore benefited from massive FDI inflows. Similar results were obtained for some developing countries by Di Maio (2008).

Beside, since the work of Borensztein, De Gregorio, and Lee (1998) and more recently that of Chen et al.(2016),FDI affects long term growth through the accumulation of both physical and human capital, technological transfer and commercial exchange or trade.

FDI can improve industrialization both directly and indirectly. In the former case is seen through the number of jobs created and the value added on goods and services produced (Markusen & Venables, 1999; Rodriguez-Clare, 1996).In the latter case, it is manifested through technological transfer and its productive capacity (Haskel, Pereira, & Slaughter, 2007).

Despite these multiple contribution, it is very difficult to come to a consensus on the effect of FDI[2] on industrialization. Must of the literature has focused on the effect of FDI on economic growth (Gui-Diby, 2014; Gunby, Jin, & Reed, 2017; Jude & Levieuge, 2017; Ngouhouo, 2008; Nkoa, 2018).

Recent studies that focus on the effect of FDI on the industrialization process, notably in Africa are limited. To the best of our knowledge there are only three studies that have examined the impact of foreign direct investment on the industrialization process in Africa, notably, Gui-Diby and Renard (2015); Nkoa (2016) and Njangang, Chameni, and Nembot (2018).

Gui-Diby and Renard (2015) on a panel of 49 African countries indicated that FDI did not have a significant impact on industrialization of these countries. Weak agricultural diversification and lack of coherence between the economic sectors could justify this result. While Nkoa (2016) established a positive link between FDI and industrialization in Africa. Such a conclusion reflects the multiple efforts put in place by the African leaders especially with measures to improve the business climate, diversify the productive base of the economy and partnership, engaging on heavy investment projects that can lead to economic emergence. Njangang et al. (2018) on

[1]Industrialization is the process by which the transformation of primary products makes it possible to obtain high value-added products that are competitive both domestically and externally in a country (CEA, 2016a; Dickenson, 1978).

[2] International Monetary Fund (2009) defines FDI as "a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy"; and the degree of influence is set at a minimum of 10% of the capital.

the Chinese FDI effect on Africa industrialization concluded that FDI has no effect on industrialization in Africa. Unique source of FDI in this analysis could justify this result given that only Chinese FDI cannot have a significant impact on Africans industrialization

However, reexamining this relation is still important because difference in the use of currencies among African countries that was not considered in the previous studies could equally play a role between these two macroeconomic variables. This will therefore help to fill this research gap.

The objective of our article is to re-examine the effect of FDI on industrialization within the franc and the non-franc zone of some selected Africa countries .Industrialization is measured by the industrial value added as a percentage of GDP. Our main hypothesis is that FDI contributes both directly and indirectly on industrialization.

To meet our objective, we will organize the rest of our paper as follows: section 2 provides the stylized fact; section 3 presents the empirical methodology as well as dataset. In section 4 we will present our result and finally in section 5 we will conclude.

2. THE STYLIZED FACT

The facts suggest that in most African countries the process of industrialization has not taken off in any significant way (Chen, Geiger, & Fu, 2015). The contribution of Africa's manufacturing sector to the continent's GDP had fallen from 19% in 1975 to 11% in 2014 while in Asia, this share increased at an average rate of approximately 8% over the same period (Balchin et al., 2016). This situation is also reflected in the evolution and positioning of the diversification indices of African countries compared with developing countries in Asia and the America. The international trade of African countries has been less diversified than that of Asian and American developing countries, and did not change significantly during the period from1995 to 2013.

Central Africa and Western Africa stands out as the worst performing regions in terms of industrialization due to ongoing de-industrialization. FDI therefore can save as a good means to improve on this. FDI inflows into developed countries increased from USD 129 billion in 1990 to USD 499 billion in 2014. During the same period, FDI inflows into developing countries rose from USD 30 billion to USD 681 billion in 2014. Regarding Africa, FDI increased from USD 4.80 billion to USD 54 billion during the period 1990-2014. However, the level of industrialization remains low despite this strong evolution as seen on Figure 1 and 2 below.

