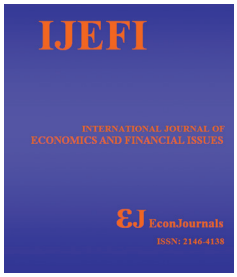

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Foreign Direct Investment and Economic Growth in Africa: Another Look from the WAEMU Region

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ABSTRACT

Using panel cointegration and Granger causality techniques for the period 1994-2018, this article empirically explores the relationship between foreign direct investment (FDI) and economic growth in the West African Economic and Monetary Union (WAEMU). Contrary to the literature's widely accepted opinion, we find no evidence of a causal relationship between FDI inflows and economic growth in the WAEMU region. This surprising result can be explained by the weakness of absorptive capacity factors as pointed out by the literature. However, we find contrary to the literature that the importance of absorptive capacity is a necessary but not sufficient condition to ensure the growth impact of FDI in these countries. The Null effect of FDI inflows on growth is also explained by the structural FDI sector-oriented puzzle observed in these countries. Sectors attracting the most FDI inflows are the ones that contribute the least to economic growth. Conversely, sectors contributing the most to economic growth are those which attract the least foreign capital. This finding provides crucial policy implications for the WAEMU region in terms of rethinking their FDI attractiveness policies in favor of more efficient, and inclusive economic growth.

Keywords: WAEMU Region, FDI Inflows, Economic Growth, Panel Cointegration Techniques, Panel Granger Causality Techniques
JEL Classifications: F21, O47, O11, O55, C33

1. INTRODUCTION

It is widely accepted in the economic literature that capital accumulation is a key driving force of economic growth (Solow, 1956; Mankiw et al., 1992). When national savings is insufficient (which is often the case) to finance investment plans, a country often relies on international capital flows. Foreign direct investment (FDI) is one of the main components of these foreign capital flows.

The literature identifies four main channels through which FDI inflows can positively influence economic growth. First, FDI inflows contribute to filling the saving gap by directly increasing investment, and stimulating job creation and economic growth. Secondly, they facilitate technology transfers and boost the human capital (knowledge and skills) of the host country workers (De Mello, 1999). Thirdly, FDI increases firms' competition in the host country and reduces their market power. Fourth, FDI inflows influence economic growth by boosting international trade as they connect the domestic market to the international one.

Developing countries and especially African countries seem particularly attached to FDI inflows since the needs in terms of investment and development are very important in these countries. This attachment seems to be corroborated by the facts. Indeed, according to the United Nations Conference on Trade and Development (UNCTAD) World Investment report (2019), FDI inflows have increased in developing countries and particularly in Africa in 2018 despite a global downward trend. Given the upward trend in FDI flows to developing countries, it is relevant to assess the effects of these international financial flows on the economic growth of these economies.

This article contributes to this literature by empirically exploring the FDI-growth nexus in the case of the West African Economic and Monetary Union (WAEMU) countries. One of the main limitations of the FDI-growth empirical literature particularly in developing countries is that researchers mainly focus on developing and diversifying econometric modeling to deal with the nexus without putting great attention to the real explanations of the results. Econometric modeling is important to robustly overcome the nexus, but deeply understanding the results is also an important task notably in terms of policy recommendations. We try to perform both exercises in the present paper.

Our findings highlight some interesting insights and contribute to the literature threefold. First, by the means of rigorous panel econometric techniques, we find no evidence (neither in the short run nor in the long run) of a causal relationship between FDI inflows and economic growth in the WAEMU region. Secondly, in trying to deeply understand this surprising result, we highlight evidence showing that the weakness of absorptive capacity factors can explain the Null effect of FDI on economic growth in these countries as pointed out by the literature. The third and probably most important contribution of this paper is to highlight that contrary to the literature, the importance of absorption factors is a necessary but not sufficient condition to ensure a significant influence of FDI on growth in these countries. Indeed, we find that the Null effect of FDI inflows on growth is also explained by the structural FDI sector-oriented puzzle observed in the WAEMU countries. Sectors attracting the most FDI inflows are the ones that contribute the least to economic growth and that create the fewest jobs. Conversely, sectors contributing the most to economic growth are those that attract the least foreign capital. This provides crucial policy implications for the WAEMU countries in terms of rethinking their FDI attractiveness policies in favor of more efficient and inclusive economic growth.

The rest of the article is organized in the following way. Section 2 presents a literature review on the FDI-growth nexus. Section 3 presents common features of WAEMU countries as well as stylized facts of FDI and economic growth trends in these countries. Section 4 presents our panel data and methodology used in this paper. Section 5 presents and interprets the results of our analysis. Section 6 presents a further analysis of robustness checks. Section 7 investigates the reasons behind the results and discusses them. Section 8 proposes some policy recommendations for the WAEMU region. Finally, we present the conclusion of the paper in Section 9.

2. FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH: WHAT HAVE WE LEARNED FROM THE LITERATURE?

Since Solow's (1956) seminal work on the theory of economic growth, the role of capital accumulation in enhancing growth has been largely debated. As FDI inflows represent one of the main components of international capital flows aimed at promoting economic growth, particular attention has been paid to the impact of this foreign capital on economic growth in the empirical literature.

Therefore, a plethora of empirical research studies on the FDI-growth nexus has been carried out both in developed and developing countries, although no consensus emerges from this debate. More precisely, three main conclusions emerge from the FDI-growth empirical literature. The first vein of the literature finds that FDI positively influences economic growth[1]. Studies supporting this view include Berthélemy and Demurger (2000), Zhang (2001), Agrawal and Khan (2011), Bayar (2014), Nguyen (2017), Dinh et al. (2019), and Sarker and Khan (2020) for Asian economies; Irandoust (2001) and Moudatsou (2003) for European countries; Al-Iriani (2007) for Middle East economies; and Adamu and Oriakhi (2013), Shitu (2018), and Jie and Shamshedin (2019) for African countries. Moreover, some studies even find a bi-directional causality between FDI inflows and economic growth, supporting a strong relationship between both variables (Al-Iriani, 2007; Gursoy et al., 2013).

A second stream of the literature rather finds null and even negative effects of FDI on economic growth. For instance, Irandoust (2001), Carkovic and Levine (2005), Hervé (2016), and Carbonell and Werner (2018) all find that FDI inflows have no significant effects on economic growth. Focusing on four WAEMU countries (Cote d'Ivoire, Senegal, Benin, and Togo) over the period 1980-2014 and applying a system GMM modeling, Hervé (2016) finds that FDI inflows do not significantly influence economic growth in these countries. Similarly, Carbonell and Werner (2018) focus on Spain to empirically investigate the nexus using the GETS (general-to-specific) methodology over the period 1984-2010. Their findings unambiguously highlight no impact of FDI on economic growth in the case of Spain. Moreover, some authors like Mencinger (2003) for European countries and Meniago and Lartey (2021) for sub-Saharan African countries find a robust negative impact of FDI inflows on economic growth.

Finally, a third part of the literature supports the conditional impact of FDI inflows on economic growth. According to this opinion, FDI inflows positively influence economic growth conditional on the relative importance of absorptive capacity factors like human capital, well-developed financial markets, degree of openness, infrastructures, quality of institutions, and so on. For instance, analyzing the nexus in a panel of 69 developing economies, Borensztein et al. (1998) find that the impact of FDI inflows on economic growth strongly depends on the level of human capital (proxied by the level of education) in the host country. Other authors highlight the importance of financial development in strengthening the FDI effects on growth (Hermes and Lensink, 2003; Alfaro et al., 2004). For instance, Alfaro et al. (2004) analyze the extent to which economies with better financial systems can exploit FDI inflows more efficiently in both OECD and Non-OECD countries. They find an ambiguous impact of FDI taken alone, but a strong impact in countries with well-developed financial markets. Azman-Saini et al. (2010) investigate the role of the degree of openness in reinforcing the FDI effects on growth using a panel of 85 countries and system GMM techniques. They find that FDI inflows alone have no impact on economic growth, but their effects depend on the degree of openness in the host

1 This opinion seems to be the most widely accepted in the literature.

economies. On the other hand, many studies including Asiedu (2006), Azam and Ahmad (2013), and Adegboye et al. (2020) highlight the importance of institutional quality (governance, political stability, corruption) in strengthening the FDI effects on economic growth.

Considering all these mixed results observed in the literature, it appears that beyond the different methods used, evaluating the real impact of FDI on economic growth crucially depends on the individual characteristics of the country or region. Indeed, it would be difficult to highlight a consensual influence of FDI on economic growth for all countries as each country has its characteristics whose changes depending on government policies tend to amplify or reduce the effects of FDI inflows on growth. In other words, the FDI-growth nexus is fundamentally an empirical case-specific question. Therefore, this study focuses on the case of the WAEMU region not only based on their similar structural features but also because they constitute an economic and monetary union. One limitation observed in the empirical literature (particularly in developing countries) is that researchers mainly focus on developing econometric modeling to deal with the nexus without putting great attention to the real explanations of the nexus results. Econometric modeling is important to robustly overcome the nexus but deeply understanding the reasons behind the results is even more important notably in terms of policy recommendations. We try to perform both exercises in the present paper. The presentation of common features of WAEMU countries as well as stylized facts of FDI and economic growth trends will be useful to start our analysis.

