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The Role of Human Capital in FDI Inflows: A Panel Study on ECOWAS Countries[1]

Doğrudan Yabancı Yatırım Girişlerinde Beşerî Sermayenin Rolü: ECOWAS Ülkeleri Üzerine Bir Panel Çalışması

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Abstract

The main purpose of this paper is to empirically investigate the role of human capital on the Foreign Direct Investment (FDI) inflows toward ECOWAS countries (Economic Community of West African States). FDI is seen as one of the most important tools that promote economic growth, employment, technology transfer and currencies' inflows in a country. In many African countries, despite reforms implemented, FDI inflows continue to be relatively low. Many studies evaluating the main determinants of FDI in African countries have revealed that one of the most important determinants is human capital. However, in many African countries, human capital is among the least developed in the world. Therefore, an empirical analysis is conducted to investigate the role of human capital in the inflows of FDI of ECOWAS countries. For this purpose, a panel data is used for the fourteen members of ECOWAS countries over the period 1991-2015 where human capital is proxied by both adult literacy rate and degree of freedom. The empirical findings revealed that the degree of freedom is the main proxy for the human capital while the adult literacy rate is not statistically significant.

Jel Codes: *C33, F21, F43, J24, O40*

Keywords: *Foreign Direct Investment, Human Capital, ECOWAS Countries, Panel Study*

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Özet

Bu çalışmanın temel amacı, ECOWAS (Batı Afrika Devletleri Ekonomik Topluluğu) ülkelerinde Doğrudan Yabancı Yatırım (DYY) girişleri üzerinde beşerî sermayenin rolünü ampirik olarak araştırmaktır. DYY, bir ülkedeki ekonomik büyümeyi, istihdamı, teknoloji transferini ve para girişlerini teşvik eden en önemli araçlardan biri olarak görülmektedir. Birçok Afrika ülkesinde, uygulanan reformlara rağmen, DYY girişleri nispeten düşük olmaya devam etmektedir. Afrika ülkelerinde DYY girişlerinin temel belirleyicilerini değerlendiren birçok çalışma, en önemli belirleyicilerden birinin beşerî sermaye olduğunu ortaya koymuştur. Ancak, birçok Afrika ülkesinde beşerî sermaye, dünyanın en az gelişmişleri arasındadır. Bu nedenle, bu çalışmada ECOWAS ülkeleri üzerine DYY girişlerinde beşerî sermayenin rolünü araştırmak için ampirik bir analiz gerçekleştirilmiştir. Bu amaçla, 1991-2015 dönemi için, ECOWAS ülkelerinin on dört üye ülkesi üzerine beşerî sermayenin hem yetişkin okuryazarlık oranı hem de özgürlük derecesi tarafından temsil edildiği bir panel veri seti kullanılmıştır. Ampirik bulgular, yetişkin okuryazarlık oranının istatistiksel olarak anlamlı olmadığını ortaya koyarken, özgürlük derecesinin DYY girişlerinde beşerî sermayenin ana temsilcisi olduğunu ortaya koymuştur.

Jel Kodları: *C33, F21, F43, J24, O40*

Anahtar Kelimeler: *Doğrudan Yabancı Yatırım, Beşerî Sermaye, ECOWAS Ülkeleri, Panel*

1. Introduction

Foreign Direct Investment (FDI) is one of the most important tools that promote economic growth, employment, technology transfer and foreign currency inflows in a country. Contrary to portfolio investments, which are short run and interest focused, FDI inflows aim to have substantial influence or effective control on companies or sectors, which are injected in, hence they are involved in the long-term economic activities of the country. Over last two decades, FDI inflows significantly increased in the world in general and especially in developing countries (UNCTAD, 2016). However, there are some disparities, because while FDI has generally increased in Africa, its relative share has decreased in favor of other developing countries (especially for Asian countries). Even after the 2008 world economic crisis, in which African countries were among the least affected, the FDI inflows for African countries declined from 4.6% in 2009 to 3.1 % in 2015 (UNCTAD, 2016).

African countries have implemented important reforms and various regulations in order to attract FDI. These consist of creating organizations which are specialized in attracting the FDI, ratification of important international agreements like the International Investment Agreements (IIA), the Bilateral Investment Treaties (BIT), and the Tax Treaty (TT). However, despite these reforms, regulations and policies, most of African countries have failed to attract more FDI inflows. The fact that the FDI inflows continue to be relatively low despite these reforms indicate that Africa is the continent with the greatest risk for the FDI inflows. This explains the extent to which mediocre economic performance; security problems and socio-political instabilities have a negative impact on the efforts conducted for reforms. Nevertheless, there is a lot of disparity among African countries in terms of the FDI. For example, in 2015 countries like Angola, Egypt, Mozambique and Morocco received much more

FDI than the countries of ECOWAS. Also, within ECOWAS countries, Ghana and Nigeria are the main receivers of FDI in the same year 2015.