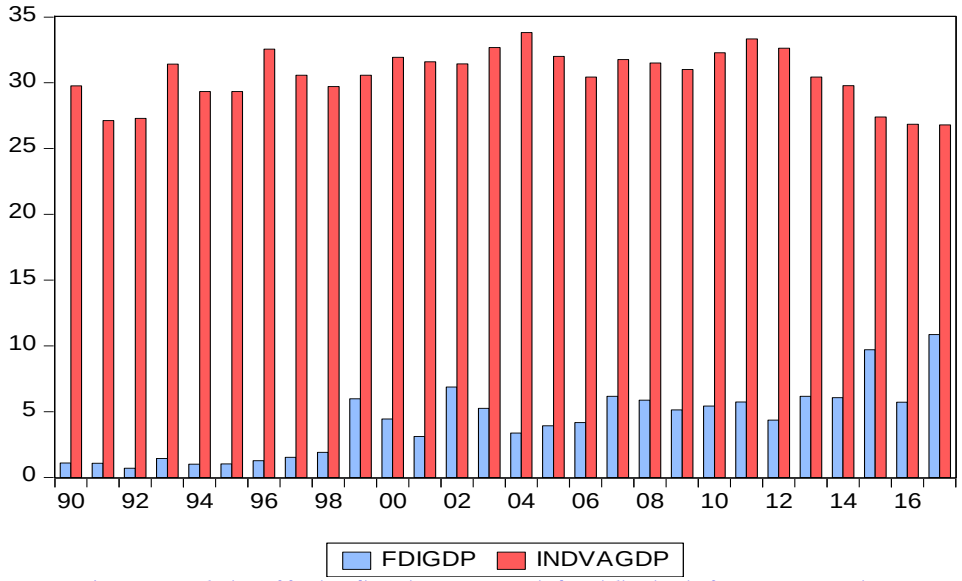

Figure-1. Evolution of foreign direct investment on industrialization in franc zone countries.

Figure 1 above show the simultaneous evolution of FDI and industrialization in the franc zone countries. Though there are fluctuations in FDI inflows in this zone, the amount of FDI remains very high throughout 1992 right up to 2012, yet this improvement does not reflect the level of industrialization. The industrial process have been very slow especially from 1990 right up to 1998.Afther this period we realize some fluctuating light improvement right up to 2017.

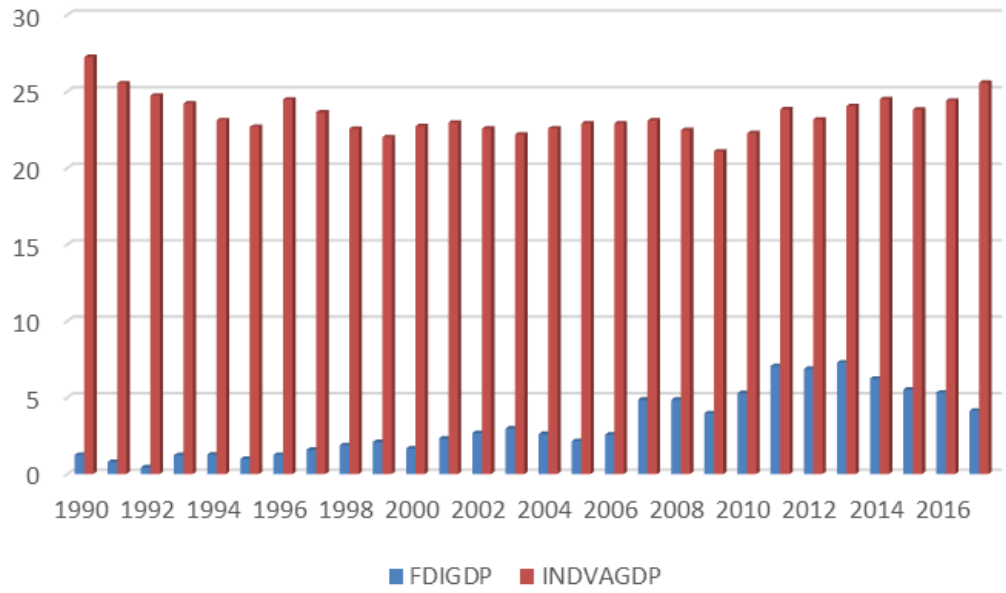

Figure-2. Evolution of FDI and industrialization in non-franc zone countries.