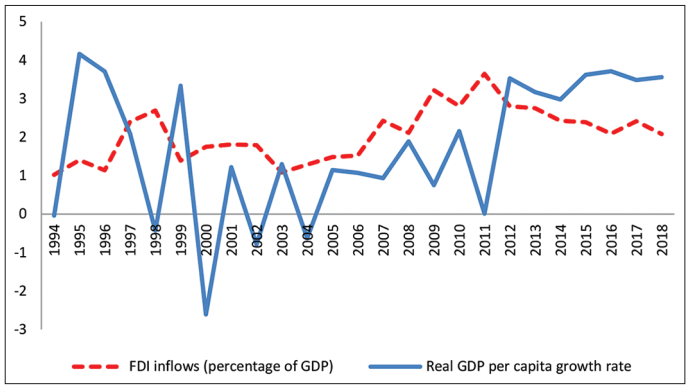
3. COMMON FEATURES AND STYLIZED FACTS IN THE WAEMU REGION

The WAEMU region includes 8 West African countries namely: Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. These countries share many common economic features. First, they belong to both the categories of least developed countries (LDCs), and heavily indebted poor countries (HIPCs) according to the World Bank classification. Secondly, they are mainly and structurally based on the primary and tertiary sectors, with a low level of industrialization. Third, they are exposed to terms of trade shocks as they are poorly diversified economies that mainly rely on one or two mining and/or agricultural export products. In fact, export flows mainly depend on commodities like cotton (Mali, Burkina Faso, Benin), cocoa (Cote d'Ivoire), cashew nut (Guinea-Bissau), fishing (Senegal), gold (Mali, Burkina Faso), phosphates (Togo, Guinea-Bissau), and uranium (Niger). Fourth, they are economies with a strong potential for unexploited arable lands, and with a dominance of subsistence agriculture, animal husbandry, and fishing.

Figure 1 presents the co-evolution of real GDP per capita growth and FDI inflows (as a percentage of GDP) in the WAEMU region during the period 1994-2018.

As can be observed from Figure 1, both variables seem to follow similar trends, particularly for the period 2004-2018, even if we

Figure 1: Dynamics of real GDP per capita growth and FDI inflows in the WAEMU region (1994-2018)



Source: Author calculations

suspect the relationship not to be so strong between both variables. However, a deeper analysis of causality is necessary to draw robust conclusions about this relationship. The subsequent sections deal with this analysis.

4. DATA AND METHODOLOGY

This section first describes our sample and variables of interest before presenting the econometric methodology followed in this study.

4.1. Describing the Sample and Data Sets

Our sample covers the 8 countries of WAEMU namely: Benin, Burkina Faso, Cote d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo. The analysis covers the period from 1994 to 2018[2] (annual frequency), which allows us to have balanced panel data with 200 observations. The first main variable is the log of real GDP per capita (constant US dollars) which will be used to measure economic growth. We choose GDP per capita over GDP to measure economic growth for two main reasons. First, GDP per capita gives a better assessment of a country's output performance, especially for cross-country comparisons. Second, GDP per capita is more relevant in the sense that it is more directly related to the country's standards of living and economic development.

The second variable of interest is FDI inflows as a proportion of GDP. To ensure the consistency of data measurement, data of both variables are taken from the UNCTAD database. To summarize, we use variables *LGDP* and *FDI* which represent respectively the log of real GDP per capita and the ratio of FDI inflows to GDP.

4.2. Methodology

The econometric methodology used in this study is described in the following subsequent sections. The methodoly follows M'baye (2022).

2 The year 1994 has been chosen as the starting point of our analysis to take into account the effects of the main structural change (CFA devaluation) that occurred in January 1994 in these countries. The main objectives of this devaluation were to develop policies aiming at (i) boosting the competitiveness of WAEMU countries, and (ii) ensuring the recovery of their economic growth after years of economic recession.

4.2.1. Panel unit root tests

To analyze the order of integration of our variables and for robustness checks, we use two of the most applied panel unit root tests in econometrics literature namely: the Levin et al. (2002) unit root test (LLC), and the Im et al. (2003)'s test for unit root (IPS). Consider the following panel data AR(1) process for the unit root analysis:

$$Y_{i,t} = a_i Y_{i,t-1} + b_i X_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where i=1, 2,…N stands for cross-section units that are observed over periods t =1, 2..., T.

$X_{i,t}$ represent exogenous variables such as fixed effects or individual trends, a_i represent the autoregressive coefficients, and $\varepsilon_{i,t}$ the error terms. If $|a_i|< 1$, the serie $Y_{i,t}$ is stationary. Otherwise, if $|a_i|= 1$, then the serie has a unit root (hence, non-stationary). Broadly speaking, the main difference between the above panel unit root tests is the assumption made on the autoregressive coefficients a_i across cross-sections. LLC test assumes that the persistence coefficients are common across cross-sections so that $a_i = a$ for all i. Conversely, the IPS test allows a_i to vary across cross-sections. Fortunately, both tests have the same Null hypothesis (H0) that is, the variable has a unit root (non-stationary). The alternative hypothesis (H1) is that the variable is stationary. To avoid misleading decisions associated with trend-stationarity, we consider panel unit root tests in two dimensions: (i) unit root test with constant only and, (ii) unit root test with both constant and trend.

