



*The effect of foreign direct investment in the agricultural sector
on food security in a sample of African countries during the
period 2012-2018.*

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Abstract

This study aimed to analyze the impact of foreign investment in the agricultural sector on food security. By conducting an empirical study on a sample consisting of 10 African countries, during the period 2012-2018. The Global Food Security Index (GFSI) as a dependent variable expressed food security, while the independent variables included foreign direct investment, expressed as net inflows of foreign investment in the agricultural sector (FDI), and gross domestic product (GDP) per capita.

One of the most important results reached is that foreign direct investment in the agricultural sector did not have a significant effect on the level of food security in the host countries. The most important recommendation presented in this study is that in order to improve the level of food security in African countries, the governments of those countries are required to work on developing local production, by providing the best conditions for technological transfer from foreign direct investments to local producers.

Keywords: foreign direct investment; agricultural sector; technological transition; food security.

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1. INTRODUCTION

The problem of food security has been the focus of attention of many governments and international organizations. This last one did. She analyzed the evolution of this problem and its possible solutions. Therefore, the food crisis in the world has witnessed a significant decline over the past decades. This reflects the effectiveness of the policies used in fighting this crisis. However, with the advent of the Corona pandemic and its spread across various countries of the world, malnutrition indicators have risen again. The year 2020 recorded an increase in the number of people suffering from hunger in the world by about 90 million people (FAO, WHO, UNICEF, & WFP, 2023).

With the decline of the coronavirus phenomenon and the return of economic activities to their previous state, the number of people suffering from hunger witnessed a decline, the severity of which varied from one country to another. The least developed and middle-income countries witnessed a slight improvement in food security indicators. This improvement did not last long until the Ukraine war crisis came, which opened the door again to the worsening of the malnutrition crisis throughout the world.

African countries are considered among the largest countries that have suffered from the hunger crisis in the world. The Prevalence of undernourishment (PoU) moved from 19.4% in 2021 to 19.7% in 2022 (FAO et al., 2023). The number of individuals suffering from hunger in Africa also reached 11 million individuals since 2021, and 57 million people since the spread of coronavirus pandemic (FAO et al., 2023). In the face of this noticeable spread of malnutrition, it has become necessary to intensify efforts to control the phenomenon. Among the solutions that have been proposed is to encourage foreign direct investments in the agricultural field, with the aim of reducing malnutrition at the level of host countries. Hence, the problem of this study was represented in the following question:

How did inward foreign direct investment in the agricultural sector affect food security in the study sample?

To answer this problem, the following sub-set of questions was posed:

- Did foreign direct investment in the agricultural sector have the same effect on food security in the countries studied?
- How did per capita GDP affect malnutrition indicators?

The main hypothesis and sub-hypotheses of the study are as follows:

- Foreign direct investment in the agricultural sector has a positive and significant effect on food security in the study sample.
- The effect of foreign direct investment in the agricultural sector on food security in in the study sample varies from one country to another.
- The gross domestic product per capita has a positive and significant effect on the food security level in the study sample.

This study aims to shed light on the effectiveness of incoming foreign direct investments in the agricultural sector on malnutrition indicators in a sample of African countries. The importance of the study is evident through the importance of analyzing the effectiveness of the various solutions proposed to address the phenomenon of food security and malnutrition in the countries studied.

The remaining parts of the study were divided as follows: The second section deals with the theoretical and empirical literature of the study. In the third section, the study methodology was presented. The fourth part presents the results and discusses them. The fifth and final section contains a conclusion in which the most important results of the study and recommendations are presented.

2. The theoretical and empirical literature review

2.1 The literature review

The Organization for Economic Co-operation and Development views foreign direct investment as being essentially based on the existence of a lasting interest and a long-term relationship between a foreign investor and a local institution (OECD, 2008). This relationship gives the foreign investor the ability to influence the management of the local enterprise (Neuhaus, 2006). The definition focused on the existence of a long-term relationship between the foreign investor and the local institution, whether he owns it completely or partially. The definition did not clarify the exact form of the relationship, which means that there are different forms of foreign direct investment.

