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Human Capital and Agricultural Development: Impact of FDI in the WAEMU

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ABSTRACT

We aimed to analyze the impact of foreign direct investment (FDI) on the interrelationship between human capital and agricultural development in the West African Economic and Monetary Union (WAEMU) zone. The econometric model was estimated using the Pooled Mean Group method. The estimates reveal an impact on the interrelation between human capacities and agricultural development in the WAEMU countries. Furthermore, it is certain that the presence of foreign investments in the WAEMU zone has created activities, which remain insufficient in relation to the potential of the zone. These inadequacies are explained by the absence of sufficiently dynamic subregional policies capable of boosting development by raising the level of human capital and promoting sustainable and profitable agriculture. Similarly, these investments have not allowed local industrial integration. As a result, few domestic sectors are created and most inputs are imported, which worsens the current account deficits of the WAEMU countries. The implications in terms of economic policy seem significant. Free access to the factor market should be guaranteed to farmers in the WAEMU countries with the agri-food policy that could lead countries to acquire competitive technical skills. Indeed, it is necessary to (1) diversify training in specific professions that aim to improve the productivity of farmers; (2) thoroughly reform the education system; (3) increase access to technological offers; (4) make the private sector more and better responsible so that it develops initiatives in the field of education and collaboration with local authorities and individual operators and (5) promote good governance because it is a factor in attracting FDI.

Keywords: Agriculture; Human Capital; Education Expenditure; Foreign Direct Investment; WAEMU

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1. Introduction

The situation of agriculture in Africa shows a continued relative decline in food production compared to the food needs of African populations [1]. Food needs vary considerably from one region to another and from one country to another [2]. Food security approaches must therefore be adapted [3]. However, development experiences of recent decades have clearly shown the main constraints to human resource development [3, 4]. Educating a population is a strategic policy aimed at reducing dependency [3, 4], particularly for Africans [3]. According to Oduro-Ofori, Aboagye and Acquaye [5], in Uganda, the schooling of farmers has enabled technology. However, it must be recognized that funding for education remains insufficient. To this end, some states, such as those of the West African Economic and Monetary Union (WAEMU), are turning to foreign direct investment (FDI) to finance agricultural development [1]. Currently, the attractiveness of FDI is at the heart of the development of the least developed countries [6, 7]. Globalization has helped to accelerate the competitiveness of countries [8]. This has had consequences on FDI flows which have accelerated in the WAEMU [9–11]. These flows have doubled, with 5.2 billion dollars in 2022 compared to 2.7 billion dollars in 2018. On this specific point, according to the African Union [12], the public authorities of the WAEMU zone must define adequate policies, particularly in agriculture, education and health, adapted to the various international developments that make it possible to reduce poverty and increase growth. The African Union's Agenda 2063 [12] has thus given a central place to education and health in the development process [13]. Education is considered a factor of influence for businesses [11]. According to Bodin [14], "We must never fear that there will be too many subjects, too many citizens because there is wealth and strength only in men." It is a fundamental pillar of sustainable development and economic growth of nations [15]. It is estimated that nearly 53% of the WAEMU population depends on agriculture [16]. However, the WAEMU faces many challenges, such as low productivity, poor infrastructure, and vulnerability to climate variations. To overcome these obstacles, these countries are seeking to stimulate growth and modernize agricultural practices in the WAEMU zone, where agriculture is a central pillar of the economy. According to Phiri, Zhao and Chen [17], smallholder farmers are the backbone of African agriculture, but their productivity often remains low, compromising their ability to meet the needs of a growing population [17]. This deficiency has prompted various organizations to launch programs aimed at improving the agricultural productivity of African smallholders and increasing their incomes [17]. Yet, the success of these programs depends on the effective transformation of agricultural extension approaches and advanced knowledge and technologies into agricultural productivity [17]. Without such transformation, achieving the desired results may be difficult [17]. African countries rely heavily on extension services to disseminate innovations from scientists to farmers [17]. While the public extension system remains the most important source of information for smallholder farmers in developing countries, its effectiveness is often compromised by the shortage of extension agents [17]. Given these challenges, building the capacity of smallholders to understand and adopt well-established technologies is critical to Africa's sustainable agricultural development [17] and to strengthening human capital. However, a major challenge is related to the issue of financing agricultural activities to achieve food security. The food system represents an interdependent chain of activities involving production, processing, distribution, and consumption that aim to meet human needs [18]. All these factors not only impact their incomes but also contribute to post-harvest losses as perishable goods may spoil before reaching final consumers [18]. In addition to limited access to credit and financial resources that hinder farmers' capacity, smallholder farmers often face challenges in adopting modern agricultural technologies and practices [18]. Given this, it is important to know the role that FDI could play in financing agricultural activities towards improving human capital. The main question we are asking is: What is the impact of FDI on human capital and agricultural development? This is the main question that concerns us throughout this research. We first discuss the literature. Then, we present our materials and methods. Finally, we deal with the results and discussion followed by a conclusion and policy implications.