4.2.2. Panel cointegration analysis

If variables are found to be integrated of the same order, one can proceed to the panel cointegration analysis that is, to detect whether there is a long-run relationship between our variables of interest by using Pedroni (1999; 2004) panel cointegration tests based on Engle and Granger (1987) cointegration technique. Pedroni's cointegration tests have 11 statistics of which 8 assume common AR coefficients across cross-sections and 3 assume heterogeneity of AR coefficients across countries. The Null hypothesis (H0) of Pedroni's tests is that there is no cointegration between variables of interest, and the alternative hypothesis (H1) is that the variables are cointegrated.

If instead, our variables are found to have different orders of integration especially if one is I(0) and the other is I(1), we cannot use the Pedroni tests to detect cointegration. Rather, we can use a panel Auto-Regressive Distributed Lag (ARDL) modeling approach proposed by Pesaran et al. (1999) with Pooled Mean Group (PMG) estimator to detect a long-run relationship between our variables.

The error correction representation of a panel ARDL model can be specified as follows:

$$\Delta Y_{i,t} = \sum_{j=1}^{p-1} \alpha_{ij} \Delta Y_{i,t-j} + \sum_{j=0}^{q-1} \beta_{ij} \Delta X_{i,t-j} + \varphi_i ECT_{i,t-1} + u_i + \epsilon_{i,t} \quad (2)$$

Where $ECT_{i,t-1}$ represents the so-called error correction term, and φ_i represents the error correction coefficient measuring the adjustment speed towards the long-run equilibrium after short-run shocks. In this specification, cointegration exists if and only if the error correction coefficient φ_i is found to be negative and statistically significant. Otherwise, we conclude that there is no cointegration between our variables of interest.

4.2.3. Model specification and panel Granger causality

One of the most widely used causality tests in the econometric literature is the Granger (1969) test. In the sense of Granger (1969), a variable X is said to cause another variable Y, if past values of X help to predict future values of Y.

Granger causality tests are usually performed within a Vector Autoregressive (VAR) framework and concern causal effects one period ahead. To analyze the direct causal effects between FDI inflows and economic growth, we follow M'baye (2022) by focusing on a bivariate VAR system. The rationale behind this strategy is that choosing a bivariate VAR for causality analysis is standard in the literature as it simplifies the issue of indirect causation resulting from adding auxiliary variables in a multivariate VAR model (Konya, 2004). Moreover, Dufour and Renault (1998) show that even in the case of causality analysis h periods ahead, no causal effect one period ahead implies no causality at any time horizon defined in a bivariate VAR system. Therefore, the choice of a bivariate VAR model is not only relevant for analyzing the direct causality between both variables but is also robust for the analysis of this causality over the long run.

The panel VAR model for Granger causality in this article is specified by the following system equations:

$$LGDP_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} LGDP_{i,t-k} + \sum_{k=1}^{K} \beta_i^{(k)} FDI_{i,t-k} + \epsilon_{1i,t} \quad (3)$$

$$FDI_{i,t} = \alpha_i + \sum_{k=1}^{K} \gamma_i^{(k)} FDI_{i,t-k} + \sum_{k=1}^{K} \beta_i^{(k)} LGDP_{i,t-k} + \epsilon_{2i,t} \quad (4)$$

Where *LGDP* and *FDI* represent respectively the log of real GDP per capita and FDI inflows observed for country N in T periods.

Coefficients α_i, $\gamma i^{(k)}$, and $\beta_i^{(k)}$ are country-fixed parameters, autoregressive parameters, and regression coefficients respectively. As for panel unit root and cointegration cases, panel Granger causality tests differ depending on the assumption made on the heterogeneity of coefficients across individuals. Two main panel Granger causality tests are considered here namely: (i) the panel stacked Granger causality test which assumes that all coefficients are the same across all countries and, (ii) the Dumitrescu and Hurlin (2012)'s test which assumes the opposite case that is, all coefficients are different across all cross-sections. In performing these Granger causality tests, one must ensure that all variables enter into the VAR in their stationary forms and that the optimal lag has been chosen notably via information criteria[3]. The null

3 The main information criteria generally used in the literature are the Akaike information criterion (AIC), the Schwarz information criterion (SIC), and the Hannan-Quin information criterion (HQ). In this study, we use the SIC criterion as a reference for selecting the optimal number of lags since it generally respects the principle of parsimony more than the other criteria.

hypothesis of both panel Granger causality tests is that there is no causality from one variable to another.