Figure 2 shows the evolution in the non-franc zone countries where FDI continue to increase. Yet, there has been a constant decrease in the amount of foreign direct investment inflows into this region right up to 2010 and the process of industrialisation followed thesame trend throughout this period. After this period, we discovered some improvement on FDI inflows but the level of industrialisation continue to fall.

3. METHODOLOGICAL APPROACH

3.1. Specification of the Equation

Our model draws inspiration from the study of Gui-Diby and Renard (2015) and Nkoa (2016). Our study analyses the effect of FDI on industrialization process in some African countries to see whether differences in the use of currency matters. Following these authors, the extension of this model permits us to add other indicators in the model which act as control variables.

$$INDU_{it} = \beta_0 + \beta_1 indus_{it-1} + \beta_2 FDI_{it} + \beta_3 X_{it} + \mu_i + \varphi_t + \varepsilon_{it} \quad \text{.....Equation (1)}$$

Where, $indus_{it}$ in Equation 1 Represents the level of industrialization for country i at given time period t ; FDI_{it} in Equation 1 is the foreign direct investment inflows in Africa; X_{it} in Equation 1 is a victor of the exogenous variables used in our model; μ_i is an unobserved country specific effect; φ_t the time specific effect while ε_{it} is the error term.

FDI can influence industrialization through human capital, trade and domestic investment (Ouyang & Fu, 2012; Zhang, 2014). These variables are three in number from where we can add other control variables.

We will first of all choose the number of lags for permits us to address endogeneity concerns that may rise in our analysis. Besides, it is also important to determine the most appropriate estimator between Pool Mean Group, Mean Group and Dynamic Fixed Effects. To do this, we will use the Hausman homogeneity assumption test based on the comparison between the Mean Group (MG) and Pooled Mean Group (PMG) estimators. Following Jouini (2015); Pesaran, Shin, and Smith (1999) the Pooled Mean Group(PMG) approach is used to estimate dynamic heterogeneous panels by considering long-run equilibrium relations, contrary to other techniques such as the dynamic panel GMM method, that purge any potential long-run linkage among variables that are used in the model.

3.2. Data and Sources

The dataset used in our analyses are made up of a number of variables gotten from our literature and other different sources such as world development indicators and united nation conference on trade and development. This study covers 23 African countries giving 11 countries in the franc zone (Benin; Burkina-Faso; Cameroon; Central African; Chad; Côte d'Ivoire; Congo; Gabon; Mali; Senegal; Togo;) and 12 countries of the non-franc zone (Botswana; Democratic Republic of Congo; Ethiopia; Ghana; Madagascar; Malawi; Mozambique; Nigeria; South Africa; Rwanda; Kenya; Zambia) due to lack of institutional data for other countries. The full description of data is displayed below:

Table-1. Descriptive Statistics.

Variable	C.V	Obs	Mean	Std. Dev.	Min	Max
INDVAGDP	0.57	583	27.60021	15.77679	.964493	77.41366
FDIGDP	1.83	612	3.80821	6.980405	-8.589432	50.63641
INFLA	5.97	577	191.719	1145.23	-11.68611	23773.13
ENERGY	0.96	579	89.90567	86.46944	2.359124	640.0816
GFCF	0.60	581	22.5517	13.65581	0	99.31888
EDUCA	0.84	330	17.463623	14.7557	1.09972	93.82378
TRADE	0.98	293	21.82803	21.39952	-3.218662	91.4986
TIME	0.87	352	38.46392	33.7388	-7.594284	179

The analysis of the coefficient of variation (CV) shows generally that there is a weak dispersion of the variables except in the case of FDIGDP and Inflation. Such result confirms the volatile nature of the FDI inflows into the African countries provoked by fluctuations in the prices of raw materials and other internal factors.

Table-2. Correlation Metrics.

Variables	Indvagdp	Fdigdp	Infla	Energy	Gfcf	Education	Taxetrade	Timestart
MANVA GDP	1.0000							
FDI GDP	0.0459	1.0000						
INFLA	-0.1966	0.6872	1.0000					
ENERGY	0.3349	0.1303	0.2605	1.0000				
GFCF	0.3104	0.3112	0.4116	0.7021	1.0000			
EDUC	-0.1350	0.7414	0.6259	-0.0641	0.2484	1.0000		
TRADE	0.0916	-0.0052	0.1154	0.6184	0.3151	-0.1189	1.0000	
TIMES	0.5218	-0.1392	-0.0821	0.1660	0.1064	-0.1818	0.1587	1.0000

Note: MANVAGDP=industrial value added as a percentage of GDP; FDIGDP=foreign direct investment as a percentage of GDP; INFLA=inflation rate; energy=renewable energy consumption; GFCF=domestic investment; EDUC=human capital; TRADE= imports and exports and TIME=administrative procedure to start up a business.

