Journal of Infrastructure, Policy and Development 2024, 8(3), 2702.
https://doi.org/10.24294/jipd.v8i3.2702

Article

Determinants of foreign direct investment in the agricultural sector: Empirical evidence based on economic regional data in Vietnam

Ha Tran Yen Nguyen[1,2]

[1] University of Economics and Law, Ho Chi Minh City 700000, Vietnam; hanty18702@sdh.uel.edu.vn
[2] Vietnam National University, Ho Chi Minh City 700000, Vietnam

CITATION

Nguyen HTY. (2024). Determinants of foreign direct investment in the agricultural sector: Empirical evidence based on economic regional data in Vietnam. Journal of Infrastructure, Policy and Development. 8(3): 2702. https://doi.org/10.24294/jipd.v8i3.2702

ARTICLE INFO

Received: 29 August 2023
Accepted: 23 October 2024
Available online: 19 January 2024

Abstract: Agriculture is an industry that plays an essential role in economic development towards eliminating poverty issues, but foreign direct investment (FDI) inflows to this sector remain modest in Vietnam. This study analyzed the determinants of foreign direct investment in the agricultural sector into the Southern Key Economic Zone (KEZ) of Vietnam, which is considered the foreign direct investment magnet of Vietnam, but its FDI inflows into the agricultural sector have been consistently low, and has shown a downward trend in recent years. The study was based on a sample of 129 foreign investors of a total of 164 multinational enterprises (MNEs) in the agricultural sector, including representatives of the Board of Directors and representatives at the department level. The Partial Least Squares Structural Equation modeling (PLS-SEM) approach was used to test the hypotheses. Findings indicated that FDI attraction policies have the strongest impact on FDI inflows. This was followed by infrastructure, regional agriculture policies, public service quality, natural conditions, and human resources. This study suggests policy recommendations to improve foreign direct investment inflows into the agricultural sector of the Southern Key Economic Zone (KEZ) of Vietnam.

Keywords: foreign direct investment; determinants; agriculture; structural equation modeling; PLS-SEM; Vietnam

1. Introduction

Foreign direct investment inflows are important for developing countries as they provide a source of capital, knowledge transfer and export competitiveness. In order to attract foreign direct investment, it is essential for policy makers to understand what motivates foreign investors to invest abroad and what constitutes the most important determinants of their inflow.

However, there is no consensus in the theories of foreign direct investment regarding the most important factors determining the flows of foreign direct investment. As Faeth (2009) stated, there is not one single theory of FDI, but a variety of theoretical models to explain FDI and the location decision of multinational enterprises (MNEs). In addition, the determinants of FDI are different among regions and countries in the world. Therefore, it is found that some determinants have a significantly positive effect on FDI inflows, but others have either negative or neutral effect in different countries or regions in the world. This lack of consensus presents a challenge in defining econometric models of foreign direct investment determinants, as the possibility of model misspecification due to omitting important variables increases.

Despite the vast empirical work done in the area of foreign direct investment' determinants, literature concerning determinants of foreign direct investment in the

agricultural sector remains limited. Most of the few studies treating this topic have focused on the general foreign direct determinants, found in other theoretical and empirical bodies of literature, often failing to address the specific characteristics of the agricultural sector (Zeytoonnejad Mousavian et al., 2021).

Since the Law on Foreign Investment was enacted in 1989, a high volume of foreign investments flowed into the country due to policy reform toward a market economy introduced in the late 1980s. Nevertheless, the proportion of foreign direct investment (FDI) capital in Vietnam's agricultural sector is quite small. From 2010 until the present, the agricultural sector constituted a mere 1.14% of the overall registered foreign direct investment (FDI) capital. The majority of these projects are of a small-scale nature, with funding ranging from 2 million USD to 5 million USD per project in the areas of farming, fishery, forestry, and agricultural service activities. However, in the livestock sector, the project funding increases to 16 million USD per project.

Approximately 47.6% of the foreign direct investment (FDI) capital allocated to the agricultural sector is concentrated in the Southern Key Economic Zone (KEZ) of Vietnam. The Southern Key Economic Zone is one of the four primary economic zones in Vietnam, encompassing the northern, southern, central, and Mekong Delta regions. The region in question is widely acknowledged as a vibrant economic hub, characterized by robust growth and a prominent position in international trade and foreign direct investment attraction. Additionally, it is noteworthy that this region has a significant level of agricultural productivity within the country. Nevertheless, the foreign direct investment (FDI) in the agricultural sector of the region is relatively limited in comparison to the industry's potential, constituting a mere 1.23% of total investments.

Hence, this article examines the various determinants that influence the investment choices made by foreign direct investors in the agricultural sector, specifically focusing on the Southern Key Economic Zone (KEZ) of Vietnam. This region is particularly noteworthy as it draws the highest amount of foreign direct investment (FDI) in the country, encompassing the agricultural sector as well.

In terms of policy implication, understanding key determinants affecting FDI localization is crucial for the government to implement appropriate location-based specialization policies to attract FDI in the agricultural sector.

2. Literature review

2.1. Theoretical foundation

Most of the researchers agree that market size is the most significant foreign direct investment determinant in the agricultural sector (Lv et al., 2010; Rashida et al., 2016; Farr, 2017; Husmann and Kubik, 2019). Besides, in each context, researchers put different determinants in the model. Rashida et al. (2016) found that poverty has a significantly negative impact on FDI in the agricultural sector in member countries of the Organization of the Islamic Cooperation (OIC) in the period 2003–2012, which showed that if the level of poverty is too high, it is hard to attract FDI into the agricultural sector. The study of Husmann and Kubik (2019) in the food and agricultural sector in Africa for each of the five year periods 2003–2007, 2008–

2012, and 2013–2017 revealed that the size of agricultural, agglomeration effects, infrastructure and institutional quality are important predictors of FDI inflows. Estimated by fixed effects for the panel data, Farr (2017) found that a new variable which measured energy imports as a share of total energy usage was statistically significant and negative to FDI inflows to the agricultural sector of 21 Latin American developing countries. Kubik (2023) found that the performance of the agricultural sector of the host country has a significant impact on the location choice of MNEs, using data of 49 African countries in the period 2003–2017. The author used agricultural production, value added, private and public investment, and the availability of agricultural land to represent the performance of the agricultural sector. Anwar et al. (2013) was the first to investigate the negative impact of government debt on the investment inflows in the agricultural sector of Pakistan. Investigating the determinants of foreign direct investments in agriculture in the countries of Danube region for the period from 2009 to 2016, Kastratović and Vasiljević (2018) found that foreign direct investments in agriculture of the region are primarily resource-seeking, although market-seeking investments are also present. Interestingly, some determinants, such as relative comparative advantage, institutional quality and membership in the European Union have the opposite effects to what has been predicted by the theory, which implied that general theoretic models of foreign direct investments do not necessarily hold true in the context of individual specific sectors. Combining economic factors and non-economic factors in an econometric model and estimating by Co-Integration regression analysis and Granger Causality analysis, Setiabudi et al. (2020) investigated both economic and non-economic factors affecting FDI long term in the Indonesian agricultural sector. Economic factors included export values, real income, exchange rates, interest rates and the consumer price index. Non-economic factors were political and legal, socio-cultural and competition. They found that both economic and non-economic factors significantly affected FDI in the Indonesian agricultural sector from 1980 to 2015. Zeytoonnejad Mousavian et al. (2021) investigated the macroeconomic and institutional determinants of FDI inflows to the agricultural sector by using a panel data set of 37 countries including developed and developing countries. With relation to the macroeconomic factors, the findings show that the openness of an economy has a negative effect on FDI inflows but economic growth and per-capita real GDP are both positively related to FDI inflows to the agricultural sector. Surprisingly, the justice system has a negative impact, but the corruption in the host country has a positive effect on FDI inflows to the agricultural sector.

There are a variety of theoretical models attempting to explain FDI and the location choice of MNEs. Therefore, researchers combined different theories in empirical studies (Faeth, 2009). To investigate the determinants of FDI in the agricultural sector in the Southern Key Economic Zone (KEZ) of Vietnam, the theoretical framework was developed based on Dunning's eclectic paradigm, the new theory of trade, institutional theory, and new economic geography theory.

Dunning (1979) combined ownership, location, and internalization advantages to create the eclectic paradigm of FDI to explain FDI and the location choice of MNEs. Ownership advantages referred to firms' competitive advantages over domestic firms such as technical knowledge, patents, brand reputation, management

skills and access to cheaper capital. Internalization advantages refer to the firm's ability to internalize its activities, and thus reduce its transaction costs. Location advantages refer to a certain location that can provide firms specific advantages such as natural resources, favorable tax system, trade openness, lower production, and transport costs.

A variety of factors can be put together in the eclectic paradigm of FDI to detect FDI's determinants depending on the scope and purpose of each research, for example, focusing on ownership, location or internalization advantages; FDI forms such as greenfield or mergers and acquisitions (M&A); country level, regional level or industry level. In our context, location-specific advantages are of particular interest, assuming that MNEs have already achieved ownership and internalization advantages.

In institutional theory, institutions play an important role in determining where MNEs are located. According to North (1990): "Institutions are the rules of the game of a society, or, more formally, are the humanly devised constraints that structure human interaction. Consequently, they structure incentives in human exchange, whether political, social, or economic." Institutions are designed to reduce uncertainty in human interaction by providing a framework for activities in society through which human interaction can be anticipated. The role of the host country government in attracting FDI through institutions and policies has increasingly attracted the attention of many researchers (Kwaw-Nimeson, 2023; Goswami, 2023; Ngo, 2017; Ullah and Khan, 2017). Dunning (2002) stated that institutions is among the essential determinants in attracting FDI because MNEs tend to shift from seeking markets and resources to seeking efficiency. Traditional factors such as natural resources and low labor costs become less important than non-traditional factors such as institutions, institution environment and economic freedom. The institution of the host country is measured by researchers through various factors such as political stability, level of corruption, efficiency of law enforcement, property rights and government incentives.

