



Determinants of the Attractiveness of Foreign Direct Investments in CEMAC: An Empirical Panel Analysis Over the Period From 1985 to 2019

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ARTICLE DETAILS	ABSTRACT
<p>History: Accepted 30 July 2022 Available Online September 2022</p>	<p><i>This This article aims to determine the factors that explain the attractiveness of foreign direct investment (FDI) at the level of the six countries of the Economic and Monetary Community of Central Africa (CEMAC), over the period 1985-2019. Using the fixed effects panel model, the results of this research indicate that gross domestic product per capita, human capital, domestic credit provided to the private sector by banks and gross national expenditure explain the attractiveness of FDI. Moreover, by using the ordinary least squares (OLS) model to analyze the determinants of the attractiveness of FDI by country, the econometric results show differentiated effects.</i></p>
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1. Introduction

Since the acceleration of the globalization process in the 1980s, the question of the determinants of the attractiveness of foreign direct investment (FDI) has become a favorite subject of many economic studies (Sumata & Zumbu, 2020 ; Moussavou, 2021). Thus, according to Lall (2000) and Sumata and Zumbu (2020), this concern is justified by the participation of FDI in global industrial restructuring, the rise of emerging and developing countries and in the wealth gap between countries.

At the global level, the work of the United Nations Conference on Trade and Development (UNCTAD, 2018 ; 2020) on the determinants of the attractiveness of FDI revealed, for example, that over the period from 1990 to 1994 the global FDI flows were 202 billion US dollars. From 1995 to 2012, they rose to 331 billion US dollars, then to 1450 billion US dollars between 2013 and 2016. From 2017 to 2018, these flows will fall by 23% to settle at 1430 billion US dollars. On the other hand, in 2019, they will go up to 1540 billion US dollars.

In developing countries, the problem of the attractiveness of FDI arises with acknowledgment.

According to Navaretti and Venables (2006), Herzer and al. (2008) as well as Ekodo and al., (2020), in these countries, FDI constitutes an important source of external financial transfers which contribute to increasing the productive capacity of their economy. To achieve their socioeconomic development goals, less developed countries resort to certain modes of external financing such as official development assistance and external borrowing (Guiswe & Abessolo, 2017).

According to UNCTAD studies (2018; 2020), in these countries, the share of FDI in total flows is unevenly distributed. For example, over the period from 2002 to 2019, this share was 54% between 2002 and 2012. Between 2013 and 2016, it represented 60% and, from 2017 to 2019, 74%. These inequalities can be explained by low oil prices, the recession in raw materials and good governance.

In the countries of the Economic and Monetary Community of Central Africa (CEMAC), research by Ekodo and al. (2020) addressed the issue of FDI attractiveness factors. Their results showed that the economic and monetary authorities of CEMAC (Cameroon, Congo, Gabon, Equatorial Guinea, Central African Republic and Chad) have put in place investment codes attractive to FDI as well as industrial free zones to attract FDI. This resulted in an increase in the flow of inward FDI. Thus, during the period from 2006 to 2018, Cameroonian FDI flows ranged from 59 to 765.1 million US dollars. In Congo-Brazzaville, they represented 1487.6 and 4113.1 million US dollars. In Gabon, FDI flows ranged from 267.8 to 845.7 million US dollars. In Equatorial Guinea, from 469.5 to 395, US\$ 8 million. In the Central African Republic, from 34 to 17.94 million US dollars. In contrast, in Chad, these flows were negative, ranging from US\$278.4 to US\$662.2 million (Ekodo and al., 2020).

Within CEMAC, empirical research on this issue is numerous and diverse. To our knowledge, the existing works come from, among others, Djaowe (2009), Guiswe and Abessolo (2017), Kouam and Nafé (2019) and Ekodo and al. (2020). These authors analyzed these determinants using periods (1993 to 2004; 1985 to 2015; 1987 to 2017; 1996 to 2018) and econometric techniques (generalized method of moments in dynamic panel; panel data with fixed effects). The results of their work turned out to be contradictory.

Therefore, the issue of this article revolves around the following central question : what are the determinants of the attractiveness of FDI within CEMAC? In other words, the variables (gross domestic product per capita, trade openness, inflation rate, global civil liberty index, degree of fight against corruption, investment rate, human capital, domestic credit provided to the private sector by banks and national expenditure) have they influenced the attractiveness of FDI ?

To address this concern, we develop, after reviewing the literature on the determinants of FDI attractiveness, an empirical analysis based on the fixed effects model (for all CEMAC countries) and the Ordinary least squares (for each country) over the period from 1985 to 2019, in order to determine the factors that explain the attractiveness of FDI in CEMAC, before suggesting some economic policies.

Our article is organized as follows : section 2 presents a review of the literature ; section 3 deals with the methodology adopted; section 4 presents and discusses the results, while section 5 serves as a conclusion and policy implications.