Many studies evaluated the main determinants of FDI in African countries. Those studies show some convergences as well as divergences. Therefore, there is no general consensus on all the factors that attract or repel FDI in Africa. However, human capital is among the factors that many studies considered as a main determinant of FDI inflows. Human capital is intrinsically about employee's skills, knowledge, habits and creativity. Therefore, it is the main interest of this study.

As a regional economic union, ECOWAS is a very important area of economic integration in Africa. It is an area of 5,114,162 km^2, more than 360 million inhabitants and 675 billion of nominal GDP in 2015 (World Bank, 2016). However, the members of ECOWAS countries have been facing to human capital development challenge for many years. The reasons are that the population is more than 360 million in 2016 (with 18 years old of median age), and this population is expected to double by 2045 (World Bank, 2016). The challenges are to transform this young age human resource into a well-educated, skilled, healthy and sociable population. This is the only way to benefit from this young population or else it will become a disaster for the socio-economic stability.

Our study aims to determine the role of human capital in the FDI inflows toward a panel of fourteen ECOWAS countries over the 1991-2015 period. In our empirical analysis, we use the Fixed Effect (FE) and Random Effect (RE) modeling. The originality of our study is that we focused on the most important factor which is the base of any country as *human capital*. The second originality is that we use two proxies for *human capital* to see how its development is perceived by investors, *adult literacy rate* and *degree of freedom*. In other words, whether the literacy of the population is significant enough to determine the human capital, or the degree of freedom of the population is a better proxy of human capital of a country.

The rest of our paper is organized as follows. Section 2 presents the stylized facts about the FDI inflows and human capital in ECOWAS countries. Section 3 presents the literature review on FDI inflows in ECOWAS countries. Next section describes the data and methodology used in the analysis. Section 5 presents the empirical analysis and findings. The last section concludes.

2. FDI and Human Capital in ECOWAS Countries

These stylized facts cover the period of study in general which is from 1990's until nowadays.

Stylized Facts about the FDI in ECOWAS Countries

As Sichei & Kinyondo (2012) bring it from the literature, we can summarize the FDI inflows into three types: (i) the market-seeking FDI called also horizontal FDI, (ii) the asset-seeking FDI known also as resource-seeking FDI, and (iii) the efficiency-seeking FDI. ECOWAS countries have these three types of FDI with country depending on specificity.

The first type of FDI, the horizontal or market-seeking one, occurs when a country has a significant market size with a relatively high market growth. In this type of FDI, the investor is clearly interested in serving the local market. In this case, the GDP, the GDP per capita and the population are the main factors that can determine the FDI inflows toward a country. For instance, in ECOWAS countries like Nigeria, somehow Ghana and Cote d'Ivoire are in this case. But the perfect example is really Nigeria. It has, in 2016, a GDP of 405.1 billion USD, a GDP per capita of 2,178 USD and 186 million inhabitants (World Bank, 2016). It is the greatest economy of Africa by these statistics.

The second type of FDI, the resource-seeking FDI, is more widespread FDI among the ECOWAS countries. In this case, investors specifically search for resources that are generally not available in their home country. They seek for natural resources mainly mining and energy but also agricultural. Sometimes, these investors target low-cost labor also. Nigeria mainly attracts that kind of FDI due to its abundant petrol production and reserve, Ghana for its gold, Cote d'Ivoire for its cocoa, and Niger for its Uranium, and Liberia for its Diamond etc.

The third type of FDI which is the efficiency-seeking. It occurs when investors want to take advantage of "*a common governance of geographically dispersed activities and presence of economies of scope and scale*" (Sichei & Kinyondo, 2012: 85). There are different types of companies seeking for this advantage in ECOWAS countries. They are in general companies in service sector such as banking, telecommunication, hoteling, transporting. Among the ECOWAS countries, there are eight countries which share another integration area: "*West African Economic and Monetary Union*" (WAEMU)[4]. These eight countries use common money (Franc CFA) and almost the common official language (French) except Guinea-Bissau. Some companies use generally Cote d'Ivoire and Senegal to have easy access to the other members of WAEMU.

Repartition of FDI's in African regions

The first important characteristic of FDI inflows toward Africa is its small share compared to the rest of the world. In 2013, FDI inflows reached US$57 billion which is only 3.9 % of the total of FDI in the world (UNCTAD, 2014). Between 1970 and 2013, the repartition of these inflows in Africa is dominated by North Africa (US$4.84 billion) and West Africa (US$3.64 billion) (UNCTAD, 2014). As for the second important characteristic, it is how these FDI inflows are unequally received by African countries. Few countries have major shares of the FDI inflows.

Repartition of FDI's in ECOWAS

To understand the repartition of FDI's inflows towards ECOWAS countries, we use the following Figure 1 and Figure 2. The Figure 1 displays the share of the countries in percentage. According to the Figure from 1991 to 2015, Nigeria received 57% of the total FDI inflows toward ECOWAS countries. So, among all member countries, more than the half of the FDI went to Nigeria in this period of time. Nigeria is followed by Ghana by 18% and Cote d'Ivoire with 5%. These are already the big three economies in ECOWAS. Niger occupies the 4th place

[4] The eight member countries of WAEMU are Mali, Senegal, Cote d'Ivoire, Togo, Guinea-Bissau, Benin, Niger and Burkina Faso.