The theory of new economic geography (Krugman, 1991) explained agglomeration effects in production in which many companies, services, and industries exist in close proximity to one another and benefit from the cost reductions and gains in efficiency that result from this proximity. MNEs tend to start up new businesses in regions with a considerable number of established foreign companies to lower the cost of informal trade barriers such as institutions, culture and language (Yang et al., 2017; Goswami, 2023). However, the intensity of local competition and higher level of knowledge spillover could have a negative effect on FDI inflows.

2.2. Hypothesis development

2.2.1. Natural conditions

Natural conditions are among the main factors in agricultural production, in which geographical location, land, natural resources, and climate play an essential role. It is undeniable that agricultural production is dependent on natural resources and land because agriculture is the basic material production industry of society,

using land for planting and sheltering, exploiting crops and raising livestock. According to Husmann and Kubik (2019), agricultural land is an important predictor of FDI inflows. Nascimento (2011) also suggested that soil, soil fertility, water, and climate affect Investment Decisions. In addition, favorable geographical location is also an essential factor affecting the behavior and decision of FDI investors, helping to optimize logistics management and reduce production and transport costs. The observations used to measure this factor include agricultural land area (Husmann and Kubik, 2019); water and climate (Nascimento, 2011); and favorable geographical location (Fawaz, 2010). Based on the literature, the following hypothesis was proposed:

Hypothesis 1 (H1): Natural conditions directly affect Investment Decision.

2.2.2. Infrastructure

Infrastructure quality is an advantage of location in attracting FDI, which helps increase return on investment by reducing transaction costs. Lv et al. (2010) and Husmann and Kubik (2019) have identified that infrastructure is among the factors which have a positive effect on FDI inflows into the agricultural sector while investigating the determinants of FDI inflows into the agricultural sector in China at the provincial level (Guangdong province), regional level (5 provinces in China including Shandong, Fujian, Guangdong, Jiangsu and Zhejiang) and continental level (the African food and beverages cluster). However, the study of Rashida (2016) showed that infrastructure has no impact on FDI in the agricultural sector of OIC high-income developing economies of OIC countries. The observations commonly used to measure this factor include power systems, ports (Husmann and Kubik, 2019); transport infrastructure (Wang et al., 2019); water and electricity supply (Fosu, 2016); banking and auditing system (Pham et al., 2022); information infrastructure (Boermans et al., 2011; Kaliappan, 2015). Thus, the research proposed the following hypothesis:

Hypothesis 2 (H2): Infrastructure directly affects Investment Decision.

2.2.3. Human resources

Human resources is one of the important inputs of the agricultural sector besides land, machinery, fertilizers and irrigation systems (Wang et al., 2019). Human resources is often analyzed from three angles: labor cost, labor force and labor quality. In which, cheap labor costs, abundant labor force (Chaudhuri and Banerjeeb, 2010; Wang et al., 2019) and good labor quality (Santangelo, 2018) are expected to have a positive effect. The observations used to measure this factor are cheap labor cost (Khamphengvong et al., 2018; Boermans et al., 2011); availability of labor force (Chaudhuri and Banerjee, 2010; Hoang and Bui, 2015); education attainment (Santangelo, 2018); the capability to learn and operate technology (Adhana, 2016); discipline of the workforce (UNDP). Thus, the research proposed the following hypothesis:

Hypothesis 3 (H3): Human resources directly affect Investment Decision.

2.2.4. Public service quality

Public services are services provided by the government to serve the basic and essential needs of the people to ensure efficiency, stability and social justice. The

government may offer these services itself or offer funding to a private organization to provide them to community members. Public services are required to be responsible and accountable to their citizens and community. In Vietnam, public services can be classified into 3 groups including public administration services such as administrative procedures; public utility services which serve the social community, such as electricity, domestic water, traffic, post office, sanitation, security; and other services such as education and health care. For MNEs, good public service quality, especially public administrative services, helps investors to comply easily with legal regulations, save time and costs in handling administrative procedures in investment and operation as well as benefiting from government support in areas where the government has advantages, but firms are difficult to access. The observations used to measure this factor are public administration services, customs procedures, support from the central government and the local authorities in investment and business operations. Therefore, the research proposed the following hypothesis:

Hypothesis 4 (H4): Public service quality directly affects Investment Decision.

2.2.5. Policies

According to Faeth (2009), using policies and incentives, governments can influence the Investment Decision process of foreign investors in location choice, modes of entry, the choice to stay or to pull out after making investment and the choice to maintain their size or to expand.

According to Pasaribu et al. (2021), and Musabeh and Zouaou (2020), preferential and supportive policies of the host country play an important role in attracting FDI inflow.

Within the research scope, the policies were analyzed from the following three perspectives:

- Approaching from the perspective of the host country to actively implement activities to attract FDI usually through investment incentives including fiscal incentives, financial incentives (Kubik, 2023; Cuervo-Cazurra et al., 2022; Husmann and Kubik, 2019; Etim et al., 2019; Rogers and Wu, 2012; Faeth, 2009).
- Approaching from the perspective of the economic sectoral level, in which the local authorities implement policies to create a favorable business environment for agricultural development. The research of Kubik (2023) indicated that the well-performing and well-capitalized agricultural sector of the host country plays an important role in FDI localization.
- By approaching from hierarchical level, in which the policies were categorized into two groups: FDI attraction policies and regional agriculture policies. While FDI attraction policies are issued by the central government and implemented in the whole country, agriculture policies are implemented according to the orientation of the central government but differentiated according to the strengths and orientations of agricultural development of each province.

To develop scales for measuring FDI attraction policies latent variable, the article relied on policies to encourage enterprises to invest in agriculture and rural areas issued by the government under Resolution No.61/2010/ND-CP; Resolution

No.210/2013/ND-CP and Resolution No.57/2018/ND-CP. The policies include support for land concentration; credit; human resource training, market development; government grants in technical infrastructure; support for enterprises to do research, transfer and apply technologies in agriculture and agricultural insurance support policy.

After conducting in-depth interviews with local authorities and MNEs, it was revealed that among the policies mentioned above, MNEs in the agricultural sector are interested in policies which include support for land concentration, credit support and government grants in building infrastructure.

However, the scale "support for land concentration" was excluded from this latent variable. The reason is that according to Vietnam's laws, foreign companies are not allowed to lease or sub-lease land from households and individuals; and not allowed to receive capital contribution with land use rights of households and individuals. Foreign companies are only allowed to rent land from the government. Therefore, support for land concentration in the case of foreign companies is not understood as financial incentive but it refers to the effort of local authorities to prepare available agricultural land for MNEs to rent.

In addition, investors prioritize predictability, stability, and transparency of financial and fiscal incentives in determining Investment Decisions (Fiedler and Iafrate, 2016; Husmann and Kubik, 2019; Punthakey, 2020; Cuervo-Cazurra et al., 2022).

To develop scales for measuring regional agriculture policies latent variable, through desk research on agricultural policies of the Southern KEZ and in-depth interview with officials from local authorities, the scales were developed including (1) supporting access and concentration of land; (2) supporting agriculture information (soil, disease, agricultural sector planning, etc.); (3) building connections among enterprises, government and farmers; (4) supporting consumption and trade promotion of agricultural products; (5) supporting product branding; and (6) supporting to build infrastructure for production, preservation and processing of agricultural products.

Consequently, I propose the following hypotheses:

Hypothesis 5 (H5): FDI attraction policies directly affect Investment Decision.

Hypothesis 6 (H6): Regional agriculture policies directly affect Investment Decision.

2.2.6. Agglomeration effects

Many studies on determinants of FDI into Vietnam (Trinh, 2013; Hoang and Gujon, 2014; Nguyen Thi Ngoc, 2016; etc.) showed that the agglomeration effects have a significantly positive effect on FDI inflows.

Trinh (2013) found that locations where there are many MNEs available tend to attract more FDI, which explains why Red River Delta and the Southeast region attracted the most FDI inflows. The studies of Hoang and Gujon (2014) and Blanc-Brude et al. (2014) also indicated that FDI tends to pour into places where they have already made previous investments. In line with that, Yang et al. (2017) found that new FDI entrants tend to choose places where there are many MNEs operating, regardless of whether they are in the same industry or in another industry. Nguyen

Thi Ngoc (2016) and Vi Dũng et al. (2018) investigate the factors that determine FDI inflows in Vietnam for the same period 2008–2012 and 2008–2013. The empirical results showed that agglomeration is among the major determinants of FDI inflows, which was measured by the previous year's FDI concentration on FDI allocation between provinces and cities in Vietnam.

In the agricultural sector, according to Gruber and Soci (2010), agglomeration effects and the choice of locations to establish agricultural production are closely related. Many studies have approached from the perspective of new economic geography theory to explain the choice of places to organize agricultural production of enterprises in the agricultural and food industries (Liang and Plakias, 2022). Research by Husmann and Kubik (2019) showed that agglomeration effects have a significantly positive effect on FDI inflows in the agricultural sector of Africa in the period from 2008 to 2012 and from 2013 to 2017. However, studies on FDI in Vietnam often ignore this factor (Yang et al., 2017).

In empirical studies, the observations used to measure this factor are the concentration of MNEs and the concentration of local firms.

Then, the following hypothesis was proposed:

Hypothesis 7 (H7): Agglomeration effects directly affect Investment Decision.

Figure 1 graphically represents all of the proposed hypotheses as below.