2. Literature review

2.1. Theoretical review

The literature on the determinants of the attractiveness of foreign direct investment is inspired by authors such as Hymer (1960). His work, according to which FDIs fit into firms where foreign

transformation industries protect firms against competition, found an echo in the research of firm theorists (Kindleberger, 1969 ; Gray, 1972 ; Horst, 1972), the “eclectic” approach (Dunning, 1981) and those of international trade (Brainard, 1993 ; Markusen, 1995). For the firm's theoreticians, notably Kindleberger (1969), the attractiveness of FDI is based on two premises. The first suggests that the firm which invests abroad must earn more than at home, if it wants to cover the risk and the cost of an operation in a legal political environment. In contrast, the second affirms that for a company to invest in a foreign country, it must have an advantage over the nature of the firms. This supposes that the firm must have an “advantage” that it can transport from one country to another and that local companies cannot acquire. According to Gray (1972), the attractiveness of FDI is explained by the “distinctive character” of the foreign manufacturer. In other words, it is a matter of giving the foreign manufacturer the possibility of making additional profits by selling his product abroad. Horst (1972) asserts that exports and production subsidiaries represent alternative means by which firms exploit their technological advantages over their foreign competitors. It must have an advantage over the nature of firms. This suppose that the firm must have an “advantage” that it can transport from one country to another and that local companies cannot acquire. According to Gray (1972), the attractiveness of FDI is explained by the “distinctive character” of the foreign manufacturer. In other words, it is a matter of giving the foreign manufacturer the possibility of making additional profits by selling his product abroad. Horst (1972) asserts that exports and production subsidiaries represent alternative means by which firms exploit their technological advantages over their foreign competitors.

With regard to the “Eclectic” approach, Dunning (1981) suggests that firms must make a choice between three methods of penetrating the foreign market: FDI, licenses and exports. These methods thus translate into three types of advantages that a firm must possess in order to internationalize. These advantages are formalized under the term OLI (Ownership, Location, Internalization) paradigm. The first advantage, termed the Ownership advantage (O) or property-specific advantage, involves physical capital, technology patents and personnel management strategies. The second, called Location advantage (L), or location advantage, assumes that the characteristics of a host country make it more or less attractive to FDI. However, the third called Internalization advantage (I), or internalization advantage, allows other firms to avoid any risk related to the sale of technology and not to expose themselves to competition. Thus, for an establishment abroad through FDI to take place, these three advantages (O, L and I) must be combined.

For international trade theorists (Brainard, 1993 ; Markusen, 1995), the emphasis is on imperfect competition, product differentiation, economies of scale and new communication and information technologies. According to these authors, the attractiveness of FDI is justified by the arbitration of multinational firms between proximity and concentration.

This review reveals opposing points of view. On this subject, several empirical studies have been carried out in developed and developing countries.

2.2. Empirical review

Empirical studies dealing with the determinants of the attractiveness of foreign direct investment in developed countries are few and far between. In this context, Dupuch and Milan (2005) have analyzed, for the case of Central and Eastern European Countries (CEEC), the determinants of FDI attractiveness during the period from 1993 to 1998. Using panel data and the Holland and Pain (1998) privatization method, they show that wage cost differentials between these countries do not favor the attractiveness of foreign direct investment. According to them, the wage differential resulting from the EU and candidate countries positively explains FDI. Studying the determinants of FDI attractiveness in

Canada over the period 1990 to 2008, Aoumari (2009) finds that human capital, the degree of trade openness, inflation and the quality of public infrastructure positively explain FDI.

In developing countries, empirical research is extensive. In this dynamic, Obwona (1998) worked on the determinants of the attractiveness of FDI in the countries of the West African Economic and Monetary Union (UEMOA) over the period from 1981 to 1995. The results of this work made it possible to conclude that two macroeconomic factors positively influence the attractiveness of FDI. These are the gross domestic product and the growth rate. In a study conducted in 29 African countries, Morisset (2000) highlights a set of macroeconomic variables that explain the attractiveness of FDI, namely, economic openness, economic growth rate and natural resources.

In another vein, Bassu and Srinivasan (2002) conducted a study on the determinants of the attractiveness of FDI in 7 African countries (Botswana, Lesotho, Mauritius, Mozambique, Namibia, Swaziland, Uganda). They lead to the results that political stability, good governance and low level of corruption favor FDI. By focusing his research on the determinants of FDI in Morocco over the period from 1960 to 2000, Bouoiyour (2003) brought very instructive results, namely, the size of the market, the cost of labor, the level public investment, inflation, human capital and exports have a positive and significant impact on FDI flows. On the other hand, Koukpo (2005), based on the UEMOA countries over the period from 1996 to 2003, asserted that two macroeconomic factors exert positive effects on FDI. These are economic openness and human capital.

In the same vein, the work of the Central Bank of West African States (BCEAO, 2007), which is also part of this research orientation, has focused on the determinants of FDI. The results of his work revealed that the openness of the economy, the rate of investment and human capital are the most significant determinants of FDI flows. With traditional attractiveness factors, Alaya and al. (2008) show that infrastructure, trade liberalization and human capital have a positive influence on FDI inflows. Similarly, in a study conducted in CEMAC over the period 1993-2004, Djaowe (2009) shows that the real GDP growth rate, current account balance, external debt, and political stability positively explain FDI attractiveness.