Our dependent variable is industrialization, measured by the manufacturing value added as a percentage of GDP. To ensure the unbiased nature of our results, we included 6 control variables namely: Inflation, energy consumption, domestic investment, human capital, Trade openness and the institutional procedures or time. Table 1 presents the descriptive statistics for all variables used. Table 2 shows the correlation matrix between the variable

and shows a weak correlation between FDI and industrialization. This correlation will be tested empirically in the next section given that correlation does not mean causality.

4. RESULTS AND DISCUSSION

The estimation of our results using the pool mean group method approach which allows identical long run coefficients without assuming homogenous short run parameter shows that the most recurrent lags are zero and one as presented in Table 3 below showing the summary of results for the number of optimal lags of our dataset. This enables us to avoid the specification error in our model. The Hausman homogeneity assumption test based on the comparison of Mean Group (MG) and Pooled Mean Group (PMG) estimators gave a coefficient of .92 which is greater than the p value of .05 meaning that the null hypothesis of homogeneity cannot be rejected hence the pool mean group is the appropriate estimator as presented in Table 4 below showing the first Hausman test results. This is further confirmed in table 5 below of the Second Hausman test results with a coefficient of 1 which is also greater than the p value of .05.As such, we proceeded to the estimation of our long run model as defined in Equation 1 above.

Our long run model results are presented in table 6 below. This results show on the one hand that in the franc zone countries, FDI has a positive and a significant effect on industrialization. If foreign direct investment changes by one unite within the franc zone, the manufacturing value added which measures industrialization will change by 2,24 unites when inflation remains low with an increase in energy consumption. These results are in line with those of Nkoa (2016). This could be because the franc CFA is peach to the Euro currency and this helps to reduce the power of those using other currencies. Besides, the franc zone countries benefit a lot from the monetary policy of France which is an added advantage.

On the other hand, the result shows that within the non-franc zone countries, FDI has a negative but a significant effect on industrialization. Gui-Diby and Renard (2015) obtain similar results. According to our results, if foreign direct investment (FDI) changes by one unite within the non-franc zone, the manufacturing value added which measures industrialization will fall by 0,83 units. This means countries that are not using the franc CFA have a slow rate of industrialization in sub-Sahara Africa. This means the use of currency have a modulating contribution on the effect of foreign direct on industrialization in Africa .

Table-3. Summary of results for the number of optimal lags of our dataset.

Variables	Lags for model 1	Lags model 2
FDIGDP	1	1
INFLA	0	0
ENERGY	0	0
GFCF	1	1
EDUC	0	0
TRADE	0	0
TIME	1	0
MANVA GDP	1	//
EMPLOSEC	//	1

Table 3 above shows our summary results of the optimal lag with the most recurrent lag being 0 and 1.Besides, it is also important in a PMG to determine the most appropriate estimator between Pool Mean Group, Mean Group and Dynamic Fixed Effects. To do this, we will use the Hausman homogeneity assumption test based on the comparison of Mean Group (MG) and Pooled Mean Group (PMG) estimators. The results of this first Hausman test are presented on the Table 4 and later on in our Table 5 below:

Table-4. First Hausman test results.

Variables	Coefficients			
	(b) Mg	(B) pmg	(b-B) Difference	Sqrt (diag(V_b – V_B)) S.E.
FDIGDP	0,3750	0,3564	0,1862	1,1762
INFL	0,1244	-0,0072	0,1316	0,2064
ENERGY	0,2188	0,1840	0,3476	0,9646
GCFGDP	0,4049	0,1778	0,2271	0,4716
EDUC	-0,7198	0,1121	-0,7310	4,9176
TRADE	4,3099	0,2815	4,5914	3,9159
TIME	0,5006	0,3042	0,0194	0,3510

Note: b = consistent under Ho and Ha; obtained from xtpmg; B = inconsistent under Ha, efficient under Ho; obtained from xtpmg; Test: Ho: difference in coefficients not systematic.
chi2 (7) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B) =2.59; Prob>chi2 = 0.9205.