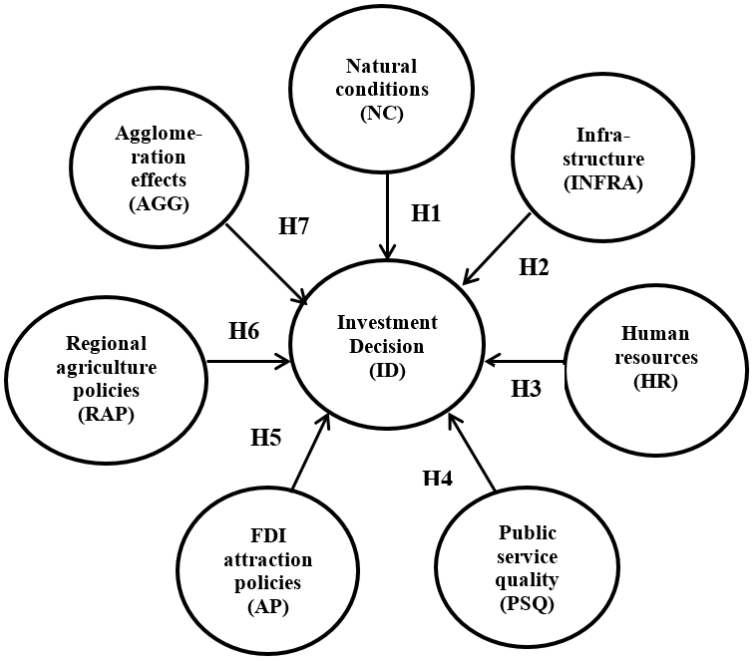


Figure 1. Author's proposed conceptual model.

3. Methodology

3.1. Sample and data collection

According to data obtained from the General Statistics Office of Vietnam and the Ministry of Agriculture and Rural Development, the agricultural sector in the Southern KEZ of Vietnam has 164 active FDI companies. The data was collected from June, 2022 to June, 2023 through a questionnaire in hard copy format in person

at the office of managing directors with 4+ years' experience. A total of 129 questionnaires were obtained, and there were no missing values.

Estimated using G*Power, version 3.1.9.4, with the power of 0.95, an effect size of 0.15, and 6 predictors (maximum of any latent variable), t-tests: linear multiple regression, a minimum sample size calculated was 74 cases. Therefore, the sample of 129 respondents is sufficient to meet the required minimum sample.

A questionnaire was designed to collect information from the MNEs in the agricultural sector. A 5-point Likert scale was used to evaluate the degree of agreement or disagreement with each statement in the questionnaire, in which 1 stands for "strongly disagree" and 5 stands for "strongly agree". The questionnaire consists of two sections: Section 1 is used to collect demographic information about the MNEs; and Section 2 contains information on the natural conditions, infrastructure, human resources, public service quality, FDI attraction policies, regional agriculture policies, the agglomeration effects and FDI decision.

Before the final questionnaire was decided, a draft of the questionnaire was sent to four officials and two academics to obtain validation by experts and a pre-test was carried out with 10 MNEs to ensure the questionnaire was easy to understand. The items included in the survey and their descriptive statistics are presented in the Appendix.

3.2. Data analysis

Structural Equation Modeling (SEM) is applied when the input variables have a linear structural relationship with the output variable. In other words, the input and output variables are considered latent variables and measured through observed variables (Sarstedt and Cheah, 2019). In terms of analytical techniques, there are two approaches to structural equation modeling (SEM) which are: (1) Covariance Based-Structural Equation Modeling (CB-SEM) and (2) Partial Least Squares- Structural Equation Modeling (PLS-SEM).

In recent years, the number of studies using PLS-SEM techniques has been increasing in comparison with CB-SEM because of the following reasons:

- PLS-SEM allows estimation of complex structural models with many observed variables, latent variables and intermediate variables (Hair et al., 2019).
- PLS-SEM is applied when the models have latent variables, which cannot be measured directly, but must be measured through observed variables.
- PLS-SEM is less constrained by the number of samples, the form of data distribution and the extent of measurement (Esposito Vinzi et al., 2010). This is considered as one of the main reasons that analysts prefer PLS-SEM over other methods (Hair et al., 2012; Nitzl, 2016).
- PLS-SEM is suitable for exploratory studies, which have an undeveloped theoretical background. The PLS-SEM model can be based on: (1) theory, (2) empirical research results, (3) laws, government regulations, and (4) other reasonable relationships. Therefore, with PLS-SEM, the theoretical basis can be strong, weak, or even exploratory (Purwanto and Sudargini, 2021).

In this research, the PLS-SEM method was used to test the hypotheses and the relationships of the theoretical model. The SmartPLS software version 4 was used to

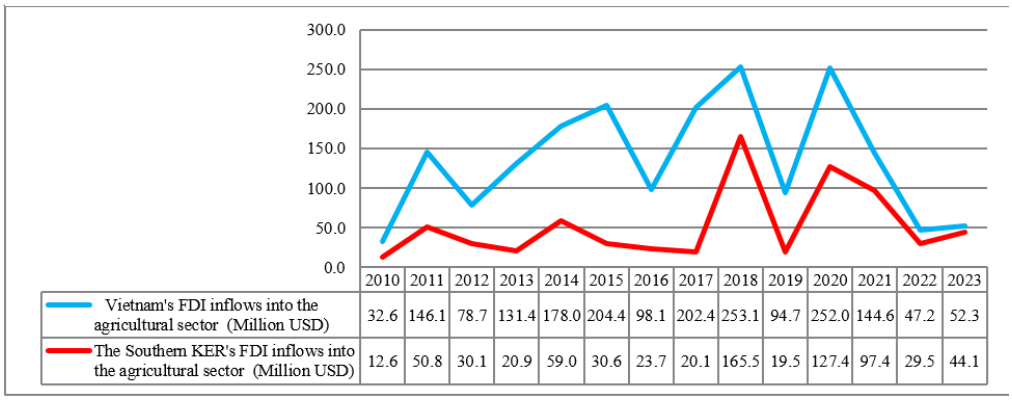
compute the model and test the hypotheses. The assessment of the PLS-SEM went through two stages: (1) the assessment of the measurement model and (2) the assessment of the structural model.

4. Findings

4.1. The overview of foreign direct investment (FDI) inflows to the agricultural sector of Vietnam (2010–2023)

The agricultural sector constituted a mere 1.14% of the overall registered foreign direct investment (FDI) capital in the period spanning from 2010 to October, 2023, in which 47.6% of the foreign direct investment (FDI) capital was allocated to the Southern Key Economic Zone (KEZ) of Vietnam. Nevertheless, the foreign direct investment (FDI) in the agricultural sector of the region is relatively limited in comparison to the industry's potential, constituting a mere 1.23% of total investments.

The analysis of FDI capital flows in the agricultural sector from 2010 to October 2023 reveals a volatile and intricate growth trajectory. Notably, the Southern Key Economic Zone, renowned for its significant FDI attraction, exhibits a fluctuating pattern that closely resembles the country's industrial FDI (see **Figure 2**).



	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Vietnam's FDI inflows into the agricultural sector (Million USD)	32.6	146.1	78.7	131.4	178.0	204.4	98.1	202.4	253.1	94.7	252.0	144.6	47.2	52.3
The Southern KER's FDI inflows into the agricultural sector (Million USD)	12.6	50.8	30.1	20.9	59.0	30.6	23.7	20.1	165.5	19.5	127.4	97.4	29.5	44.1

Figure 2. Foreign Direct Investment (FDI) inflows into the agricultural sector of Vietnam and the Southern Key Economic Zone (KEZ) of Vietnam in the period from 2010 to 2023.

Source: Author's calculation from data accessed from the Foreign Investment Agency of the Ministry of Planning and Investment.

The overall amount of FDI capital invested in the agricultural sector is influenced by various external factors including global and regional economic fluctuations and changes in the parent company's strategy. Vietnam's policy revisions during the process of international economic integration have had a considerable impact. Typically, there is an upward trend in foreign direct investment (FDI) inflows into the agricultural industry for the period spanning from 2010 to 2015. It is evident that in the year 2010, the implementation of Free Trade Agreements, such as the ASEAN—Australia/New Zealand Free Trade Agreement became valid. In 2011, Vietnam entered the Vietnam—Chile Free Trade Agreement. In the year 2015, Vietnam entered into four free trade agreements with Korea and the

Eurasian Economic Union. Additionally, negotiations on the Vietnam-EU Free Trade Agreement were successfully finished during this period. Furthermore, the promulgation and implementation of the Law on Investment enacted in the year 2014 has significantly facilitated the establishment of firms and enhanced the investment and business climate. This has therefore fostered a secure and transparent legal framework, thereby potentially attracting foreign investors. Foreign direct investors in the agricultural sector exhibit significant interest in the phenomenon of worldwide economic integration, as it coincides with a period wherein most of the foreign direct investment (FDI) projects in agriculture are primarily focused on export-oriented activities.

The livestock sector of the agricultural industry has experienced a significant influx of foreign direct investment (FDI) for the period spanning since 2017, albeit sporadically in 2019, but other areas of the agricultural industry have received only minimal FDI capital. The agricultural sector saw significant losses in 2019 as a result of the impacts of African swine fever, drought, and saltwater intrusion, all of which were attributed to climate change. The years 2021 and 2022 witnessed the emergence and proliferation of the COVID-19 outbreak in Vietnam, leading to disruptions in manufacturing and supply chains, resulting in a drop in foreign direct investment (FDI) inflows. Nevertheless, the data pertaining to the year 2023 exhibits indications of recuperation as foreign direct investment (FDI) firms within the cattle sector commence injecting money to augment their production capacities and company operations.