Foreign direct investment has a significant ability to achieve prosperity in the economies that attract it, and this is through its contribution to providing capital and modern technology to those economies (Caves, 1974; Rodriguez-Clare, 1996; Newman, Rand, Talbot, & Tarp, 2015). In addition to its contribution to the development of that country's foreign trade (Li & Tanna, 2019). Despite the

importance of foreign direct investment, the agricultural sector's share is limited, as its value does not exceed 5% in many countries (Gerlach & Liu, 2010; Liu, 2014).

The period since the mid-1990s has been marked by an improvement in the agricultural sector's share of total foreign direct investment flows, especially the period that followed the 2007/2008 mortgage crisis, when many countries suffered from high food prices at the global level (Weingärtner, 2010). Which prompted it to search for the best sustainable ways to achieve food security. This made countries with significant population growth and financial capacity look to invest their capital in the agricultural sector outside the borders of their country, and this is in countries that enjoy an abundance of arable land and suffer from weakness in their agricultural productivity. All this in order to avoid the specter of poor food supply in their countries of origin (Dogan, 2022). What increased the importance of studying food security was the outbreak of the Russian-Ukrainian war and the increasing fears of a decline in the level of food security in many developed and non-developed countries (Nyiwul & Koirala, 2022).

To talk about the relationship between food security and foreign direct investment, it is necessary to define the concept of food security and present the conditions for its emergence and indicators for measuring it.

The United Nations Food and Agriculture Organization discussed food security for the first time officially during the World Food Summit in 1974 in Rome. According to it, food security expresses "ensuring the availability at all times of adequate global supplies of basic foodstuffs through appropriate reserves" (United_Nations, 1975, p. 3). This definition explains the traditional view of food security, by focusing on the amount of food available, and the stability of its availability, that is, the extent of its availability at all times. In 1983, a new dimension was added to the traditional concept. It is the extent of consumers' ability to acquire food, in addition to the volume and stability of available food (FAO, 1983, p. 14). That is, food security is achieved by "ensuring that all people, at all times, have physical and economic access to the basic food they need" (Maxwell, 1996).

In 1986, a distinction was made between the problem of chronic food insecurity, which is imposed by the structural characteristics of the country's economy and its level of poverty. And the problem of transitory food security, which is caused by temporary natural, economic, and political crises that have occurred in the economy of a particular country or group of countries (World_Bank, 1986). Therefore, the solutions adopted to achieve food security differ between the problem of chronic and transient food security. Considering that, the latter is linked to the effects of the crises causing it.

The food quality feature was also added later. By talking about a healthy food. That is, the following sentence was added to the definition of food security: "Access of all people at all times to sufficient food for an active and healthy life" (FAO, 2003, p. 27).

Accordingly, the comprehensive definition of food security became as follows: "Food security, at the individual, household, national, regional, and global levels. Food security exists when all people, at all times, have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (FAO, 1996).

In 2001, a modification was added to that comprehensive definition, by introducing the social dimension into food security. Accordingly, the new definition of food security became " Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (Berry, Dernini, Burlingame, Meybeck, & Conforti, 2015). This reflects the growing interest in developing a comprehensive concept of food security, through which policies that allow its achievement can be identified.

Beginning in 2009, an additional fourth pillar was added to the previous food security pillars. This is related to the pillar of stability and sustainability, as food security programs seek to ensure the availability of food with the required characteristics during a certain period of time, that is, at least its availability in the short and medium term (Berry et al., 2015). It is clear from the historical development of the concept of food security that the latter depends on four basic dimensions (BenSlimane, Huchet-Bourdon, & Zitouna, 2016; Peng & Berry, 2019).

- Food availability: It expresses the amount of food available in various geographical regions, as well as the extent of its access to various regions of the world. Some researchers believe that the problem of famine in the world does not mean that global food production does not cover the global need for consumption. However, statistics indicate that there is a sufficient amount of food, sufficient to cover all the needs of the world's population. However, some areas in the world do not receive the food they need (Sen, 1981), and this could be due to weak infrastructure, or the decline in financial resources of some countries, which limits their ability to import the food they need.

- Food Accessibility: This dimension expresses the ease of access to food for all people in the world. Some regions in the world have a large and diverse supply of food, but some social groups cannot satisfy their food needs. That is, they see food with their own eyes but cannot obtain it, and

this is due to the poverty of those social groups and their weak purchasing power.