However, studies that have examined the determinants of FDI attractiveness have multiplied since 2011, in particular Anyanwu (2011), Kamara (2013), Bourri and Benmassoud (2014) and Azeroual (2015). Thus, Anyanwu (2011) conducted an empirical study on the determinants of FDI flows to Africa over the period from 1980 to 2007. The author shows that market size, trade openness, consumer spending of administrations and the endowment of natural resources have a positive and significant impact on FDI. Kamara (2013), in the context of 44 sub-Saharan African countries over the period from 1981 to 2010, shows, from the Generalized Moments Model (GMM), that the factors that positively influence FDI are financial development and institutions; while human capital and infrastructure impact it negatively. Bouri and Benmassoud (2014) dealt with the determinants of the attractiveness of FDI in the MENA region. The results of their study revealed that, in the period from 1980 to 2011, the size of the market, the degree of economic openness, the level of infrastructure, political stability and the development of financial structures positively impact FDI flows. The work of Tirhboula and al. (2017), for the case of 40 developing countries over the period from 2000 to 2015, validated these results. For his part, Azeroual (2015) studied, for the case of Morocco, the main determinants of FDI during the period 1980-2012. He confirms that in the long run, human capital, the real exchange rate, gross fixed capital formation, the guaranteed minimum wage, and infrastructure are the main determinants of FDI.

This issue has also been investigated by Lam'hammdi and Makhtari (2018), Pegdwendé (2018), Kouam and Nafé (2019) and Sumata and Zumbu (2020). With this in mind, Lam'hammdi and Makhtari (2018) studied the determinants of the attractiveness of FDI in Morocco based on the ARDL model over the period from 1980 to 2017. They show that in the long term, gross capital formation Fixed income and human capital have a positive impact on FDI. On the other hand, in the short term, trade openness and infrastructure have an insignificant impact on FDI.

Similarly, Pegdwendé (2018) worked on the link between FDI, governance and economic growth in China and in 45 sub-Saharan African countries over the period from 2004 to 2010. He used the "Within" method and shows that the effects of FDI on these variables depend on their interaction with the control of corruption. Ekodo and al. (2020), from the relationship between FDI, corruption and economic growth in CEMAC, during the period of 1996-2018, highlighted a lack of relationship between these variables.

For their part, Kouam and Nafé (2019), in their work devoted to the determinants of the attractiveness of foreign direct investment in the CEMAC zone over the period from 1987 to 2017, find from the fixed effects panel model that the financial development index, urbanization rate, natural resources, public debt ratio, population growth rate, economy growth rate, public investment rate and degree of trade openness have positive and significant effects on FDI. While the rate of corruption, the democratic system, private investment, the level of inflation, the unemployment rate and the effective exchange rate exert harmful effects on FDI.

Furthermore, in a study published in 2020, Sumata and Zumbu conducted an investigation into the determinants of FDI and their impact on economic performance in the Democratic Republic of Congo (DRC). Their results revealed that the quality of institutions, economic openness, domestic investment and macroeconomic instability are determinants of FDI.

Recent literature on the determinants of FDI attractiveness insists on the role of governance indicators. Thus, by examining the role of governance indicators as a determinant of FDI in a sample of 44 African countries over the period 1985-2015, Mohamed and Aichi (2021) arrived at the following results : openness to trade, the exchange rate, the rule of law, the functioning of the state and the balance of current payments have positive and significant effects on FDI flows. On the other hand, market size, infrastructure, the fight against corruption, the quality of regulation and political stability negatively affect FDI in Africa.

In view of the above, it is interesting to highlight the determining factors of the attractiveness of FDI in the CEMAC, through an appropriate methodology.

3. Research Methodology

3.1 Model Specification

In order to examine the determinants of FDI attractiveness, the methodology is based on the work of Guiswe and Abessolo (2017), Kouam and Nafé (2019), Ekodo and al. (2020), Sumata and Zumbu (2020) and Mohamed and Aichi (2021). These authors used, among others, the methods of ordinary least squares (OLS), Dynamic Ordinary Least Squares (DOLS) and generalized moments (GMG).

Within the framework of the Economic and Monetary Community of Central Africa, we are inspired by the empirical work of Guiswe and Abessolo (2017) on the determinants of the attractiveness

of CEMAC countries with regard to FDI. These authors used the following model:

$$\frac{IDE}{PIB} = \gamma_0 + \alpha AGLOM_{i,t} + \beta_1 CRECO_{i,t} + \beta_2 COMM_{i,t} + \beta_3 PIBH_{i,t} + \beta_4 TINF_{i,t} + \beta_5 CHANGE_{i,t} + \partial_1 LIPOL_{i,t} + \partial_2 LICIV_{i,t} + \partial_3 TURB_{i,t} + \partial_4 INFR_{i,t} + \varepsilon_{i,t} \quad (1)$$

In this specification, Guiswe and Abessolo (2017) retain the ratio (FDI/GDP) as the explained variable. And, as explanatory variables, agglomeration (AGLOM), credit to the economy (CRECO), trade openness (COMM), gross domestic product per capita (GDP), inflation rate (TINF), real exchange rate (CHANGE), global index of political rights (LIPOL), global index of civil liberties (LICIV), the rate of urbanization (TURB) and the stock of infrastructure (INFR). The variable γ_0 , represents the constant. The variables α and β range from 1 to 5. Those of ∂_i , from 1 to 4. On the other hand, the variables ε_i and t indicate the error term.

The choice of this model, in CEMAC, is dictated by practical considerations and common characteristics (coastal, Sahelian, monetary). But also, by the fact that this model has already been used in this area. As such, it seems to better explain the determinants of the attractiveness of FDI.