In recent decades, the livestock sector, as well as the general agricultural sector, has garnered significant appeal for foreign direct investment (FDI) due to numerous compelling factors. Vietnam is characterized by a politically stable environment, wherein the government has demonstrated commendable proficiency in economic management and has consistently implemented policies to encourage foreign direct investment (FDI). Moreover, Vietnam is a nation that has entered into numerous free trade agreements with various countries across the globe. Subsequently, Vietnam has emerged as a prominent open market, presenting several prospects for the expansion of export markets, particularly in the domain of agricultural products. Hence, foreign direct investment (FDI) initiatives directed towards Vietnam's agricultural sector can potentially provide advantages by facilitating the exportation of agricultural goods to nations engaged in trade connections with Vietnam. Vietnam is a significant consumer market for animal goods within the livestock sector. Vietnam's cattle industry exhibits a prominent scale within the Southeast Asian region, characterized by an average annual growth rate of 4%–5%. Vietnam's agricultural ecosystem has witnessed significant progress, as evidenced by the establishment of a substantial number of agricultural cooperatives, agricultural cooperative unions, cooperative groups, and farms. Based on updated criteria in manufacturing, the country currently boasts more than 19,100 cooperatives, 78 agricultural cooperative unions, over 30,000 cooperative groups, and over 19,600 farms. These figures highlight the immense potential that Vietnam's agricultural sector holds. In addition, according to the Meat Product Global Market 2023 Report of the Business Research Company, it is projected that there will be a rise in the worldwide demand for meat products, with an estimated increase from 903.06 billion USD in 2022 to 969.18 billion USD in

2023. This growth is likely to be driven by a compound annual growth rate (CAGR) of 7.3%. Furthermore, it is anticipated that the demand will continue to expand, reaching 1232.9 billion USD by 2027, with a CAGR of 6.2%. In order to address the substantial demand, FDI firms are implementing large-scale high-tech livestock farming as the sole means to accomplish this objective. This is a significant rationale for the substantial investments made by FDI enterprises in Vietnam's livestock sector.

The influx of foreign direct investment (FDI) businesses has played a significant role in enhancing agricultural practices by replacing conventional production methods with more extensive and modernized approaches. The prevalence of large-scale industrial livestock farming is on the rise, while the number of smallholder farming businesses is rapidly declining. This trend is increasingly aligning Vietnamese livestock farming with sophisticated livestock farming practices observed globally.

Nonetheless, this matter also gives rise to apprehensions regarding the potential harm posed to local small-scale farmers, as the gradual decline in the number of smallholder farming enterprises can be attributed to their diminishing competitive edge in the marketplace. In the domain of pig farming, it is observed that the rate of household farming experiences a decline of approximately 5%–7% per annum on average. Notably, throughout the period spanning from 2019 to 2021, this decline is more pronounced, reaching a range of 18%–20%. By the year 2022, it is projected that the number of livestock farms in the country will decrease to approximately 1.7 million, which is a decline from the 2.0 million farms recorded in 2020. To adjust, certain agricultural households are transitioning towards the practice of outsourcing farming activities to foreign direct investment (FDI) businesses. If the current trajectory persists and progresses without effective guidance and oversight, the livestock industry is at risk of forfeiting its autonomy and experiencing a gradual erosion of its internal resilience.

In contrast, there is a notable lack of foreign direct investment (FDI) in many segments within the agricultural sector including farming, fishery and forestry. One primary factor contributing to the challenge faced by foreign direct investment (FDI) firms is the limited access to agricultural land for establishing stable raw material locations. The present distribution of agricultural land predominantly comprises small-scale farmers who possess fragmented holdings, hence impeding the establishment of specialized farming regions. To secure a desired land site, each foreign direct investment (FDI) firm is required to engage in a process wherein they compensate farmers for the acquisition of land, and then transfer ownership to the State, which then grants a leaseback arrangement. When it comes to investing in industrial parks and export processing zones, the State demonstrates a swift clearance of land and the allocation of substantial land areas. However, the process of investing in agriculture does not mirror this expeditious approach. Moreover, in conjunction with Vietnam's ongoing industrialization and modernization endeavors, the available land for agricultural production is progressively diminishing due to its conversion for the establishment of industrial parks and urban zones.

At present, Vietnamese agricultural products primarily engage in competition within the lower market sector, relying predominantly on cost competitiveness and

high-volume production. The technology level and organizational structure of Vietnam's agricultural sector remain constrained. Moreover, within the context of the industry 4.0 age, the adoption of advanced agricultural models and the implementation of smart agriculture is becoming an unavoidable trajectory in substituting conventional agricultural practices, mostly due to the escalating demands for enhanced agricultural product standards. The land area is experiencing a reduction in size as a result of urbanization and the intensification of climate change, while the population continues to grow steadily. Hence, the progression towards the development of advanced agricultural practices is an unavoidable trajectory. One of the strategies employed to facilitate access to biotechnology, engineering technology, and management technology in the agricultural sector is the attraction of foreign direct investment (FDI). This approach also enables investment recipients to potentially engage in global production networks, if effectively managed.

4.2. Measurement model assessment

To assess the measurement model, the first step is examining the indicator loadings. Hair et al. (2019) suggested that outer loadings should be above 0.708 to ensure acceptable item reliability. If an outer loading of each construct is above 0.708, it indicates that the construct explains more than 50 per cent of the latent variable.

The second step is assessing internal consistency reliability, using composite reliability (CR) introduced by Jöreskog (1971). Higher values of CR indicate higher levels of reliability while values between 0.60 to 0.70 are considered "acceptable in exploratory research" and values from 0.70 to 0.90 mean "satisfactory to good". The result calculated showed that the model is sufficiently reliable and internally consistent.

Cronbach's alpha is another measure of internal consistency reliability that assumes similar thresholds, but produces lower values than composite reliability. While Cronbach's alpha may be too conservative, the composite reliability may be too liberal, and the construct's true reliability is typically viewed as within these two extreme values. Cronbach's alpha is considered a good scale if its value is greater or equal to 0.800 and an acceptable scale if its value is between 0.700 to 0.800. All Cronbach's alpha values calculated from the model are between 0.739 to 0.930, which indicates that the measurement model has high reliability.

The third step is assessing the convergent validity of each construct in the model, using the average variance extracted (AVE), which was calculated for all items of each construct. The value of 0.500 or higher of AVE indicated that the construct explains at least 50 per cent of the variance of its items. All AVE values calculated ranged from 0.557 to 0.822, which confirms that the reflective scales are internally consistent (see **Table 1**).

Table 1. Item reliability, internal consistency reliability and convergent validity.

Latent variables	Factor loading	Cronbach's alpha	CR	AVE
Natural conditions (NC)				
NC1	0.74			
NC2	0.713	0.739	0.834	0.557
NC3	0.725			
NC4	0.804			
Infrastructure (INFR)				
INFR1	0.801			
INFR2	0.845	0.851	0.900	0.693
INFR4	0.876			
INFR5	0.785			
Human resource (HR)				
HR1	0.741			
HR3	0.772			
HR4	0.752	0.843	0.883	0.601
HR5	0.789			
HR6	0.821			
Public service quality (PSQ)				
PSQ1	0.932			
PSQ2	0.912	0.858	0.914	0.781
PSQ4	0.802			
FDI attraction policies (AP)				
AP1	0.891			
AP2	0.723	0.876	0.912	0.723
AP4	0.857			
AP5	0.917			
Regional agriculture policies				
RAP1	0.805			
RAP2	0.857	0.861	0.897	0.685
RAP3	0.899			
RAP5	0.762			
Agglomeration effects				
AGG1	0.939			
AGG2	0.918	0.930	0.949	0.822
AGG3	0.924			
AGG4	0.844			
Investment Decision				
ID1	0.911			
ID2	0.886	0.802	0.883	0.717
ID3	0.731			

Source: Author's calculation from the research of 129 MNEs in the Southern KEZ of Vietnam by Smart PLS software.

The fourth step is evaluating the discriminant validity to confirm whether a construct is empirically distinct from other constructs in the structural model. The conventional method for evaluating the accuracy of discrimination involves employing the "square root of the AVE" metric introduced by Fornell and Larcker (1981). According to this index, the correlations between any two constructs should not surpass the square root of the average variance extracted (AVE) for each construct. Nevertheless, current research suggests that this particular metric is not appropriate for evaluating discriminant validity. Henseler et al. (2015) used the heterotrait-monotrait (HTMT) ratio of the correlations as an alternative measure. The HTMT is operationalized as the average correlation value of the items across constructs in proportion to the geometric mean of the average correlation for the items assessing the same construct.

The analysis of the HTMT index is conducted in two stages. The initial step involves the computation of the HTMT index, followed by the subsequent step of evaluating the hypothesis H0 to determine if the HTMT index is equal to or exceeds 1.

In the initial phase, the outcomes of data processing utilizing the Smart PLS software yield the HTMT index values for the various pairs of concepts, which are presented in **Table 2**.

Table 2. Discriminant validity (HTMT Matrix).

	Regional agriculture policies	**Infrastructure**	**FDI attraction policies**	**Public service quality**	**Human resource**	**Agglomeration effects**	**Investment Decision**	**Natural conditions**
Regional agriculture policies	-	-	-	-	-	-	-	-
Infrastructure	0.331	-	-	-	-	-	-	-
FDI attraction policies	0.799	0.452	-	-	-	-	-	-
Public service quality	0.553	0.482	0.463	-	-	-	-	-
Human resource	0.532	0.620	0.549	0.695	-	-	-	-
Agglomeration effects	0.086	0.187	0.111	0.066	0.179	-	-	-
Investment Decision	0.278	0.840	0.647	0.648	0.686	0.161	-	-
Natural conditions	0.394	0.569	0.340	0.663	0.612	0.185	0.685	-

Source: Author's calculation from the research of 129 MNEs in the Southern KEZ of Vietnam by Smart PLS software.

