

**REPUBLIC OF TURKEY**  
**ISTANBUL GELISIM UNIVERSITY**  
**INSTITUTE OF GRADUATE STUDIES**

Department of Economics and Finance

**THE EFFECT OF FOREIGN DIRECT INVESTMENT ON  
AGRICULTURE PRODUCTION IN DJIBOUTI**

Master Thesis

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Supervisor

Asst. Prof. Dr. Emrah DOĞAN

**Istanbul – 2023**



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## **DECLARATION**

I hereby declare that in the preparation of this thesis, scientific ethical rules have been followed, the works of other persons have been referenced in accordance with the scientific norms if used, there is no falsification in the used data, any part of the thesis has not been submitted to this university or any other university as another thesis.

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## SUMMARY

This study experimentally investigates the effect of foreign direct investments on Djibouti's agricultural production. The researcher has chosen a sample of 34 years' worth of data collection records from 1980 to 2014 taken from Sesric's Djibouti Economic Data repository. By using fundamental correlation and deterministic models, econometric procedures are enhanced. Data have been evaluated and all variables were examined for their unit roots, and they were stationary in the first-difference model while they were non-stationary in the level model. Descriptive statistics tests, the LMS test, the data Unit root test, the ARDL model (ECM regression), the heteroskedasticity test, (Breusch Pagan Godfrey) Ramsey test, and model stability tests are also used. According to this research Agriculture production is the dependent variable while Foreign Direct Investment (FDI), labor, and capital act as the independent factors. The researcher has demonstrated in this research that foreign direct investment and the productivity of Djibouti's agricultural sector are directly linked based on the data.

**Keywords:** Agriculture production, Djibouti, Foreign direct investments, Capital, Labor.

## ÖZET

Bu çalışma, doğrudan yabancı yatırımların Cibuti'nin tarımsal üretimi üzerindeki etkisini deneysel olarak incelemektedir. Araştırmacı, Sesric'in Cibuti Ekonomik Veri deposundan alınan 1980'den 2014'e kadar 34 yıllık veri toplama kayıtlarından bir örnek seçti. Temel korelasyon ve deterministik modeller kullanılarak ekonometrik prosedürler geliştirildi. Veri değerlendirmesi yapılmış ve tüm değişkenler birim kökleri açısından incelenmiş ve birinci farklar modelinde durağan iken seviye modelinde durağan olmamıştır. Tanımlayıcı istatistik testleri, LMS testi, veri Birim kök testi, ARDL modeli (ECM regresyon), değişen varyans testi, (Breusch Pagan Godfrey) Ramsey testi ve model kararlılık testleri de kullanılmaktadır. Bu araştırmaya göre, tarım üretimi bağımlı değişkenken, doğrudan yabancı yatırım, emek ve sermaye bağımsız faktörler olarak hareket etmektedir. Araştırmacı, bu araştırmasında, doğrudan yabancı yatırım ile Cibuti'nin tarım sektörünün üretkenliğinin, verilere dayanarak doğrudan bağlantılı olduğunu göstermiştir.

**Anahtar Kelimeler:** Tarımsal üretim, Cibuti, doğrudan yabancı yatırımlar, Sermaye, emek.



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## **ABBREVIATIONS**

**ADF** : Augmented Dickey-Fuller

**ARDL** : Autoregressive Distributed Lag

**FDI** : Foreign Direct Investment

**GDP** : Growth Domestic product

**PP** : Philip-Peron

**SESRIC** : Statistical, Economic and Social Research and Training Centre for  
Islamic Countries

**WBD** : World Bank Development

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## **PREFACE**

First and foremost, I am very pleased to thank Allah for everything. By the way, I want to express my gratitude to Assistant Professor Dr. Üyesi EMRAH DOĞAN for his steadily support and perfect daiy help during my working on this thesis. Especially for all of the guidance and instruction he provided throughout my thesis .Besides, I am so grateful to thank Gelişim University Headquarters and especially department of economics and finance, with its crucial and significant staff, and everyone who gave me a permission to work on my thesis and pursue a graduate degree. Notably, my family whom supported me every moment and gave me profound insight into the matter.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of The Study

According to the world, agriculture supplies raw materials for industry and food and nutrition for people (Djokoto, 2021). In 2018, the agricultural industry contributed 4% of the global GDP. In some emerging nations, agriculture accounts for more than 25% of GDP Growth in the farming industry are between two and agriculture. Therefore, compared to other sectors, improving agriculture is four times more successful at boosting wealth among the poorest people. The most effective methods for reducing extreme poverty, promoting shared prosperity, and providing food for an estimated 9.7 billion people by 2050 were used by 65% of impoverished working adults in 2016. (Djokoto, 2021). Developing countries have implemented strategies to draw foreign direct investment into their economies, including agriculture. The creation of jobs, the transfer of technology, and investment accumulation have aided in agriculture development. By offering fiscal incentives, which were costly for the economies, these were made possible. The money could have been used to support domestic producers and increase the budget for social services. Foreign direct investment (FDI) in agriculture has also contributed to land grabbing in developing countries (Deming, 2011; Escresa, 2014; Häberli, 2014; Byerlee et al., 2015; Fraser, 2019). Foreign direct investment is expected to boost domestic investment and job growth in the agricultural sector. Food production is increased through fostering technological development and supporting local talent. According to Djokoto (2021), agriculture may increase the wealth of the poor up to four times more effectively than other industries.

The production of food may increase, which would reduce prices and halt price inflation. These would improve the human development index, increasing social welfare in the long run. Gohou, Soumaré, and Ranjkeshan (2021) discovered that foreign direct investment has a more significant impact on poverty reduction the poorer and less developed the country is, even though wealthier countries benefit more overall. Kennedy et al. (2012) claim that foreign direct investment impacts ripple effects that raise the bar for human capital, compounding a rising standard of living.

When analyzing the effect of agricultural foreign direct investment on welfare or human development, the review focuses on the foreign direct investment of the entire economy on interest in Africa. The relevant literature has addressed developing countries (Reiter and Steensma, 2010; Ngo, 2021; Djokoto et al., 2022); African countries (Gohou and Soumaré, 2012; Agbloyor, 2019;



Atitianti and Dai, 2021); and sub-Saharan African countries (Ganiyu, 2016; Aloui, 2019; Adegboye) concerning the impact of foreign direct investment on welfare, as measured using (Evans and Kelikume, 2018). All studies, except for Allou et al., employed panel data, as was expected. Evans and Kelikume (2020) and (2018). The estimators used were the generalized technique of moments, Prais-Winsten GLS, and generalized least squares (Adegboye et al., 2021; Agbloyor, 2019).fitted to the panel data (De Groot, 2014; Kolster, 2015; Ranjkeshan, 2021). According to public statements of business investment plan six, the African food and beverage cluster received a total of \$48.737 billion in investments between 2003 and 2017. Twenty-one and a half percent of these investments, or \$21.325 billion, were made in the agro-chemical sector, which deals with pesticides, fertilizers, and other goods. It should be noted that the dataset does not make any further distinctions between pesticides, fertilizers, and other agro-chemicals. However, when we used Google to search the objectives of each of the 55 projects, we found that 86% of the money invested in the subsector was for fertilizer and 14% for pesticides and other agro-chemicals.

Foreign direct investment enhanced welfare in developing countries (Reiter and Steensma, 2010; Ngo, 2021; Djokoto et al., 2022); in Africa (Gohou and Soumaré, 2012); in sub-Saharan Africa (Ganiyu, 2016); in the Middle East and North Africa (Kolster, 2015; Hamdi and Hakimi, 2022); and in Cote d'Ivoire (Reiter and Steensma, 2010). Foreign direct investment (Allou et al., 2020). Investments in infrastructure, information and communications technology, health, education, agriculture, and other sectors, according to Allou et al. (2020), have raised the human development index, raising social welfare generally. According to Ganiyu (2016), foreign investment increases employment. Raises interest by encouraging technical development and local skill growth. But studies by Adegboye et al. for western sub-Saharan Africa and Ranjkeshan for sub-Saharan Africa have shown that foreign direct investment does not advance welfare. The social capacities of the sub-Saharan African countries, they highlighted, are insufficient to absorb the benefits of foreign direct investment.

Additionally, high levels of corruption prohibited the poor from benefiting from foreign direct investment have been shown to have little impact on welfare in sub-Saharan Africa, central, eastern, and southern sub-Saharan Africa, and Nigeria, according to Evans and Kelikume (2018), Aloui (2019), and Adegboye et al. (2021). Agbloyor (2019) asserts that foreign direct investment is concentrated in sectors like the oil industry that have little bearing on welfare and do not trickle

down to the larger economy. The lack of impact on terrorism and militancy was attributed to Aloui (2019).

Djibouti, in the horn of Africa, offers unique alternatives and keeps a competitive advantage as a viable investment site, claims. For the reasons outlined below, it is distinctive:

- Favorable location: Thanks to its convenient location in the Horn of Africa, Djibouti enjoys rapid access to both the major international transportation hubs of the Red Sea and the Indian Ocean.
- Djibouti controls a sizable portion of the agricultural land close to the principal producing zones. Production is among the most important economic sectors in Djibouti when one considers its effects on the country's employment, revenue, and food security. It employs 30% of the labor force and generates 20% of the nation's GDP (East Africa Business Journal, 2016).

As a viable investment site in the Horn of Africa, Djibouti provides unique alternatives and keeps a competitive edge. It is distinctive for the following reasons:

- **Favorable location:** The Horn of Africa's more than 10 million hectares of agricultural land provides a wealth of opportunities. Two crop cycles (the Gu' and Deyr rainy seasons) can be produced annually in a large portion of the country thanks to the nation's diverse climate zones, fertile soil, and ample water supply. Investing in increasing current output, adding new production capacity, constructing processing facilities, storing products, and commercializing products are just a few of the agribusiness alternatives with a high return on investment

- **An established and developed private sector:** The private sector is the country's primary engine of economic growth and rebuilding, and various policy options have been taken to promote and create the best conditions for increasing private sector activity.