Unlike the model of Guiswe and Abessolo (2017), the econometric model is built by admitting that the determinants of the attractiveness of FDI can be explained by the combination of 9 variables: gross domestic product per capita, trade openness, inflation rate, overall civil liberty index, degree of fight against corruption, investment rate, human capital, domestic credit provided to the private sector by banks and gross national expenditure.

These data were retained because of their theoretical and empirical role on the determinants of FDI. Thus, the explained variable is the flow of inward FDI as an annual percentage of GDP (FDI/GDP). This variable designates the export of capital to another country in order to acquire, create a business or take a stake there.

The explanatory variables are : gross domestic product per capita (GDP). It is considered an indicator of economic performance. When this indicator increases, the material resources of the inhabitants increase. This variable is supposed to have a positive influence on FDI (Obwona, 1998 ; Brahim & Rachdi, 2014 ; Zghidi, Sghaier & Abida, 2016). Trade openness (OUV) measures the place held by the rest of the world in a country's economy. A positive relationship is expected between trade openness and FDI (Morisset, 2000 ; Koukpo, 2005 ; BCEAO, 2007 ; Aoumari, 2009 ; Anyanwu, 2011 ; Bouri & Benmassoud, 2014 ; Tirhboula and al., 2017 ; Kouam & Nafé, 2019 ; Sumata & Zumbu, 2020; Mohamed & Aichi, 2021). The inflation rate (TINF) illustrates the phenomenon of a general rise in prices. A positive relationship (Bouoiyour, 2003 ; Aoumari, 2009) is expected between inflation and FDI. The Global Civil Liberty Index (GLCI) variable varies between 1 and 7. The number 1 indicates civil liberty and the number 7 corresponds to repression. The lowest scores (1 and 2) are assigned to countries respecting freedom of expression. The highest scores (6 and 7) correspond to states offering few freedoms to their citizens. The positive sign is expected between IGLC and FDI (Bassu & Srinivasan, 2002 ; Mohamed & Aichi, 2021). The degree of fight against corruption (DLFC) implies the intervention of the State to increase transparency and promote public participation in decision-making processes. This variable is supposed to have a positive influence on FDI (Bassu & Srinivasan, 2002). The investment rate (TINV) reflects the immediate expenditure incurred by States, companies or individuals with the aim of improving their productivity. A positive sign is expected between the investment rate and FDI (Bouoiyour, 2003; BCEAO, 2007; Azeroual, 2015; Lam'hammdi & Makhtari, 2018; Kouam & Nafé, 2019; Sumata & Zumbu, 2020). Human capital (KH) relates to all the knowledge, skills,

experiences, talents and qualities accumulated by a person. A positive sign is expected between human capital and FDI (Bouoiyour, 2003; Koukpo, 2005; BCEAO, 2007; Alaya and al., 2008; Aoumari, 2009; Azeroual, 2015; Lam'hammdi & Makhtari, 2018). The variable "domestic credit provided to the private sector by banks (CIFSPB)" refers to the financial resources provided to households and businesses by financial institutions in the form of loans, purchases of securities other than capital and claims. A positive sign is expected between this variable and FDI (Barro & Sala-i-Martin, 2004; Keza, 2011). Gross National Expenditure (GNE) refers to household and government final consumption expenditure. The positive sign is expected between this aggregate and FDI (Anyanwu, 2011). A positive sign is expected between this variable and FDI (Barro & Sala-i-Martin, 2004; Keza, 2011). Gross National Expenditure (GNE) refers to household and government final consumption expenditure. The positive sign is expected between this aggregate and FDI (Anyanwu, 2011).

Assuming the model is linear, the empirical model to be estimated is a multiple regression model with the following baseline specification:

$$\frac{IDE}{PIB} = \alpha_0 + \alpha_1 \ln PIBH_{i,t} + \alpha_2 \ln OUV_{i,t} + \alpha_3 \ln TINF_{i,t} + \alpha_4 \ln IGLC_{i,t} + \alpha_5 \ln DLFC_{i,t} + \alpha_6 \ln TINV_{i,t} + \alpha_7 \ln KH_{i,t} + \alpha_8 \ln CIFSPB_{i,t} + \alpha_9 \ln DNB_{i,t} + u_i + r_t + \varepsilon_{i,t} \quad (2)$$

3.2 Data

The statistics used in this study are taken from the World Bank's World Development Indicator (WDI) database for gross domestic product per capita, trade openness, inflation rate and investment rate. Those relating to the overall index of civil liberty, the degree of the fight against corruption, human capital, domestic credit provided to the private sector by banks and gross national expenditure are taken from the World Perspective. These annual data cover the period from 1985 to 2019. Table 1 presents the descriptive statistics of the variables used in the model.