Discriminant validity problems are present when HTMT values are high. Henseler et al. (2015) proposed that an HTMT value above 0.90 would suggest that there is no discriminant validity for constructs that are conceptually very similar. When constructs are conceptually more distinct, a lower threshold value of HTMT is suggested, such as 0.85. The results in **Table 2** showed that all the HTMT values were lower than the conservative threshold of 0.850, which indicates that the data met this requirement.

The subsequent step involves doing a hypothesis test on H0 in order to determine whether the HTMT index is equal to or greater than 1. This will be

accomplished by performing bootstrapping with 5000 resamples with the Smart PLS program. The results are reported in **Table 3**.

Table 3. HTMT inference.

	Original sample (O)	**Sample mean (M)**	**CI 2.5% Lower**	**CI 97.5% Upper**
INFR <-> RAP	0.331	0.346	0.193	0.536
AP <-> RAP	0.799	0.799	0.707	0.882
AP <-> INFR	0.452	0.454	0.281	0.616
PSQ <-> RAP	0.553	0.551	0.348	0.738
PSQ <-> INFR	0.482	0.477	0.255	0.659
PSQ <-> AP	0.463	0.461	0.298	0.611
HR <-> RAP	0.532	0.536	0.333	0.722
HR <-> INFR	0.620	0.616	0.415	0.782
HR <-> AP	0.549	0.550	0.393	0.692
HR <-> PSQ	0.695	0.682	0.452	0.836
AGG <-> RAP	0.086	0.135	0.068	0.236
AGG <-> INFR	0.187	0.210	0.101	0.361
AGG <-> AP	0.111	0.143	0.058	0.292
AGG <-> PSQ	0.066	0.115	0.059	0.204
AGG <-> HR	0.179	0.207	0.088	0.365
ID <-> RAP	0.278	0.295	0.171	0.465
ID <-> INFR	0.840	0.843	0.716	0.954
ID <-> AP	0.647	0.649	0.503	0.787
ID <-> PSQ	0.648	0.646	0.448	0.815
ID <-> HR	0.686	0.683	0.507	0.832
ID <-> AGG	0.161	0.194	0.095	0.336
NC <-> RAP	0.394	0.402	0.214	0.616
NC <-> INFR	0.569	0.572	0.369	0.762
NC <-> AP	0.340	0.365	0.223	0.532
NC <-> PSQ	0.663	0.660	0.437	0.833
NC <-> HR	0.612	0.612	0.388	0.806
NC <-> AGG	0.185	0.217	0.115	0.353
NC <-> ID	0.685	0.687	0.487	0.863

Note: CI: confidence intervals.
Source: Author's calculation from the research of 129 MNEs in the Southern KEZ of Vietnam by Smart PLS software.

Table 3 presents the HTMT values in the first column, representing the original sample. The second column displays the average HTMT value derived from 5000 samples. The third and fourth columns provide the lower and upper bounds of the confidence intervals (CI), respectively. For a desired confidence interval of 95%, the lower limit observation is calculated by multiplying 5000 by 0.025, while the upper bound observation is obtained by multiplying 5000 by 0.975. The HTMT index in the original sample will exhibit a range of 2.5% to 97.5% with a 95% level of confidence. According to the findings presented in **Table 3**, it can be observed that

the HTMT values of all 5000 bootstrap samples fall within the 95% confidence interval and are found to be less than 1. An illustration of this may be seen in the 95% confidence interval of the HTMT index between the constructs Infrastructure (INFRA) and Regional agriculture policies (RAP), which ranges from 0.193 to 0.536. It is worth noting that this interval is below the value of 1. Thus, it can be concluded that the null hypothesis H0 can be rejected with a probability of 5%. Therefore, it can be affirmed that the model attains a precise degree of differentiation among scales.

4.3. Structural model assessment

When the measurement model assessment is satisfactory, the next step is assessing the structural model. Standard assessment criteria to assess the structural model includes: (1) collinearity between constructs; (2) predictive power using the coefficient of determination (R^2); (3) the blindfolding-based cross validated redundancy measure Q^2, (4) evaluation of effect size f^2; and (5) the statistical significance and relevance of the path coefficients. In addition, researchers should assess their model's out-of-sample predictive power by using the PLS predict procedure (Shmueli et al., 2016).

4.3.1. Collinearity assessment

The structural model analysis begins by examining the collinearity to make sure it does not bias the regression results. The variance inflation factor (VIF) is often used to evaluate the problem of multicollinearity.

VIF values above 5.00 (VIF > 5.00) indicate possible collinearity problems among predictor constructs, but the problems can also occur at lower VIF values from 3.00 to 5.00 ($3.00 \leq VIF \leq 5.00$). VIF values are expected to be below 3.00 (VIF < 3.00) to ensure there are no potential problems of collinearity (Becker et al., 2014).

After calculating the VIF, **Table 4** shows that all the VIF values fluctuate from 1.084 to 2.103, indicating that there is no collinearity in the structural model (see **Table 4**).

Table 4. Variance inflation factor (VIF).

Constructs	VIF
1. Natural conditions	1.668
2. Infrastructure	1.604
3. Human resources	2.101
4. Public service quality	2.03
5. FDI attraction policies	2.103
6. Regional agriculture policies	2.099
7. Agglomeration effects	1.084

Source: Author's calculation from the research of 129 MNEs in the Southern KEZ of Vietnam by Smart PLS software.

4.3.2. *R* square

The next step is testing the R^2 value of the endogenous construct. The R^2 is used

to measure the model's explanatory power (Shmueli and Koppius, 2011) and the in-sample predictive power (Rigdon, 2012). The R^2 calculated in the model is 0.773, which can be considered substantial (Henseler et al., 2009; Hair et al., 2022). In other words, the independent variables explained 77.3% of the variation of the dependent variable. The remaining 22.7% are from errors or other factors that have not been included in the model.

4.3.3. Effect size f^2

The effect size (f^2) is used to assess how the removal of a certain predictor construct affects an endogenous construct's R^2 value and whether exogenous constructs have a substantive impact on endogenous constructs. Values higher than 0.02, 0.15 and 0.35 depict small, medium and large f^2 effect sizes (Cohen, 1988).

In this research, all f^2 values are between 0.000 to 0.605. The effect sizes of FDI attraction Policies, Infrastructure, Regional Agriculture Policies when explaining Investment Decision are strong, which are 0.605; 0.427; 0.385 respectively. The f^2 values of Natural Conditions, Human Resources, Public service quality when explaining Investment Decision are weak, which are 0.086; 0.028; 0.050 respectively. Agglomeration effects have no effect when explaining Investment Decision (f^2 = 0.000) (see **Table 5**).

Table 5. Effect size f^2.

Constructs	f^2	**Type**
Regional agriculture policies	0.385	Substantial
Infrastructure	0.427	Substantial
FDI attraction policies	0.605	Substantial
Natural conditions	0.086	Weak
Public service quality	0.05	Weak
Human resources	0.028	Weak
Agglomeration effects	0	

Source: Author's calculation from the research of 129 MNEs in the Southern KEZ of Vietnam by Smart PLS software.

4.3.4. Predictive power

While R^2 only evaluates the model's in-sample explanatory power but does not explain the model's out-of-sample predictive power (Shmueli, 2010; Shmueli and Koppius, 2011; Dolce et al., 2017), Q^2 can combine out-of-sample prediction and in-sample explanatory power (Shmueli et al., 2016). Q^2 was calculated using a blindfolding procedure that removes individual data points from the data matrix and substitutes the removed points for the mean and estimates the model parameters.

According to Hair et al. (2019), Q^2 value of a specific endogenous construct should be greater than zero to ensure the predictive accuracy of the structural model for that construct. The predictive accuracy of the model is high if $Q^2 > 0.5$; medium if $0.25 \leq Q^2 \leq 0.5$; and low if $Q^2 < 0.5$. In the research's model, the Q^2 value of Investment Decision is 0.74, indicating that the model achieved high predictive accuracy.

4.3.5. Path coefficients, significance and relevance

By performing PLS-SEM algorithm, estimates are obtained for the structural model relationships (i.e., path coefficients), which represent the hypothesized relationships between the constructs. Before examining the sizes of the path coefficient, the statistical significance of PLS-SEM results were assessed. Thus, the bootstrapping method, which is a non-parametric statistical procedure, was used to examine the statistical significance of PLS-SEM results (i.e., *t*-statistics). Through a bootstrapping process with 5000 resamples (Henseler et al., 2015), the path coefficients of the model were measured with a significance level of 5%. The results are presented in **Figure 3**.