The economy of Djibouti was anticipated to develop at a steady 3.5% rate in 2011, similar to that of 2010. However, the nation experienced three detrimental incidents throughout the year that slowed its progress. First, the effects of the global financial crisis were still being felt, as evidenced by the fact that Foreign Direct Investment (FDI) influx and port activity were continuing to slow down. Due to the financial crisis, the increase in Foreign Direct Investment (FDI) anticipated for 2011 but delayed from 2009 and 2010 did not occur. Second, the extreme drought in the Horn of Africa in 2008 is a second factor. As a result, the nation escalates its already chronic food insecurity, the worst in 60 years. Third, a period of wait-and-see in the private sector following the presidential elections in April 2011 further lowered the economy's performance. However, with port activity returning and Foreign Direct Investment (FDI) coming back due to the expansion of

the container terminal at Doraleh and the use of the nation's geothermal resources, the economy's growth rate should accelerate in 2012 and 2013. Global Foreign Direct Investment (FDI) inflows grew by 30% in 2007, breaking the previous record set in 2000 after four years of expansion Weissleder(2008). Foreign direct investment inflows, especially to developing countries, reached their most excellent level ever (\$500 billion), up 21% from 2006. Foreign Direct Investment (FDI) in 2007 A record \$13 billion was spent on the least developed nations (LDCs) (WEISSLEDER, 2009).

With a contribution to the GDP of approximately 77% in 2011, the services sector continues to dominate economic growth. Following the marginalization of the trans-shipment industry in 2010, port activities remain the primary engine of the tertiary sector, with a focus mainly on transit business with Ethiopia. The amount of interaction with Ethiopia in 2011 remained at 2010 levels, which were already significantly lower than the years before. Although they are not yet on a large enough scale to make up for the decline in port activities, its logistical services, and the reduction in Foreign Direct Investment (FDI), telecommunications and financial services play an increasingly significant role in the tertiary sector. Secondary sector development, which accounts for about 19.5% of GDP, has declined due to the country's manufacturing prices and factor availability limitations. The sector also comprises many businesses focused on the agri-food industry that makes carbonated beverages and mineral water, building and public works firms, and the two national companies that produce energy and water. Despite this, the sector experienced tremendous growth once the electrical network connection between Ethiopia and Djibouti became active. More cheap hydroelectricity imports from Ethiopia have allowed the nation to lessen its energy shortages. In January 2012, energy prices for low-income households decreased by 30%. A general decline in energy costs across the private sector sparks economic and social progress. With a 3.5% GDP contribution, the primary industry is still minuscule.

The lack of development in the sector is brought on by the country's limited amount of arable land, the dry climate, low availability and mobilization of water resources, the lack of advancement in fishery operations, and poor irrigation management. Structural The terrible drought that afflicted the whole nation in the Horn of Africa in 2011 made matters worse for those who experienced food insecurity. The pastoral areas in the north-west close to the border with Ethiopia and The hardest impacted regions were urban areas and the south-east near Somalia. Mainly hard-struck were the nomadic populations of these regions, who depended entirely on

livestock for milk and meat sales. Food prices rose for those who lived in cities. At 120 000, or a considerable 15% of the population, the overall number of affected people has been calculated.

The United Nations (UN) initiated a fundraising campaign to raise 33 million US dollars (USD) to help these 120 000 extremely vulnerable individuals deal with this severe food crisis. 19 million dollars were generated through international mobilization. Despite this, the nation continued its long-term strategy of lowering its reliance on foreign countries for food supply over the year by drawing on its domestic resources—agricultural farms in Sudan and Ethiopia. The government reduced the effects of the drought on food prices in the nation thanks to supplies from these farms.

Capital-rich nations seek the primary goal of "food security," which publications like "Sueddeutsche.de" (January 2009) and "Financial Times Deutschland" (August 2009) refer to as "neocolonialism," to outsource the production of food. According to GRAIN (2008), net importers, particularly Saudi Arabia, Japan, China, and India, see this as an innovative long-term plan to feed their citizens more securely and at a fair price than before. They depend on imported food; thus, they are worried about market constraints brought on by the global food problems. However, since they have a lot of money, they also attempt to take over foreign farms to supply the country with food. A second new motivation is to ensure financial gains. Since food prices have risen recently and land prices are low in many nations worldwide, investors of all stripes are flocking to real estate due to the current financial crisis. So controlling the best soils can result in financial gain (Grain, 2008).

According to Elibarik's study, three key factors influence the importance of Foreign Direct Investment (FDI) flows into agriculture: First, the agricultural sector is crucial to the economy and can help the nation achieve its goals of economic expansion and poverty eradication. Second, since agriculture is their primary source of income and more than 60% of Djiboutians reside in rural regions, it is essential to their survival. To increase agricultural productivity and farm income, any policies intended to combat poverty must be workable. Although growth is the one element most significant to reducing poverty, Foreign Direct Investment (FDI) flow into the industry is crucial to reaching the objective. Third, Foreign Direct Investment (FDI) also creates employment possibilities that help lessen poverty in urban and rural areas (Elibarik, 2007).

When considering its impact on the nation's food security, income levels, and employment, agriculture production is one of Djibouti's most significant economic sectors. 30% of the workforce is employed by it, which contributes around 20% to GDP (East Africa Business Journal.

Three unfavorable circumstances weighed on Djibouti's economic expansion in 2011. First, the country's two primary economic drivers—port activity and foreign direct investment—continued to slow growth due to the financial crisis Foreign Direct Investment (FDI). Second, a severe drought and the presidential election impacted its economy, and the private sector went through a waiting period. Due to the completion of investments that have been put off since the start of the financial crisis, the expansion of the Doraleh container terminal, and the utilization of the nation's geothermal resources, port activity, and Foreign Direct Investment (FDI) are expected to expand in 2012 and 2013. Third, the country also inked a landmark deal for trilateral cooperation with Ethiopia and South Sudan in February 2012. To connect South Sudan to Djibouti, which has access to the sea, the agreement focuses on building telecommunications, roads, trains, and oil transport infrastructure in the three nations. Djibouti will be able to decouple its economic performance from Ethiopian commerce as a result of this new investment, growth in business, especially port activities, and increase in business., 2016). This study set out to determine how foreign direct investment affected Djibouti's agricultural output.

Foreign direct investment (FDI) can fill the gap when local private sector investment is insufficient because of financial constraints. Additionally, Foreign Direct Investment (FDI) has the potential to significantly improve local economies beyond simply contributing financial resources; it is also anticipated to improve infrastructure, offer new technologies that increase productivity, and profit domestic investors through spillover effects (Zhan et al., 2018). However, concerns about market dominance, the exclusion of smallholder farmers, and the lack of ties to local economies in the case of export-oriented efforts continue to be raised by Foreign Direct Investment (FDI), particularly significant investments (Zhan et al., 2018; Karlsson, 2014). Furthermore, foreign land purchases have drawn criticism for allegedly violating locals' rights and way of life, leading to resource conflicts or being motivated by theoretical as opposed to practical purposes (FAO, 2011; Deininger, 2011). In addition, the extent to which Foreign Direct Investment (FDI) enhances wellbeing is significantly influenced by the host country's level of openness and business climate (Moran, 2006).

The theoretical framework for this inquiry was the Ricardian model. Although it is one of the simplest models, adding the idea of comparative advantage makes it one of the strongest arguments in favor of international commerce. Ricardo's theory, which emphasizes the physical characteristics of the land and urban demand as essential variables in rent production, serves as the theoretical foundation for this study. In addition to lobar, von Thünen's thesis emphasized the distance from farm to market. Institutional arrangement theory, market prices, and production costs as rent c. One dependent variable (DV), foreign direct investment, and an independent variable (IV), agricultural production, make up the investigation's two master variables (IV).

## **1.2 Problem Statement**

For developing nations, foreign direct investment is crucial since it gives them access to resources they otherwise wouldn't have. As a result of these advantages of Foreign Direct Investment (FDI), many developing nations actively seek Foreign Direct Investment (FDI) through initiatives like economic and political improvements to enhance their investment climate.. based on information from the Djiboutian ministry of agriculture and live stock. However, three adverse variables impacted Djibouti and contributed to the country's lower agricultural output. First, due to the financial crisis' effects on its two primary economic drivers—agricultural production activities and foreign direct investment—the country's growth in agricultural production has continued to decrease Foreign Direct Investment (FDI). Second, a severe drought there also affected agricultural output. Third, port activities and Foreign Direct Investment (FDI) should experience an increase in 2012 and 2013 due to investments that have been put off since the commencement of the financial crisis.

Due to the limited amount of study on agricultural output that has been done, there are still very few studies being conducted in Djibouti. Therefore, this study's purpose was to evaluate foreign direct investment's contribution to agricultural productivity in the district of Djibouti.

## **1.3 Objective of The Study**

The study's primary goal is to investigate the potential impact of foreign direct investment on agricultural output. The study's particular goals are as follows:

1. To analyze the effect of Foreign Direct Investment (FDI) on agriculture production for institutional arrangement in Djibouti
2. To investigate the impact of Foreign Direct Investment (FDI) on agriculture production for labor in Djibouti.

3. To examine the effect of Foreign Direct Investment (FDI) agriculture production on market capital in Djibouti.

#### **1.4 Research Questions**

The general research question in this study was to answer

What is the role of foreign direct investment in agriculture production in Djibouti?