To be certain on the appropriate method to apply, Table 5 on the Second Hausman comparison test between the DFE and PMG estimators once again shows that the PMG is appropriate because the probability is greater than 0.05.

Table-5. Second Hausman test results.

Variables	Coefficients			
	(b) Mg	(B) Pmg	(b-B) Difference	Sqrt (diag(V_b –V_B)) S.E.
FDIGDP	1,3290	0,3564	0,9726	11,1214
INFL	-0,3239	0,0072	-0,0252	0,2842
ENERGY	-0,0113	0,1840	-0,1953	2,1085
GCFGDP	0,0027	0,1778	-0,1751	1,9794
EDUC	-1,0859	0,0112	-1,0970	10,4192
TRADE	0,3566	0,2815	0,6381	5,5977
TIME	0,0348	0,3042	0,0044	1,2602

Note: b = consistent under Ho and Ha; obtained from xtpmg; B = inconsistent under Ha, efficient under Ho; obtained from xtpmg; Test: Ho: difference in coefficients not systematic; chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)= 0.03; Prob>chi2 = 1.0000.

After the preliminary tests have been carried out as revealed above, we can now estimate our long run model as in Equation 1 above. The results obtained are presented in Table 6 below:

Table-6. The effect of FDI on industrialization in both groups of countries.

Variables	FRANC ZONES countries	Non FRANC ZONES countries
FDIGDP	2,23532*** (3,10)	-0,83463*** (-3,93)
INFLA	-0,2547*** (-3,93)	0,00130 (0,23)
ENERGY	0,36401*** (2,93)	1,03204*** (5,11)
GFCF	-0,01467 (-0,13)	0,02285 (0,48)
EDUC	-0,69610* (-2,35)	2,82126*** (5,07)
TRADE	0,37357* (2,51)	-0,01106 (-0.26)
TIME	-0,06082 (-1,46)	-0,03182 (-0,92)
No observation	273	307
No of countries	11	12

Note: ***, **, and * specify that the coefficients are statistically significant at 1%, 5% and 10% levels.

5. CONCLUSION AND PLOICY RECOMMENDATION.

Our article empirically explores the effect of FDI on industrialization by comparing the franc and the non-franc zone using data on a panel of 25 Africa countries spanning from 1990 to 2017 and the pool mean group technic was used. The results reveals that in the Francs Zone countries, FDI is having a positive and a significant effect on

industrialization meanwhile in the non-franc zone it has a negative but a significant effect on industrialization. These results remain robust after choosing carefully the estimation technics and the different dataset. Study beyond African countries could be more interesting. Beside, considering modulating effects of policy variable such as governance could sound more interesting when examining the effect of FDI on industrialization in Africa. The results have some policy implications. Policy makers should rethink on policies like Good governance, effective and non-corrupt public institutions that promote open markets. Countries that improve their governance in these respects are not only likely to increase the probability that they will receive more FDI inflows; they will also receive greater absolute amounts. Finally, Policy makers should rethink on the design of national policies aimed at attracting FDI, as well as to design and implement sound monetary and industrial policies and streamline all the policies in the same framework.

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APPENDIX

Table-7. Variables description and data sources.

Variable	Signs	Description	Data sources
Foreign direct investment	FDI	Foreign direct investment As a percentage of GDP	World Development Indicators World Development Indicators
Industrialisation	MANVA GDP	manufacturing Value added (as a part of the GDP)	World Development Indicators
Inflation	INFLA	GDP deflator (annual %)	World Development Indicators
Energy consumption	Energy	Energy use(Kg of oil equivalent) per $1,000 GDP (constant 2011 ppp)	World Development Indicators
The propensity of capital accumulation	GFCF	Investment: Gross capital formation (constant 2010 US$)/GDP (constant 2010 US$)	World Development Indicators
Education	EDUC	School enrollment, secondary (% gross)	World Development Indicators
Trade opening	Trade	Trade openness Index: (Exports of goods and services in current US$ + imports of goods and services in current US$)/GDP in current US$	World Development Indicators
Time period to start operating.	Time	Time to resolve insolvency (per year)	World Development Indicators