5. EMPIRICAL RESULTS

5.1. Panel Unit Root Results

The results of both panel unit root tests are presented in Table 1.

What emerges from the analysis of Table 1 is that real GDP per capita (*LGDP*) is not stationary at level but becomes stationary at the first difference (1% significance level), regardless of whether both constant and trend are taken into account together or not. This implies that real GDP per capita is I(1) that is, integrated of order 1. However, the ratio of FDI to GDP is found to be stationary at level that is, I(0). According to traditional approaches to cointegration (Engle and Granger, 1987, Pedroni, 2004), there is no cointegration between GDP per capita and FDI to GDP ratio as both variables are integrated at different orders. However, Pesaran et al. (1999) develop new techniques allowing to detect cointegration even if variables are integrated at different orders, precisely if some variables are I(0) and others I(1). Consequently, cointegration analysis will be performed by using the panel ARDL modeling approach proposed by Pesaran et al. (1999) with PMG estimator.

5.2. Panel Cointegration Results

Table 2 presents the results of the panel ARDL cointegration tests.

Recall that cointegration is accepted if and only if the error correction coefficient φ_i is found to be negative and statistically significant. Otherwise, we conclude that there is no cointegration between both variables. As we can observe from Table 2 (regarding signs and P-values of the error correction coefficients), cointegration tests reveal no cointegration between real GDP per capita and FDI inflows that is, there is no long-run association between both variables in the WAEMU region. This result leads to another conclusion: since there is no long-run relationship between both variables, there is no long-run causality between both variables as well. This implies that if there is a causal association between GDP per capita and FDI inflows in WAEMU countries, this causality can only be a short-run causality[4].

5.3. Panel Granger Causality Results

Table 3 presents the results of short-run panel VAR Granger causality tests. The homogeneous coefficients panel causality (stacked Granger causality) is first presented before presenting the heterogeneous coefficients panel causality test of Dumitrescu and Hurlin (2012). As we noted earlier, we must ensure that all variables of interest enter the VAR in their stationary forms. Hence, we consider real GDP per capita in its first difference form before performing panel Granger causality tests as only this variable is I(1). Since GDP per capita was initially converted into logarithmic form, its first difference expresses the economic growth rate.

Results from Table 3 reveal that for both panel Granger causality tests, there is no short-run causal relationship in any direction between economic growth and FDI inflows in the WAEMU countries[5].

6. ROBUSTNESS CHECKS: THE TODA AND YAMAMOTO CAUSALITY TEST

The drawback of the previously used panel causality methods is that they fundamentally depend on unit root and cointegration tests. As noted before, variables must be stationary before integrating them into the VAR model. Consequently, possible wrong conclusions about the integration order of the variables can lead to spurious causality results (Konya, 2004). Moreover, if both variables are truly cointegrated, standard Granger causality tests would no longer be valid (Engle and Granger, 1987). To overcome these issues, Toda and Yamamoto (1995) have developed a new method for Granger causality based on an augmented VAR system with a Modified Wald test (MWald).

The main and powerful advantage of the Toda and Yamamoto procedure is that it ensures the validity of Granger causality regardless of the integration order of the variables and the nature of cointegration between them. Following M'baye (2022), if the results from Toda and Yamamoto (1995) procedure confirm our previous causality results, our findings would be robust[6].

To reinforce our conclusions, we present the Toda and Yamamoto causality test not only for the whole panel but also for each WAEMU country. Table 4 presents the obtained results. It can be observed from Table 4 (regarding p-values) that our previous results are confirmed. Consequently, we conclude that there is neither a short-run nor long-run causal relationship between FDI inflows and economic growth in the WAEMU region.

4 Indeed, cointegration implies long-run causality at least in one direction (Engle and Granger, 1987). However, even in the absence of cointegration, short-run causality may exist. Putting it differently, cointegration implies causality but causality does not necessarily imply cointegration.

5 We find that the VAR(2) is optimal for this analysis.

6 We also perform this test after controlling for no serial correlation in the residuals and stability conditions of the VAR.