Table 1: Descriptive statistics

	FDI_GDP	LNPIBH	LNEW	TINF	LNIGLC	LNDLF	LNTINV	LNKH	LNCIFSPB	NBDL
Mean	6.022	13.484	-5.551	30.358	1.687	2.924	-5.985	3.217	2.127	4,500
Median	1.918	13.265	-5.332	5.572	1.791	2.995	-5.716	3.256	2.128	4.597
Maximum	161.823	15.934	-3.532	151.785	1.945	3.912	-3.588	4.217	3.643	5.303
Minimum	-8.703	11,848	-15.242	-17.64	1.098	2.302	-8.089	1.731	0.698	3.916
Std. Dev.	15.911	1.155	1.217	41.891	0.196	0.540	1.025	0.649	0.639	0.246
Skewness	6.074	0.417	-2.570	1.109	-0.570	0.179	-0.262	-0.434	-0.007	-0.544
Kurtosis	51.109	1.961	20.421	2.970	2.741	1.834	2.050	2.136	2.518	2.829
Jarque Bera	21441.24	15.468	2873.194	42.922	11,913	12,960	10.261	13.071	2.020	10.593
Likelihood	0.000	0.000	0.000	0.000	0.002	0.001	0.005	0.001	0.364	0.005
Sum	1258.783	2818.275	-1160.	6344.000	352.720	611.208	-1250.	672.373	444,000	940.506
Sum Sq. Dev	52661.860	277.657	308.505	365102.500	7.992	60.791	218.775	87.683	85.012	12.595
Observation	209	209	209	209	209	209	209	209	209	209

Source: Author based on data from the World Bank (WB, 2020) and World Perspectives (PM, 2020).

It can be seen from table 1 that the highest level of FDI in CEMAC is 161,823, while the minimum is -8,703. This result shows that there is a strong disparity between the different countries.

The Jarque-Bera test (21441.24) shows that the associated probability statistics are less than 5%. The result thus reveals that the variables retained in this research do not follow a normal distribution.

4. Estimate, results and discussions

4.1. Model estimation and results

To avoid spurious regression problems, we used two types of unit root tests : the stationarity tests of Levin, Lin and Chu (LLC, 2002) and Im, Pesaran and Shin (IPS, 2003), for the all CEMAC countries and the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) stationarity tests for the CEMAC countries, taken individually. The results of the unit root tests of LLC (2002) and IPS (2003) are given in table 2 and those by country, in table 3.

Table 2: Results of LLC (2002) and IPS (2003) stationarity tests on CEMAC

Variables		In level						In first difference					
		IPS	Prob	Decide.	LLC	Prob	Decide.	IPS	Prob	Dec	LLC	Prob	Decide.
FDI/GDP	Inter	-1.531	0.062	Acc. Ho	-0.796	0.212	Acc. Ho	-8.187	0.000	Rej. Ho	-4.576	0.000	Rej. Ho
	Trend	-2.096	0.018	Rej. Ho	0.307	0.620	Acc. Ho	-6.453	0.000	Rej. Ho	-3.096	0.001	Rej. Ho
LNPIBH	Inter	-0.953	0.170	Acc. Ho	-1.809	0.035	Rej. Ho	-5.870	0.000	Rej. Ho	-3.669	0.000	Rej. Ho
	Trend	-0.408	0.341	Acc. Ho	-2.329	0.009	Rej. Ho	-4.767	0.000	Rej. Ho	-3.170	0.000	Rej. Ho
LNEW	Inter	-3.003	0.001	Rej. Ho	-1.669	0.047	Rej. Ho	-11.137	0.000	Rej. Ho	-9.043	0.000	Rej. Ho
	Trend	-1.737	0.041	Rej. Ho	-1.264	0.103	Acc. Ho	-9.778	0.000	Rej. Ho	-7.212	0.000	Rej. Ho
TINF	Inter	-0.562	0.287	Acc. Ho	-0.486	0.313	Acc. Ho	-8.334	0.000	Rej. Ho	-5.653	0.000	Rej. Ho
	Trend	-1.052	0.146	Acc. Ho	-0.878	0.189	Acc. Ho	-6.749	0.000	Rej. Ho	-4.394	0.000	Rej. Ho
LNIGLC	Inter	-1.848	0.032	Rej. Ho	-1.243	0.106	Acc. Ho	-7.677	0.000	Rej. Ho	-8.231	0.000	Rej. Ho
	Trend	-0.605	0.272	Acc. Ho	-2.112	0.017	Rej. Ho	-6.841	0.000	Rej. Ho	-7.629	0.000	Rej. Ho
LNDLF	Inter	1.144	0.873	Acc. Ho	-0.081	0.467	Rej. Ho	-7.965	0.000	Rej. Ho	-7.673	0.000	Rej. Ho
	Trend	-0.856	0.195	Acc. Ho	-1.002	0.158	Acc. Ho	-6.428	0.000	Rej. Ho	-6.542	0.000	Rej. Ho
LNTINV	Inter	-1.187	0.117	Acc. Ho	-1.340	0.090	Acc. Ho	-8.982	0.000	Rej. Ho	-6.005	0.000	Rej. Ho
	Trend	-1.110	0.133	Acc. Ho	-2.442	0.007	Rej. Ho	-7.833	0.000	Rej. Ho	-4.289	0.000	Rej. Ho
K.H.	Inter	-1.609	0.053	Acc. Ho	-1.882	0.029	Rej. Ho	-5.722	0.000	Rej. Ho	-4.239	0.000	Rej. Ho
	Trend	0.535	0.703	Acc. Ho	-1.940	0.026	Rej. Ho	-6.216	0.000	Rej. Ho	-4.311	0.000	Rej. Ho
CIFSPB	Inter	0.208	0.582	Acc. Ho	-1.246	0.106	Acc. Ho	-5.599	0.000	Rej. Ho	-5.425	0.000	Rej. Ho
	Trend	1.150	0.875	Acc. Ho	-0.164	0.434	Rej. Ho	-4.765	0.000	Rej. Ho	-5.008	0.000	Rej. Ho
DNB	Inter	-0.777	0.218	Acc. Ho	-1.146	0.125	Acc. Ho	-10.314	0.000	Rej. Ho	-7.394	0.000	Rej. Ho
	Trend	-1.336	0.090	Acc. Ho	-3.073	0.001	Rej. Ho	-9.837	0.000	Rej. Ho	-5.799	0.000	Rej. Ho

Source: Author, based on data from the World Bank (WB, 2020) and World Perspectives (PM, 2020).