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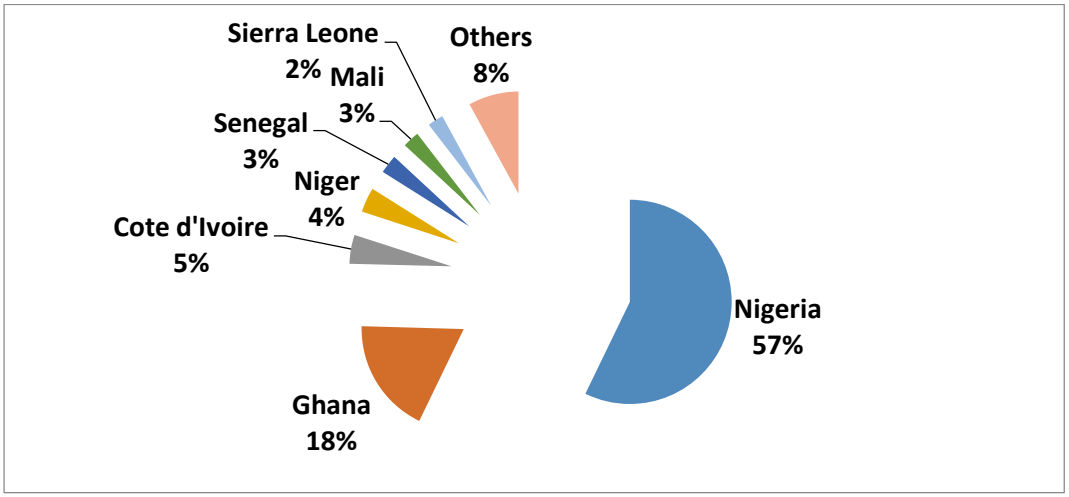
with 4% of the FDI. After Niger, Senegal and Mali have 3% each and Sierra Leone has 2%. As for the rest of the countries (Gambia, Togo, Guinea-Bissau, Cap Verde, Burkina Faso, Guinea and Benin) share together just 8% of the FDI.

Figure 1: Repartition of FDI in ECOWAS countries (1991 to 2015, %)

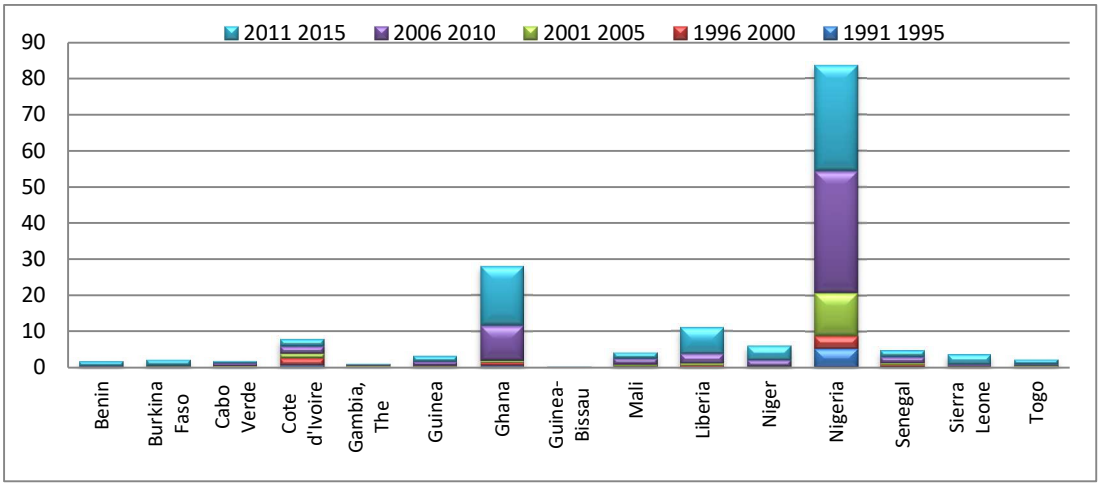


Source: Calculated by authors using the WDI (World Bank, 2017)

The Figure 2 displays a five-year evolution of the FDI inflows by country. With an overall view, we can see that the FDI inflows were more important in the last 5-year (2011-2015) of almost every country. The second-best period for ECOWAS in general was from 2006-2010. In the period Nigeria did even better than 2011-2015.