The study was the answer the following research questions:

1. What is the effect of FDI on agriculture production for institutional arrangement in Djibouti?
2. What is the effect of FDI on agriculture production for labor in Djibouti?
3. What is the effect of FDI agriculture production on market capital in Djibouti?

#### **1.5 Significant of The Study**

This study allows the decision-makers of investors to focus on the opportunities for foreign investment in agriculture production. The findings of this study will also go a long way toward shedding light on the difficulties investors frequently encounter when implementing new investment platforms and will broadly offer practical suggestions for increasing its uptake to gain a competitive advantage in a fiercely competitive environment.

#### **1.6 Scope of The Study**

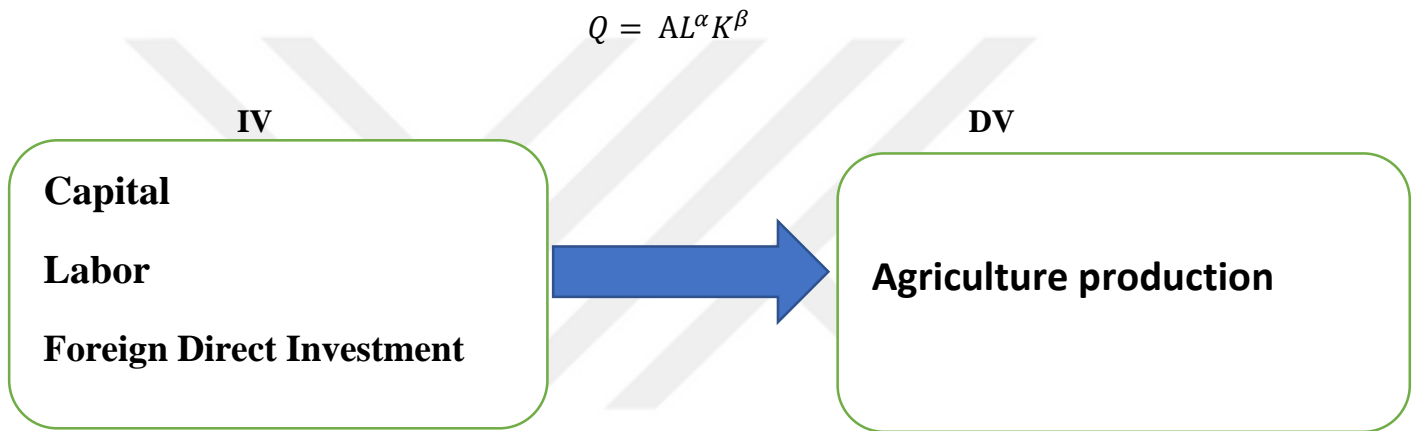
This study examines time series data from 1980 to 2014 to explore the relationship between foreign direct investment and Agriculture production and to track changes in certain factors.

#### **1.7 Conceptual Framework**

The Cobb-Douglas model is one of the most basic models, but by introducing the concept Cobb and Douglas came up with the most well-known production function in 1928. It looks like this: where  $Q$  is the total production, which is the value of all goods made in a year,  $K$  is the capital input, which is the total investment in fixed assets,  $L$  is the labor input, which is the total number of people or hours worked in a year, and  $A$  is a positive constant that means total factor productivity (Cobb & Douglas, 1928). The output elasticity to capital is shown by the parameter  $\alpha$ , and the output elasticity to labor by the parameter  $\beta$ . Output elasticity measures how sensitive output is to changes in how much labor and capital are used to make something. Cobb-Douglas production function lets the size of the inputs change based on how the price of a factor changes. One of the problems with this production model is that it can only explain production with two inputs (Liao, Wu, and Xu, 2010).of comparative advantage, it provides some of the strongest arguments in favor of global trade.

One dependent variable (DV), foreign direct investment, and an independent variable (IV), agricultural production, make up the investigation's two master variables (IV). According to the plausible case study, the researcher will hypothesize that the dependent variable (DV), agricultural production, can also represent foreign direct investment, Institutional arrangement capital, and labor (Figure 1.1).

The theoretical model is mentioned below:



**Figure1. The conceptual framework for effective foreign direct investment in agricultural production**

Figure 1 presents the hypothesized relationship between foreign direct investment and agricultural production in Djibouti, and Agricultural production was conceptualized as institutional arrangement, labor income, and market capital. In contrast, onion production was conceptualized as the effect of the agricultural output in Djibouti.



## **CHAPTER TWO**

### **REVIEW LITERATURE**

This chapter's objective is to present the academic and nonacademic literature that is accessible to help readers gain a thorough grasp of FDI and agricultural production in Djibouti. The study mentions one significant independent variable that is important to both agricultural production and foreign direct investment. The FDI's effect on Djibouti's agricultural production is the variable. The study draws its information from various investment publications and research on studies conducted in the associated fields of expertise. The study's conceptual framework will be presented in the chapter's last section to highlight how the relationships between the study's variables and data are related.

#### **2.1 The Impact of FDI on Agriculture Production**

Global Foreign Direct Investment (FDI) inflows surged by 30% in 2007 to reach \$1,833 billion, breaking the previous record high set in 2000 after four years of growth. 2009 (WEISSLEDER). FDI inflows, particularly to developing countries, reached their highest level ever (\$500 billion), a 21% increase over 2006. In addition, the least developed countries (LDCs) in 2007 attracted FDI totaling a record-breaking \$13 billion. 2009 (WEISSLEDER). This trend interests a wide range of people, including governments, international organizations, scientists, economists, and civil society representatives. They are curious about the reasons behind these significant increases in FDI inflows, whether they represent a long-term trend and any potential consequences. Although everyone in the globe acknowledges the need for further investments, particularly in the agriculture sector, necessary With the aim of promoting rural development and eradicating hunger and poverty, many critical voices have recently been raised, addressing the potentially detrimental influence of FDIs on the agriculture sector in developing nations. Jacque Diouf, Director of the FAO of the UN, is one of the protesters who mentions "Neo-colonialism" and "Land Grabbing."

According to empirical studies, FDI is significant because it encourages domestic private investment and serves as a source of money. FDI boosts total factor productivity and income growth in host nations above and beyond what domestic investment would otherwise achieve, according to the findings of numerous research (Blomstrom & Kokko, 2003; Chen & Demurger & Lui, 2014). Following additional research, trade regimes that encourage exports and policies that build domestic technological capabilities, such as those that fund education, technical training,

and R & D, are necessary prerequisites for the favorable effects of FDI. (Msuya, 2007). Research on FDI's effects on agriculture has demonstrated that FDI can fill the investment gap in developing nations. These studies indicate that foreign direct investment (FDI) benefits the economy. FDI is crucial based on the increase in agricultural productivity in a host or recipient country.

For instance, Oleyede (2014) finds a positive short- and long-term relationship between FDI and the productivity of the agriculture sector. Oleyede contends that FDI encourages the diversification of domestic income, which boosts the agriculture industry (2014). However, political unrest would eventually have a negative impact on investment choices in agriculture. Similar to how it is unlikely that FDI would entirely replace other funding sources, it has the potential to have several positive effects on the agricultural sector of the host nation, including the creation of jobs, the transfer of technology, and improved access to funds and markets. FDI in agriculture can increase the productivity of a nation's agricultural sector by encouraging investment in high-cost sectors like irrigation and infrastructure (Lui, 2014). But the success of agrarian FDI in emerging countries depends on agricultural innovation, comparative advantage, the technical and economic sustainability of proposed FDI arrangements transparently and robustly, institutional frameworks for land governance, and small-holder competitiveness and market access, among other considerations (Oloyede, 2014). Foreign direct investment (FDI) in agriculture, according to Rakotoarisoa (2011), can have an impact on some production parameters, including farmer education and training, increased access to farm inputs, adoption of better farming practices, and crop yield-increasing agricultural technologies (Almfraji & Almsafir, 2014 & Gorgen, et al., 2009). More efficient use of marginal arable land may result from enhanced irrigation infrastructure, partly due to targeted FDI (Yiyong, 2015).

Additionally, FDI affects agriculture by facilitating exports and expanding farmers' access to domestic and foreign markets through enhanced transportation, communication, and storage infrastructure (Yiyong et al., 2015). Additionally, it is reasonable to anticipate that the countries receiving FDI will transfer more technology and experience to the host nation. However, FDI's effect on various agricultural and industrial industries needs to be empirically researched because they are not well defined. According to Wilkie (2001), Alfaro, Wilkie & Wang (1992), Findlay (1978), and (2003). Concerning FDI, introducing new procedures, employee training, technology transfers, and management know-how typically concern the manufacturing sector rather than the agricultural sector.

The main continents where land has been purchased in the previous three years are Africa, South America, and Asia. Although the continent of Africa is rich in natural resources and incredibly agriculturally productive land, it also lacks funds and is eager to raise money by leasing or selling property. In recent press publications, Djibouti, Kenya, and Madagascar are mentioned explicitly as countries where foreign nations aim to buy or lease land significantly. The government of Ethiopia works hard to attract foreign direct investments to enhance agricultural and rural development, which is why Ethiopia was chosen for this case study. FDI flows in the farming sector have significantly increased in Djibouti during the last three years (since 2006). Being one of the least developed nations, Djibouti, In some of the most populous nations on the African continent, where more than 45% of the population suffers from undernourishment, and about 40% of the population lives on less than one US dollar per day, we are curious to find out what effects significant amounts of FDI in the agricultural sector will have on the rural population. To determine whether Djibouti's FDI inflows are motivated by the same variables as those mentioned for other nations, such as food security and return security on investment, this article evaluates whether they are. Using country-specific data sets and supplemental sources, a comprehensive analysis of the investment development in the Djiboutian agriculture industry is provided for 2000 to 2008. specialist interviews.