2. FDI, Human Capital and Agricultural Development: Theories and Approaches

There are many lessons that can be learned from the literature on FDI, human capital and agricultural development, both from a theoretical and empirical point of view[19, 20]. According to Bouda[13], education is essential in the productivity and capacity to produce individuals. According to this author, it is a subject that interests researchers. The history of human capital dates back to the work of the Chicago school during the 1960s, where economists such as Schultz[21] and Becker[22] developed the concept of human capital[23]. The theory of human capital that emerged following the work of these two authors states that any expenditure likely to improve the level of education of an individual increases their productivity, and consequently their future income, hence the name human capital[23]. The analysis of human capital is complex because of the concept itself, but especially because of considerations related to its measurement[13]. Indeed, human capital is considered an intangible asset attributed to man; human capital cannot be measured easily because it is inherently intangible[13]. As it is a personal quality, it is also difficult to agree on an objective unit of measurement and to compare the levels of human capital of different people. However, the two main dimensions found in the literature are education and health[24]. Ultimately, human capital can be considered a source of development because a high level of it is synonymous with an improvement in the living conditions of populations[13]. Bouda[13] goes on to say that while it is true that development models differ from one country to another as suggested by growth theories, the fact remains that the development programs and policies developed have always devoted a significant budget to education as an essential factor in improving the level of human skills, and therefore in accelerating wealth creation and rapidly increasing the well-being of populations. For him, education is the fourth link in the development goals for 2030 and all signatory states of the Sustainable Development Goals (SDGs) charter have committed to ensuring a quality education cycle for all, from childhood to university, leading to decent jobs and entrepreneurship, integrating professional and technical aspects. Countries also commit to improving the skills needed for decent employment and entrepreneurship[13]. Although in recent years human capital has regained interest in the economic literature as a determinant of economic growth, it was considered as the expenditure of acquiring talents during education, studies and apprenticeship[13]. According to Goldin, Abdelhai and Lebzar[25], these talents are the result of real expenditures because they represent a capital that the person acquires and are part of the fortune of the individual, the company and also of society as a whole. Individuals invest in themselves or in members of society in order to benefit from them later[13]. However, it is difficult to fully understand human capital, not only because of the concept itself, but especially because of considerations related to its measurement, since it is considered in particular as an intrinsic quality of humans. Being a non-material asset, human capital cannot be measured easily because it is inherently intangible. Since it is a personal quality, it is also difficult to agree on an objective unit of measurement and to compare the levels of human capital of different people[13].

While the different definitions of human capital converge towards the admission of the intrinsic nature of individuals, debates also arise on the indicator used to measure it[13]. Human capital is a dynamic process that has several facets and encompasses various time horizons[23]. Based on the fact that investments are made in individuals in the hope that they will obtain better financial benefits, some use GDP per capita and wages or unit labor costs (World Bank) as indicators of human capital. The quality of human capital is better if these indices are high, but it does not take into account qualitative aspects. The index developed by the UNDP takes into account health (life expectancy at birth), GDP (income per capita), and education. Another quantitative indicator is the number of employees or the evolution of the working population. Unfortunately, this indicator does not take into account qualifications, i.e., the quality of workers. This is why Angrist et al.[26] developed an indicator based on the quality of education. Some authors measure human capital by a happiness index (HCI), which is a measure of the average level achieved in ar-

eas such as longevity and health, skills and well-being. The factors taken into account in determining these indicators are survival, schooling, and child health. Abdelkhalek and Boccanfuso [27] criticize the HCI by emphasizing the inadequacy of the construction stages, from design to estimation. For them, several sources of uncertainty can be identified. According to Bouda [13], many indices integrate education in determining the index; and even if an individual has natural dispositions for certain knowledge, skills and abilities, education can lead him to improve, or even help those who do not have this natural endowment. Speaking of education, we consider preschool, school, secondary, university, non-formal education, apprenticeship in training centers, experience, qualification and competence, although the latter two are linked to education. Thus, studies use the level of education as an indicator of human capital [13]. Education can be understood by the number of years, expenditure (public or private) in education, formal education and/or non-formal education. Whatever the indicator chosen, the authors are unanimous on the positive impact of human capital on the economic performance of countries [13].

