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An Analysis on the Influence of Market Access and International Trade on the Philippine Agricultural Sector: A Heckscher-Ohlin Approach

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ABSTRACT

Purpose: The study aims to evaluate the applicability of the Heckscher-Ohlin Theory by examining the impact of market access, international trade, labor force participation rate, and agricultural land area on the Philippine agricultural sector.

Methodology: A quantitative research method was used in this study, which employs the Ordinary Least Squares (OLS) regression analysis, along with several diagnostic tests. The study adopts a time-series approach, using data from the Philippines spanning the period 1991 to 2021 at the national level.

Findings: Results show that improved market access and international trade significantly drive agricultural growth in the Philippines by offering farmers better opportunities and expanding access to larger global markets, thereby boosting productivity and economic development. Meanwhile, the labor force participation rate and land area for agriculture show positive but statistically insignificant relationships with the sector.

Contribution to Theory, Policy and Practice: The study recommends that policymakers prioritize securing stable import channels for essential agricultural inputs to enhance the competitiveness of the Philippine agricultural sector. By focusing on trade agreements that reduce tariffs on key imports such as fertilizers, machinery, and seeds, policymakers can help reduce production costs for local producers, making them more competitive in the global market. This approach not only supports export growth but also contributes to long-term economic development by fostering a more efficient and sustainable agricultural sector.

Keywords: *Market access, International trade, Labor Participation, Agricultural Land, Philippine Agriculture*

1.0 INTRODUCTION

Over the recent decades, the volume of global agricultural exports has significantly increased. However, its growth rate has been behind that of manufactured goods, leading to a steady decline in the share agriculture has in world merchandise trade. The World Trade Organization (WTO) (n.d) stated that raw materials are the other main category of agricultural products. Since the mid-1980s, trade in processed and other high-value agricultural products has expanded more rapidly than in basic primary products such as cereals. Despite this, agricultural trade remains vital to many countries' economies, contributing to overall economic growth, domestic production, and employment.

Agriculture has historically been tightly linked to the growth of the Philippine economy. Given their rich farming tradition, it has been a foundation of livelihoods, sustenance, and economic development for an extended period of time. According to Statista (2023), there are approximately 10.66 million Filipinos employed through the agricultural industry by the year 2021. In addition to this, the International Labor Organization (ILO) (2022) noted that 25% of the Philippine population participates in the labor force through their involvement in the agriculture sector. The 25% is divided into the four sub-sectors of Philippine agriculture: farming, fisheries, livestock, and forestry—in which they participate in their respective agricultural activities such as crop management, livestock raising, and agroforestry (Statista, 2024).

Beyond its role in providing livelihoods to the Filipino people, the Philippine agricultural sector also plays a significant role in the global market. The Philippines has established itself as a dependable trading partner, being the eighth-largest global market (International Trade Administration, 2024). The large assortment of agricultural products the country holds such as fruits, vegetable oil, and nuts, are amongst the top exports of the Philippines (TradeImeX, 2023). Overall, it fosters economic growth and garners foreign exchange participation. Furthermore, Preciados & Zabala (2019) have highlighted the labor-intensive nature of the Philippines given their resources, further validating the pivotal role the agricultural sector plays in the economy of a country. In terms of the Philippines, the agricultural sector contributes a total of 8.9% to their Gross Domestic Product (GDP) (Statista, 2024).

As the world becomes increasingly interconnected, the Philippines recognizes the necessity of embracing international trade and incorporating it into their market decision-making in order to sustain its economic growth. International trade serves as a vital conduit for the exchange of goods and services, linking Filipino farmers to the global market. The WTO (n.d.) emphasizes the potential participating in international trade has for the economic growth of a country. By participating in international trade, countries have access to the global market. This opens up the opportunity for the country to maximize both the comparative advantage of their country, and of others. According to Brighton College (2022), one benefit to international trade is the expansion of the target market and increasing revenues. Taking part and noticing the importance of international trade also allows countries to use this conduit of trade to garner revenue from

different countries by exporting the products they produce best. This also opens up their market to the specialties of other nations such as the Philippines importing electronics and machinery from Japan, the United States, and South Korea (ExportGenius, n.d.). As said by Vijaysri (2013), in the modern era of globalization, no country can fully sustain itself.

Concurrently, market access pertains to the ability and ease of trading goods and services across local and international borders that a country holds. Contrary to free trade, there are borders that encompass market access: such as tariffs, duties, or quotas, which all serve as an initial phase in developing trade relationships. Market access highlights the necessity of promoting cross-border economic transitions. Negotiations between governments that involve international trade and market access are complex discussions that ensure favorable conditions for export industries while safeguarding domestic sectors from potential competition. According to the WTO (n.d.), significant disparities existed between the regulations governing agricultural primary products and industrial goods under the General Agreement on Tariffs and Trade (GATT) framework before its establishment. Under GATT 1947, export subsidies were permissible for agricultural products but not for industrial products. This was subject to a condition where they would stay within a fair share of global exports. Import restrictions were also allowed under specific circumstances to manage domestic production.