▪ **Food Utilization:** It expresses how food is used, and the energy and benefit that an individual can get from eating that food. This is based on the materials used in food production, the technology used in watering crops, and the genetic modifications that affect food, which may produce new types of diseases. In addition to this, health care and sanitation services are added. And nutritional culture among community members, especially as it relates to healthy nutrition for infants and young children.

▪ **Food Stability:** This dimension is related to time, as it expresses the extent of the availability of food security in its various previous dimensions over time. Therefore, it expresses the extent of the ability of countries and individuals to adapt to some of the natural and human crises that occur. This results in a shortage in the quantity of available food and an increase in its prices, which may limit the ability to acquire it.

Based on the set of four dimensions mentioned above, it is possible to analyze the level of food security in a particular country. However, the main problem in the analysis process lies in the nature of the relationship between these dimensions. Considering that they are interconnected and affect each other.

The relative importance of each of them varies from one place to another and from time to time. Therefore, there is no specific relative weight for each of them. That is why; beginning in 2009, FAO relied on using the term path Instead of pillars. Which shows “the links from food production (availability) to the household (accessibility) to the individual (utilization). Accessibility relates to physical (transport, infrastructure) and economic means (food purchasing power). It also involves socio-cultural access and preferences and its health effects and, with them, the importance of social protection. Stability thus emphasized the importance of bringing a time dimension, albeit short term, to food security” (Berry et al., 2015). The path expresses the interconnected relationship between those dimensions, as the availability of food affects the ability of individuals to access it, and any loss in agricultural production or shortage of food imports will affect It affects the amount of food available to individuals, which affects its prices, and thus affects the purchasing power of individuals.

On the other hand, individuals' ability to access food affects the type of food available for consumption. Therefore, the energy that food will provide is related to the type of food available. Accordingly, the causal relationship becomes clear from the first dimension (food availability) to the

second dimension (the ability to obtain food) and then to the third dimension (food use). However, this does not deny the existence of a feedback relationship between these dimensions. The fourth dimension (food stability) expresses the development of these three dimensions over time.

Food security has been expressed based on a set of indicators, some of which are comprehensive, while others are specific to one of the four dimensions of food security mentioned previously. The Prevalence of Undernourishment indicator is considered one of the indicators approved to express the general level of food security in a country. This indicator measures the percentage of individuals who do not obtain sufficient food to provide the energy needed for a healthy and more active life (De Haen, Klasen, & Qaim, 2011), and the higher this percentage, the more it indicates a weak level of food security in that country. This index is calculated by comparing the probability distribution of the usual daily dietary energy consumption, with the minimum necessary for a healthy and more active life, which is known as the “minimum dietary energy requirement.” Thus, the percentage of individuals who have not reached that minimum requirement is reached (FAO., 2013, p. 46).

In addition to the previous index, there is the Global Food Security Index (GFSI), which was developed by the Economist Effect magazine and with the support of Corteva Agriscience, a company specializing in the production of plant protection products and agricultural seeds that was created in 2019. The GFSI evaluates security Food in 113 countries across four main pillars: affordability, availability, quality and safety, sustainability, and adaptation. The index is based on a dynamic measurement model created from 68 food security sub-indicators (The_Economist_Impact_team, 2023). In addition to the overall indicators mentioned above, there are indicators that measure each of the dimensions of food security mentioned.

Foreign direct investment in the agricultural sector can contribute to achieving food security at the level of its host countries through a range of channels. The agricultural productivity improvement channel is considered the most important. Considering that foreign direct investment can develop agricultural productivity in the host countries through developing agricultural technology for local investors through contact with foreign investors (Crespo & Fontoura, 2007; Takii, 2011), as well as the transfer of qualified labor to the host countries (Görg & Greenaway, 2004). Therefore, local and foreign investors contribute to the development of local agricultural technology and thus improve the level of productivity (Huang & Zhang, 2017).

Experience has shown that local companies have significant experience in their field of production. It also has a great interest in the field of research and development. They have a greater ability to acquire technology brought by foreign direct investments (Liang, 2017; Makiela & Ouattara, 2018). Therefore, the process of transferring technological development through direct foreign investments to host countries is not a permanent matter but rather requires the availability of some conditions and characteristics in the host countries and their local facilities.