## **2.2 FDI on Agriculture and Institutional Arrangement**

Institutional relationships between governments and investors in the literature are currently available. Only one analysis of an oil palm project in Djibouti looked at the rules that investors must follow. The authors conclude that investor tax incentives result in lost government revenue. Additionally, they reduce the manufacturing costs for the investor and boost the profitability and competitiveness of domestic oilseed producers and processors who must pay taxes (Benin and Walusimbi, 2004). Another general finding from the examination of 12 case studies of African agricultural exporters is that processor competition often favors farmers since it enables them to command higher farm-gate prices and, as a result, higher revenue levels (Depetris Chauvin and Porto, 2010). The contracts signed between investors and contract farmers or staff are not discussed at any length in the literature we reviewed. Numerous research claims that investors purchase items above market values to avoid side selling (e.g., Minten et al., 2009). Several investors also set prices in their transactions, enter credit-based agreements with farmers, and provide inputs. Still, the studies do not contrast these conditions with the local market. The supplier

agreements for farmers who supply stores are also ambiguous. In light of Rao et al. (2012), Farmers sell to traders who pick up vegetables at the farm gate in the traditional market without any prior arrangements.

In contrast, supermarkets have agreements with vegetable farmers regarding product price, physical quality, hygiene, and consistency of supply. Prices have been agreed upon before delivery. Only once a week or twice a month do payments commonly occur. As a result, supermarket prices tend to be more expensive and reliable than those at local vegetable markets. This produces a significant competitive advantage. As a result, farmers are incentivized to sell to supermarkets (Rao and Qaim, 2011; Rao et al., 2012). However, no written contracts were ever made between stores and farmers in this investigation; all agreements were verbal (Rao et al., 2012).

### **2.3 Labor and Agriculture Production**

In addition to providing for the population's food needs, agriculture is a significant source of income thanks to crop sales and employment opportunities in the sector. Inputs, including land, money, and other resources, are also necessary for agricultural production, which also depends on labor. Labor (skilled and experienced) (qualified and experienced) is frequently employed in agricultural systems. Africa's agricultural labor productivity increased more slowly overall between 1961 and 2010 than the continent's agricultural land productivity, suggesting that labor-intensive African agriculture has increased (Pardey, 2014). Increasing agricultural labor productivity is crucial due to its direct implications on the vast majority of people who work in the industry as well as its effects on growth in other sectors (De Janvry and Sadoulet, 2010). Investment plans could have a secondary impact on the product market. In addition, the inhabitants' other activities are impacted by these investment project spillover impacts. For instance, other crops might benefit from improved administrative abilities or production technology understanding.

It may indirectly affect food supply and regional prices if substantial land areas are set aside to grow non-food crops. Both effects are relevant, as are the results of scarcity and the market's openness. New employment opportunities, particularly for women, can directly affect the labor market by generating new sources of wage income. However, if new employment opportunities lower the supply of labor in rural areas and the opportunity costs of labor change, as a result, changes in the price of rural labor may occur. Shifts in the labor market also have indirect

effects, including more chances to invest in agricultural production technologies because of off-farm income. Studies evaluating a wide range of reasons usually reveal this propensity. For example, they assess how innovations are adopted or how intra-household inequalities and bargaining power change when women obtain new employment (e.g., Feder et al., 1985; also see Govereh and Jayne, 2003; von Braun and Kennedy, 1994). For instance, a large percentage of low-skilled female workers make up the agri-food processing and packaging labor market. Such improvements will likely impact how welfare is divided within households as women's negotiating power increases. Resources are more frequently distributed following women's priorities as their negotiating power increases, continually improving children's access to nutrition, health care, and education (Ashraf, 2009; Getahun, 2016).

Investing in mechanization might result in comparable outcomes. The effort required to thresh is reduced when it is done mechanically, which can free up male labor for other tasks and enable women and children to take over. The usage of threshers can lead to higher salaries when there are opportunities for employment off-farm, allowing male workers to engage in other income-generating activities (Pingali, 2007). When investors build or improve local infrastructure and other facilities or encourage public investment by opening up credit or enticing credit-granting agencies, direct effects on public goods occur. Private sector investments may also impact the environment due to excessive use and pollution, such as increased or decreased water availability via the building by emphasizing a specific industry politically—waste water treatment facilities.

One of the indirect effects of projects is changes in the levels of inequality in society; inequality decreases when projects help historically oppressed groups and increases when some groups find new sources of income while others do not. The inflation of local prices is a related indirect effect that may negatively affect persons who do not profit as much if (some) salaries climb significantly. People who benefit from investment initiatives may also experience psychological advantages like incredible pride and self-confidence. Mechanization investments reduce struggle, which can help families split the labor and make agriculture more appealing, especially to younger generations. Benin (2015), Hounsou and Chapoto (2015), Daum and Birner (2017), and Pingali (2007) are a few examples.

The types of direct and indirect channels that impact wellbeing are determined by the institutional structure of the investment. Institutional arrangements include comprehensive agreements with farmers (prices, quality requirements, input provision, and other specifications),

employment contracts with staff members, and supplementary measures implemented by the investor, such as health or educational facilities. It also contains the steps taken to carry out the project, such as consulting with and exchanging information with farmers, buying land, or using control over water. Market rivalry, crucial for creating market dominance, and corporate social responsibility are the last two elements of the larger institutional structure (Poulton et al., 2004). All of these factors and their interactions may positively or negatively affect the local population's wellness. Therefore, identifying which demographic groups benefit and which lose in relative and absolute terms.

## **2.4 Capital and Agriculture Production**

Africa has risen in importance as a location for investment in recent years. With a noticeable growth in the number of domestic and foreign investors working in the region and a corresponding increase in investment volume, Eastern Africa and Sub-Saharan Africa (SSA) have become a particular focus for investment within the continent of Africa.

Many causes, including rising food prices and investments in farming and agribusiness, have fueled this. Numerous investments in agriculture have been financed via relatively new means, such as sovereign wealth funds, hedge funds, and private equity (PE) firms, which are occasionally criticized for the highly speculative nature of their financial operations (FAO, 2010). Additionally, the function of private capital in generating

The New Alliance for Food Security and Nutrition emphasizes investing in agriculture. Newspapers like "Sueddeutsche.de" and "Financial Times Deutschland" have labeled the outsourcing of food production by capital-strong nations, which targets the first objective of "food security," as neocolonialism<sup>1</sup>. According to GRAIN (2008), net importers like Saudi Arabia, Japan, China, and India regard this as a creative long-term strategy to feed their citizens at a fair price and with far more security than before. They are concerned about markets being more constrained due to the global food crises since they depend on imported food. On the other side, they have a lot of money and are trying to pay for home meals. By taking over farmland in other nations and increasing global demand. Ensuring financial gains is the second new motivation. Due to the recent rise in food prices and the cheap land prices in many nations worldwide, investors of all stripes are flocking to real estate in light of the present financial crisis. Consequently, gaining possession of the best soils might result in financial gain (Grain, 2008).

According to several studies, farmers who participate in investment projects have access to better technologies, which is expected to increase their output and, as a result, their income and welfare. In their study comparing Uganda's sorghum, sunflower, and rice contract farming schemes, Elepu and Nalukenge (2009) demonstrate that contract farming schemes improve access to seeds and better technology adoption rates, notably for sunflower and sorghum. Additionally, they show how the production of distinct varieties may factor in the disparity in gross income between contract and non-contract sunflower producers. Similar to this, a study on the outcomes of a program in Ghana that promotes farmers to grow organic mangoes reveals that participants notice significant improvements in the transfer of technology and are more likely to adopt contemporary farming practices. Several studies indicate that investment projects provide farmers access to better technologies, which is expected to improve their production farming techniques.

In Madagascar's export of vegetables, Numerous studies indicate that farmers who participate in investment projects have access to better technologies, increasing their output and, consequently, their income and welfare. Elepu and Nalukenge (2009) show that contract farming schemes enhance access to seeds and more excellent technology adoption rates, especially for sunflower and sorghum, by comparing the sorghum, sunflower, and rice contract farming schemes in Uganda. They also demonstrate how the cultivation of various kinds may influence the discrepancy in gross income between contract and non-contract sunflower producers. In a similar vein, According to a study on the results of a Ghanaian program that encourages farmers to cultivate organic mangoes, participants see notable advances in the transfer of technology and are more willing to adopt modern farming practices even if this institutional framework demonstrates efficient resource usage, it is impossible to evaluate the advantages of supplied inputs because there is limited data on the situations of non-participating farmers.

Many land transactions include provisions for crop production, and most agricultural production and processing activities involve the acquisition of land use rights. As a result, agricultural investments are frequently land-based. Investments are expected to continue to increase in the agribusiness industry in Africa, which has grown to be a significant investment destination. PE might be an essential extra source of funding for agriculture (Miller, 2010)

## **2.5 Conceptual Framework: Impacts of FDI on Agriculture Production**

The primary drivers of agricultural production are labor and capital, which have a favorable relationship with agricultural output. Numerous economic and political factors can favor or

negatively impact foreign investment opportunities in the agriculture and food sector. Market size, per capita GDP, GDP growth, cultural similarities between the home and host countries, availability of natural resources, a favorable exchange rate, and industry labor productivity are all characteristics that promote investment. The amount of FDI in the agriculture sector will suffer from governmental restrictions such as high corporate taxes and foreign ownership restrictions. When multinational corporations decide where to place their foreign investments, the degree of another essential factor to take into account is a country's political and economic risk. Most countries work to promote FDI by facilitating the development of a legal and policy environment that supports the influx of foreign investors. Because a high FDI flow dramatically increases productivity by closing the host country's investment and technology gaps. Many developing countries that rely on the agricultural sector have made every effort to attract FDI to their respective countries since the beginning of 1990. They carried out a wide range of political and economic reforms to create an environment that supported the expansion of FDI in their country. The most well-known steps taken by these countries are their policies of privatization and liberalization, as well as their numerous multilateral and bilateral agreements, all of which improve the confidence of foreign investors in their countries. As a result, despite the global financial crisis, FDI inflows to Africa rose by almost 80% between 2005 and 2007, from US\$29 billion to US\$53 billion, their highest amount to date (Weissleder, 2009). Between 2000 and 2016, FDI inflows into developing countries roughly doubled. Going from US\$ 5 billion in 2000 to US\$ 9.1 billion in 2006 in the agriculture industry (agricultural plus food processing). 2009 (Weissleder).