Enhanced market access amplifies the reach of the Philippine agricultural products and mobilizes its competitiveness in the global market. Moreover, by leveraging international trade agreements, the Philippine agricultural sector can seize opportunities for increased market penetration, augmented competitiveness, and diversified revenue streams. The symbolic relationship between agriculture, international trade, and market access is vital to foster economic growth and development. Agriculture, a pioneer in the Philippine economy, can utilize market access and international trade in order to thrive in the global market. This holistic approach integrates agriculture, market access policies, and international trade agreements to maximize the strengths and comparative advantage that a country holds.

1.1 Problem Statement

Understanding the state of the Philippine agricultural sector, and recognizing the impact market access and international trade have on the economy can play a pivotal role in developing the Philippine economy even more. This will also push the maximization of the agricultural resources available to the country. Applying the Heckscher-Ohlin model may also offer insights on the strengths and weaknesses of the Philippine economy given its natural resources. Identifying the factors contributing to the abundance of labor in the country further gives the country its options on optimization of their resources. It is imperative to determine the comparative advantage of the Philippines in order to maximize their benefits in their participation in international trade. Additionally, this knowledge will enable the country to capitalize on their abundant resources, further pushing for economic growth.

This paper carries significant implications for Sustainable Development Goals (SDGs) #8 [Decent Work and Economic Growth], #9 [Industry, Innovation, and Infrastructure], and #11 [Sustainable Cities and Communities]. SDG #8 aims to foster sustained and inclusive economic growth and employment opportunities. This would contribute to understanding how trade dynamics impact economic growth and employment in the agricultural sector. Meanwhile, SDG #9 emphasizes the importance of resilient infrastructure and promoting sustainable industrialization. By examining market access and trade, the research would provide insights into the infrastructure needs and industrial development strategies necessary to enhance the competitiveness and sustainability of the Philippine agricultural sector. Lastly, SDG #11 focuses on creating inclusive, safe, and sustainable cities and communities. Understanding the influence of international trade on the agricultural sector can inform policies to nurture resilient and inclusive agricultural communities.

2.0 LITERATURE REVIEW

2.1 Theoretical Review

In light of international trade, the Heckscher-Ohlin theory developed by Swedish economist Bertil Ohlin followed through the works of Eli Filip Heckscher, his teacher and Swedish economist (Britannica, 2024). This is a theory of comparative advantage where countries should export what they have more; if they have more capital, they should export capital-intensive products and import labor-intensive products, and when they have more labor, they should export labor-intensive products and import capital-intensive products (Montevirgen, 2024).

Outlining the works of Akther et al. (2022), the Heckscher-Ohlin model involves two nations with two production factors and producing two goods. As per the model, the trade pattern of a country is determined by the relative abundance of its production factors. The Heckscher-Ohlin model suggests that the exports of a country depend on the goods that require a domestically abundant factor for production and import goods that utilize a relatively scarce factor. This principle reflects the notion of comparative advantage, thereby maximizing efficiency and welfare gains in international trade.

2.2 Conceptual Framework

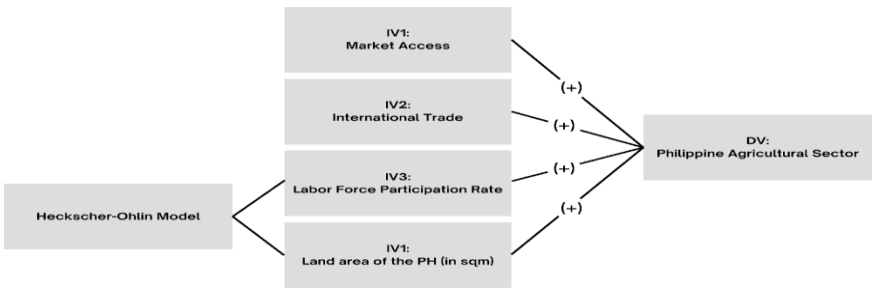

Figure 1: Conceptual Framework, Source: Ballesteros and Robale (2024)

This research will use the Heckscher-Ohlin model to analyze the influence of market access and international trade on the Philippine agricultural sector. The said variables directly relate to the dependent variable, the Philippine agricultural sector. Meanwhile, the Philippines' labor force participation rate and land area are expected to have a positive relationship with the Philippine agricultural sector.