The role of agriculture in the growth of the Gross Domestic Product (GDP) is essential. Agriculture, education and road networks contribute significantly to agricultural growth in all regions, and therefore to economic growth [13]. Studies affirm that education positively impacts agricultural development and agricultural yield [28–30]. Through schooling, farmers increase their management capacity, their ability to perceive and solve new problems and are better able to assess opportunities and associated risks [13, 31]. It promotes efficient allocation of resources, and producers obtain better prices for their products [13]. Education allows for higher productivity by promoting the adoption of new agricultural techniques [13, 28, 32]. Producers with a certain level of education are increasingly inclined to use new technologies or change their attitude [33], which will increase their productivity and production. Welch [34] identified a clear difference between the educated farmer and the low-skilled farmer [13]. He describes two effects of education on agricultural yield: the "worker effect", which indicates the farmer's ability to efficiently exploit a quantity of resources, and the "allocation effect", which describes the educated farmer's ability to decode information on the characteristics of inputs. Once educated, the barriers to accessing information are broken down and they make good use of this information [13]. Bouda [13] showed that recent empirical studies have concluded that education does not have positive effects on agriculture; "the most educated households concentrate on more remunerative or more prestigious jobs" [13]. This is linked to a mismatch of the variables considered in these studies [13, 30]. Indeed, the quality of education data is poor, ranging from overcrowding to the inclusion of individuals who were enrolled but did not validate the year, as well as those who dropped out in the middle of the year [13]. The data could not properly measure the school enrollment rate [30], which explains the negative effect on agriculture. Pritchett [35] concludes that schooling does not effectively affect cognitive abilities or that the formal education received by producers is imprecise in increasing yields [13]. For Yang [36], yield estimates may decrease if farmers' activity is not included [13]. To be efficient, rural households can reallocate at least part of the investment resources initially allocated to non-agricultural activities to compensate for the gaps linked to the inadequacy of the indicators. Thus, some authors propose as indicators the average of years of schooling [13].

In light of the theories underlying a sometimes positive, sometimes insignificant or even negative relationship between education and some aspects of agricultural development, this paper seeks to measure the impact of FDI on human capital and agricultural development in Burkina Faso.

Drawing on empirical work, some authors have used human capital "proxies" among the explanatory variables. According to the World Bank [37], the health and education components of the index are combined to describe their contribution to worker productivity, based on data from rigorous empirical microeconometric studies. The sum of individual dividends from human capital greatly benefits economies because the more human capital accumulates, the richer the countries are; human capital adds to physical capital in the production process and is an important factor in technological innovation and long-term growth [37]. Be-

yond traditional models that assume that technological externalities are exogenous and automatic and do not depend on any transmission mechanism, the endogenization of externalities is based on the prerequisites of technological transfer (human capital, training, learning, role of institutions, technological aptitude, etc.).

Development and investment in human capital and foreign direct investment (FDI) are among the main drivers of economic growth in transition countries [38]. Tabit's work [38] reveals that education, as a factor influencing the progress and sustainability of a company, requires constant investment in qualified and overqualified human capital, making it a priority. Indeed, for him, the process of acquiring people with skills, education and experience is crucial for the development of a country, and foreign direct investment has demonstrated its usefulness in the development of human capital [38]. While it is difficult to construct quality indicators and human capital indicators and the available statistical indicators are recorded as an investment in human resources in a separate category, the literature dealing with the academic approach to FDI analysis assumes that human capital is one of the key factors in attracting FDI and the specialized one specifies the quality of human capital as a determinant of FDI [38]. Several theories have addressed the issue without being able to provide a unified theoretical framework to clearly specify and quantify the impact of this variable in host economies. Schools of thought differ in their response elements due to the evolution of FDI and the approach adopted. In this study, we have focused on a few major theories: Dunning's eclectic approach, neoclassical theory, international trade theory and the New Theories of International Trade.