On the other hand, foreign direct investments create competition within the local market for agricultural products. This improvement in competition creates an incentive for local enterprises to adopt technological innovations in the agricultural field (Malikane & Chitambara, 2018). In addition to increasing its interest in research and development in search of developing new innovative technologies of its own, which constitute a sustainable competitive advantage for it.

However, the effect of foreign direct investments on competition within the country's economic sectors remains a relative matter, determined by some characteristics of the sector concerned with investment in terms of entry and exit barriers. As well as the degree of differentiation of products with it, that is, is there a great deal of scope for differentiating products with it, or not. Which makes the competition greater in price than in terms of quality. In addition to the characteristics of the sector itself, there are the characteristics of the institutions active in it, especially the local ones. In terms of the competitive advantages it enjoys. All of these characteristics have the ability to determine the amount of competition that could result from the entry of direct foreign investments into the sector.

On the other hand, competition may result in foreign investors becoming monopolists within the local market for agricultural products. This could result in negative damage to local producers and consumers and to the local economy as a whole. Which may eliminate local production in that sector (Demena & van Bergeijk, 2019). This problem is exacerbated by the fact that local investors give up significant portions of their lands to foreign investors in the form of sale or rent, as they are content with the rents they obtain to escape the hardship of investment (Smith & Haberli, 2012). This may increase the level of unemployment, in addition to working to raise the prices of agricultural and food products, and limit the available quantities of them to the extent that maximizes the benefit of the monopolist (Dogan, 2022). Thus reducing the purchasing power of the local consumer, which may have a negative effect on the level of food security in the host country.

2.2 The empirical review

Many studies have attempted to test the effect of foreign direct investment in general, and agricultural investment in particular, on food security in host countries. Among these studies, the following can be mentioned:

(Djokoto, 2012) on Ghana during the period 1995-2007. It concluded that there is a positive and significant effect of foreign direct investment in the agricultural sector on the level of food security in Ghana.

A study by (BenSlimane et al., 2016) on the effect of foreign direct investment on food security. They relied on dividing foreign direct investment into sectors (three main sectors: primary sector, secondary sector, and tertiary sector). Using a panel of 55 developing countries, during the period from 1995 to 2009. The study concluded that foreign direct investment in the primary sector, represented by the agricultural sector, had a positive effect on food security, while the effect of investment in other sectors was negative.

In a study by (Santangelo, 2018), which included a sample of 65 countries during the period 2000-2011, where the researcher focused on analyzing the effect of foreign direct investment in the agricultural sector on the nationality of the foreign investor. The study found that investments coming from developed countries had a positive effect on the food security of host countries, while foreign investments coming from developing countries had a negative effect. According to him, investors coming from developed countries have the incentive and ability to develop agriculture in the host country quantitatively and qualitatively, in addition to transferring modern technology to it, and this is mainly due to the large technological gap between the two countries.

A study by (Fleming, 2019), on the effect of foreign direct investment in the agricultural sector on food security, for the families of employees working in these foreign investments in a village in Mozambique. The study concluded that the presence of these investments improved the standard of living for employees' families.

A study by (Wardhani & Haryanto, 2020) on a sample of 20 developing countries during the period 2012-2017. His study relied on measuring food security through the Global Food Security Index, and also used foreign direct investment in agriculture, forestry, and fishing as one of the independent variables in the study model. The study found a positive effect of foreign direct

investment in agriculture on food security.

A study by (Yao, Alhussam, Abu Risha, & Memon, 2020) on a sample of countries affiliated with the Belt and Road Initiative during the period 2006-2015. Using the two stages least squares method 2sls, the study found a difference in the direction of causality between food security and foreign direct investment in the agricultural sector. However, the results proved that there is a positive and significant effect of foreign direct investment in the agricultural sector on food security, whether the effect is direct or indirect.

A study by (Dogan, 2022) on a sample of 56 developing countries, during the period from 2005 to 2020. The study relied on two food security indicators, which are the Prevalence of undernourishment PoU, and the dietary energy consumption index. This study found that foreign direct investment in the agricultural sector does not always lead to enhancing food security in the host country. The recent wave of agricultural land investments is characterized by the search for resources, and its main motive is to enhance food security in the investing country, not the host country. The study also pointed out the importance of the agricultural land governance element in making good use of foreign direct investments to develop food security in the host country.