2.3 The Philippine Agricultural Sector

Agriculture has always played a fundamental role in the Philippine economy. It has contributed significantly to the GDP of the country, accounting for 8.9% of the overall Philippine GDP in 2022 (Statista, 2024). This contribution stems from the production of staple crops such as rice, corn, sugar, coconuts, and fruits; Reflecting the agricultural diversity and historical reliance the country holds on agriculture as a primary economic driver (Caballero-Anthony et al., 2016). Despite recurring natural disasters, the agricultural sector has proven resilient (Ravago et al., 2017). Due to the COVID-19 pandemic, the Philippine agricultural sector suffered a reduction of 3.11% in productivity in 2020, but has then recovered, garnering a Gross Value Added (GVA) of 1.78 trillion pesos in 2022 (Department of Agriculture Press Office, 2022; Statista, 2024). This resilience highlights the enduring importance of sustaining economic growth and stability through the Philippine agricultural sector.

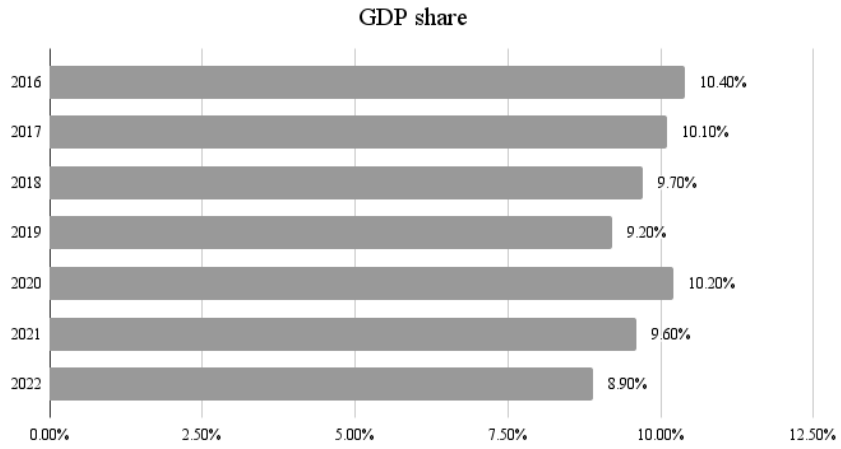

Figure 2

Source: Statista (2024)

The vitality of Philippine agriculture is undeniable. Nearly half of the Philippine population resides in rural areas that heavily depend on agriculture as their primary source of income and livelihood (Heckelman et al., 2018; Yamagishi et al., 2021). Yamagishi et al. (2021) studied that while developing countries similar to the Philippines possess substantial potential in agribusiness, they contribute only a small share to global agricultural production compared to high-income

economies, despite the large portion of their population relying on agriculture for livelihood (United Nations Industrial Development Organization, n.d.). The Philippine agricultural sector also has many hidden potentials. In his study on the rice sector of the Philippines, Montesclaros (2023) highlighted that the rice productivity growth in the country is no longer meeting the demands of rice of the Filipino people. Because of this, rice sourced from the Philippines itself has higher prices compared to the rice the country imports, causing the country to rely on imports for this sector, which they have been doing since the 1990s (Mariano & Giesecke, 2014). If reforms in the agricultural sector were to be made, the Filipino people would be able to utilize the crops grown from their own country.

According to Felipe et al. (2022) and as reported by the Philippine Statistics Authority (PSA) (2023), in the face of a rapidly evolving global economy, the Philippines has shifted from traditional agricultural exports to diversified and value-added products such as electronic products. Although this is the economic turn the Philippines is currently taking, the natural abundance of agricultural resources in the Philippines presents an opportunity to leverage its strengths in agriculture and use this to foster economic growth in the country.

2.4 Market Access on the Philippine Agricultural Sector

The global economy is increasingly beginning to recognize the importance of interdependence among different nations to cater to the demands of their populations. Given the abundant agricultural resources of the Philippines, understanding market access and its policies becomes crucial for leveraging this advantage and fostering economic growth in the country. Although this is the case for the Philippines, the total employment of the agricultural sector is declining in the country, necessitating measures to enhance the competitiveness of the sector and reviving efforts to maximize the potential of the agricultural sector (Felipe et al., 2022).