In studying the role of agricultural growth in economic growth and poverty and hunger reduction, FAO [39] finds that agricultural growth was driven by growth in agricultural labour productivity [39]. This rapid growth in agricultural labour productivity was made possible by an exodus of agricultural workers, driven by the combined attraction of the industrial sector and the desire to leave agriculture [39]. Furthermore, total factor productivity growth in agriculture was higher than in the non-agricultural sector [39]. Overall, agricultural growth probably has a more important role to play as one factor in poverty reduction, rather than as one driver of economic growth [39]. This is because the proportion of people working in agriculture is much higher than the share of economic output coming from agriculture [39]. In Africa, since the 1980s, the World Bank has been particularly interested in finding a link between agriculture and growth and notes an overall growth in the countries (Benin, Cameroon, Central African Republic, Ghana and Togo) between 1980 and 2005 [40]. Agricultural production evolves with modern technology in the agricultural sector. Thus, surplus agricultural labor can migrate to the industrial sector. Gollin, Parente and Rogerson [41] also note that the speed at which labor moves from agriculture to industry depends on the rate of assimilation of technologies. For Ouattara, N'da and Tape-Dali [42], the level of education is a factor in identifying the most capable, increasing qualifications, and implies a direct increase in productivity [42]. Education can improve work and the quality of inputs [42]. Thus, human capital largely explains the divergence observed between the growth of the product and that of the quantity of productive factors employed, leading to a qualitative improvement in the productivity of the labor factor which increases its contributory capacity and promotes economic growth [42]. In the agricultural sector, the production function approach establishes a link with education [42]. On average, traditional agricultural production receives non-zero effects from education [42]. We can also note in the analysis of Ouattara, N'da and Tape-Dali [42], on the role of education on modern agricultural systems, the need to study for better agricultural productivity in Africa [42]. Médard and Henri [1] evaluate the impact of social capital on the technical efficiency of agricultural producers in rural Cameroon. From household data and using the stochastic frontier method, the authors identify the levels and determinants of the technical efficiency of agricultural producers. The education and experience of producers who are heads of households reduce their inefficiency [1]. This is an essential component of policies aimed at eliminating poverty and inequality. Knowledge has become a key factor in the productivity of individuals and nations. The main determinant of a country's standard of living is the extent

to which it succeeds in developing and using the skills, knowledge and work ethics of its population. But producer training policies often have divergent effects on agricultural productivity [42]. After highlighting the literature on the impact of FDI on the interrelationship between human capital and agricultural development, we will present the materials and methods adopted to carry out this research.

3. Materials and Methods

3.1. Choice of Model, Presentation of Data Source Variables

Our basic equation, which is inspired by the work of Dème and Yerbanga [11], is written:

$$Y_{it} = \alpha_i + \beta_k X_{it} + \varepsilon_{it} \quad (1)$$

Y represents the endogenous variable; α constant; βk coefficients of the k exogenous variables; X explanatory variables; i country; t time; Ɛ error term.

By applying this model to the context that takes into account the impact of foreign direct investment on the interrelation between human capital and agricultural development in the countries of the WAEMU zone, our final equation is as follows:

$$\begin{aligned} LnFDI_{ti} = \beta_t + \alpha_1 KHM_{ti} + \alpha_2 Ag_{ti} + \alpha_3 Gouv_{ti} \\ +\alpha_4 PIBT_{ti} + \alpha_5 Ouv_{ti} + \alpha_6 Pop_{ti} + \varepsilon_t \end{aligned} \quad (2)$$

Where t represents the year, i the country, β constant and ε error term. **Table 1** presents the study variables.

We used the same data as Dème and Yerbanga [11] with the only difference that the governance variable was integrated. The data come from the World Bank and the UNESCO databases. The data concern the eight (8) WAEMU countries, namely Benin, Burkina, Ivory Coast, Guinea Bissau, Mali, Niger, Senegal and Togo; they cover the period from 2000 to 2020.

Table 1. Dictionary of variables.

Variables	Definition	Expected Signs
FDI (or IDE)	In the literature and to ensure the robustness of the analysis, two different measures are usually used for inward FDI: FDI in current dollars and the FDI/GDP ratio. However, like Egger et al. [43], and Dème et Yerbanga [11], we use FDI flows. It is measured by inward investment flows in current dollars.	
KHM	The indicator chosen is higher education. According to Egger et al. [43], development positively affects this capital. It is measured by the gross rate of higher education enrollment.	+
Ag	We use value added at the agricultural level (Ag) to analyze the link between FDI. Indeed, if many authors [1, 42] emphasize agricultural productivity, the expected effects are positive. It is measured by the value added of agriculture as a percentage of GDP.	+
PIBT (GDP)	We retain the parents' income. All things being equal, the expected effect must be positive. We use GDP per capita in constant 2000 dollars.	+
OUV	Commercial opening (Ouv) would be in favour of an expansion of FDI [11]. It represents the rate of commercial openness expressed as a percentage of GDP.	+
POP	Population growth can generate a demographic dividend and would be favorable to the development of FDI. On the other hand, if the population growth promotes unemployment, the expected effects in FDI flows would be negative. It is measured by the population growth expressed as an annual percentage.	+/–
Gouv	Governance (Gov) is an indicator that allows us to know the attractiveness of FDI in a country. In the economic literature, it has been shown that good governance (due to the quality of institutions, democracy, freedom of expression, etc.) promotes a good business climate, hence the attractiveness of FDI. On the other hand, an environment conducive to corruption and poor governance would be unfavorable to the attractiveness of FDI. It is measured by the governance index, a characteristic of government efficiency and responsibility from a world perspective.	+/–

Source: Authors.