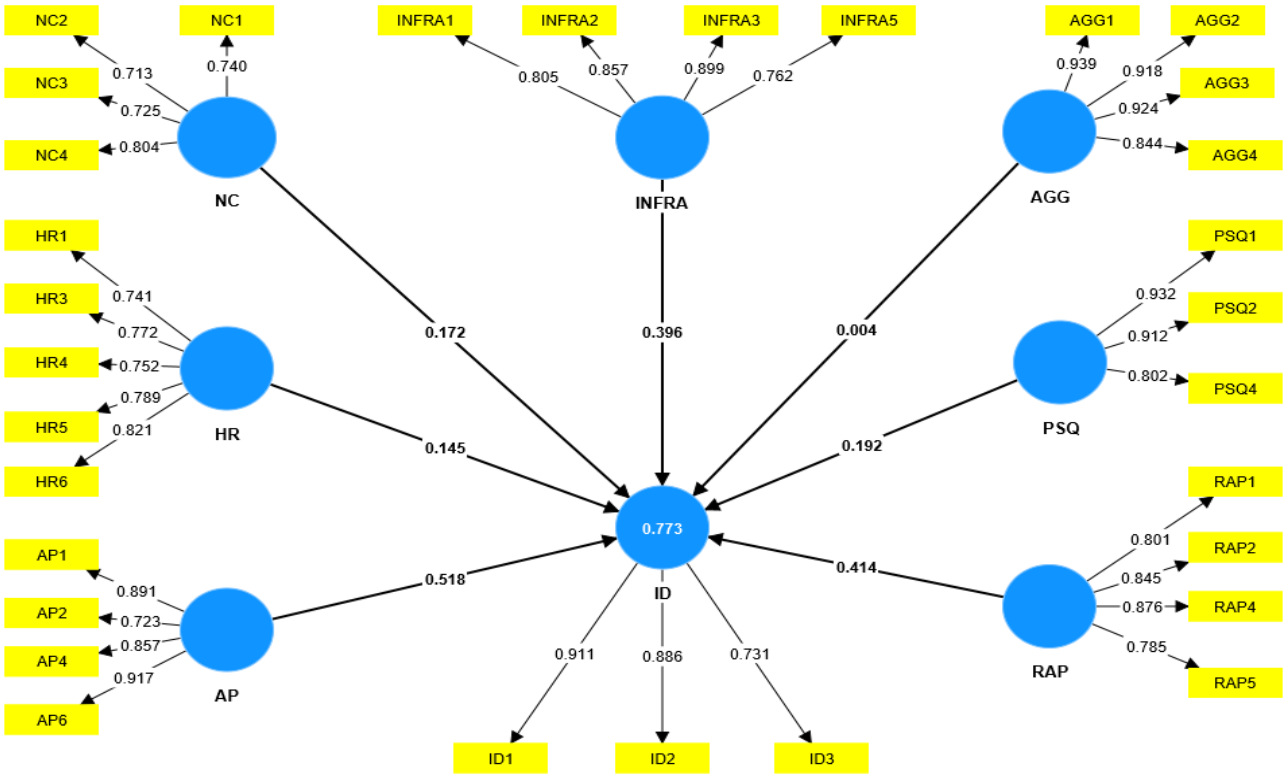


Figure 3. Structural equation model.

Source: Author's calculation from the research of 129 MNEs in the Southern KEZ of Vietnam by Smart PLS software.

To make the explanation easier to understand, the author summarizes the indicators of **Figure 3** in **Table 6**. The results of hypothesis testing are displayed in **Table 6** as below.

Table 6. Hypothesis results and path coefficients.

Hypothesis	Direct path	Path coefficient (*β*)	Standard deviation (STDEV)	T statistics (O/STDEV)	*P*-values
Supported	Natural conditions directly affects Investment Decision	0.172	0.065	2.641	0.008
Supported	Infrastructure directly affects Investment Decision	0.414	0.108	3.816	0.000
Supported	Human resources directly affects Investment Decision	0.145	0.064	2.263	0.024

Table 6. (*Continued*).

Hypothesis	Direct path	Path coefficient (β)	Standard deviation (STDEV)	T statistics (O/STDEV)	*P*-values
Supported	Public service quality directly affects Investment Decision	0.192	0.083	2.324	0.020
Supported	FDI attraction policies directly affects Investment Decision	0.518	0.081	6.363	0.000
Supported	Regional agriculture policies directly affects Investment Decision	0.396	0.069	5.775	0.000
Rejected	Agglomeration effects directly affects Investment Decision	0.004	0.051	0.077	0.938

Source: Author's calculation from the research of 129 MNEs in the Southern KEZ of Vietnam by Smart PLS software.

Table 6 shows the results of the proposed hypotheses. The path coefficients of the constructs of Regional Agriculture Policies, Infrastructure, FDI Attraction Policies, Natural Conditions, Public Service Quality, Human Resources are significantly positive in relation to Investment Decision, in which FDI Attraction Policies variable has the most substantial effect (β = 0.518), followed by Regional Agriculture Policies (β = 0.414) and Infrastructure (β = 0.396). Natural Conditions (β = 0.172), Public Service Quality (β = 0.192), and Human Resources (β = 0.145) have significantly positive influence on Investment Decision but small effect. However, the relationship between Agglomeration Effects with Investment Decision is not significant (β = 0.004; p = 0.938 > 0.05).

5. Discussion

The results obtained indicate that six out of seven latent variables positively influence Investment Decision including FDI attraction policies, infrastructure, regional agriculture policies, public service quality, human resources and natural conditions with a significant level of 5%.

Among all the constructs, FDI attraction policies is the most prominent, which indicates that the FDI investors in agriculture were attracted by fiscal incentives (corporate tax and land rental) and financial incentives (government grants in agricultural insurance and infrastructure investment, favorable credits), the stability and predictability of the tax system and the stability of policies for FDI in agriculture. This might be due to the fact that investing in agriculture requires large capital but high risks and slow capital recovery. It is in line with the study by International Monetary Fund (2003) suggesting that tax incentives are essential in sectors whose fixed costs are relatively high and investments are generally front-loaded.

Regional agriculture policies is a new variable introduced to measure the effect on Investment Decision, which represents the characteristics of the location regarding agriculture. Regional agriculture policies is a relevant factor at the sector level but research including this factor remains limited. The results indicated that it is the second most influential factor on Investment Decision with a strong impact (f^2 = 0.385). To a certain extent, it is consistent with the study of Kubik (2023) stating that the well-performed and well-invested agricultural sector of the host country is the main factor influencing location choice of MNEs in the food and beverage sector.

Infrastructure is another factor that plays an essential role in Investment Decision. The result implies that investors prefer to invest in places with favorable infrastructure conditions rather than those with less developed infrastructure. Good infrastructure (transportation system, power supply, water supply, irrigation and drainage system, etc.) helps increase return on investment by reducing transaction costs.

Natural conditions, human resources and public service quality also have positive and significant effects on Investment Decision but to a lesser extent. The results are in line with the research hypotheses and previous studies. In particular, the influence of natural conditions has been reducing as the Fourth Industrial Revolution is shifting agricultural production to new models such as smart farming, precision farming or digital farming.

With respect to human resources, the quantity and quality of human resources are essential to attract FDI in agriculture. A new indicator introduced to measure the construct human resources, which was "having experience in agriculture", is demonstrated as an appropriate indicator (factor loading = 0.752). However, "cheap labor" is not good enough to support the construct of human resources. The result indicates that investors were more interested in the availability of a good quality labor force rather than cheap labor. Public service quality is another important factor contributing to Investment Decision. Good public service quality helps firms to handle the necessary administrative procedures in investment and operational activities smoothly. The descriptive statistics reveal that investors appreciated "A welcoming local government supportive of FDI" the most.

The findings are consistent with the studies of Phung (2016) and Dunning (2002) that traditional factors such as natural resources and low labor cost become less important than factors such as institutions and policies, especially, policies at the sector level and region level play an important role in attracting FDI in agriculture.

Agglomeration effects do not have an influence on Investment Decision, which is not in line with results obtained by Yang et al. (2017) when they studied the location choice of MNEs in Vietnam. It might be because Agglomeration effects is the construct with high degree of dispersion among the respondents. It may be the result of the fact that MNEs made their first Investment Decision in the agricultural sector in Southern KEZ in different times since 1991 when the first FDI in agriculture was implemented. In addition, a small sample of 129 firms is also another limitation.

6. Conclusions

The research focused on identifying the determinants of foreign direct investment inflows into the agricultural sector in the Southern KEZ of Vietnam. An econometric model was derived from previous theoretical and empirical work, and it was verified by analyzing the PLS-SEM model through a sample of 129 foreign investors of a total of 164 MNEs in the agricultural sector in the Southern KEZ.

In general, the results suggest that factors including "FDI Attraction Policies", "Regional Agriculture Policies" and "Infrastructure" have a strong positive impact on Investment Decision in agriculture while the factors such as "Natural Conditions",

"Human Resources" and "Public Service Quality" have positive but weak impact. The research confirmed that policies are effective in attracting FDI and revealed that not only national but regional policies play an essential role in attracting FDI into the agricultural sector.

With these results, this article contributes to filling a gap related to the need for a theoretical model which could serve as a framework and define the important determinants for empirical studies about FDI, taking into account the specific aspects of the agricultural sector in the region which is considered the FDI magnet of Vietnam.

This research has important implications for policy makers to attract FDI in the agricultural sector in the Southern KEZ including revision of current FDI and agriculture policies to ensure the synchronization, the enforcement and the resources for implementation as well as to enhance public service quality. It is necessary to pay more attention to regional agriculture policies, taking into account local conditions and utilizing each province's comparative advantages. Furthermore, improving the infrastructure, protecting the natural environment, developing human resources and forming a skilled and well-trained workforce are always the fundamental solutions to create a favorable investment environment.

This study has some limitations, which provide future lines of research. This study utilizes data from multinational enterprises (MNEs) operating in the agricultural sector of the Southern Key Economic Zone of Vietnam. Consequently, caution should be exercised when generalizing the findings to other regions. It is important to note that "Regional agriculture policies" are context-specific factors that vary across localities, influenced by the unique strengths and focus of agricultural production in each area, as well as the availability of local resources. Hence, it is recommended that forthcoming research endeavors incorporate samples from diverse geographical areas for the purpose of comparative analysis. Furthermore, it is anticipated that in the year 2022, a mere three foreign direct investment (FDI) firms will engage in capital expansion endeavors to facilitate the growth of their production and commercial operations. Similarly, in the subsequent year of 2023, only three enterprises will initiate new FDI projects, while an additional six enterprises will opt to augment the capital of their existing projects. In the interim, around 14% of foreign direct investment (FDI) businesses saw a temporary cessation of their business operations. Hence, it would be of scholarly interest to investigate the determinants that influence the decision to reinvest foreign direct investment (FDI), particularly in the aftermath of the COVID-19 pandemic. Additionally, it would be valuable to analyze the disparity between intention and the actual decision to reinvest, encompassing both the continuation and expansion of investment. This is of considerable relevance for policy makers to adopt appropriate measures to bridge the gap and boost the attractiveness of agriculture for investors. Furthermore, it is essential to investigate Vietnam's position in the Investment Development Path (IDP) following the Investment Development Path Theory (Dunning and Narula, 1996). The identification of IDP phase can be applied for policy makers to implement appropriate policies that boost FDI performance and move the agricultural sector of Vietnam forward to higher stages of the Investment Development Path.