The importance of agriculture is evident, with nearly half of the population of the world linked to the agrifood systems, further emphasizing the necessity to explore marketing opportunities to utilize agricultural resources (FAO, 2023). Market access plays a crucial role in facilitating trade and technology transfer, it poses as an important factor in economic growth, notably in middle-income economies such as the Philippines. The shifting dynamics of agricultural production and trade, along with emerging economies gaining more acknowledgement, highlight the importance of market access policies and trade agreements (Alston & Pardey, 2014). In a study conducted on the agriculture of Vietnam, it was found that there is a need for comprehensive reforms to boost market access and competitiveness, especially when it comes to trading within markets with stringent standards (Xu et al., 2023). Moreover, the International Institute for Sustainable Development (IISD) (2019) have demonstrated that improved market access holds the potential to boost exports from least developed countries (LDCs) and developing countries. Enhancing market access in agriculture can lead to broader impacts on Gross National Product (GNP) and aggregate welfare, benefiting both producers and consumers (Donaldson & Hornbeck, 2016). Gradually

adopting market-oriented measures, such as reducing tariffs on agricultural goods, can pave the way for a more stable and prosperous economy in the Philippines (Briones, 2022). This comprehensive understanding highlights the crucial role of market access policies in driving agricultural development and economic growth, not just in the Philippines, but globally as well. In 2023, the World Bank reported that their Executive Directors had approved US$600 million allotted to improve market access and income for farmers and fisherfolk of the Philippines. The improvement of market access will aid in raising income for farmers and fisherfolk in the rural areas of the Philippines, fostering economic growth and may even aid in alleviating poverty, one of the social issues the country has struggled with (World Bank, 2023).

While improved market accessibility has the potential to ignite economic growth, it is important to note that making sacrifices in our environment should not be an option, especially in agriculture-dependent regions. A study by Abman & Lundberg (2024) found that market accessibility has the ability to trigger negative environmental impacts, which hinders agricultural development. By aligning agricultural practices with environmental sustainability goals, the enhancement of market access and global competitiveness will cultivate a balance between economic growth and environmental preservation (Xu et al., 2023). Moving from the traditional ways of agriculture into accommodating the new technology demanded by the continuously developing global market can be a complicated process, especially when it may imply threats to the welfare of our environment (Laborde et al., 2019). Finding this delicate balance will pave the way for sustainable economic growth and will foster the promotion of sustainable development in the global economy.

2.5 International Trade on the Philippine Agricultural Sector

"Trade, as a mechanism, was theoretically intended to efficiently allocate immovable land resources so as to match global supply and demand, thus leading to improved global prosperity, while simultaneously distributing environmental pressures among the least sensitive ecosystems" (Raschio, 2017, p.4). It facilitates efficient allocation of production globally and enhances natural resource utilization. At the same time, open markets enable access to innovative technologies that enhance domestic production efficiency and decrease reliance on environmentally harmful inputs (Avesani et al., 2024).

Erokhin & Ivolga (2013) stated, "trade of agricultural products in the last decades has become more and more globalized. The global trading system is now both freer and fairer than ever before, boosting global prosperity, making significant contributions to global economic development." Nagurney et al. (2024) presented a comprehensive model assessing the impacts of decreases in agricultural production and transportation capacities, as well as exchange rates, on commodity prices and trade volumes, emphasizing the critical role of international agricultural trade in influencing food security, indicating a positive outcome as it enhances understanding of the intricate relationship between international trade dynamics and the resilience of the agricultural sector to disasters. Furthermore, Erokhin et al. (2014) say that state support of agriculture

significantly impacts international trade dynamics, with developed countries like the USA and the EU employing various tools to enhance competitiveness and income growth for domestic farmers, a practice not proportionally replicated in developing nations due to lower support volumes and constraints imposed by WTO membership.

However, despite the advancements made in international trade through agricultural production within the framework of the WTO following numerous rounds of negotiations, full liberalization in international trade of agricultural products remains distant (Erokhin & Ivolga, 2013). The global strengthening of intellectual property rights (IPRs) systems, particularly post-TRIPS, has adversely impacted agricultural trade, particularly in developing countries, as evidenced by reduced total trade, adverse effects on most sub-sectors, and a disparity in trade outcomes between developed and developing nations, highlighting the notion that a uniform system may not equally benefit all nations (Campi & Dueñas, 2016). These challenges underscore the need for careful consideration and strategic planning in the field of international agricultural trade.

According to Alston & Pardey (2014), evidence suggests a general deceleration in agricultural productivity growth worldwide, with caution advised in relying solely on measures of total factor productivity estimated using data from the Food and Agriculture Organization (FAO), particularly concerning the perception of a slowdown in productivity growth over time, indicating a negative relationship with international trade as it highlights potential challenges in meeting future demands despite globalization. Meanwhile, Kastner et al. (2013) suggest an adverse consequence as globalization-induced international trade has led to a notable spatial misalignment between cropland production and consumption, with cropland allocated for export expanding while that for domestic use remains static, underscoring the importance of focusing on closing yield gaps rather than boosting trade volumes to address future cropland demands. On a different note, Brondino (2021) reveals that the Heckscher-Ohlin theory, a cornerstone of trade theory, fails to adequately explain fragmentation and modern trade patterns due to the limitations of comparative advantage in accounting for increasing trade in intermediate and capital goods and domestic production disintegration. This highlights the need for further research and the development of new theories to understand the complexities of international agricultural trade better.