Table 3 : Results of the ADF and PP stationarity tests by country

C O U N T R Y	FDI/GDP		LNPIBH		LNEW		TINF		LNIGLC		LNDLF		TINV		K.H.		CIFSPB		NBDL	
	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP	ADF	PP
C A M	-10.75	-7.26	-3.30	-2.75	-9.47	-4.23	-5.29	-30.25	-5.19	-29.33	-3.34	-5.29	-6.39	-6.55	-5.81	-5.81	-4.16	-5.78	-6.25	-8.42
	0.00	0.00	0.02	0.07	0.00	0.01	0.01	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C G B	-7.96	-26.29	-4.43	-4.45	-10.04	-10.27	-5.36	-7.96	-5.63	-4.28	-5.86	-5.91	-6.34	-7.82	-3.83	-3.72	-4.92	-4.60	-6.78	-7.15
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
A T M	-7.75	-9.92	-5.87	-6.22	-9.20	-26.12	-4.59	-11.65	-5.18	-5.15	-5.39	-5.87	-5.81	-5.81	-5.72	-5.72	-6.51	-6.25	0.00	-9.09
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
G E	-7.37	-7.80	-3.06	-3.02	-3.06	-3.02	-6.61	-16.88	-8.25	-9.26	-7.18	-7.20	-4.38	-7.55	-8.74	-4.28	-4.16	-4.01	-6.14	-7.81
	0.00	0.00	0.03	0.04	0.03	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R C A	-7.23	-7.44	-5.89	-6.39	-4.96	-4.96	-3.91	-3.75	-5.57	-5.73	-5.77	-5.78	-6.22	-7.69	-5.44	-5.49	-4.94	-5.02	-7.09	-7.09
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
T C H	-3.58	-5.27	-4.86	-4.87	-6.64	-7.25	-5.52	-6.84	-7.32	-7.34	-6.33	-6.58	-5.03	-5.13	-4.47	-4.46	-4.89	-4.91	-5.31	-10.40
	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

It emerges from the results of table 2 that the probabilities of wrongly rejecting the null hypothesis of unit root on the variables in first differences are less than 5%, for all the variables. While these probabilities are almost higher than 5% when the same tests are implemented in level. This leads us to conclude that all our series are affected by a unit root. In other words, they are stationary in level. The results of the ADF and PP tests carried out by country (table 3) confirm that all the variables of the study are stationary in first difference.

The main results of our research obtained from the fixed effects panel model (for all CEMAC countries) and the ordinary least squares (OLS) model (for each country) on the determinants of the attractiveness of IDE are presented in tables 4 and 5, respectively. In order to test the robustness of our results, we performed the Arrelo-bond, Redundant, Fisher LM (table 6) and Wald (table 7) tests.

Table 4 : Estimation results of the fixed effects panel model

Variables	Coefficient	Std. Error	t-Statistic	Prob.
VS	43.303	42.379	1.021	0.308
LNPIBH	-10.391	2.276	-4.564*	0.000
LNEW	-0.610	1.367	-0.446	0.655
TINF	-0.085	0.058	-1.471	0.142
LNIGLC	9.227	8.070	1.143	0.254
LNDLF	-3.174	3.463	-0.916	0.360
LNTINV	1.911	2.443	0.782	0.434
LNKH	12.504	4.287	2.916*	0.004
LNCIFSPB	-8.275	2.298	-3,600*	0.000
NBDL	18.797	9.066	2.073*	0.039
R2	0.293			

Source: Author * indicates significant coefficients at the 5% level.

Table 5: OLS model estimation results (by country)

	Variables	Coefficient	T-statistic	Probability
CAM	LNPIBH	-2.459	-0.591	0.559
	LNEW	-0.050	-0.392	0.697
	TINF	0.016	0.456	0.651
	LNIGLC	9.842	2.172*	0.039
	LNDLF	-1.033	-0.887	0.382
	LNTINV	-1.548	-0.581	0.565
	LNKH	1.529	0.703	0.487
	LNCIFSPB	-0.793	-0.596	0.555
	NBDL	1.195	0.118	0.906
CGB	LNPIBH	-15.954	-1.704	0.100
	LNEW	-0.425	-0.088	0.930
	TINF	0.044	0.579	0.567
	LNIGLC	-22.076	-2.031*	0.052
	LNDLF	29.767	5.349*	0.000