The growth of international financial flows from overseas investors offers the host nation many options. The foreign market, new technologies, and expertise are a few opportunities. Such a circumstance opens the door for a rise in the productivity and overall output of the nation's agriculture sector. Agriculture's productivity increase is thought to be crucial for ensuring sustainable growth and reduction in poverty, which is notable in developing countries. According to agricultural and developmental economists, agricultural productivity growth is vital if agricultural output rises quickly enough to combat poverty (Namizinga N. 2007).

Additionally, it makes it possible for the agricultural industry to undergo structural change and improve its competitiveness in the world market. The capacity of the country's foreign reserves is increased by all these improvements in the agriculture sector, which raise export earnings. The majority of developing nations can now import more technology to alter the sector's structure



because of the increase in agricultural export revenues. For instance, Ethiopia's agrarian export revenue enables the government to buy a significant amount of improved seed and fertilizer to raise the country's agricultural sector's productivity and output (Bijsterbosch, M. and M. Kolasa. 2009).

According to some economists, foreign investment is a significant source of the money, technology, and knowledge developing nations need. On the other hand, other people point out that one of the problems with international corporations is that they squeeze out regional businesses and introduce unfair competition. This shows that opinions are divided regarding how FDI affects host nations.

However, none of these FDI benefits and prospects will be without risk, particularly for the agricultural sector. Lack of infrastructure, which plagued the agricultural sector in most developing nations, hinders the growth of FDI. Additionally, a significant factor in the bad performance of FDI in the farming industry is the inability to deliver essential land timely. Another critical factor is how many investors are forced to hunt for non-agricultural activities in the host country due to the drop in the price of agricultural products on the global market over the past five years. However, many FDI investors are now happily investing in the business. Therefore the scenario is changing recently.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

This chapter outlines the research methodology used to meet the study's objectives. Secondary data, the chapter is divided into four main parts. The first section presents the definition of essential variables in the study, the second section focuses on the data source, the third section provides the estimation methods of the study followed by descriptive analysis, correlation analysis, and linear regression, and the last section will explain the model of specification.

#### **3.1 Definitions**

A corporation or individual who invests in commercial interests in another nation from their own country is said to be engaging in foreign direct investment.

Students who major in agricultural production study soil science, plant development, pest management, poultry production, and agricultural leadership in addition to crop production and farming, which includes identifying and resolving environmental challenges.

Because it represents the whole amount of human physical and mental work put into producing goods and services, labor is a critical aspect of production. The number of adults in a nation and how much they work or are willing to work for compensation define the size of that nation's labor force.

**Capital:** Capital refers to the resources and goods that are used to produce goods and services . It can also refer to financial resources, such as money or assets, that are used to invest in a business or other venture. Capital can take many forms, including physical assets like buildings, equipment, and inventory, as well as financial assets like cash, stocks, and bonds. Capital is a key factor in economic growth and development, as it allows businesses to expand and create jobs, and it is an important source of funding for governments and other organizations (World Bank, 2021).

**Labor:** Labour refers to the physical and mental effort of people, typically in the context of work, paid or unpaid, used to produce goods and services. It includes all the activities of individuals who work for wages, salaries, or other forms of compensation, and also includes unpaid family workers and those who work in their own businesses. Labour is an important factor in economic growth and development, as it provides the workforce needed to produce goods and services, and is an important source of income for individuals and families (International Labour Organization, 2021).

**Foreign Direct Investment:** Foreign Direct Investment (FDI) refers to an investment made by a company or entity based in one country, into a company or entity based in another country. This type of investment can take the form of establishing new operations or acquiring existing assets in the foreign country. FDI is often made to gain access to new markets, technology, or resources, and can take many forms such as opening a new factory, buying shares in a foreign company, or investing in real estate. The World Bank, International Monetary Fund (IMF) and the United Nations Conference on Trade and Development (UNCTAD) are few of the organizations that monitor and provide data on FDI. (United Nations Conference on Trade and Development, 2019).

### 3.2 Data Source

The World Bank, IMF, and Statistical, Economic, and Social Research and Training Center for Islamic Countries are the sources of this information (SESRIC). Djibouti was chosen as the research's study nation. In order to learn more about how foreign direct investment (FDI), labor, capital, and agricultural output are all interconnected, we are using a time series analysis. Due to a lack of data for the most relevant variables, the sample observation period for this dataset spans 1980–2014.

**Table 3.1.** Data Details

Variables		Abbreviation	Data	Sources
<b>Foreign</b>	<b>Direct</b>	FDI	Foreign Investment (\$)	World Bank
<b>Investment</b>				
<b>Capital</b>		CAP	Capital (\$)	World Bank
<b>Labour</b>		LBR	Labour Force Total	World Bank

### 3.3 Model Specification

As we are required an econometric model, the regression model adopted in this study is stated below with the dependent variable as Agriculture production. In contrast, the explanatory variables are FDI, labor, and Capital. Multiple Linear Regression expresses the relationship between foreign direct investment and agriculture production by fitting a linear equation to observed data.

$$Y = \beta_1x_1 + \beta_2x_2 + \beta_3x_3.$$

$$AP = \beta_0 + \beta_1FDI + \beta_2L + \beta_3C + U$$

Where;

FDI = Foreign Direct Investment, L= Labor , C= Capital, U = Error term

### 3.4 Data Analysis

We are using one of the econometric tools in this study to analyze the impact of foreign direct investment on Agriculture production in Djibouti.

#### 3.4.1 Unit Root Test

To prevent the problem of false regression, the variables are examined to see if they are stationary in the time series before estimating the equation. The data series can be integrated into one or more orders if recognized and determined to be stationary; if not, they are non-stationary. The Dickey-Fuller and Phillip-Perron checks are used to evaluate enhanced unit root tests, which may be based on the null hypothesis of non-stationary and failing to deny 0, signaling rejection, and the necessity for sufficient variations to set off stationary.

#### 3.4.2 The Augmented Dickey-Fuller (ADF) Test

Regarding the Augmented Dickey-Fuller test for request combinations credited to Dickey and Fuller, several scientists have developed several methodologies (1979, 1981). The Augmented Dickey-Fuller test is based on rejecting unreliable unit root hypotheses when the series are nonstationary for the model's stationarity trial theories. The Dickey-Fuller test, the Augmented DF test, and the slack adaption of the reaction variable is added to the DF condition to address the autocorrelation issue in the series (Dickey and Fuller, 1979).

### 3.4.3 Autoregressive Distributed Lag (ARDL) model

Due to its limited power and many problems with alternative test approaches, Pesaran et al. (2001) 's ongoing single cointegration method, called Auto-Regressive Distributed Lag (ARDL), has become the method that most analysts and researchers adopt. The ARDL limits checking approach of cointegration developed by Pesaran and Shin (1999), Pesaran (1997), and Pesaran (1998) was used in this review (2001). Two steps for evaluating long-term relationships are included in the ARDL method for dealing with cointegration (Pesara, 2001). The first step is to identify any existing long-term relationships between all the variables in the situation being evaluated.

The traditional "ARDL" model is specified as follows;

$$Y_t = \alpha_0 + \sum_{j=1}^p (\delta_j Y_{t-j} - 1) + \sum_{j=1}^q \beta_j X_{t-j} + u_t$$

In the model,  $u$  is the vector of the error terms, and  $p$  and  $q$  are lag lengths, constant, and coefficients. The model permits alternative integrated ordering for both the regressors and the regress.

### 3.4.4 Bounds Testing Procedure

The Bound test is used to determine whether a co-integration association exists, and the overall significance of the coefficients is investigated. Given that the Bounds test establishes upper and lower bounds, the  $H_0$  of no co-incorporation is acknowledged if the calculated F-measurements have a value less than the lower breaking point of the fundamental worth. Additionally, the  $H_0$  is ignored, and it is said that the factors are cointegrated if the calculated F-measurements have a value more significant than the outermost bounds of the fundamental esteem (Pesaran et al., 2001).

### 3.4.5 Stability of the model

As indicated in the figure, the cumulative amount of recursive squares (CUSUM) is used to estimate the model's stability. Such a test is provided for this circumstance by the CUSUM test, which is dependent on the residuals from the recursive assessments.

Theory:  $H_0$ : The CUSUM distribution is a symmetric appropriation with a zero-point focus.

$H_1$ : There is no specific appropriation or symmetric distribution of the CUSUM.

When the CUSUM insights chart lies between the limits of the whole region for a test at 5% degree of significance or the opposite, the invalidity of the ordinary conveyance hypothesis is accepted.

### **3.4.6 Descriptive Statistics**

We shall do graphic measurements for this review or inspection. This examination, simply put, provides summaries regarding the example and information's proportions to aid depict understand the critical points of a particular informative collection. The most well-known sorts of illustrative insights are the mean, middle, and mode of focal proportions, which are applied at practically all mathematical and measurement levels. The mean or the normal is obtained by adding all the data from the informational collection and dividing it by the total number of data points in the analysis.