Table 1: Panel unit root tests[a]

Variables	With constant only		With constant and trend	
	LLC test	IPS test	LLC test	IPS test
LGDP	−0.651 (0.257)	2.448 (0.993)	0.083 (0.533)	−0.229 (0.409)
Δ (LGDP)	−7.81*** (0.000)	−10.81*** (0.000)	−5.15*** (0.000)	−8.61*** (0.000)
FDI	−3.96*** (0.000)	−4.44*** (0.000)	−3.52*** (0.000)	−4.77*** (0.000)
Δ (FDI)	−14.09*** (0.000)	−15.54*** (0.000)	−12.11*** (0.000)	−13.36*** (0.000)

Source: Author calculations. [a]Numbers without parentheses represent statistics for unit root tests, and numbers in parentheses represent their corresponding P values, ***A level of statistical significance at the 1% level, and Δ stands for the variables in the first differences. LLC: Levin, Lin, and Chu, IPS: Im, Pesaran, and Shin, LLC: Levin, Lin, and Chu, IPS: Im, Pesaran, and Shin

7. ANALYSIS OF RESULTS AND DISCUSSION

The analysis stressed above put forward an important conclusion. FDI inflows do not significantly contribute to economic growth and at the same time, higher economic growth is not a significant factor attracting foreign capital in the WAEMU region. Our findings are consistent with the second stream of the empirical literature (Carkovic and Levine, 2005; Hervé, 2016; and Carbonell and Werner, 2018). They are particularly in line with those of Hervé (2016) as he also focuses on the WAEMU region. However, we depart from his work in three key aspects: (i) we include all WAEMU countries in our analysis, (ii) perform also a reverse causality analysis, and (iii) provide a deeper analysis of the reasons behind our results[7].

Turning to our results, they suggest that almost three decades of development policies have not been enough to impulse the role of FDI inflows in enhancing economic growth in the WAEMU countries and vice-versa. This alarming situation calls for a serious rethinking of FDI attractiveness policies in the WAEMU region. However, efficient FDI policies cannot be implemented without a deeper understanding of why FDI inflows do not significantly contribute to economic growth in the WAEMU region. In metaphorical words, one should first understand the real causes of the disease before providing adequate care.

We argue that our surprising results can be explained by two main reasons: (i) the weakness of the so-called absorptive capacity factors, and (ii) the "*FDI sector-oriented puzzle*" observed in these countries. Unfortunately, both reasons are fundamental structural issues in the case of WAEMU.

Concerning absorptive capacity factors, literature shows that the importance of these factors including human capital, infrastructures, institutional quality, and business environment amplifies the FDI effects on economic growth as stated above (Borensztein et al., 1998; Asiedu, 2006; Azam and Ahmad, 2013; Adegboye et al., 2020). However, evidence shows that there exists a structural weakness of these factors in the WAEMU region. For instance, in terms of human capital, the UNDP Education Index[8] ranks WAEMU countries among the bottom countries in terms of education level.

Table 5 presents and compares the Education Index of WAEMU countries relative to the USA and South Africa, two of the most advanced countries in terms of education level respectively

7 Indeed, Hervé (2016) includes just 4 out of 8 countries in his analysis while we include all the 8 countries of WAEMU in ours. Moreover, Hervé (2016) does not provide a reverse causality analysis nor does he provide deeper explanations of his results.

8 This Index goes from 0 to 1. The higher the Index, the higher the country's performance in terms of Education.

Table 2: Panel auto-regressive distributed lag cointegration tests

Error correction coefficient	FDI→LGDP	LGDP→FDI
φ_i	−0.071	0.321***
P	0.1516	0.000

Source: Author calculations

Table 3: Panel Granger causality tests

Stacked Granger causality (common coefficients)				
Null hypothesis	***F*-statistic**	**P**	**Conclusion**	
FDI does not Granger cause Δ (LGDP)	0.7216	0.4874	No causality	
Δ (LGDP) does not Granger cause FDI	0.0586	0.9431	No causality	
Dumitrescu and Hurlin Granger causality (individual coefficients)				
Null hypothesis	**Wald-statistic**	**Zbar-statistic**	**P**	**Conclusion**
FDI does not homogeneously Granger cause Δ (LGDP)	3.4174	1.2556	0.2092	No causality across all countries simultaneously
Δ (LGDP) does not homogeneously Granger cause FDI	2.3211	0.0594	0.9526	No causality across all countries simultaneously

Source: Author calculations

Table 4: Toda and Yamamoto Granger causality test

Countries	Maximum order of integration (dmax)	Optimal lag length of the VAR (K)	VAR (K+dmax) Granger causality/ MWald test		VAR (K+dmax) Granger causality/ MWald test	
			LGDP→FDI (χ^2)	LGDP→FDI (*P*)	FDI→LGDP (χ^2)	FDI→LGDP (*P*)
WAEMU panel	1	VAR (3)	0.0881	0.9932	1.1623	0.7621
Benin	1	VAR (1)	1.0937	0.2957	1.4227	0.2330
Burkina-Faso	1	VAR (1)	0.2339	0.6286	0.3694	0.5433
Côte d'Ivoire	1	VAR (2)	0.6409	0.7258	3.7208	0.1556
Mali	1	VAR (2)	0.3577	0.8362	3.8743	0.1441
Niger	1	VAR (2)	1.9476	0.3776	1.1724	0.5564
Guinea-Bissau	1	VAR (1)	0.0003	0.9953	0.7055	0.4010
Senegal	1	VAR (1)	2.6149	0.1059	0.1948	0.6590
Togo	2	VAR (1)	0.1920	0.6612	0.4898	0.4840