Table 1: Summary of Philippine Agricultural Trade

Indicator	Third Quarter 2022 (r)		Second Quarter 2023 (r)		Third Quarter 2023 (p)	
	FOB Value (in million USD)	Year-on-Year Growth (%)	FOB Value (in million USD)	Year-on-Year Growth (%)	FOB Value (in million USD)	Year-on-Year Growth (%)
Total Agricultural Trade	7,041.84	17.5	5,938.59	-14.8	6,199.21	-12.0
Agricultural Exports	1,860.52	2.6	1,616.29	-24.3	1,612.94	-13.3
Agricultural Imports	5,181.32	23.9	4,322.30	-10.7	4,586.26	-11.5
Balance of Trade in Agricultural Goods	-3,320.80	40.2	-2,706.01	0.1	-2,973.32	-10.5

p - preliminary ; r – revised; Source: Philippine Statistics Authority (PSA) (2023)

In the context of the Philippine Agricultural Trade, according to data from the Philippine Statistics Authority (2023), the country experienced a 12% year-on-year decrease in total agricultural trade in the third quarter of 2023, amounting to USD 6.20 billion, showing a slower decline compared to the 14.8% decrease in the second quarter of 2023, contrasting with the 17.5% annual increase recorded in the third quarter of 2022. Moreover, cereals represented the most significant portion, amounting to USD 969.89 million or 21.1% of the overall value of agricultural imports in the third quarter of 2023, among the principal commodity categories. In 2023, the Philippines' top agricultural exports were edible fruits, nuts, and citrus fruit peels, totaling approximately $2 billion in export value. Following closely were products like fats, oils, and waxes derived from animals or vegetables, with an export value of around $1.3 billion (Balita from Statista, 2024). Additionally from the Philippine Statistics Authority (2023), agricultural exports to EU member nations amounted to USD 285.19 million, constituting 12.5% of the total exports to EU countries. The Netherlands emerged as the primary destination for agricultural commodities, accounting for USD 150.44 million or 52.8% of the total agricultural exports to EU member countries during this period in 2023. As of August 2023, the highest export value of the Philippines was to the USA at USD 1.10 billion (16.4%), followed by Japan (USD 917.98 million, 13.7%), Hong Kong (USD 870.91 million, 13.0%), China (USD 838.04 million, 12.5%), and Singapore (USD 347.28 million, 5.2%). The majority of exports go to Asia-Pacific Economic Cooperation (APEC) countries (USD 5.56 billion, 82.9%), followed by Regional Comprehensive Economic Partnership (RCEP) valued at (USD 3.21 billion, 47.9%), and East Asia (USD 3.20 billion, 47.7%).

The Philippines joined the WTO in 1995 with hopes of economic benefits, particularly for the rural sector, through increased industry efficiency and job creation. However, after the implementation

of WTO commitments, especially in agriculture, it became apparent that the anticipated gains were not met (Baracol, n.d). The increase in agricultural imports, as noted by Bello (2021), has exacerbated the challenges faced by Philippine agricultural producers, with the agricultural trade of the country moving from surplus to deficit after joining the WTO, reaching USD7.9 billion in 2019, a trend likely to be further compounded by facilitation of more imports of the Regional Comprehensive Economic Partnership (RCEP). However, fostering a sense of patriotism among Filipinos to support locally-made products and initiatives such as buying locally-produced vegetables and assisting local farmers in selling their produce in urban areas offer hope for revitalizing the agricultural sector (Lu, 2023).

Hence, to optimize gains from trade in the agro-food sector, the OECD (n.d.) recommends reducing domestic support and trade barriers, implementing well-designed regulations, and fostering an enabling environment through government policies supporting agricultural productivity growth and competitiveness in global value chains. Moreover, the Department of Agriculture (DA) aims to enhance the competitiveness of provinces and regions in cultivating specific crops by focusing on the value chain, including mechanizing farming practices, establishing processing facilities, and nurturing export-oriented businesses in agri-industrial corridors, empowering smallholders to supply raw materials for export products. Additionally, the DA will encourage provinces and regions to champion high-value crops with export potential and maintain international cooperation to expand global trade opportunities (Department of Agriculture, n.d).

2.6 Labor Force Participation Rate for Agriculture and the Philippine Agricultural Sector

Economic globalization has reshaped countries worldwide, impacting several economies and societies. Agriculture, with approximately a quarter of the world's labor force involved, is a vital player in the global economy, especially in developing countries like the Philippines, and is a source of livelihood for so many (Roser, 2023). Although the importance of agriculture does not go unnoticed, achieving maximum employee productivity in an important sector such as the agriculture sector proves the need for a thorough understanding of how economic globalization influences both agriculture and employment dynamics (World Review of Political Economy, 2016). Following the “trilogy of production”: Labor force, land, and capital, this portion of the paper will delve into the specific relationship between the labor force participation rate and the Philippine Agricultural Sector (Popescu et al., 2021).