3.2. Hypothesis Tests

First, we carried out stationarity tests on our variables. In the econometric literature, we have tests of Levin et Lin [44], Im, Pesaran and Shin [45], Maddala and Wu [46], Choi [47] and Hadri [48]. These tests allow us to measure the presence of a unit root, which avoids making spurious regressions. We limited ourselves to the first test [44].

The level of stationarity of our selected variables is analyzed in the **Table 2**.

Table 2. Stationarity tests.

Variables	Level	First Difference	Decision
FDI	2.6967	0.5669 ***	I (1)
	(0.9965)	(0.7146)	
KHM	–0.2830	–4.9114 ***	I (1)
	(0.3886)	(0.000)	
Ag	–1.4742*	–8.4892***	I (0)
	(0.0702)	(0.0000)	
PIBT	–1.1920	–4.4578***	I (1)
	(0.1166)	(0.0000)	
Ouv	–2.5499***	–4.0006 ***	I (0)
	(0.0054)	(0.0000)	
Pop	–3.7198	–6.6045 **	I (0)
	(0.0001)	(0.000)	
Gouv	–2.9979	–4.6500	I (0)
	(0.0000)	(0.000)	

Note: (***): 1% threshold, (**): 5% threshold and (*): 10% threshold.
Source: Authors.

The stationarity tests performed on Stata show that the variables Ag, Ouv, Gouv and Pop are stationary while the FDI, KHM and PIBT are stationary in the first difference.

After checking the stationarity of our variables, we performed cointegration tests (**Table 3**). We focused on the Pedroni test which seems more interesting in our research.

Table 3. Cointegration tests of the variables.

Tests		t-Statistic	Prob.
within	Panel v-statistic	–3.5658	0.0002
	Panel rho-statistic	1.9826	0.0237
	Panel PP-statistic	0.5198	0.3016
	Panel ADF-statistic	1.8654**	0.0311
between	Group rho-statistic	3.5997***	0.0002
	Group PP-statistic	0.3498	0.3632
	Group ADF-statistic	0.2713	0.3931

Note: (***): 1% threshold, (**): 5% threshold and (*): 10% threshold.
Source: Authors. The data used for this variable are the same as in Dème and Yerbanga [11], which leads to the same values.

We note a clear difference between the individual and group test values. We made the estimations with the Pool Mean Group (PMG), which allowed us to have very interesting results. Indeed, two estimation methods are often used to estimate panel data models [49]. The first (group mean estimator) consists of averaging separate estimates for each group in the panel [49]. The second method is the usual panel method (random or fixed effects and GMM methods) [49]. These models force the parameters to be identical across countries and can lead to inconsistent and misleading long-run coefficients, a possible problem that is exacerbated when the

period is long[49]. One advantage of the PMG estimator is that it allows the short-run dynamic specification to be differentiated across countries while constraining the long-run coefficients to be identical[49]. Moreover, unlike the dynamic OLS method (DOLS) and the fully modified OLS method (FMOLS), the PMG estimator highlights the adjustment dynamics between the short and long runs[49]. The reasons for assuming that the short-run dynamics and error variances should be the same tend to be less compelling[49]. Not requiring equality of the short-run slope coefficients allows the dynamic specification to differ across countries[49]. Martínez-Zarzoso and Bengochea-Morancho[50] add that the PMG estimator is an intermediate estimator between the DFE and the MG since it involves both clustering and averaging[50]. For him, the PMG allows short-term coefficients, adjustment speed and error variances to differ across countries, but imposes common long-term coefficients[50]. This estimator is particularly suitable for panels with large T (time interval) and N (number of countries). It does not impose homogeneity of short-term slopes and it allows dynamics[50].

4. Results

We present the results of the estimations before proceeding to the discussion. **Table 4** shows the descriptive statistics of our variables.

Table 4. Descriptive statistics.

Variable	Obs	Std. Dev.	Min	Mean	Max
FDI	168	2.81e+08	–1.81e+08	2.42e+08	1.85e+09
KHM	168	3.798619	0.87438	6.254273	15.96484
Ag	168	8.77063	12.24591	25.93513	41.36694
Gouv	168	12.74075	1.923077	27.62915	55.13514
PIBT	168	443.3487	389.0775	906.637	2325.724
Pop	168	0.4345849	2.000212	2.852933	3.867091
Ouv	168	14.69828	30.36824	55.37382	112.761

Source. Authors. The data used for this variable are the same as in Dème and Yerbanga[11], which leads to the same values.