Figure 2: A Five-Year Evolution of the FDI Inflows by Country

(1991-2015, in billion US dollars)



Source: Calculated by authors using the WDI (World Bank, 2017)

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Human Capital in ECOWAS Countries

Before *Theodore Schultz*, to reflect the value of human capacities, the expression "h*uman capital*" was known but not conventionally used in the economics studies. He had had an important role in making the use of the expression *"human capital"* accepted in the 1960s. He started his article with: *"I propose to treat education as an investment in man and to treat its consequences as a form of capital. Since education becomes a part of the person receiving it, I shall refer to it as human capital"* (Schultz, 1960: 571). From that, human capital can be considered as any other type of capital. Therefore, it could be improved in quality and level of production by investing in it through education, training etc. Besides Schultz, Becker (1964) and Mincer (1958) made the use of the expression *"Human Capital"* popular by explaining it as "*a stock of knowledge, habits, social and personality attributes, including creativity, embodied in the ability to perform labor so as to produce economic value*" (Cyesa et. al., 2019: 17).

African countries and specifically ECOWAS countries are mostly among the weakest economies of the world. Human capital accumulation is a very important factor of economic growth according to the endogenous growth theories. Romer (1986) and Lucas (1988) show that human capital accumulation is a very important factor of a long period economic growth. Moreover, many studies tend to approve that human capital is a significant factor of growth. From there, we can see a link between weak economic performances and poor human capital accumulation for African countries. Therefore, poor human capital accumulation can be one of the most important determinants of weak economic performances in ECOWAS countries. Except for Cape Verde and Ghana which are in the medium human development group, all the ECOWAS countries are in the group of the low human development index, according to report of UNDP (United Nations Development Programme) (Malik, 2013).

3. Literature Review

In this section, we present a brief literature review on the determinants of FDI inflows in Africa. Although our study focused just on the role of one factor among others, we bring as much details as possible about studies conducted on the determinants of FDI in African countries in general, and West African particularly.

Human Capital as a Determinant of FDI

Human capital plays an important positive role as a determinant of FDI. Indeed, Reiter & Steensma (2010) brings very interesting points about the conditions in which human capital will be a positive determinant of FDI. First, they think that host country should implement a protectionist policy in some economic sectors. In other words, for some specific sectors, foreign investor should be discriminated in favor of domestic investor. Second, they also argue that FDI corruption affects negatively the positive relationship between FDI and improvement in human development. Other authors are also unanimous about the positive role of human capital as a determinant of FDI. Noorbakhsh et al. (2001), Markusen (2002), Miyamoto (2008) and Ajide (2014) agree that Human capital has a positive effect in general on the FDI inflows.

Moreover, Rodríguez & Pallas (2008) see human capital as the most important factor that determines FDI inflows. As for the proxies adding to those that are generally used in the literature (schooling and adult literacy), we found that population health (Alsan et al., 2006) and level of freedom (Suliman & Mollick, 2009) can also be used.

Other Determinants of FDI

Assunçao et al. (2011) present a literature review of analytical approaches and experimental studies on determinants of geographical distribution of FDI in the world. The authors reveal the most significant factors that explained this distribution. They found three categories of aspects. The first one is the OLI paradigm aspect summarized by production costs, human capital, economic stability and infrastructure. The second one is the institutional aspect like fiscal incentives, financial incentives, corruption, institutional quality and political instability. And the last one is linked to the "*New Trade Theory*" like factor endowments, market growth, openness of the economy and market size.

In order to analyze how economical, institutional and political factors attract FDI toward BRICS countries, Jadhav (2012) uses panel data from 2000 to 2009. He reunites the factors in two categories: (i) economic determinants, and (ii) institutional and political determinants. The first category is compounded by natural resources, market size and trade openness. And the second one is compounded by government effectiveness, corruption control, macroeconomic stability, regulatory quality, voice and accountability, rule of law and political stability. According to his result, the FDI inflows in BRICS countries are more significantly due to economic factors, especially market size and trade openness, than institutional and political factors. However, natural resource availability is negatively significant. Thus, unlike the resource-seeking purpose that is a stylized fact of FDI in African countries, the FDI in BRICS countries is different.

FDI inflows to African countries are significantly low compare to the aggregated amount of FDI in the world, despite multiple reforms to attract them. Thus, Ajayi (2006) has tried to highlight how African countries got in this situation. The author claims Africa is a risky area to invest due to economic instability (in regard to price and exchange rate) and institutional issues (inefficient reforms). However, depending on policy adopted, some countries enhanced their FDI inflows while in others FDI inflows decreased. The author provides a survey on the main factors of FDI in Africa from 2000 to 2003.

According to *UNCTAD World Investment Report 2000*, the most determinant factors (variables) that promote FDI inflows in Africa are found as follows: "*growth of local market, profitability of Investment, size of local market, access to regional markets, trade policy, political and economic outlook, tax regime, regulatory & legal framework governing, access to skilled labor, state of physical infrastructure, investment incentives, access to natural resources, administrative costs of doing business, access to low-cost unskilled labor, access to capital finance, access to global markets, level extortion and* bribery" (UNCTAD, 2000: 48).