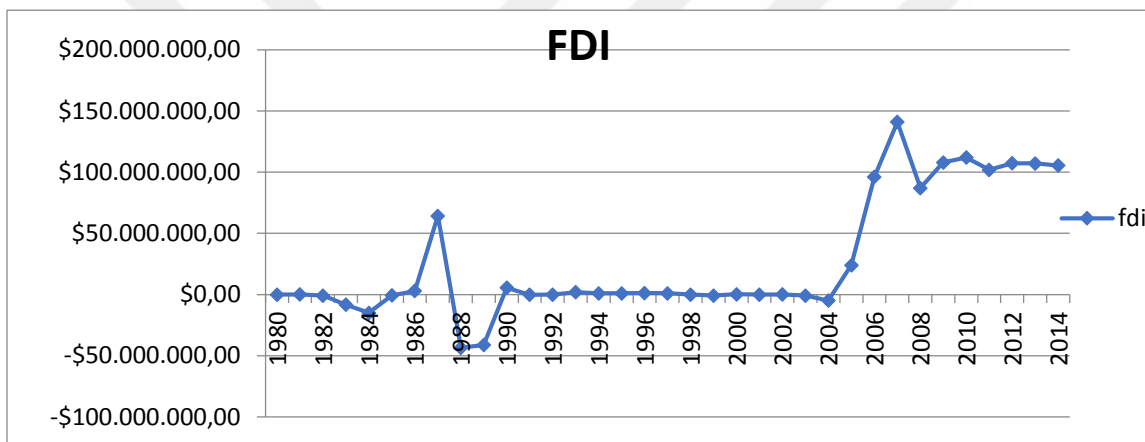
## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.1 Introduction

This is the fourth chapter of the study entitled foreign direct investment and agriculture production in Djibouti. This chapter will cover the following topics: first descriptive statistics of the variables. Second, results and interpretations; third, model diagnostics; and finally, discussion.

**Figure 4.1 Foreign Direct Investment of Djibouti**

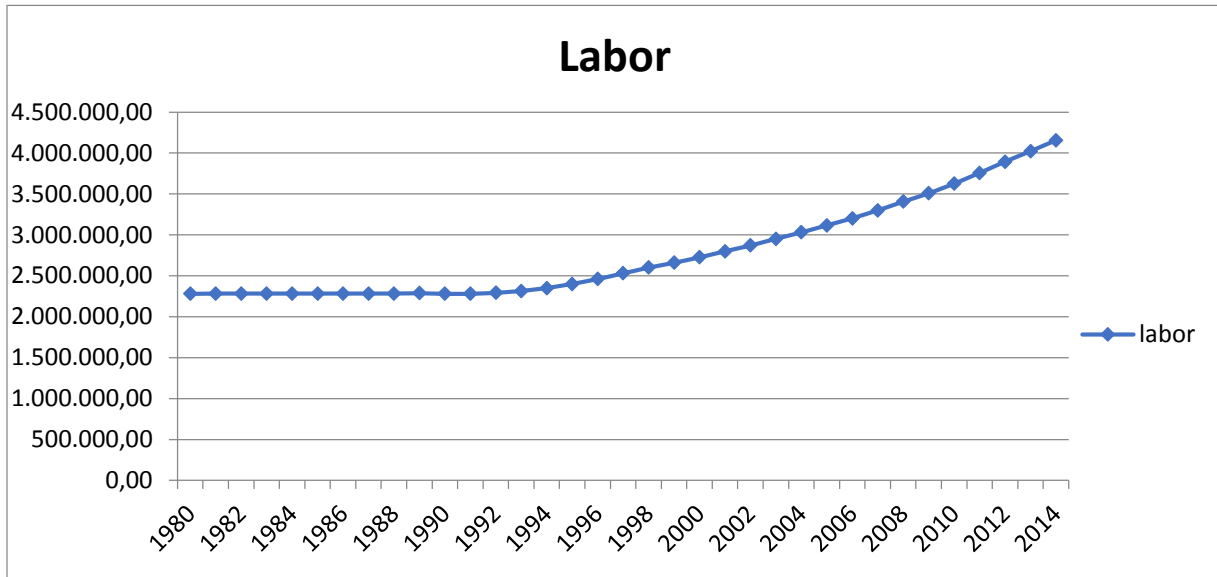


**Figure 4.1.** Foreign Direct Investment in Djibouti 1980 to 2014

*Source:* World Bank

The above figure shows the trends of FDI inflows into Djibouti from 1980 into 2014. The FDI Inflows into Djibouti had declined since the 1980s when the central government in Djibouti started to fall, and there has not been foreign direct investment into Djibouti. However, this graph also illustrates that in 2004 FDI in Djibouti had begin to increase, although, after that time, FDI sometimes fell into recession and expanded.

**Figure 4.2 Labor of Djibouti**

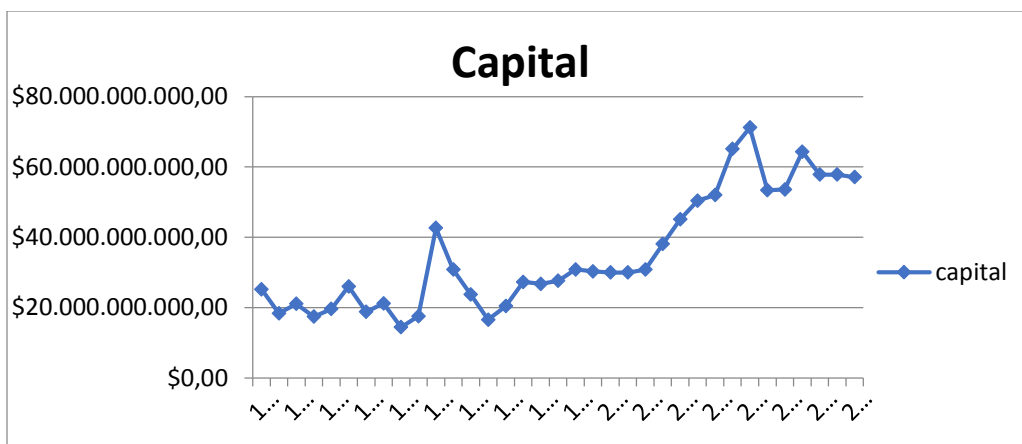


**Figure 4.2.** Labor in Djibouti 1980 to 2024

*Source:* World Bank

The above figure shows the labor trends in Djibouti from 1980 to 2014. Djibouti's labor seemed to grow after but in 1998 was raised straightly because of the many workers who participate in the agriculture sector and also labor (skilled and experienced) is used more intensively.

**Figure 4.3 Capital of Djibouti**



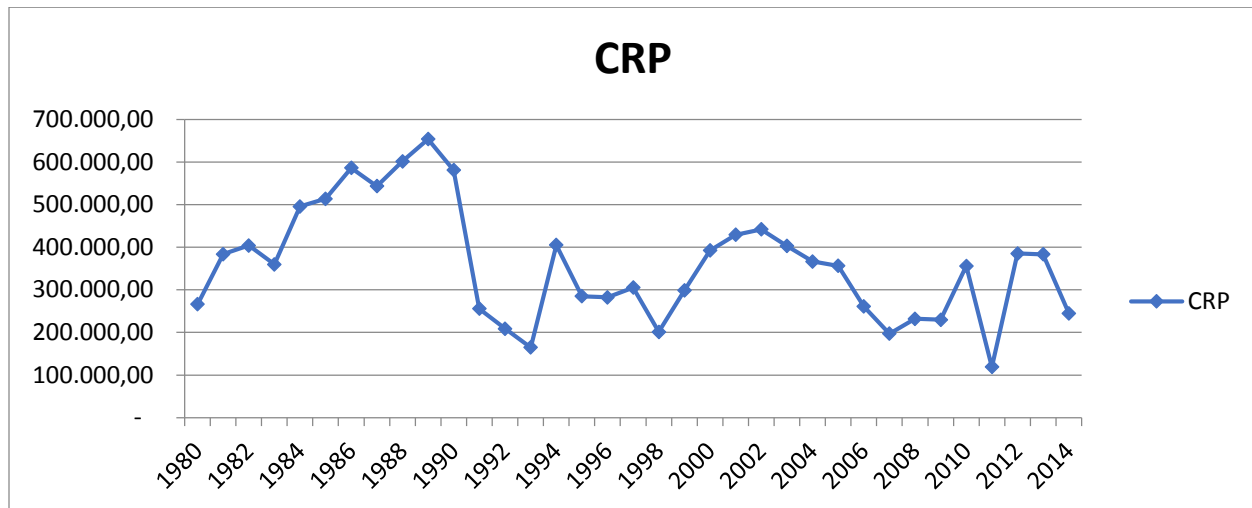
**Figure 4.3.** Capital in Djibouti 1980 to 2024

*Source:* World Bank



Figure 4.3 shows that the country's capital has been growing from 1980 to 1990, from \$10 Billion to \$45 billion. However, the capital of Djibouti dropped from \$45 billion to \$15 billion during 1990-1994. This was due to the destruction of most industries the country possessed by the civil war. From 1994 to 2008, it has been increasing gradually, reaching up to \$74 billion, but from 2008 up to 2014, there is little recession.

**Figure 4.4 Crop Production of Djibouti**



**Figure 4.4.** Crop Production in Djibouti 1980 to 2024

**Source:** Social Research and Training Center for Islamic Countries(SESRIC)

Figure 4.4 tells us that the country's crop production has been growing from 1980 to 1990, initiating from \$250,000 to \$650,000. However, the crop production of Djibouti dropped from \$650,000 to \$150,000 during 1990-1994. This was due to the destruction of most industries the country possessed by the civil war. From 1994 to 2002, it decreased gradually reaching up to \$200,000.