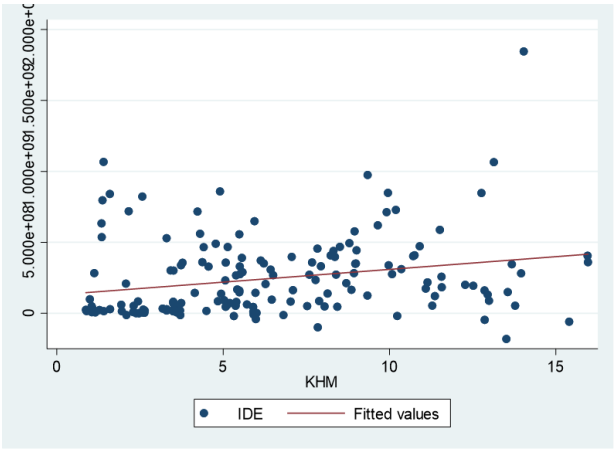
The average added value of agriculture (Ag) is 25.93513 and the extreme values are respectively equal to 12.24591 (min) and 41.36694 (max). Governance (Gov) has an average of 27.62915 with a minimum of 1.923077 and a maximum of 55.13514. For the rest of the variables we have practically the same results as Dème and Yerbanga[11]. **Table 5** shows the correlations between our variables.

Human capital (KHM), agricultural value added (Ag), governance (Gov), parental income (GDP), openness rate and population growth rate are positively correlated with FDI. These correlations are confirmed by the scatter plots (**Figure 1**).

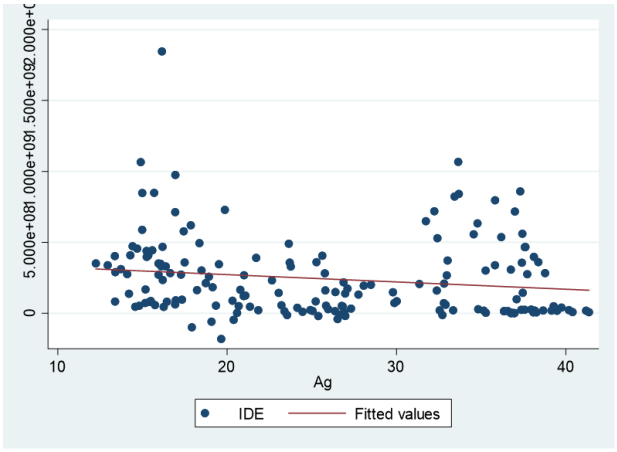
Table 5. Relationship between variables.

Variables	FDI	KHM	Ag	Gouv	PIBT	Pop	Ouv
FDI	1.0000						
KHM	0.2427***	1.0000					
Ag	0.1606**	0.5845***	1.0000				
Gouv	0.0728	0.4164***	0.5684***	1.0000			
PIBT	0.4089***	0.5910***	0.6180***	0.0588	1.0000		
Pop	0.1707**	0.3800***	0.5157***	0.0581	0.5018***	1.0000	
Ouv	0.0552	0.3210***	0.1890**	0.1175	0.0290	0.1793**	1.0000

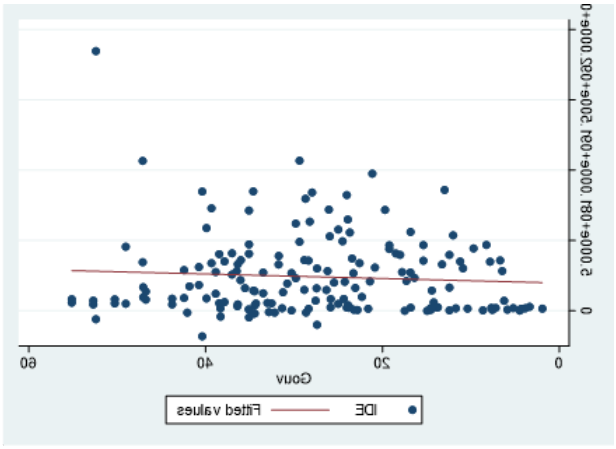
Note: (***): 1% threshold, (**): 5% threshold and (*): 10% threshold.
Source: Authors.



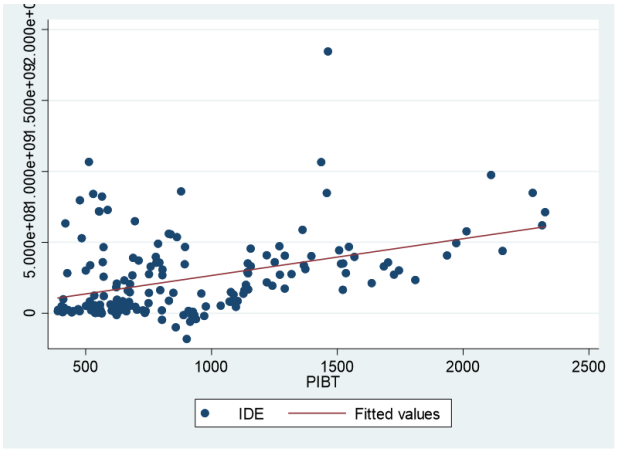
(**a**) correlations between FDI and KHM