Ajide (2014) analyzes the role of both governance and human capital in the FDI toward ECOWAS countries. Using a fixed effect panel data model, he found that GDP per capita, the quality of infrastructure, human capital and governance are the main factors that favor FDI

inflows toward this economic integration area. Moreover, GDP per capita and human capital, have positive impact on FDI while the quality of infrastructure, the openness degree and inflation have negative effect on FDI.

Asiedu (2002) tries to understand why, despite policy reforms, Sub-Saharan African (SSA) countries relatively failed to attract FDI unlike other developing countries did. The author found that Africa is different when it comes to FDI determinants. She found that factors, like return on investment and infrastructure, that stimulate FDI to non-SSA countries have no impact for SSA countries. Moreover, an increase in trade liberalization in both SSA countries and non-SSA countries will create more FDI for non-SSA than SSA countries. She also found that, ceteris paribus, geographical effect pushes investors to have preference for non-SSA over an SSA country.

In the same order of idea than Asiedu (2002), with regards to the failure of economic and institutional reforms to attract significant FDI inflows, Onyeiwu & Shrestha (2004) analyze the main determinants of FDI in Africa. They find that growth, inflation, trade openness, foreign currency assets, international and natural resource availability are the main factors that significantly promote FDI inflows in African countries. However, unlike Assunçao et al. (2011) and Ajide (2014), they find that political rights and infrastructure are not significant.

Anyanwu (2011) brings a very pertinent list of factors that are positively and negatively affected the FDI in Africa. Some of the determinants are already listed below the recapitulative table of main determinants of FDI in Africa (see Table 1). However, there are factors which are not so commonly mentioned in the literature although they are very interesting: financial development with a negative effect on FDI inflows, government consumption expenditure with a positive effect on FDI inflows, international remittances with a positive effect on FDI inflows and agglomeration with a strong positive effect on FDI inflows. Most recently, about the interesting contributions in the case of the determinants of FDI inflows in ECOWAS, Sane (2016) added some other interesting determinants such as government spending, access to domestic credit for private sector, interest rate and gross fixed capital formation. However, the author remarks that stable macroeconomic environment, natural resources and market size are more significant.

Sichei & Kinyondo (2012) use dynamic panel data estimation techniques to identify main factors that promote FDI in Africa. Like, Onyeiwu & Shrestha (2004), they find that natural resources and real GDP growth are significant factors. Moreover, they find that agglomeration economies and international investment agreements are also significant factors. Authors conclude that since year 2000, Africa become more attractive to the FDIs. Suliman & Mollick (2009) check the role of human capital development and war in the FDI flows to Africa. As expected, human capital (represented by literacy rate) and freedom have a positive significant role in the FDI to Africa. As for war, it has negative significant effect on these FDIs.

The following Table 1 summarizes the main variables used by relevant studies in the specific case of SSA countries. However, it is crucial to perceive that the significance of the determinants change due to the country of origin of the FDI, the geographical, cultural and diplomatic ties between the investing and the receiving country, and the period of time when FDIs are made.

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Table 1: The Main Determinants of FDI in Africa According to Literature

Determinants	Proxy	Effects of Proxy	Authors
Location dimension of the OLI paradigm			
Infrastructure	No. Phone Lines per 1000 Inhabitants	Positive	Asiedu (2002)
		Positive	Anyanwu (2011)
		Negative	Ajide (2014)
		Positive	Ajayi (2006)
		Null	Onyeiwu & Shrestha (2004)
		Null	Suliman & Mollick (2009)
Human Capital	Secondary Education Index	Positive	Cleeve (2008)
		Positive	Ajide (2014)
		Positive	Ajayi (2006)
	% Adult Literacy	Positive	Asiedu (2002)
		Positive	Ajayi (2006)
		Positive	Suliman & Mollick (2009)
Economic Stability	Inflation Rate	Negative	Asiedu (2002)
		Negative	Anyanwu (2011)
		Negative	Ajide (2014)
		Negative	Onyeiwu & Shrestha (2004)
	Nominal Exchange Rate Adjusted GDP Deflator	Positive	Cleeve (2008)
Institutional Approach			
Corruption	Corruption Index	Negative	Cleeve (2008)
		Negative	Asiedu (2002)
		Negative	Ajide (2014)
		Negative	Ajayi (2006)
Political Instability and Institutional Quality	No. of Coups d'état	Negative	Asiedu (2002)
	No. of Assassinations	Negative	Ajide (2014)
	No. of Insurrections		
	Effectiveness of Rule of Law (ICRG)	Positive	Asiedu (2002)
		Positive	Onyeiwu & Shrestha (2004)
New Theory of Trade			
Market Size	GDP per Capita	Positive	Cleeve (2008)
		Negative	Anyanwu (2011)
		Positive	Ajide (2014)
		Negative	Ajayi (2006)
	GDP	Positive	Asiedu (2002)
		Positive	Suliman & Mollick (2009)
Market Growth	GDP Growth Rate	Positive	Cleeve (2008)
		Positive	Ajayi (2006)
		Positive	Onyeiwu & Shrestha (2004)
		Positive	Suliman & Mollick (2009)
		Positive	Sichei & Kinyondo (2012)
Openness of the Economy	(X+M)/GDP	Positive	Cleeve (2008)
		Positive	Anyanwu (2011)
		Negative	Ajide (2014)
		Positive	Ajayi (2006)
		Positive	Onyeiwu & Shrestha (2004)
		Negative	Suliman & Mollick (2009)
		Positive	Sichei & Kinyondo (2012)
	Openness Index	Positive	Asiedu (2002)
Natural Resources	X Fuels + Minerals / Total X	Positive	Asiedu (2002)
		Positive	Ajayi (2006)
		Positive	Anyanwu (2011)
	Net Oil Exporters	Positive	Ajayi (2006)
		Positive	Onyeiwu & Shrestha (2004)