3. Methodology

Through this section, we will attempt to address the components of the study sample. In addition to presenting and analyzing the adopted variables and their data sources. Then the various forms of the study model will be presented.

3.1 The study sample

The study sample consisted of a group of African countries. Data for which was easily obtained from international databases. The sample included 10 countries: Zambia, Tanzania, Uganda, Rwanda, Tunisia, Morocco, Kenya, Egypt, Ghana, and Mozambique; the data for these countries was analyzed for the period from 2012 to 2018, based on the available data. The data was obtained from the Food and Agriculture Organization (FAO) website, as well as from the World Bank database.

3.2 The study variables

The dependent variable is the Global Food Security Index (GFSI), which was developed by Economist Impact magazine. The GFSI assesses food security in 113 countries across four main

pillars: affordability, availability, quality and safety, sustainability, and adaptation. The index is based on a dynamic measurement model created from 68 food security sub-indicators (The_Economist_Impact_team, 2023). This indicator takes values between 0 and 100, where 100 is the best value for food security.

Explanatory variables include the following:

Net Inward foreign investment in the agricultural sector (FDI): This study uses Inward FDI in agriculture, forestry, and fisheries in developing countries in the period 2012-2018 as an independent variable. Its data was obtained from the Food and Agriculture Organization (FAO) website. This variable takes positive and negative values, and the larger its value, the more it indicates the presence of an inflow and outflow of foreign capital. Therefore, we find that its negative values mean that at least one of the components of foreign direct investment is negative and is not matched by positive amounts of the remaining components. It is the case of reverse investment or disinvestment. This variable was used with a two two-time period, given that its expected effect on food security does not appear in the same year.

GDP per capita: GDP divided by population at the middle of the year. GDP per capita is the sum of gross value added by all resident producers in the economy plus any product taxes (less subsidies) not included in the valuation of output, divided by mid-year population. Data are in current US dollars. Data were obtained from the World Bank database.

3.3 Presentation of the study model

We relied on Panel data, as there are three main forms that this type of model can take: the pooled model, the fixed effects model, and the random effects model.

The pooled model means the general model, in which there are no individual effects that distinguish between the members of the study sample. The study model can be formulated according to the pooled model as follows (Greene, 2018, p. 383):

$$GFSI_{it} = a_{0i} + a_1 FDI_{it} + a_2 GDPP_{it} + \varepsilon_{it}$$

Based on the previous pooled model, a fixed effects model can be derived from it. This is done by dividing the constant coefficient a_{0i} into a fixed part a_0 and a fixed part a_i that varies from one unit to another (Bourbonnais, 2015, p. 355). That is:

$$a_{0i} = a_0 + a_i.$$

Therefore, the new form of the fixed effects model becomes as follows:

$$GFSI_{it} = a_0 + a_i + a_1 FDI_{it} + a_2 GDPP_{it} + \varepsilon_{it}$$

The random effects model of the study model is distinguished by the fact that the random error coefficient ε_{it} is a composite of the value of the random error ϑ_{it} in addition to a fixed part that characterizes the individual effect of each item a_i , that is: $\varepsilon_{it} = \vartheta_{it} + a_i$ (Bourbonnais, 2015, p. 357). Accordingly, the new form of the study model according to the random effects model becomes as follows:

$$GFSI_{it} = a_{0i} + a_1 FDI_{it} + a_2 GDPP_{it} + \vartheta_{it} + a_i$$

In order to determine the best form for estimating the parameters of the study model. A set of statistical tests will be used to compare these models. This will be presented in the following items.

4. RESULTS AND DISCUSSION

4.1 Estimating the three panel models

In order to analyze the relationship between the study variables, the three forms of the study model will initially be estimated: the pooled model, the fixed effects model, and the random effects model. In the next element, a comparison will be made between these models. The following table summarizes the estimation results for each of the previous models.