	LNTINV	-12.986	-1.588	0.124
	LNKH	2.703	0.120	0.904
	LNCIFSPB	0.413	0.100	0.920
	NBDL	21.069	1.325	0.196
ATM	LNPIBH	-1.220	-0.459	0.649
	LNEW	-0.040	-0.031	0.974
	TINF	-0.090	-1.386	0.177
	LNIGLC	5.658	1.293	0.207
	LNDLF	-3.444	-0.943	0.354
	LNTINV	0.431	0.572	0.571
	LNKH	8.347	1,820	0.080
	LNCIFSPB	2.923	1.218	0.234
	NBDL	-2.614	-0.378	0.707
GE	LNPIBH	-4.205	-0.384	0.704
	LNEW	8.579	0.541	0.592
	TINF	0.004	0.005	0.995
	LNIGLC	121.619	1.359	0.185
	LNDLF	-37.347	-1.257	0.219
	LNTINV	-3.376	-0.123	0.902
	LNKH	57.055	1.402	0.172
	LNCIFSPB	2.099	0.087	0.931
	NBDL	-48.318	-0.618	0.541
RCA	LNPIBH	0.049	0.019	0.984
	LNEW	-3.558	-2.468*	0.020
	TINF	0.0406	2.573*	0.016
	LNIGLC	-0.198	-0.096	0.923
	LNDLF	-0.705	-0.314	0.755
	LNTINV	0.067	0.085	0.932
	LNKH	-3.409	-1.206	0.238
	LNCIFSPB	0.214	0.130	0.897
	NBDL	-1.637	-0.277	0.783
TCH	LNPIBH	-19.356	-3.066*	0.005
	LNEW	11,467	2.071*	0.048
	TINF	0.061	0.710	0.483
	LNIGLC	7.038	0.666	0.510
	LNDLF	-10.242	-1.697	0.101
	LNTINV	-4.140	-0.944	0.353
	LNKH	22.196	2.811*	0.009
	LNCIFSPB	2.196	0.965	0.343
	NBDL	49.065	5.452*	0.000

Source: Author * indicates significant coefficients at the 5% level.

Table 6: Results of the Arrelo-bond test - Redundant Fixed Effects Tests Fisher LM, Wald.

Effets Test	Statistic	Probability
Cross-section F	6.278	0.000
Cross-section Chi-square	31.345	0.000

Table 7: Panel Wald test results

Test Statistic	Value	Likelihood
F-statistic	0.628	0.534
Chi square	1.256	0.533

4.2 Discussion and interpretations of results

From the results of the model, it appears that all the variables of the study retained have an influence on the explained variable, insofar as the value of $R^2 = 0.293$ has a positive sign. Moreover, the Arrelo-bond test performed suggests that the probabilities associated with the statistic are zero. About Wald's statistics, the probabilities obtained are 0.534 and 0.533, above the threshold of 5%. This result attests that the fixed-effect panel model is well specified.

4.2.1 Interpretations of CEMAC results

The econometric results given in table 4 indicate that in CEMAC, four variables affect the attractiveness of FDI. These variables are : gross domestic product per capita, human capital, domestic credit provided to the private sector by banks, and gross national expenditure. Indeed, GDPH exerts negative effects at the 5% threshold on the attractiveness of FDI. A 1% increase in gross domestic product per capita, all other things being equal, reduces FDI by around 10.391%. This result contrasts with the work of Obwona (1998), Brahim and Rachdi (2014) and Zghidi, Sghaier and Abida (2016) which confirm the positive effect of GDPH on the attractiveness of FDI. In the CEMAC context, this result suggests the low level of FDI. The results obtained are contrary to the theoretical predictions.

The “human capital” variable has a positive and significant impact on the attractiveness of FDI at the 5% threshold. A 1% increase in this capital results in an increase in FDI of 12.504%. This finding is consistent with the work of Bouoiyour (2003), Koukpo (2005), BCEAO (2007), Alaya and al. (2008), Aoumari (2009), Azeroual (2015) and Lam'hammdi and Makhtari (2018). Regarding the CEMAC, it means that human capital has favored the establishment of foreign firms.

Moreover, domestic credit provided to the private sector by banks negatively explains the attractiveness of FDI. A 1% increase in these credits implies a decrease in FDI of 8.275%. This result is opposed to those of the authors Barro and Sala-i-Martin (2004) and Keza (2011). In the CEMAC, it suggests the inefficiency of the financial system. Even better, the CEMAC financial system does not support domestic investment.

With regard to the “gross national expenditure” variable, the results obtained show positive and statistically significant effects on FDI at the 5% threshold. When national expenditure increases by 1%, FDI increases by 18.797%. This result corroborates that of Anyanwu (2011) which supports the positive impact of national expenditure on FDI. In the context of the CEMAC, it suggests that the purchases of goods and services made by the authorities of this community have been sufficient.

From the CEMAC results, it appears that trade openness, the inflation rate, the global index of civil freedom and the investment rate have no impact on the attractiveness of FDI.

4.2.2 Interpretation of Results by Country

A few specificities emerge from these results. In the six countries of the CEMAC area, domestic credit provided by the private sector to banks and the investment rate do not impact FDI.

* In Cameroon, the overall index of civil freedom exerts a positive influence on the attractiveness of FDI. A 1% increase in this index generates an increase in FDI of 9.842%. This result corroborates those of Bassu and Srinivasan (2002) as well as Mohamed and Aichi (2021). In the case of Cameroon, it confirms the degree of civil freedom in relation to FDI.