Source: Authors compilations from the literature review

4. Data and Methodology

In this study, the determinants of FDI inflows are empirically investigated in the ECOWAS countries with a particular importance on human capital. Among the fifteen-member countries of ECOWAS only Liberia is not part of the analysis due to lack of data. Therefore, our sample is compound by fourteen countries except Liberia over the period of 1991-2015. The data used came from the *World Bank World Development Indicator* (World Bank, 2016) database except for '*Freedom*' data which came from *Freedom House*[5].

Dependent and Independent Variables

Determining with precision the main factors that promote the FDI inflows in a country is obviously difficult, hence we constructed the variables in our study depending on data availability and previous empirical studies mentioned in the literature review. Therefore, the following variables are constructed according to the literature emphasized.

FDI inflows as ratio of GDP *(FDI)***:** Our dependent variable is the share of total inflows of FDI in the current Gross Domestic Product (GDP) over a year in a country. This variable came from the World Bank database (Word Bank, 2016). The same variable is used by Suliman & Mollick (2009), Anyanwu (2011) and Ajide (2014) in the literature.

Human Capital *(LIT and FREE)***:** Human capital was divided into two independent variables as Suliman & Mollick (2009) constructed: (i) the level of education (LIT) and (ii) the level of freedom (FREE). For the LIT, the secondary school enrolment (like Root & Ahmed, 1979 and Barro & Lee, 1993) or the adult literacy rate could be chosen (like Hanson, 1996). We prefer to use the adult literacy rate because it includes people who have completed the secondary school already, and those who become literate by other ways. So, literacy rate variable is the percentage of adult over 15 ages who are literates. For the FREE variable, political and civil rights are used as a proxy of freedom as Suliman & Mollick (2009). According to the *Freedom House* indexes, FREE variable takes the value on integer from 1, which is the highest degree of freedom, to 7, which is the lowest degree of freedom (Freedom House, 2017). We expect positive relationship between LIT and FDI, and negative relationship between FREE and FDI.

Natural Resources *(NAT)***:** As proxies some studies use the sum of both fuel and mineral exports as a share of total exports as Asiedu (2002) and Ajayi (2006). On the other hand, Onyeiwu & Shrestha (2004), and Anyanwu (2011) use net oil exporters as proxy of natural resources. In our case, we find that the total natural resource rents as a share of GDP is more relevant because ECOWAS countries natural resources are not limited to fuel and mineral, but non-mineral resources are also included. This variable is expected to have positive impact over FDI inflows according to the economic theory and empirical researches.

Infrastructure (*INFRS)***:** This independent variable is the percentage of individuals using the internet in a country over a year. It came from the *World Bank Database (World Bank, 2016)*. Almost all the studies, which took into account infrastructure as main factor of the FDI inflows, use the percentage of fixed telephone subscribers as proxy of infrastructure. But in our case, we use the percentage of individuals using the internet, because since 2000's, the mobile

[5] For details about the *Freedom House* please see Freedom House (2017) in references.

phone and the internet have supplanted the fixed telephone subscription. INFS is expected to have a positive effect on the FDIs.

Economic Stability *(CPI)***:** According to the OLI paradigm, the economic stability can be measured either by the inflation rate (consumer prices, annual %) or the Nominal Exchange Rate Adjusted GDP Deflator (ref. Table 1). Most of studies (*Asiedu, 2002; Onyeiwu & Shrestha, 2004; Anyanwu, 2011; Ajide, 2014*) use the inflation rate as a proxy for economic stability. So, we choose the consumer prices index (CPI) as a proxy of economic stability. We expect a positive relationship between CPI and FDI.

Market Size *(GDP)***:** In the New Theory of Trade, market size is among the most important factors that promote the FDI inflows. Studies on African countries generally retain two possible proxies. Either they use GDP per capita (Cleeve, 2008; Anyanwu, 2011; Ajide, 2014; Ajayi, 2006) or the nominal value of GDP (Asiedu, 2002; Suliman & Mollick, 2009). In our study, we decided to use the current dollars nominal GDP as the proxy of market size for two reasons. First, among those who use the GDP per capita some found its impact positive (Cleeve, 2008; Ajide, 2014), while others found it negative (Ajayi, 2006; Anyanwu, 2011). The second reason is that the GDP in the case of ECOWAS is more relevant because it reflects somehow the population of the major countries (Nigeria, Ghana and Cote d'Ivoire) while GDP per capita of the small countries (like Cap Verde) hides the small size of its market. GDP is expected to have positive effect on FDI inflows.