Table 1. the estimation results of the three forms of the study model

Dependent variable : GFSI					
T=5	N=10	number of observation = 5×10 =50			
variable	the pooled model		the fixed effects model		the random effects model
FDI(-2)	(0.1039)	0.0012	(0.2314)	0.0022	0.0030 (0.3183)
GDPP	(11.9655)	* 0.004	(1.1508)	0.0018	(6.2920) *0.0040
C	(50.3438)	*42.3462	(15.8700)	* 46.8845	(30.1534) *42.9146
R2	0.7531		0.8920		0.4558
F-statistic	71.6852		28.5542		19.6878
Prob (F-statistic)	0.0000		0.0000		0.0000
Breusch-Pagan LM test	18.2862	(0.0000)			
Hausman Test	2.2563	(0.3236)			

Source: Eviews 13 software outputs

(...) means the value of the t-student statistic, while the sign (*) means that the coefficient is significant at the 5% level.

It is clear from the previous table that the coefficients of the variables and their significance differ from one model to another, so a comparison must be made between these models in order to analyze the relationship between these variables.

4.2 Comparison between panel data models

The restricted F test will be relied upon to compare between the pooled effect model and the fixed effect model. While the Breusch-Pagan LM test will be relied upon to compare the random effects model and the pooled model. The Hausman Test will also be used to compare the fixed effects model and the random effects model, and the results of these tests are as follows.

The F-test value is calculated according to the following equation:

$$F = \frac{(R_{FEM}^2 - R_{pooled}^2)/(N - 1)}{(1 - R_{FEM}^2)/(NT - N - K)}$$

Therefore, the test result is as follows:

$$F = \frac{(0,8920 - 0,7531)/(10 - 1)}{(1 - 0,8920)/(50 - 10 - 2)} = 5.43$$

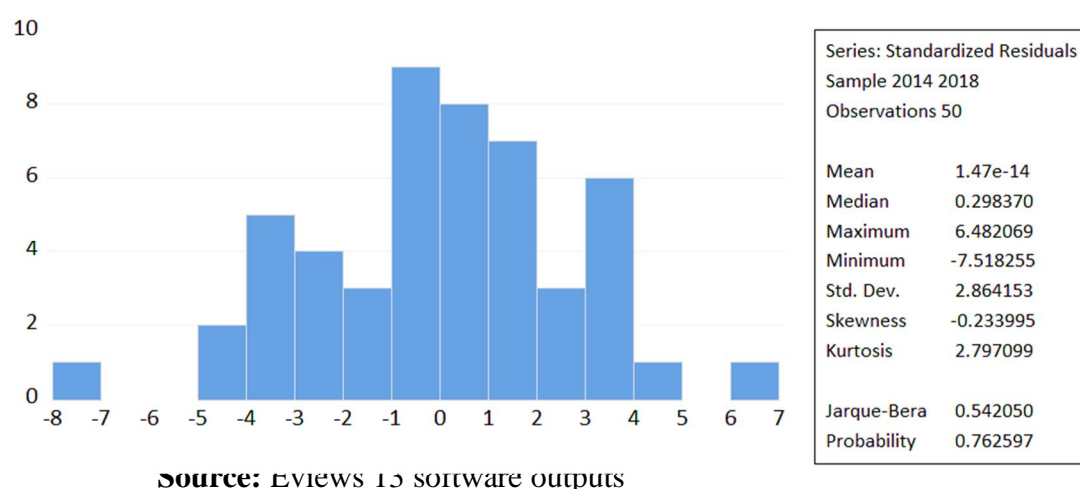
By comparing the calculated F value with the tabulated F value ($F_{38}^9 = 2.14$), we find that the calculated value is greater than the tabulated value, which means that the fixed effects model is better than the pooled model.

To compare **the random effects model and the pooled model**, we use the **Breusch-Pagan LM test**. The null hypothesis of this test is **that there are no special differences in the effect between one individual and another. There are also no differences in the effect from time to time**. While his alternative hypothesis states that the random effects model is the best (Baltagi, 2005, p. 59), the test result is determined based on the chi-square statistic (Le, Singh, & Nguyen, 2015, p. 205), and the previous table shows the results of the comparison test between the random effects model and the pooled model. We note that the value of the Breusch-Pagan LM test amounted to 18.2862, and this value was significant at the 5% level. This indicates that the null hypothesis was not met, and the alternative hypothesis was met, which states that the random effects model is the best.