Source: Author calculations. VAR: Vector autoregressive, WAEMU: West African Economic and Monetary Union

Table 5: UNDP education index (based on mean years of schooling and expected years of schooling)

Countries	1995	2000	2005	2010	2015
USA	0.861	0.850	0.867	0.887	0.890
South Africa	0.637	0.655	0.659	0.685	0.695
WAEMU	0,218	0,256	0,289	0,335	0,345

Source: Author calculations based on the UNDP Education index database. WAEMU: West African Economic and Monetary Union

among developed and African countries during the period 1995-2015.

It emerges from Table 5 that Education Index in the WAEMU countries is structurally very low with a score of 0.29 on average over the period 1995-2015. Over the same period, the average scores of the USA and South Africa were about 0.87 and 0.67 respectively.

Moreover, WAEMU countries are lagging far behind in terms of infrastructure. Table 6 presents the WAEMU Africa Infrastructure Development Index (AIDI)[9] for the period 2016-2018.

As we can observe from Table 6, WAEMU countries have a very low level of infrastructure Index with an average score of 15.7 over the period 2016-2018. This score is significantly below the average of all African countries (27.77), and even far below the average for North Africa (72.07) which has the highest infrastructure Index in Africa.

In terms of institutional quality, the Transparency International 2019 report shows that the majority of WAEMU countries are among the bottom countries in the world in improving their institutional quality. Table 7 presents the WAEMU corruption perception Index[10] compared to New Zealand (highest score in the World), and South Africa (one of the highest scores in Africa) over the period 2000-2015.

Table 7 shows that the corruption perception Index of WAEMU countries is structurally low and far from New Zealand and South Africa scores over the period 2000-2015. Finally, in terms of the business environment, African countries and especially WAEMU countries are improving very slowly their business climate. According to the World Bank's Doing Business 2020 report, the average score in the WAEMU region is 54.8 (on a scale of 100), far below the average of OECD countries (78.4) as well as the world average (63).

The second main explanation of our results is the FDI sector-oriented puzzle observed in the WAEMU countries. Sectors attracting the most FDI inflows are the ones that contribute the least to economic growth and create the fewest jobs. Conversely, sectors contributing the most to economic growth are those that attract the least foreign capital in these countries.

Table 6: Africa infrastructure development index

Regions	2016	2017	2018
Africa	27,12	27,75	28,44
North Africa	71,63	71,62	72,96
WAEMU	15,26	15,69	16,15

Source: Author calculations based on the AIDI index database. AIDI: Africa Infrastructure Development Index, WAEMU: West African Economic and Monetary Union

Table 7: Corruption perception index of transarency international (maximum score=100)

Countries	2000	2005	2010	2015
New zealand	94	96	93	91
South Africa	50	45	45	44
WAEMU	30,6	27,8	26	33,6

Source: Author calculations based on the Transparency International database. WAEMU: West African Economic and Monetary Union

To better understand this FDI puzzle, let us take a look at Table 8 which presents the relative contributions of the different sectors to Gross Value added over the period 1995-2018.

It emerges from Table 8 that the agricultural sector (including its sub-components), manufacturing, and commerce (wholesale, retail trade, and hotels) are in this order and structurally, the biggest contributors to wealth creation and economic growth in the WAEMU region over the period 1995-2018. Over the same long period, the mining, transport, and telecommunications sectors are among the sectors that contribute the least to economic growth. Based on this reality, we should observe a concentration of investment and in particular FDI inflows in the sectors which contribute the most to growth and employment. Unfortunately, we observe the opposite in the case of WAEMU countries. FDI inflows are mainly directed to the mining as well as transport and telecommunications sectors, but concern to a lesser extent agricultural, manufacturing, and commerce sectors.

For instance, BCEAO (2013) shows that over the period 2007-2011, FDI inflows to the mining sector represent almost 50% of total flows, followed by the transport and telecommunications sector representing 14,8% of total flows. On the other hand, manufacturing, commerce, and agricultural sectors attracted less FDI, with respectively 11.9%, 7.1%, and <2% of total flows. The puzzle is more pronounced for the agricultural sector. Indeed, it is the biggest contributor to growth and employment in the WAEMU region, and at the same time, it is the sector that attracts the least FDI inflows. However, as stated above, subsistence agriculture largely dominates export agriculture in these countries, which does not allow to attract FDI inflows from multinational firms as their strategies are mainly driven by international commercial logic. Therefore, developing export agriculture could better attract FDI in these countries. Another issue is the weak synergy between the agricultural and industrial sectors for the transformation of raw materials. As stated above, the few export products are based on raw materials in these countries which do not allow to have sufficient export earnings and reduce poverty. Moreover, raw materials exports make them exposed to terms of trade shocks. Developing manufacturing and especially Agribusiness will allow increasing

9 The AIDI includes 4 components namely : (i) electricity, (ii) transport, (iii) ICT, and (iv) water and sanitation. The maximum score is 100 and the higher the score, the higher the country's infrastructure development performance.