Openness of the Economy *(OPEN)***:** The third factor of New Theory of Trade is the openness of the economy. The proxy which is generally used in this case is the trade openness degree (sum of exports and imports as ratio of GDP). Like Onyeiwu & Shrestha (2004), Ajayi (2006), Cleeve (2008), Suliman & Mollick (2009), Anyanwu (2011), Sichei & Kinyondo (2012), and Ajide (2014), we use this variable as a proxy of the openness of economy. A positive relationship is expected between OPEN and FDI.

Model

The regression estimations will be conducted according to the following model:

$$FDI_{it} = \beta_0 + \beta_1 LIT_{it} + \beta_2 FREE_{it} + \beta_3 NAT_{it} + \beta_4 OP_{it} + \beta_5 INFS_{it} + \beta_6 ln(GDP)_{it} + \beta_7 CPI_{it} + \mu_{it} \quad (1)$$

- *FDI*: FDI inflows as ratio of GDP (%)
- *LIT*: Literacy Rate
- *FREE*: Degree of Freedom (1 to 7)
- *NAT*: Natural Resources as share of GDP (%)
- *OP*: Openness of the Economy (Sum of exports and imports as ratio of GDP) (%)
- *INFS:* as infrastructures
- *Ln (GDP):* as the logarithm of GDP
- *CPI:* as Inflation

Before the estimation, we should proceed to the tests of stationarity of the variables. The unit root test is a prerequisite in panel data analysis especially when the time period is superior to number of cross-sectional units. According to Hurlin & Mignon (2007), since 1992 the study of

the unit root in the case of empirical studies have increased and developed to two generations of panel unit root tests. The following table summarized the unit root test for all our variables.

Table 2: Panel Unit Root Summary for the Variables

Variables	Individual Specificity[a] and Integration level[b]	Levin, Lin & Chu t	Im, Pesaran & Shin W-stat	ADF-Fisher Chi2	PP–Fisher Chi2
FDI	**I(0)**	**-3.96*****	**-4.21*****	**68.02*****	**67.06*****
LIT	I(0)	1.57	3.46	17.80	15.31
	I(1)	**-1.62***	**-2.95*****	**55.61*****	**66.28*****
FREE	**I(0)**	**-3.80*****	**-3.53*****	**66.8*****	**119.3*****
NAT	I(0)	0.197	0.526	20.07	20.69
	I(1)	**-12.40*****	**-10.7*****	**157.3*****	**221.0*****
OP	I(0)	-0.27	-0.729	29.99	42.87**
	I(1)	**-5.71*****	**-8.89*****	**130.0*****	**288.4*****
INFS	I(0)	12.83	13.18	2.86	0.02
	I(1)	4.17	4.03	20.44	27.41
	I(2)	**-2.27*****	**-8.03*****	**134.2*****	**477.5*****
ln(GDP)	I(0)	1.16	4.35	4.78	3.74
	I(1)	**-8.68*****	**-9.11*****	**133.6*****	**191.7*****
CPI	I(0)	1.31	3.45	23.35	36.94
	I(1)	**-3.99*****	**-4.61*****	**84.73*****	**98.6*****

Note: *** p<0.01, ** p<0.05, * p<0.10. And, here a: the individual specificity here is only "Intercept"; b: I(0) means stationary at level; I(1) means stationary at 1st difference; I(2) means stationary at 2nd difference.

Source: Created by authors

The Table 2 also indicates a summary of *"Levin, Lin & Chu", "Im, Pesaran & Shin", "ADF–Fisher"* and *"PP–Fisher"* tests results. According to the results, *FDI* and *FREE* variables are stationary at level I(0). The others variables *LIT, NAT, OP, CPI,* and *ln(GDP)* are found as stationary at first difference. Only INFS is stationary at second difference I(2).

5. Empirical Analysis and Findings

The fixed effects (FE) and random effects (RE) estimations are performed by using the regression as showed in equation 1 above.

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Table 3: Results of Fixed Effects and Random Effects

Explanatory Variables	Fixed Effects		Random Effects	
	Coefficient	**t-Statistic (p-value)**	**Coefficient**	**t-Statistic (p-value)**
D(LIT)	-0.214	-1.613 (0.107)	-0.209	-1.584 (0.114)
FREE	-0.760	-3.679 (0.000)***	-0.727	-3.962 (0.000)***
D(NAT)	0.075	1.351 (0.178)	0.078	1.405 (0.161)
D(OP)	0.067	3.217 (0.001)***	0.068	3.266 (0.001)***
DD(INFS)	0.255	1.614 (0.107)	0.258	1.631 (0.104)
D(lnGDP)	2.541	2.075 (0.039)**	2.541	2.081 (0.038)**
CPI	0.063	8.633 (0.000)***	0.060	8.879 (0.000)***
Constant	5.128	5.812 (0.000)***	5.033	5.390 (0.000)***
Significance				
R^2		0.456		0.333
Adjusted R^2		0.420		0.318
F-statistics		12.513		22.208
(p-value)		(0.000)		(0.000)

Note: *** p<0.01, ** p<0.05, * p<0.10

Source: Created by authors

The Hausman test is performed to decide which model (FE or RE) is appropriate. The results are summarized in the following Table 4.