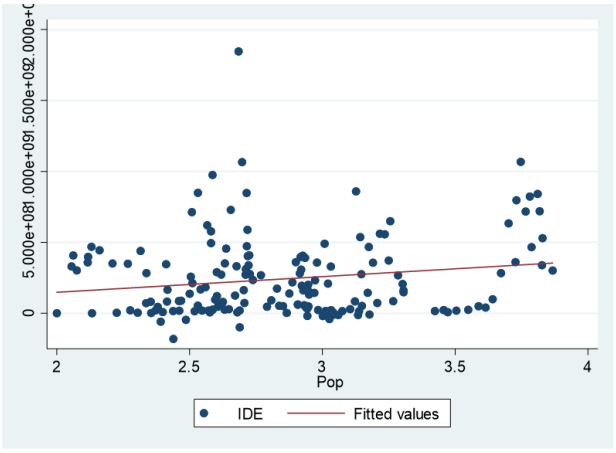
(**b**) correlations between FDI and AG



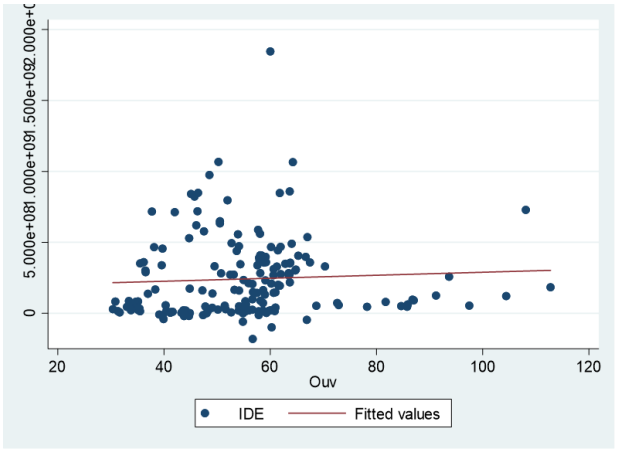
(**c**) correlations between FDI and Gouv



(**d**) correlations between FDI and PIBT



(**e**) correlations between FDI and Pop



(**f**) correlations between FDI and Ouv

Figure 1. Scatter plot and correlation.

Source. Authors.

We estimated our model by the PMG method and the results are as follows (**Table 6**).

Table 6. PMG regression.

Dependent Variable: LnFDI			
Variables	**Coefficient**	**Std. Err.**	**P-Value**
	Long Term		
KHM	0.7690021		0.259
	(0.6815847)		
Ag	0.130007 ***		0.082
	(0.7461168)		
Gouv	0.6173648***		0.026
	(0.2764966)		
PIBT	0.385886.4**		0.001
	(0.119941.8)		
Pop	0.150008***		0.146
	(0.1.03e+08)		
Ouv	0.6936940***		0.000
	(0.991045)		
	Short Term		
ECT	0.6061258		0.000
	(0.1715952)		
D. KHM	–0.7346408		0.873
	(0.4.61e+07)		
D.Ag	–0.6181492		0.446
	(0.8111005)		
D.Gouv	–0.7748452		0.236
	(0.2866442)		
D.PIBT	0.3399543		0.099
	(0.0589464)		
D.Pop	–3.76e+07		0.792
	(0.430008)		
D.Ouv	0.1806823		0.654
	(0.4028056)		
Constant	1.42		0.02
	(0.60493)		
Number of observations	168		
Number of countries	8		
Log likelihood	–85.62		

Note: (***): 1% threshold, (**): 5% threshold and (*): 10% threshold.
Source: Authors.

5. Discussion

We find that FDI increases with human capital by 79.90% in the long run, all things being equal. The impact of agricultural development on FDI is positive and significant at 10%. When the level of agricultural development increases by 13%, FDI increases by 1%. We can therefore think that in the opposite direction, FDI positively impacts agricultural development. This is explained by the fact that FDI has a direct impact on growth. Indeed, according to the FAO [39], for agricultural growth to extend to the poor, it must use the factors of production available to the poor. Given that the poor have only their labor force to offer, to reduce poverty and improve access to appropriate food, both quantitatively and qualitatively, it is therefore absolutely necessary for growth to create jobs, increase wages and improve the quality of jobs [39]. This confirms the thinking of Gollin, Parente and Rogerson [41], which stipulates that FDI is favorable to the development of agriculture. Noting that African agriculture was on a growth trajectory, the World Bank [51] notes that African leaders again gave agriculture top priority in 2004 [51], but one may wonder whether this desire is still relevant given the difficulties in feeding populations properly. The investment plans and programs developed by the CAADP, although of good technical quality, suffered from implementation difficulties at the country level due to the frequent lack

of qualified technical personnel [51]. The World Bank [51] emphasizes that improvements in this sector have a positive correlation with all major economic and social indicators such as economic development, external income, the labor market, food security, poverty reduction, and equity [51]. The results of Kouakou [52] show that Gross Fixed Capital Formation (GFCF) makes it possible to increase agricultural production; this agricultural production, in turn, positively impacts the living conditions of the populations in Côte d'Ivoire. These elements support our results obtained.