In 2022, the Philippines had a labor force participation rate of 58.37%. Over the past decade, the country's labor force participation rate has shown fluctuations, hitting its lowest point in 2020 (Balita from Statista, 2023). Moreover, the Philippines' employment in agriculture as a percentage of total employment was 23.71%, according to the World Bank's development indicators (Trading Economics, 2024). According to data from PSA (2020), from 2015 to 2019, employment in the agricultural sector in the Philippines steadily decreased, with 9.70 million individuals, resulting in

a 22.9% contribution to total employment. Despite Western Visayas maintaining the highest agricultural employment, it decreased to 873,000 individuals in 2019, while increases were observed in Central Visayas, Northern Mindanao, SOCCSKSARGEN, and BARMM. Conversely, the National Capital Region (NCR) had the lowest count at 25,000 persons in 2019. However, according to a National Economic and Development Authority (NEDA) official, data from December 2023 shows that the agricultural sector saw increased labor participation, generating over 500,000 jobs (Presidential Communications Office, 2024).

Despite being the largest employer in the Philippines, accounting for 25% of employment, the agricultural sector is falling behind in terms of employment productivity. This disparity has led to a noticeable trend of individuals transferring from the agricultural sector to the service sector (Felipe et al., 2022; Statista, 2024). However, the labor-intensive nature of agriculture can offer advantages for the Philippines. Research suggests that countries tend to export goods or services that align with their abundant factor in production (Stollinger & Guarascio, 2023). Given the abundance of labor in the Philippines, the need to recognize the importance of the labor-intensive agricultural sector aligns well with this pattern.

Exploring policy frameworks and initiatives aimed at enhancing labor force participation and agricultural development can provide valuable insights for policymaking in the Philippines. However, it is vital to first recognize the underlying factors that drive individuals in or out of specific sectors, which may include their age, migration patterns, and working conditions, all being particularly important for labor-intensive sectors like agriculture (Popescu et al., 2021; Aaronson et al., 2014). The Philippine agricultural sector has reported their largest drop in employment in the year 2022, losing approximately 197,000 workers in the month of October alone (Baclig, 2022). In a study conducted by Cerutti & Li (2021), they have found that one of the major influences to employment outflows from the agriculture sector is the widening wage differentials. In 2022, PSA reported that the basic pay salaried agricultural workers receive comes to ₱285.19 per day. However, the WageIndicator organization (2024) has reported that minimum wage in the agricultural sector (non-plantation and plantation) comes to ₱533 in the NCR. The only “pull” factor in the agricultural sector, Cerutti & Li (2021) reported, is the lack of high school and college educational attainment.

The significant variations that exist in labor supply and demand conditions across different agricultural enterprises and regions, influenced by factors such as the nature of agricultural operations and local weather conditions, all affect the dynamics between agriculture and employment. The government and concerned authorities are to find the perfect balance between all of these factors to ensure maximum economic growth through the agricultural sector of the Philippines. Considering the bare minimum conditions faced by agricultural workers in the Philippines, ILO (n.d.) has suggested the Department of Labor and Employment (DOLE) to take initiative in creating a committee that ensures responsible business practices and decent working

conditions in the agricultural sector. It is essential to consider these factors when analyzing labor market dynamics in agriculture (Fisher & Knutson, 2013).

2.7 Philippine Land Area for Agriculture (in square meter) and the Philippine Agricultural Sector

The Philippines comprises 7,107 islands, with a total land area of 115,739 square miles (299,764 square kilometers). Although previously thought to comprise 7,107 islands, the Philippines was found to have over 500 additional islands in 2016, with dimensions stretching approximately 1,150 miles (1,850 km) from north to south and about 700 miles (1,130 km) from east to west at southernmost point (Britannica, 2024). Its principal island groups include Luzon, Visayas, and Mindanao (DFA, n.d). According to data, since 2020, agricultural crop cultivation in the Philippines has utilized approximately 13.42 million hectares of land, primarily dedicated to growing palay, corn, and coconut (Statista, 2023). Moreover, arable land makes up 18.7% of the total land area, while permanent crops cover 17.9%. In 2012, the area of irrigated land reached 16,300 square kilometers (Landlinks, 2017).