Table 4: Hausman Test Results

Test Summary	Chi-Sq. Statistic	Chi-Sq (df)	prob.
Cross-section random	3.386	7	0.847

Source: Created by authors

The null hypothesis (H0) is cross-section random. The probability is more than 0.05, so the null hypothesis cannot be rejected. Then, the appropriate model is the RE model. Therefore, we base our analysis on the RE model provided that the model is significant. The Wald test (also called the Wald Chi-Squared Test) is a test that allows knowing whether the explanatory variables in a model are significant or not. If they are significant then their contribution to the model is important if not, they have to be removed.

Table 5: Wald Chi-Squared Test

Test Statistic	Value	df	prob.
F-statistic	6.107836	(7, 311)	0.0000
Chi-square	42.75485	7	0.0000

Source: Created by authors

According to the results of the Wald Chi-Square test, all the variables are significant for the model, meaning that the model is consistent. Except for *LIT, NAT* and *INFS,* the other variables

are significant. So, we can conclude that in our model *FREE (Degree of Freedom)*, *CFI (Inflation Rate)*, *OP (Openness of the Economy),* and *ln(GDP)* are among the main determinants of FDI inflows to ECOWAS countries from 1991 to 2015.

Our study aims to determine the role of human capital in the FDI inflows toward a panel of fourteen ECOWAS countries over 1991-2015 period. The findings reveal that *LIT* variable is insignificant while *FREE* is highly significant. Therefore, in regard to the role of human capital in the FDI inflows, our study shows that, in the investor's perspectives, the literacy of the population (LIT) is not enough to determine the human capital of a country. Consequently, the degree of freedom of the population is perceived as the appropriate proxy of human capital. Results show that an increase[6] of a unit in the degree of freedom has a marginal effect of 0.73 on FDI. An improvement in the degree of freedom in ECOWAS countries is a sign of the improvement in the labor productivity of the population, which further assures investors of the potential return on their capital. ECOWAS countries policies should emphasize on a better degree freedom in the population.

On the other hand, we have natural resources (NAT) which are known to attract FDI in Africa. However, we want to know, in this new world of technology, how determinants are natural resources in the attraction of FDI toward ECOWAS countries. Without any surprise, it appears that natural resources (NAT) still have a positive effect as a determinant of FDI inflows to ECOWAS countries. But it gives the impression that the marginal effect 0.078 is not as important as expected. It can be explain by the fact that, most of the possibility of investing in natural resources is being exhausted because known natural resources are already being exploited by other firms. Regarding the other variables, we see that the trade openness of ECOWAS countries is highly significant as determinant. However, its marginal effect is only 0.07.

The infrastructure level (INFS) is almost significant at 10%, therefore if we have to take it into account, we see that it has an important marginal effect (0.258) on the FDIs. So, any improvement of infrastructure should lead to an increase of FDI. Finally, the marginal effect of GDP[7] is significant and very important (2.541) on the FDI. It has actually some logic behind, because in our data, the top three countries in terms of GDP have the largest share of all the FDI inflows in ECOWAS countries. And also inflation rate (CPI) is significant at 1% level but with a small marginal effect (0.06).

6. Conclusion

The aim of this paper is to determine the role of human capital in the FDI inflows toward a panel of fourteen ECOWAS countries. In other words, we empirically analyzed how the human capital impacts the FDI inflows toward ECOWAS countries. Therefore, a panel data of fourteen-member of ECOWAS countries are used over 1991-2015 period. To bring empirical evidence about the question, the RE modeling is used in accordance with the Hausman test.

[6] Here, mathematically it is a decrease because 7 is the lowest level while 1 is the highest level of freedom. That's why estimation results show the coefficient sign as negative.
[7] Because GDP is in logarithm, we have to divide it by 100 before interpreting.

In our study, two proxies are constructed for the human capital variable: *adult literacy rate* and *degree of freedom*. The empirical evidence shows that *the degree of freedom* is the appropriate proxy of human capital while *adult literacy rate* is not (insignificant). Therefore, we learn how important the freedom of the population is to the investors. The study showed also the important role of GDP that has as an attractive factor of FDI in ECOWAS countries.

FDI inflows play a crucial role for the economic growth of beneficiary countries especially if they have a decent level of human capital and poorly endowed with capital. By emphasizing on improving the level of human capital, the ECOWAS countries will attract more capital and subsequently compete with Asian countries.

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