*In Congo-Brazzaville, two variables explain FDI. These variables are : the global index of civil freedom and the degree of fight against corruption. Indeed, the overall index of civil freedom exerts negative effects on the attractiveness of FDI. A 1% increase in this index implies a 22.076% decrease in FDI. This result contradicts the work of Bassu and Srinivasan (2002) and Mohamed and Aichi (2021). It signifies an absence of civil liberty in the case of Congo-Brazzaville.

The “degree of fight against corruption” variable has a positive impact on the attractiveness of FDI. A 1% increase in this variable leads to a 29.787% increase in FDI. This result has already been demonstrated by Bassu and Srinivasan (2002). It suggests the ineffectiveness of anti-corruption policies in Congo-Brazzaville.

* In the Central African Republic, inflation exerts a positive and significant influence on the attractiveness of FDI. A 1% rise in inflation generates that of FDI in the order of 0.040%. This observation corroborates those of Bouoiyour (2003) and Aoumari (2009). Which is to say that inflation has not ensured macroeconomic stability in this country.

As regards the “trade openness” variable, it has a negative impact on FDI. A 1% increase in trade openness implies a 3.558% decrease in FDI. This result contradicts those of the authors (Morisset, 2000; Koukpo, 2005; BCEAO, 2007; Aoumari, 2009; Anyanwu, 2011; Bouri & Benmassoud, 2014; Tirhboula and al., 2017; Kouam & Nafé, 2019; Sumata & Zumbu, 2020; Mohamed & Aichi, 2021) which confirm the positive role of trade openness on FDI. This result means that firms established in the country have not changed the typology of trade openness.

* *In Chad*, the econometric results revealed that gross domestic product per capita, trade openness, human capital and gross national expenditure positively explain FDI. Indeed, GDPH exerts a negative influence on FDI. When GDPH increases by 1%, FDI decreases by 19.356%. This result contradicts those of Obwona (1998), Brahim and Rachdi (2014) and Zghidi, Sghaier and Abida (2016).

Trade openness, for its part, has a positive influence on FDI. When trade openness increases by 1%, FDI increases by 11.467%. This result corroborates those of the authors (Morisset, 2000; Koukpo, 2005; BCEAO, 2007; Aoumari, 2009; Anyanwu, 2011; Bouri & Benmassoud, 2014; Tirhboula and al., 2017; Kouam & Nafé, 2019; Sumata & Zumbu, 2020; Mohamed & Aichi, 2021). He suggests that trade openness has favored the flow of information. This resulted in an improvement in the perception of risk by investors, as suggested by Campos and Kinoshita (2003).

Furthermore, a 1% increase in human capital results in an increase in FDI of 22.196%. This result agrees with the work of Bouoiyour (2003), Koukpo (2005), BCEAO (2007), Alaya and al. (2008), Aoumari (2009), Azeroual (2015) and Lam'hammdi and Makhtari (2018). He suggests that in Chad, human capital favored the attractiveness of FDI.

Finally, with regard to gross national expenditure, the results obtained revealed a positive impact on the attractiveness of FDI. A 1% increase in these expenditures implies an increase in FDI of 49.065%. This result was confirmed by Anyanwu (2011).

5. Conclusion and Policy Implications

The objective of this paper was to analyze the determinants of FDI attractiveness in CEMAC over the period 1985 to 2019. To do so, we use the panel fixed effects model for CEMAC and the OLS model for each CEMAC country. The results of this research have led to the following lessons and policy implications.

- With regard to lessons, some results obtained within CEMAC and by country are in line with the theoretical framework adopted. In the CEMAC, these results showed that economic growth proved to be a determining factor in the attractiveness of FDI. It explains FDI negatively, but the effect produced is not what one would have expected. The "human capital" variable, which is analyzed in terms of knowledge and skills, has had a positive impact on FDI. Domestic credit provided to the private sector by banks has had a negative impact on FDI; their produced effects were not expected. In addition, the study highlighted the determining role of gross national expenditure in the attractiveness of FDI; their impact is positive.

- On the other hand, the results by country revealed that in Cameroon, the overall index of civil liberty also proved to be a determinant of FDI. It has a positive impact on the attractiveness of FDI. In Congo-Brazzaville, the degree of fight against corruption and the overall index of civil freedom respectively influenced negatively and positively FDI. In the Central African Republic, trade openness (negative effect) and inflation (positive effect) have impacted FDI. In Chad, trade openness (positive effect), GDPH (negative effect), human capital (positive effect) and gross national expenditure (positive effect) explained the attractiveness of FDI. In the Central African Republic (Ouv, Inf) and Chad (PIBH, Ouv, KH, DNB), the effects of these variables on the attractiveness of FDI were mixed. In Gabon and Equatorial Guinea, on the other hand, no variable influenced FDI attractiveness.

From these lessons, several implications for economic policy emerge. Taking into account the challenges of attracting FDI in CEMAC, despite the establishment by the authorities of investment codes and industrial free zones to attract FDI, it is important that these policies be strengthened. These should incorporate both economic and financial factors. The economic factors should concern: price stability, control of public expenditure and the strengthening of human capital and that of economic growth.

Financial factors (domestic credit provided to the private sector) have emerged in this research as an obstacle to the attractiveness of FDI. An appropriate credit policy would boost the performance of FDI in CEMAC.

In addition, the determining role of national expenditure, as a determining factor of FDI that has been observed in this study, implies for CEMAC to support it.

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