#### 4.2 Descriptive Statistics

The study included 35 observations, as shown in table (4.1) above. FDI, capital, and labor are the three independent variables, with CRP as the sole dependent variable. The CRP Agriculture production fluctuates between 653760 and to118870 . The CRP rate, on average, is 359600. This suggests that there is significant economic volatility. The FDI ranges from 1.41E+08 to -43390000, while the average is 2725871. The pop ranges from 71200000000 to 144000000000, with a mean of 35200000000 and a median of 144000000000. The labor ranges from 4154141 to 2280715, with an INF average of 2781327.

**Table 4.1. Descriptive Statistics**

	<b>CAPITAL (CAP)</b>	<b>CROP PRODUCTION (CRP)</b>	<b>FOREIGN DIRECT INVESTMENT (FDI)</b>	<b>LABOUR (LBR)</b>
Mean	35200000000	359738.7	27258571	2781327
Median	30000000000	359600	1000000	2529621
Maximum	71200000000	653760	1.41E+08	4154141
Minimum	14400000000	118870	-43390000	2280715
Std. Dev.	16600000000	133464.7	50890006	591559.1
Skewness	0.647624	0.406366	0.889219	0.921317
Kurtosis	2.084785	2.460149	2.307575	2.555416
Jarque-Bera	3.668127	1.38829	5.239731	5.239731
Probability	0.159763	0.499501	0.07024	0.072813
Sum	1.23E+12	12590854	9.54E+08	97346449
Sum Sq. Dev.	9.35E+21	6.06E+13	8.81E+16	1.90E+13
Observations	35	35	35	35

### 4.3 Methodology

To investigate how capital affects agricultural productivity, a model was initially constructed, followed by diagnostic tests, stationary variable analysis, the implications of the long-run and short-run forms of ARDL, and the implications of the error correction form of the test. CUSUM tests were employed in the final stage.

**ARDL:** This review utilized the ARDL limits-checking approach to cointegration created by Pesaran and Shin (1999), Pesaran (1997), and Pesaran (1998). (2001). The ARDL cointegration approach consists of two steps for analyzing long-term relationships (Pesaran, 2001). The first stage is finding any long-term connections between all the factors in the circumstance being examined.

**Bound test:** this test is running according to this study to check for the presence of co-incorporation affiliation the Bound test is utilized and the overall meaning of the coefficients are tried .

**Unit Root Test:** It is established whether the variables in the time series are stationary before estimating the equation in this study. Depending on how they are recognized and proven to be stationary, the data series can be incorporated into one or more orders; if not, they are non-stationary. Enhanced Dickey-Fuller and Phillip-Perron tests, which can be predicated on the null hypothesis of non-stationary and failing to deny 0, indicating rejection and the necessity for significant variations to set off stationary, are used to evaluate unit root checks.

**Descriptive statistics:** We'll conduct graphic measures during this review or assessment. Put, as per this test, provide summaries regarding the example and information's proportions to aid in portraying and understanding the highlights of a specific informational collection.

**Stability test:** In this study, the co-incorporation connection is tested using the Bound test, and the overall significance of the coefficients is also examined.

#### **4.4 Unit root test**

The enhanced Dickey-Fuller method is used to determine whether the series is stationary. And Philip-Peron tests are used. The results and degrees of significance are shown in table 4.2. A unit root test is frequently performed to verify whether a time series is stationary and contains a unit root. The researcher evaluated the stationary in the collection for this study using improved Dickey-Fuller and Philip-Peron tests. The findings and levels of significance are displayed in the table below.

**Table 4.2, ADF-PP Unit Root Test Results**

		ADF			PP			
		Level intercept and trend	1st Difference intercept and trend	Decision		Level intercept and trend	1 <sup>st</sup> Difference intercept and trend	Decision
<b>CAP</b>	T-statistics	-3.14129	-5.732104	1st Difference	Adj T-statistics	-3.181759	-9.68414	1st Difference
	Probability	0.1134	0.00038		Probability	0.105	0.0000	
<b>CRP</b>	T-statistics	-3.394053	-6.886611	1st Difference	Adj T-statistics	-3.430033	-7.281628	1st Difference
	Probability	0.069	0.0000		Probability	0.0641	0.0000	
<b>FDI</b>	T-statistics	-2.713697	-5.674946	1st Difference	Adj T-statistics	-2.713697	-9.498896	1st Difference
	Probability	0.2377	0.0003		Probability	0.2377	0.00001s	
<b>LBR A</b>	T-statistics	-0.719899	-4.871127	1st Difference	Adj T-statistics	1.057928	-4.872079	1st Difference
	Probability	0.963	0.0023		Probability	0.9998	0.0023	

Table 4.3 is organized according to the 5% significance level and Schwarz criteria0.

According to the unit root test results, all variables considered in the study become stationary when their first difference is taken.

#### 4.5 ARDL Bounds Test

When the initial property of a time series is  $I(0)$ , fully  $I(1)$ , or concertedly cointegrated, the bounds testing process is a crucial statistical tool for evaluating position connections. This paper used an ARDL model to hypothesize a univariate frame for sampling the reality of a single-level relationship between agricultural production and capital in Djibouti. Then, the Bound test is applied to see whether a co-incorporation connection exists, and attempts are made to interpret the coefficients generally.

When it is unclear if the information-generating process underlying a period series is first order or pattern, bound testing, a part of ARDL showing, uses F value to assess the relevance of the slack levels of the components in a univariate harmony adjustment framework. Fixed difference.

**Table 4.4. ARDL Bound Testing Results**

Model	Optimal Lag*	F Statistics**	Bound Test Critical Values	
			Lower	Upper
F (cap, crp, FDI, lbr)	(1,4,3,4)	6.709291	2.37	4.66

The bound test evaluates whether there is a long-term link between the dependent variable and the independent factors. For example, table 4.3.2 reveals a long-term relationship between agricultural production and the independent variables when the F-statistic (6.709291) exceeds the upper threshold value (4.66) at the 5% significance level.

#### 4.7 Long-Term Coefficients

It was demonstrated that all elements, including GDP, capital, FDI, and labor, are co-consolidated over the long term under the particular test of long-term coordination. Therefore, the normal long-term coefficients after normalizing on GDP are referred to in the following after the long-term relationship has been verified.

**Table 4.5 ARDEL Model Long-Term Coefficients**

<b>Levels Equation</b>				
<b>Case 2: Restricted Constant and No Trend</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>T-Statistic</b>	<b>PROB</b>
<b>FDI</b>	0.001743	0.001493	-01.167567	0.0219
<b>LBR</b>	0.067430	0.087504	0.770597	0.0128
<b>CAP</b>	0.00000194	0.00000312	-0.622543	0.0031
<b>C</b>	230834.9	155231.5	1.487037	0.1471
<b>EC = CRP - (-00014*FD1 + 0.3190*LBR-0.0000*CAP-41605.1630)</b>				

The results of the previous table show that the coefficient of labor is positive and statistically significant at the 5% level. This suggests that labor and agricultural productivity in Djibouti is positively connected. For example, if labor costs rise by 1%, agricultural output will increase by 6.7%. Additionally, the table shows that the coefficient of capital is statistically significant and positive at 5%. Therefore, it can be determined that capital and agricultural production in Djibouti have a positive connection, meaning that a one-unit change in the capital will result in a 0.019% change in agricultural production. Additionally, the FDI coefficient is positive and statistically significant at the 5% level. Additionally, there is a positive correlation between FDI and agricultural production in Djibouti, which suggests that a change of one unit in FDI will result in a change of 0.17% in agricultural production.

**Table 4.6. Error Correction Model Test Results form for ARDL**

ARDL Error Correction Regression		
Dependent Variable: D(CRP)		
Selected Model: ARDL(1,4, 3, 4)		
Case 2: Restricted Constant and No Trend		
Sample: 1980 2014		
Included observations: 31		

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI)	-0.000321	0.000461	-0.696768	0.4966
D(FDI (-1)))	0.001361	0.000496	2.742626	0.0151
D(FDI (-2)))	0.000809	0.000507	1.595765	0.1314
D(FDI (-3)))	0.002711	0.000509	5.325047	0.0001
D(LBR)	-1.810111	1.775721	-1.019367	0.3242
D(LBR(-1))	-3.532116	2.716251	-1.300364	0.2131
D(LBR(-2))	4.884894	1.829958	2.669402	0.0175
D(CAP)	-2.12E-06	1.76E-04	-1.205043	0.2649
D(CAP(-1))	-4.67E-06	2.02E-06	-2.31675	0.351
D(CAP(-2))	-2.74E-06	1.93E-06	-1.416713	0.177
D(CAP(-3))	-1.12E-05	1.89E-06	-5.923051	0.0000
<b>ECM(-1)*</b>	-0.413777	0.113298	-3.652117	0.0024
R-squared	0.837938	Mean dependent var		-3717.226
Adjusted R-squared	0.744112	S.D. dependent var		119724.2
S.E. of regression	60562.89	Akaike info criterion		25.1454
Sum squared resid	6.97E+10	Schwarz criterion		25.70049
Log-likelihood	-377.7537	Hannan-Quinn criteria.		25.32634
Durbin-Watson stat	1.882803			

In Table 4.5, the model's short-run dynamics coefficients are displayed. As was previously indicated, it is clear from the table's modified R2 that the factors used in the model account for

74% of the dependent variable. The ECt-1 coefficient states that a shock to the economy takes a year to bring 41% of Agriculture production to equilibrium. If the error correction term's coefficient value is between 0 and -1, there is a unidirectional convergence toward the long-term equilibrium value. The value of the coefficient is positive. The equilibrium has been upset if the value is less than or equal to -2. Finally, a bug fixes. The value of the coefficient falls between -1 and -2. Long-term equilibrium values for the error correction term indicate that it has done so, and the ripples around it are getting smaller. As can be seen from the data, our findings show no statistically significant difference for a long-term connection (-0,41). According to the estimated coefficient, the short-term imbalance can be fixed in the long run at a rate of 41% if the right policies are put in place.