Funding: This research is funded by the University of Economics and Law, Vietnam National University Ho Chi Minh City / VNU-HCM.

Conflict of interest: The author declares no conflict of interest.

References

Adhana DK (2016). Foreign direct investment in the Indian agricultural sector: Opportunities and Challenges. Kaav International Journal of Economics, Commerce & Business Management 3(2).

Anwar Z, Saeed R, Khan MK, Syedah SEA (2013). Determinants of foreign direct investment (FDI) in Pakistan's agricultural sector. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development 13(1): 13–18.

Becker JM, Ringle CM, Sarstedt M, Völckner F (2014). How collinearity affects mixture regression results. Marketing Letters 26(4): 643–659. doi: 10.1007/s11002-014-9299-9

Blanc-Brude F, Cookson G, Piesse J, Strange R (2014). The FDI location decision: Distance and the effects of spatial dependence. International Business Review 23(4): 797–810. doi: 10.1016/j.ibusrev.2013.12.002

Boermans MA, Roelfsema H, Zhang Y (2011). Regional determinants of FDI in China: A factor-based approach. Journal of Chinese Economic and Business Studies 9(1): 23–42. doi: 10.1080/14765284.2011.542884

Chaudhuri S, Banerjee D (2010). FDI in agricultural land, welfare and unemployment in a developing economy. Research in Economics 64(4): 229–239. doi: 10.1016/j.rie.2010.05.002

Cohen J (1988). Statistical Power Analysis for the Behavioral Sciences, 2nd ed. Routledge.

Cuervo-Cazurra A, Silva-Rêgo B, Figueira A (2022). Financial and fiscal incentives and inward foreign direct investment: When quality institutions substitute incentives. Journal of International Business Policy 5(4): 417–443. doi: 10.1057/s42214-021-00130-9

Dunning JH (1979). Explaining changing patterns of international production: In defence of the eclectic theory. Oxford Bulletin of Economics and Statistics 41(4): 269–295. doi: 10.1111/j.1468-0084.1979.mp41004003.x

Dunning JH (2002). Trade, location of economic activity and the multinational enterprise: A search for an eclectic approach. In: Theories and Paradigms of International Business Activity. Edward Elgar. doi: 10.4337/9781843767053.00007

Dunning JH, Narula R (1996). The investment development path revisited. In: Foreign Direct Investment and Governments. Routledge.

Dolce P, Esposito Vinzi V, Lauro C (2017). Predictive path modeling through PLS and other component-based approaches: Methodological issues and performance evaluation. In: Partial Least Squares Path Modeling. pp. 153–172.

Esposito Vinzi V, Chin WW, Henseler J, Wang H (2010). Handbook of Partial Least Squares: Concepts, Methods and Applications. Springer Berlin Heidelberg. doi: 10.1007/978-3-540-32827-8

Faeth I (2009). Determinants of foreign direct investment—A tale of nine theoretical models. Journal of Economic Surveys 23(1): 165–196. doi: 10.1111/j.1467-6419.2008.00560.x

Farr F (2017). Determinants of Foreign Direct Investment and Foreign Direct Investment in Agriculture in Developing Countries [Master's thesis]. University of Hohenheim.

Fawaz B (2010). Location Motivations for Foreign Direct Investment in the Petrochemicals Industry:

The Case of Saudi Arabia [PhD thesis]. Brunel University.

Fiedler Y, Iafrate M (2016). Trends in Foreign Direct Investment in Food, Beverages and Tobacco. Food and Agriculture Organization of the United Nations.

Fornell C, Larcker DF (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research 18(1): 39. doi: 10.2307/3151312

Fosu P (2016). Infrastructure and foreign direct investment inflows: Evidence from Ghana. Available online: https://mpra.ub.uni-muenchen.de/100375/1/MPRA_paper_100375.pdf (accessed on 10 November 2023).

Goswami V (2023). Do institutional determinants matter for FDI inflows location choice? Evidence from sub-national panel data in India. International Journal of Emerging Markets ahead-of-print. doi: 10.1108/ijoem-11-2021-1725

Gruber S, Soci A (2010). Agglomeration, agriculture, and the perspective of the periphery. Spatial Economic Analysis 5(1): 43–72. doi: 10.1080/17421770903511353

Hair JF Jr, Hult GTM, Ringle CM, Sarstedt M (2022). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM). SAGE.

Hair JF, Risher JJ, Sarstedt M, Ringle CM (2019). When to use and how to report the results of PLS-SEM. European Business Review 31(1): 2–24. doi: 10.1108/ebr-11-2018-0203

Hair JF, Sarstedt M, Pieper TM, Ringle CM (2012). The use of partial least squares structural equation modeling in strategic management research: A review of past practices and recommendations for future applications. Long Range Planning 45(5–6): 320–340. doi: 10.1016/j.lrp.2012.09.008

Henseler J, Ringle CM, Sarstedt M (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science 43(1): 115–135. doi: 10.1007/s11747-014-0403-8

Henseler J, Ringle CM, Sinkovics RR (2009). The use of partial least squares path modeling in international marketing. In: Sinkovics RR, Ghauri PN (editors). New Challenges to International Marketing. Emerald Group Publishing Limited. doi: 10.1108/S1474-7979(2009)0000020014

Hoang HH, Bui DH (2015). Determinants of foreign direct investment in ASEAN: A panel approach. Management Science Letters 5(2): 213–222. doi: 10.5267/j.msl.2014.12.015

Hoang HH, Goujon M (2014). Determinants of foreign direct investment in Vietnamese provinces: A spatial econometric analysis. Post-Communist Economies 26(1): 103–121. doi: 10.1080/14631377.2014.874658

Husmann C, Kubik Z (2019). Foreign direct investment in the African food and agriculture sector: Trends, determinants and impacts. SSRN Electronic Journal. doi: 10.2139/ssrn.3370799

International Monetary Fund (IMF) (2003). Foreign Direct Investment in Emerging Market Countries. Capital Markets Consultative Group. Available online: https://www.imf.org/external/np/cmcg/2003/eng/091803.pdf

Jöreskog KG (1971). Statistical analysis of sets of congeneric tests. Psychometrika 36(2): 109–133. doi: 10.1007/bf02291393

Kaliappan SR, Khamis KM, Ismail NW (2015). Determinants of services FDI inflows in ASEAN countries. International Journal of Economics and Management 9(1): 45–69.

Khamphengvong V, Xia E, Srithilat K (2018). Inflow determinants of foreign direct investment. Human Systems Management, 37(1), 57–66. doi:10.3233/HSM-17229.

Kastratović R, Vasiljević Z (2018). Determinants of foreign direct investments in agriculture of Danube region. In: Subic J, Kuzman B, Vasile AJ (editors). Thematic Proceedings "Sustainable Agriculture and Rural Development in Terms of the Republic of Serbia Strategic Goals Realization within the Danube Region—Support Programs for the Improvement of Agricultural and Rural Development". Institute of Agricultural Economics. pp.511–528.

Krugman P (1991). Increasing returns and economic geography. Journal of Political Economy 99(3): 483–499. doi: 10.1086/261763

Kubik Z (2023). The role of agricultural sector performance in attracting foreign direct investment in the food and beverages sector. Evidence from planned investments in Africa. Agribusiness 39(3): 875–903. doi: 10.1002/agr.21800

Kwaw-Nimeson E, Tian Z (2023). Institutional quality, foreign direct investment, and regional integration: Empirical evidence from CEN-SAD. SAGE Open 13(1): 21582440221. doi: 10.1177/21582440221148389

Liang CL, Plakias ZT (2022). Interdisciplinary system and network perspectives in food and agricultural economics. In: Handbook of Agricultural Economics. Elsevier. pp. 4705–4779. doi: 10.1016/bs.hesagr.2022.03.002

Lv L, Wen S, Xiong Q (2010). Determinants and performance index of foreign direct investment in China's agriculture. China Agricultural Economic Review 2(1): 36–48. doi: 10.1108/17561371011017487

Musabeh A, Zouaoui M (2020). Policies and variables affecting FDI: A panel data analysis of North African countries. Journal of Economic Policy Researches 7(1): 1–20. doi: 10.26650/jepr635016

Nascimento JR (2011). Analysis of International Investments in the Agricultural Sector of Brazil. Food and Agriculture Organization of the United Nations (FAO).

Ngo HG (2017). Institutional Determinants of FDI in Vietnam [Master's thesis]. Radboud University Nijmegen School of Management.

Le VT, Nguyen LBD (2017). Analysis of factors affecting FDI of Vietnamese provinces and cities by spatial econometric model (Vietnamese). Journal of Asian Business and Economic Studies (JABES) 28(7): 4–33.