Over the years, the Philippines has struggled to effectively manage its natural resources, leading to their overexploitation and a significant decline in biodiversity. The intensification of agriculture, driven by the need for increased crop production, has been a major contributor to global biodiversity loss, particularly in plantation farming (Ortiz & Torres, 2020). Agricultural Land Conversion (ALC) is a critical form of land conversion (LC), as it significantly affects the livelihoods of impoverished rural populations, serving as their main source of food, shelter, income, and social equity. Therefore, it is crucial for policymakers involved in land use planning to have an accurate understanding and projection of ALC (Azadi et. al., 2015).

Despite a significant portion of lands being redistributed (88%), affluent private landowners still maintain control over some of the most productive and fertile agricultural lands (Landlinks, 2017). The Comprehensive Agrarian Reform Program (CARP) of 1988, which aimed to provide land to landless farmers, has had a profound impact on land ownership and farm productivity (Koirala et. al. 2015). However, according to information on Statista (2024), the slow development of the agricultural sector in the Philippines has been attributed to the widespread conversion of fertile lands into residential areas, industrial zones, and tourist resorts. According to Dy & Chau (2023), private farmlands in the Philippines are often bought compulsorily, with some landowners suspected of using land use conversions (LUCs) to avoid expropriation, or opting for market-led agrarian reform (MLAR) to retain control over their farmland. A study conducted by Adamopoulos & Restuccia (2020) showed that land reform initially reduces the average farm size by 34% and agricultural productivity by 17%, mainly due to the disruption it causes to farmers' decisions about their occupations and technologies, particularly through the reallocation of land to those who previously did not own any.

2.8 Research Gaps

A key research gap lies in the limited exploration of more ways to stabilize import channels, particularly tariff reductions on essential agricultural inputs such as fertilizers, machinery, and seeds. While existing studies have explored trade policies broadly, few have focused on how stabilizing imports can directly lower production costs and enhance global market competitiveness for the Philippines. Additionally, while quality standards are essential for improving the competitiveness of Philippine agricultural exports, there is insufficient analysis on the implementation of stringent quality improvement policies and their impact on market access and export growth. Further research is needed to explore these areas in depth, particularly how a more consistent import environment can drive export growth and contribute to the overall sustainability of the sector.

3.0 METHODOLOGY

This research was conducted to determine the influence of market access and international trade on the Philippine agricultural sector while using the Heckscher-Ohlin model. The authors tested the relationship between the variables through the use of the Ordinary Least Squares (OLS) linear regression analysis. They also utilized diagnostic tests such as Unit Root, Autocorrelation, Normality of Residuals, Specification Error, Heteroskedasticity, Multicollinearity, and Stability. The location and data of this study is in the Philippines on a national level. The research is conducted in a time series manner, and the time period is from the year 1991 to 2021. The researchers gathered secondary data on all the variables. The data gathered for the dependent and independent variables were all collected from the World Bank, PSA, and Trading Economics. The following variables were measured by their respective indicators: [1]Market access, agricultural net imports, [2]International trade, countries the Philippines export to, [3]Labor factor endowment (Heckscher-Ohlin model), labor force participation rate for agriculture [4]Land factor endowment (Heckscher-Ohlin model), Philippine land area dedicated to agriculture, [5]Philippine agricultural sector, agricultural net exports. The purpose of this paper is to determine the impact market access and international trade has on the Philippine agricultural sector while approaching it with the Heckscher-Ohlin model. To measure and test the impact the independent variables have on the dependent variable, the following econometric model was used:

$$Ae = \beta_0 + \beta_1 MA + \beta_2 IT + \beta_3 LFPR + \beta_4 LA + e$$

Where:

Ae = Agricultural Exports

β_0 = Intercept

β_1, β_2, β_3, β_4 = Beta Coefficients

MA = Market Access

IT = International Trade

LFPR = Labor Force Participation Rate

LA = Land Area of the Philippines in sqm

e = error term

4.0 RESULTS AND FINDINGS

Table 2: Diagnostic Tests Results

Diagnostic Test	Results	Interpretation
Augmented Dickey-Fuller test	all p-values < 0.05	No presence of unit root and time series is stationary
Variance Inflation Factors	all values < 10	No presence of multicollinearity
Breusch-Pagan test	p-value > 0.05	No presence of heteroskedasticity
White's test	p-value > 0.05	No presence of heteroskedasticity
Normality of Residual	p-value > 0.05	Residuals are normally distributed
Ramsey's RESET test	p-value > 0.05	No presence of misspecification
Chow test	p-value > 0.05	No structural breakpoint at observation 2006

Table 3: Regression results (Ordinary Least Squares)
Model 1: OLS, using observations 1991-2021 (T=30)

variable	coefficient	std. error	t-ratio	p-value
const	0.0182224	0.0304768	0.5979	0.5553
MA	0.559321	0.157488	3.552	0.0016***
IT	0.00493944	0.00218210	2.264	0.0325**
LFPR	0.0210257	0.026288	0.8000	0.4313
LA	3.11378e-05	2.19149e-05	1.421	0.1677