#### **4.8 Stability Tests**

The balance of the version is determined using the cumulative sum of squares of recursive residuals (CUSUM), shown in the figure. In this case, the CUSUM test provides this kind of test based solely on the residuals from the recursive estimations.

#### **Hypothesis1:**

H0: Asymmetric and aimed at 0, the CUSUM distribution is a distribution.

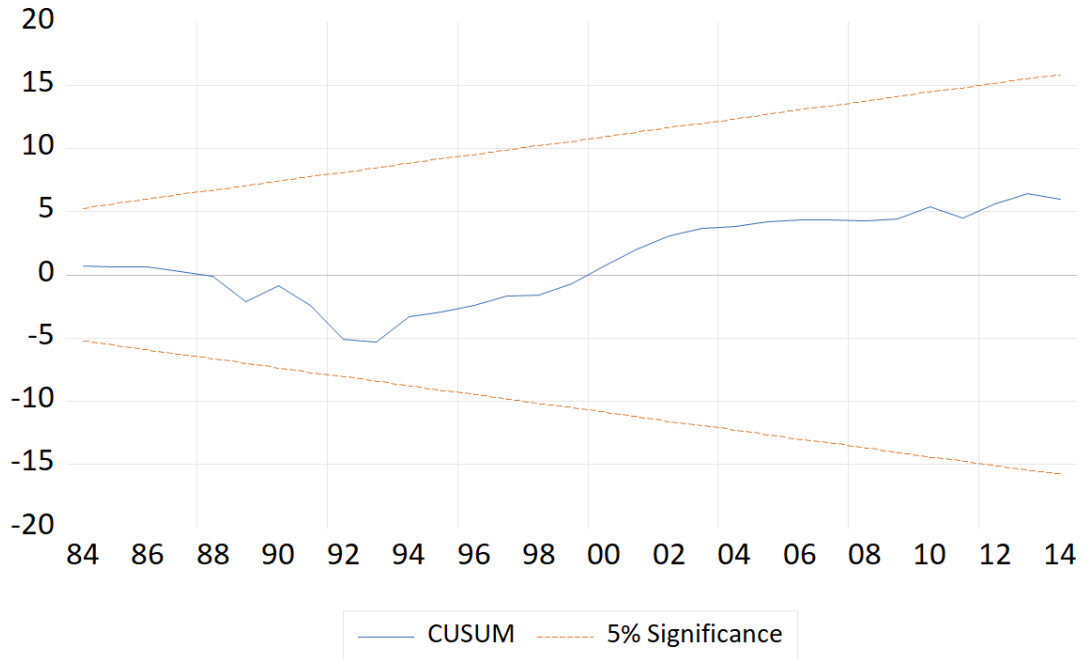
H1: The CUSUM distribution does not always have a symmetric distribution and does not follow a normal distribution.

#### **Decision rule.**

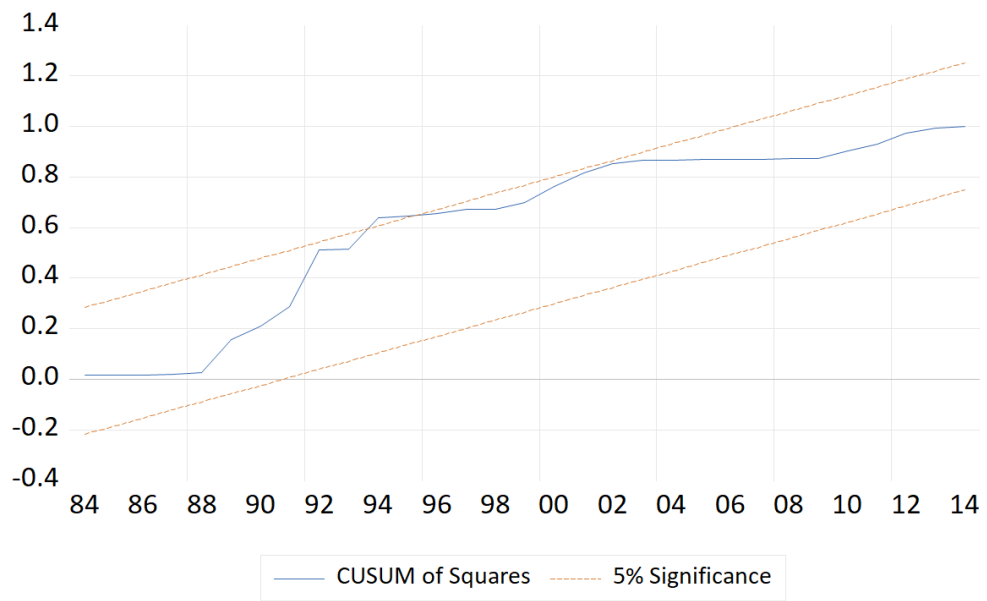
The null hypothesis of a normal distribution is accepted when the graph of CUSUM data is within the critical region for a check at 5% significance level and vice versa. The chart of CUSUM data establishes the following limits around the significant area based on the study's conclusions.



### CUSUM TEST



### CUSUM SQUARE TEST



**Graphic 1.** Stability test

The above figure demonstrates that the model has not experienced any stability issues

## **CHAPTER FIVE**

### **CONCLUSION AND POLICY IMPLICATIONS**

#### **5.1 Conclusion**

This study aimed to examine foreign direct investment and agricultural output in Djibouti utilizing the Autoregressive Distributed Lag method was used to analyze the data. ARDL demonstrates that if labor costs rise by 1%, agricultural output will increase by 6.7%. Additionally, the table shows that the coefficient of capital is statistically significant and positive at 5%. Therefore, it can be determined that capital and agricultural production in Djibouti have a positive connection, meaning that a one-unit change in the capital will result in a 0.019% change in agricultural production. Additionally, the FDI coefficient is positive and statistically significant at the 5% level. Additionally, there is a positive correlation between FDI and agricultural production in Djibouti, which suggests that a change of one unit in FDI will result in a change of 0.17% in agricultural production. The employed essential regression function consisted of three independent variables and one dependent variable. Agriculture Production is the dependent variable, while FDI, labor, and capital are the independent factors. The econometric view was used to execute and evaluate the data (E-view 12). this research Agriculture production is the dependent variable while FDI, labor, and capital acting as the independent factors. The researcher has demonstrated in this research that foreign direct investment and the productivity of Djibouti's agricultural sector are directly linked based on the data. The researcher has chosen a sample of 34 years' worth of data collection records from 1980 to 2014 taken from Sesric's Djibouti Economic Data repository

International investment should help the receiving nation develop in terms of technology transfer, job creation, upstream and downstream ties, and other advantages. Thus, rather than being "neo-colonialism," these investments could be "win-win." These advantageous flows, however, are not always there. Therefore, care must be taken when creating investment contracts and choosing acceptable business models, and relevant legislative and administrative frameworks must be in place to guarantee that development gains are realized, and dangers are reduced. However, there is a severe lack of knowledge needed to create and put into effect effective laws and regulations. The extent, character, and results of international investments must therefore be closely monitored, and best legal and policy practices must be compiled to advise better both host and foreign investors, nations as well as investors.

A thorough impact study is required to determine what laws and regulations—national or international—are needed and which particular actions are most suitable. It is necessary to balance the investment goals of investors with the investment requirements of developing nations if foreign direct investment is to close the investment gap facing developing country agriculture effectively. A thorough and well-rounded investment strategy must include investment priorities, and the best ways to encourage matching money to opportunities and requirements must be determined. According to the report, policies that support foreign direct investment in agriculture should be regulated and focused more on the host nation's beneficiaries. In addition, the host nation must establish an atmosphere that encourages international investment and lessens the perceived risks.

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## **5.2 Recommendations**

The researcher has demonstrated in this report that foreign direct investment and the productivity of Djibouti's agricultural sector are directly linked based on the data and conclusion reached above. As a result, this study provides the following recommendations.

The study first suggests that capital substantially impacts the agricultural output of poor farmers since lower capital investment results in less production and can further harm local production overall in urban regions. The study suggests that the ministry of agriculture strengthen the skills of local farmers in the Djibouti district and invest in their properties to increase farm output.

Second, the study discovered that labor considerably impacts farmers' agricultural output in the Djibouti district. This implies that farmers' average income is influenced by their production degree. Therefore, the study also suggests that to increase agricultural production, the government, particularly the ministry of agriculture, should lend a visible hand to farm laborers.

Finally, even if the study indicated that foreign direct investment had a less substantial impact on the farmers' agricultural output in the Djibouti district, this does not mean that it should be discontinued; instead, it should be used healthily. Therefore, the researcher also suggests that the ministry of agriculture implement policies to use foreign direct investment healthily to inspire farm workers and encourage farmers in Djibouti and the country to double their production so that they can withstand the effects of agricultural production.

### **5.3 Area of Further Study**

The study was only restricted to the Djibouti district. Still, the researcher claims that the issue of foreign direct investment on agricultural productivity affects not only the district but also the entire country of Djibouti. Therefore, the researcher advises that more extensive research be conducted to encompass locations outside the Djibouti district. Furthermore, since this study primarily depended on a questionnaire, future studies should use a different methodology. Nevertheless, this study ensured that increasing direct investment in agriculture would improve agricultural output.



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