Nguyen Thi Ngoc A (2016). Regional determinants of FDI location in Vietnam. Journal of Economics and Development 18(1): 19–37. doi: 10.33301/2016.18.01.02

Nitzl C (2016). The use of partial least squares structural equation modelling (PLS-SEM) in management accounting research: Directions for future theory development. Journal of Accounting Literature 37(1): 19–35. doi: 10.1016/j.acclit.2016.09.003

North DC (1990). Institutions, Institutional Change and Economic Performance. Cambridge University Press. doi: 10.1017/CBO9780511808678

Pasaribu D, Murwani A, Setiawan I (2021). Foreign direct investment in Indonesia's agriculture. Center for Indonesian Policy Studies. doi: 10.35497/345257

Pham HT, Gan C, Hu B (2022). Causality between financial development and foreign direct investment in Asian Developing Countries. Journal of Risk and Financial Management 15(5): 195. doi: 10.3390/jrfm15050195

Phung HB (2016). Determinants of FDI into Developing Countries. Summer Research Fund in Economics.

Punthakey JJ (2020). Foreign Direct Investment and Trade in Agro-Food Global Value Chains. OECD Publishing.

Purwanto A, Sudargini Y (2021). Partial least squares structural equation modeling (PLS-SEM) analysis for social and management research: A literature review. Journal of Industrial Engineering & Management Research 2(4): 114–123. doi: 10.7777/jiemar.v2i4.168

Etim RS, Jeremiah MS, Jeremiah OO (2019). Attracting Foreign Direct Investment (FDI) In Nigeria through effective tax policy incentives. International Journal of Applied Economics, Finance and Accounting, 4(2), 36–44. doi:10.33094/8.2017.2019.42.36.44

Rashida IMA, Bakar NA, Razak NAA (2016). Determinants of foreign direct investment (FDI) in agriculture sector based on selected high-income developing economies in OIC countries: An empirical study on the provincial panel data by using stata, 2003–2012. Procedia Economics and Finance 39: 328–334. doi: 10.1016/s2212-5671(16)30331-8

Rigdon EE (2012). Rethinking partial least squares path modeling: In praise of simple methods. Long Range Planning 45(5–6): 341–358. doi: 10.1016/j.lrp.2012.09.010

Rogers CL, Wu C (2012). Employment by foreign firms in the U.S.: Do state incentives matter? Regional Science and Urban Economics 42(4): 664–680. doi: 10.1016/j.regsciurbeco.2012.04.006

Santangelo GD (2018). The impact of FDI in land in agriculture in developing countries on host country food security. Journal of World Business 53(1): 75–84. doi: 10.1016/j.jwb.2017.07.006

Sarstedt M, Cheah JH (2019). Partial least squares structural equation modeling using SmartPLS: A software review. Journal of Marketing Analytics 7(3): 196–202. doi: 10.1057/s41270-019-00058-3

Setiabudi E, Wahyuningsih D, Novialumi A, et al. (2020). Foreign investment analysis of direct agricultural sector in Indonesia. International Journal of Scientific & Technology Research 9(1): 3933–3939.

Shmueli G (2010). To explain or to predict? Statistical Science 25(3): 289–310. doi: 10.1214/10-sts330

Shmueli G, Koppius O (2011). Predictive analytics in information systems research. SSRN Electronic Journal 35(3): 553–572. doi: 10.2139/ssrn.1606674

Shmueli G, Ray S, Velasquez Estrada JM, Chatla SB (2016). The elephant in the room: Predictive performance of PLS models. Journal of Business Research 69(10): 4552–4564. doi: 10.1016/j.jbusres.2016.03.049

Trinh NH (2013). Agglomeration economies and the location of foreign direct investment: Evidence from Vietnam. Asian Economic and Financial Review 3(4): 512–531. doi: 10.1080/00343400902783230

Ullah I, Khan MA (2017). Institutional quality and foreign direct investment inflows: Evidence from Asian countries. Journal of Economic Studies 44(6): 1030–1050. doi: 10.1108/jes-10-2016-0215

Vi Dũng N, BíchThủy ĐT, NgọcThắng N (2018). Economic and non-economic determinants of FDI inflows in Vietnam: A sub-national analysisPost-Communist Economies. Post-Communist Economies 30(5): 693–712. doi: 10.1080/14631377.2018.1458458

Wang Y, Xie L, Zhang Y, et al. (2019). Does FDI promote or inhibit the high-quality development of agriculture in China? An agricultural GTFP perspective. Sustainability 11(17): 4620. doi: 10.3390/su11174620

Yang CH, Chiu CY, Tsou MW (2017). Location choice of multinational and local firms in Vietnam: Birds of a feather flock together? The Japanese Economic Review 68(1): 95–114. doi: 10.1111/jere.12110

Zeytoonnejad Mousavian SR, Mirdamadi SM, Farajallah Hosseini SJ, Omidi NajafAbadi M (2021). Determinants of foreign direct investment inflow to the agricultural sector: A panel-data analysis. Journal of Economic and Administrative Sciences 39(3): 709–729. doi: 10.1108/jeas-11-2020-0196

Appendix

Name	No.	Mean	Median	Min	Max	Standard deviation	Excess kurtosis	Skewness
NC—Natural Conditions								
NC1-Climate	0	4.814	5	4	5	0.389	0.676	−1.633
NC2-Agricultural land	1	4.682	5	4	5	0.466	−1.395	−0.792
NC3-Water volume	2	4.651	5	4	5	0.477	−1.613	−0.642
NC4-Geographical location	3	4.783	5	4	5	0.412	−0.072	−1.389
INFRA—Infrastructure								
INFRA1-Transportation system	4	4.775	5	3	5	0.436	1.391	−1.615
INFRA2-Electrical system	5	4.729	5	3	5	0.462	0.253	−1.278
INFRA3-Water supply and irrigation systems	6	4.798	5	3	5	0.420	2.208	−1.819
INFRA4-Information and communications technology	7	4.698	5	3	5	0.476	−0.268	−1.088
INFRA5-Banking and auditing system	8	4.814	5	3	5	0.427	4.330	−2.218
INFRA6-Public services and utilities serving both the local community and foreign employees	9	4.597	5	3	5	0.564	0.115	−1.046
HR—Human Resources								
HR1-Abundant labor force	10	4.705	5	2	5	0.589	6.263	−2.341
HR2-Low-cost labor	11	4.543	5	2	5	0.623	4.063	−1.625
HR3-Skilled and well-trained labor	12	4.760	5	3	5	0.445	0.951	−1.494
HR4-Labor with experience in agricultural production	13	4.628	5	2	5	0.558	2.735	−1.471
HR5-The ability of workers to absorb and operate technology	14	4.760	5	4	5	0.427	−0.495	−1.230
HR6-Highly disciplined labor	15	4.829	5	4	5	0.376	1.160	−1.773
PSQ—Public Service Quality								
PSQ1-Administrative procedures	16	4.783	5	3	5	0.465	3.606	−2.064
PSQ2-Customs procedures	17	4.752	5	3	5	0.483	2.413	−1.789
PSQ3-There are dialogues activities between local authorities and foreign firms to address difficulties and problems	18	4.690	5	3	5	0.525	4.264	−1.788
PSQ4-A welcoming local government supportive of foreign firms	19	4.853	5	4	5	0.354	2.088	−2.014
PSQ5-Investment and trade promotion centre provide good support for businesses	20	4.643	5	4	5	0.479	−1.659	−0.606
AP—FDI attraction policies								
AP1-Long-term orientation and policies in attracting FDI into the agricultural sector	21	4.574	5	3	5	0.510	−1.362	−0.478
AP2-Investment incentive policies	22	4.736	5	4	5	0.441	−0.834	−1.086
AP3-Credit support	23	4.403	4	3	5	0.506	−1.525	0.218
AP4-Government grants in building infrastructure	24	4.636	5	4	5	0.481	−1.701	−0.570
AP5-Agricultural insurance support policy	25	4.775	5.000	3	5	0.436	1.391	−1.615
AP6-The predictability, stability and transparency of incentives	26	4.589	5.000	4	5	0.492	−1.895	−0.367

Name	No.	Mean	Median	Min	Max	Standard deviation	Excess kurtosis	Skewness
RAP—Regional agriculture policies								
RAP1-Local government support for facilitating access and concentration of land	27	3.333	3.000	3	5	0.503	−0.027	1.081
RAP2-Local government support for building raw material areas	28	3.279	3.000	3	5	0.498	1.527	1.555
RAP3-Local government support for information of the local agriculture (soil, diseases, government planning, etc.)	29	3.364	3.000	3	5	0.497	−0.964	0.761
RAP4-Local government support for building connections among enterprises, government and farmers	30	3.349	3.000	3	5	0.493	−0.823	0.838
RAP5-Local government support for trade promotion of agricultural products	31	3.302	3.000	3	5	0.476	−0.268	1.088
RAP6-Local government support for product branding	32	3.674	4.000	3	5	0.485	−1.184	−0.546
AGG—Agglomeration effects								
AGG1-There are many MNEs in Southern Key Economic Zone (KEZ)	33	4.318	5.000	3	5	0.807	−1.174	−0.645
AGG2-There are many MNEs in the agricultural sector in the Southern KEZ	34	4.078	4.000	3	5	0.774	−1.324	−0.136
AGG3-There are many domestic suppliers in the Southern KEZ	35	4.264	4.000	3	5	0.793	−1.237	−0.511
AGG4-There are many domestic suppliers in the agricultural sector in the Southern KEZ	36	4.248	4.000	3	5	0.726	−1.020	−0.422
ID—Investment Decision								
ID1-Companies will grow well when investing in the agricultural sector of the Southern KEZ	37	4.806	5.000	4	5	0.395	0.464	−1.568
ID2-Investors will achieve profits as expected when investing in the agricultural sector of the Southern KEZ	38	4.682	5.000	4	5	0.466	−1.395	−0.792
ID3-The agricultural sector of the Southern KEZ will bring potential investment opportunities for investors	39	4.775	5.000	4	5	0.417	−0.224	−1.334