The Hausman test allows comparison between the random effects model and the fixed effects model. The null hypothesis of the test states that the random effects model is better than the fixed effects model, and the previous table shows the probability of test values was 0.3236, which is greater than 0.05, which means accepting the null hypothesis, which states that the random effects model is the best;

We conclude, through the previous three tests, that the random effects model is the best model for estimating the parameters of the study model compared to the rest of the other models, and for this reason, it will be relied upon in the analysis process.

The following figure shows the results of the Jarque-Bera test for the normal distribution of the residual series.

Fig.1. the Jarque-Bera normal distribution test of the residual series.

Source: EViews 15 software outputs

The results show that the value of the Jarque-Bera coefficient reached 0.5420, and its probability value reached 0.7625, which means that the null hypothesis of the test is met, which states that the residual series follows a normal distribution.

4.3 Discussion

The results of the comparison between the three models for panel data showed that the random effects model is the best. The estimation results for this model showed that its R-squared was 0.4558, which means that the model is able to explain 45.58% of the change in the food security variable, and the remaining percentage is due to other factors not included in the study model. The results also show that the value of the Fisher coefficient for the model as a whole reached 19.6878, which is significant at the 5% significance level, which means that the study model is significant.

The results of the study showed that the coefficient of the foreign direct investment variable has an insignificant effect, as its Prob value reached 0.7517, which is greater than 0.05. Therefore, foreign direct investment has no effect on the level of food security in the countries studied. This is the same result reached by a study (Dogan, 2022).

The GDP per capita variable had a positive and significant coefficient. This means that the greater the value of the per capita GDP, the higher the level of food security in the country. This is a logical result, given that the more the incomes of the individual and the country improve, the more this will lead to improving the country's ability to import the foodstuffs it needs. This leads to the availability of foodstuffs for individuals, as well as increasing their ability to acquire their food needs

(so, there is an improvement in both the supply and demand aspects of food products in the country). This result is consistent with what was found in the study of (Yao et al., 2020; Dogan, 2022).

5. CONCLUSION

This study examined the effect of foreign direct investment in the agricultural sector on food security in the countries hosting it. By studying a sample of 10 African countries during the period 2012-2018. The study presented the concept of foreign direct investment in the theoretical literature, its importance to host countries, and its specificities in the agricultural sector. then also discussed The concept of food security and how the concept has developed from the point of view of the United Nations, in addition to presenting its dimensions and indicators for measuring it.

Finally, we will discuss the ways in which foreign direct investment (in theory) can contribute to improving food security in the countries hosting it. Do its effects on food security have the same result or can it have negative effects? After examining the field literature as well as the standard study, a set of results was reached, including the following:

- The effect of foreign direct investment in the agricultural sector on food security can be affected by the original nationality of the investment itself; It varies from one country to another according to the specificities of that country (the level of technology and development in the country). As well as the extent to which that country can accommodate the upcoming technological transformation from foreign direct investments.

- The agricultural sector has a small share of inward foreign direct investment, as it often does not exceed 5% of the total inward foreign investment.

- Foreign direct investment in the agricultural sector did not have a significant effect on the level of food security therein, and therefore we conclude that the main **hypothesis has not been fulfilled**, which states: “Foreign direct investment in the agricultural sector has a positive and significant effect on food security in the countries studied.”

- **We also conclude that the first sub-hypothesis has not been met**, which states, “The effect of foreign direct investment in the agricultural sector on food security in the studied countries varies from one country to another”.

▪ The GDP per capita had a positive and significant effect on the level of food security in the countries studied, due to its connection to the supply and demand for food in those countries. **This means that the second sub-hypothesis has been fulfilled**, which states: “The GDP per capita has a positive and significant effect on the level of food security in the countries studied.”

Based on previous results, in order to improve the level of food security in African countries. This requires the governments of these countries to work to develop local production. Considering that, it is more effective in improving the level of food security there. Since it is in the interest of the local investor to invest in local lands in a way that achieves, his personal benefit without harming the quality of the land or the public benefit in his country. Also, Land governance factors must be activated to ensure more effectiveness in land exploitation, whether by local or foreign investors.

Governments are required to improve the training level and technology of local investors. This is in order to increase their competitive capabilities against foreign investors.

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