10 The maximum score of this index is 100. The higher the score, the higher the country's performance in terms of fighting corruption.

Table 8: Contribution of different sectors to gross value added in the west African economic and monetary union region (% of GDP)

Sectors	1995	2000	2005	2010	2015	2018
Agriculture, hunting, forestry, fishing	27,51	26,16	26,66	27,06	26,58	26,45
Industry (mining and utilities)	3,05	2.52	3,54	5,83	6,17	6,47
Industry (manufacturing)	17,70	18,98	16.47	14,50	14,58	13,23
Industry (construction)	2,99	3,65	3,92	3,83	4,39	4,79
Services (wholesale, retail trade, restaurants, and hotels)	17,84	16,93	14,45	14,02	13,62	13,77
Services (transport, storage, and telecommunications)	5,20	5,62	7,12	7,47	7,68	7,37
Services (other activities)	25,71	26,14	27,85	27,28	26,97	27,93

Source: Author calculations based on the UNCTAD database. UNCTAD: United Nations Conference on Trade and Development

value added of products (before their export), labor productivity, and export earnings in these countries.

8. POLICY RECOMMENDATIONS

Based on our results and in light of the above discussion, we argue that the two main issues (weakness of absorptive capacity factors and FDI sector-oriented puzzle) explaining the Null effects of FDI on growth in the WAEMU countries must be addressed simultaneously to generate a real growth impact of FDI inflows. Focusing on one issue without actively addressing the other would not be efficient for inclusive and sustainable growth in these countries. We propose the following policy recommendations for the attractiveness and effectiveness of FDI inflows in the WAEMU region.

- Accelerating the improvement of absorptive capacity factors (human capital, infrastructures, quality of institutions, business environment) to attract more FDI inflows, and to improve their impact on economic growth in the region.
- Promoting and developing export agriculture to attract FDI in the agricultural sector. As this sector is the biggest contributor to growth and employment, WAEMU countries must develop policies aimed at developing export agriculture for instance by exploiting their strong potential of unexploited arable lands. The use of unexploited lands will not only allow to increase the food production necessary to face food crises, but also and mainly to increase export agriculture which is of greater interest to multinational firms, and which will create more jobs, especially in rural areas. Moreover, attracted FDI inflows will increase agricultural productivity by introducing new technologies in the production process. Because of the scarcity of financial resources, public-private partnerships (PPP) can be an ideal financial alternative to achieve such export agriculture development policies.
- Developing synergy between agricultural and manufacturing sectors and attracting FDI inflows toward this synergy for the structural transformation of WAEMU economies. This synergy appears to be the heart of the WAEMU countries' development process. Indeed, this agricultural-industrial connection (mainly based on Agribusiness) will allow for an increase in the value-added of products (before their export) and hence, to take better advantage of international trade. Moreover, this industrialization process will allow transferring labor from less productive activities to more productive ones, thus increasing living standards and facilitating poverty reduction in these countries.

9. CONCLUSION

In this article, we empirically explore the causal relationship between FDI inflows and economic growth in the West African Economic and Monetary Union (WAEMU) countries. Using panel econometric techniques, we interestingly find no evidence (neither in the short run nor in the long run) of a causal relationship between FDI inflows and economic growth in the WAEMU region. This surprising result (at least in the long run) can be explained by the weakness of absorptive capacity factors as pointed out by the literature as well as the structural FDI sector-oriented puzzle observed in these countries. Sectors attracting the most FDI inflows are the ones that contribute the least to economic growth and create the fewest jobs. Conversely, sectors contributing the most to economic growth are those which attract the least foreign capital. This alarming situation calls for a rethinking of FDI attractiveness policies in favor of more efficient and inclusive economic growth.

We argue that the two main issues (weakness of absorptive capacity factors and FDI sector-oriented puzzle) explaining the Null effects of FDI on growth in the WAEMU countries must be addressed simultaneously to generate a real growth impact of FDI inflows. Focusing on one issue without actively addressing the other would not be efficient for inclusive and sustainable growth in these countries. Consequently, WAEMU countries must not only actively improve the absorption factors but also develop policies aimed at promoting export agriculture and increasing synergy between the agricultural and industrial sectors to attract more FDI inflows toward the structural transformation of these economies.

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