FDI impacts governance with a positive effect (61%) and is significant at 5%. FDI is therefore favorable thanks to better governance. According to Lepage and Cheriet [53], the agricultural producer is recognized as being primarily responsible for the management of his farm and the strategies put in place to operationalize its growth. He is supervised and influenced in his strategic choices by a governance system [53]; and the desire for growth rather than independence encourages these producers to develop and formalize the functioning of their organization and their governance structure in order to achieve their objectives [53]. However, trust remains a preferred governance mechanism; it does not prevent producers from structuring their way of doing things, deciding in order to achieve their growth objective, and convincing governance actors to support them in this process [53]. These results show how important a good governance system is for agricultural development and the attractiveness of FDI. The effect of FDI (38.58%) on GDP indicates that high incomes may be due to the entry of foreign capital. The results obtained by Mansouri [54] reveal that labor (L) and capital positively affect Morocco's GDP. For Kouakou [52], citing UNCTAD [55], with a minor role in agriculture and that in general, FDI is mainly focused on downstream activities (processing, manufacturing, trade, etc.) [52]. Just like in the cases of Dème and Yerbanga [11], a 1% increase in FDI is due to a trade openness of almost 69.36% [11]. However, open economies can attract significant FDI. In addition, a large population provides labor to businesses but also to consumers. This therefore benefits foreign investors [11].

6. Conclusions

This article sought to measure the impact of FDI on the interrelationship between human capital and agricultural growth in the WAEMU countries. The econometric model was estimated using the Pooled Mean Group method. The estimates reveal an impact on the interrelationship between human capacities and agricultural development in the WAEMU countries. Furthermore, it is certain that the presence of foreign investments in the WAEMU zone has created activities (jobs, exports, etc.), which remain insufficient in relation to the potential of the zone. Indeed, FDI, as a driver of revitalization and a lever for structural transformation of the economies of the WAEMU zone, is largely concentrated in sectors with medium or low technological content. These inadequacies are explained by the absence of sufficiently dynamic sub-regional policies capable of boosting development by raising the level of human capital and promoting sustainable and profitable agriculture. Similarly, these investments have not enabled local industrial integration. As a result, few domestic sectors are created and most inputs are imported, which worsens the current account deficits of WAEMU countries. The challenge would be not only to increase and facilitate the entry of foreign investments, but also to target specific categories of investments with significant technological content, in particular through the transfer of sophisticated technologies and good managerial practices in the agricultural sector. One of the most effective strategies would be to diversify training in agricultural professions that aim to improve farmers' profitability. Consequently, it is essential to adopt more effective strategies and to implement policies to strengthen the capacities of agricultural producers. Hence the importance of the implications in terms of economic policy for the WAEMU countries. It is a question of further developing human skills so that countries can both attract FDI and fully exploit these benefits on the productivity of the national economy through the assimilation of foreign technologies. In partnership with foreign investors, it is necessary to stimulate the growth of local production. It would be necessary to guarantee free access to the factor market for farmers in the

WAEMU countries with the agri-food policy that could lead countries to acquire competitive technical skills. Indeed, it is necessary to (1) diversify training in specific professions that aim to improve farmers' productivity; (2) thoroughly reform the education system; (3) increase access to technological offers; (4) make the private sector more and better responsible so that it develops initiatives in the field of education and collaboration with local authorities and individual operators; and (5) promote good governance because it is a factor in attracting FDI.

Author Contributions

Conceptualization, D.E.H.Y. and D.S.A.; methodology, D.E.H.Y.; software, D.E.H.Y. and D.S.A.; validation, D.E.H.Y.; formal analysis, D.E.H.Y.; data, D.E.H.Y. and D.S.A.; writing—preparation of original draft, D.E.H.Y.; writing—review and editing, D.E.H.Y.; visualization, D.E.H.Y.; supervision, D.E.H.Y.; project administration, D.E.H.Y.; funding acquisition, D.E.H.Y. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement

The data used in this published article come from the World Bank database (https://donnees.banquemondiale.org/) and UNESCO (https://data.uis.unesco.org/?lang=fr).

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Conflicts of Interest

All authors disclosed no any conflicts of interest.

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