Mean dependent var	–0.010408	S.D. dependent var	0.142597
Sum squared resid	0.345388	S.R. of regression	0.117539
r-squared	0.414280	Adjusted r-squared	0.320565
F (4, 25)	4.420624	P-value (F)	0.007709
log-likelihood	24.39611	Akaike criterion	-38.79223
Schwarz criterion	-31.78624	Hannan-Quinn	-36.55095
rho	-0.140069	Durbin-Watson	2.262056

4.1 Discussion

4.2.1 Market Access and the Philippine Agricultural Sector

Regression results show that market access has a positive relationship and is statistically significant towards the Philippine agricultural sector. This proves that it generally drives economic growth, especially in middle-income countries like the Philippines. This is backed up by the International Institute for Sustainable Development (IISD) (2019), which states that improved market access can increase exports from least developed and developing countries. Understanding the overall impact of creating market access policies will drive agricultural development and economic growth in the Philippines and globally. This is backed up by Alston & Pardey (2014), who highlight the importance of market access policies and trade agreements benefiting emerging economies. In the scope of agriculture, the enhancement of market access can lead to more significant effects on improving our GNP and aggregate welfare (Donaldson & Hornbeck, 2016). Policies may involve reducing tariffs on agricultural goods (Briones, 2022). Improving market access will also increase income for the farmers and fisherfolk, for which the World Bank has approved US$600 million, which also helps alleviate poverty (World Bank, 2023).

4.2.2 International Trade and the Philippine Agricultural Sector

The regression results show that international trade has a positive relationship and is statistically significant to the Philippine agricultural sector, aligning with the findings of Erokhin and Ivolga (2013) that emphasizes the continuous globalization of agricultural products in the past decades. Studies by Raschio (2017) and Avesani et al. (2024) highlight how international trade can improve global prosperity and efficiency, and specifically mentions the benefit of open markets enabling access to innovative technologies that enhance domestic production efficiency in the agricultural sector.

On another hand, the Department of Agriculture aims to enhance agricultural productivity and export competitiveness, aiming to create a stronger link between domestic agricultural development and international trade opportunities. Based on data from the Philippine Statistics Authority (2023), agricultural products made in the Philippines have high demand, with a significant portion going to key trade partners like the USA, Japan, and China, emphasizing the country's positive participation in global trade through major agreements like APEC and RCEP.

As the world continues to encourage interconnectedness through globalization, developing countries such as the Philippines can foster agricultural productiveness by tapping into the global market to access larger, international markets. A study conducted by Nagurney et al. (2024) supports this, stating that international trade has a crucial role in food security, especially in crises such as natural calamities. Another study by Erokhin et al. (2014) implies the benefits of state support and international trade in enhancing competitiveness and income growth for domestic

farmers, which can be positive for the Philippine agricultural sector, given the proper support and tools.

4.2.3 Labor Force Participation Rate for Agriculture and the Philippine Agricultural Sector

The results for labor for participation rate for agriculture and the Philippine agricultural sector show a positive but insignificant relationship, showing the nuanced relationship between the two variables. Roser (2023) mentions in their study that in the global scale, the agricultural sector takes up a significant portion of employment. However, the sector has faced challenges in maintaining high labor productivity, hence, the result of an insignificant relationship in the regression model. The PSA (2020) reported that although the agricultural sector takes up 23.71% of the workforce, this number has faced a significant decline throughout the past years. A trend of the labor market shifting out of the agricultural sector to higher-paying job opportunities has been highlighted in a study conducted by Felipe et al. (2022), further proving why there may be an insignificant relationship between the labor force participation rate for agriculture and the Philippine agricultural sector. To support this, Cerutti and Li (2021) mentions in their study that agricultural workers in the Philippines earn a daily wage of ₱285.19, which may be one of the main driving forces behind the mass shifting of employment out of the agricultural sector.

On the other hand, the positive relationship between the labor force participation rate for agriculture and the Philippine agricultural sector can be found through a study by Popescu et al. (2021), wherein they argue that the labor-intensive nature of agriculture offers several potential advantages to developing countries like the Philippines, where labor is abundant. The Philippine government has tested this out through their initiative to boost labor productivity, which has generated 500,000 jobs in the agricultural sector in the year 2023 (Presidential Communications Office, 2024). Policies that target these differences and finds the balance between the two may further foster economic growth through the Philippine agricultural sector.

4.2.4 Philippine Land Area for Agriculture and the Philippine Agricultural Sector

The results indicate that while land area for agriculture is positively related to the Philippine agricultural sector, this relationship is statistically insignificant. The Comprehensive Agrarian Reform Program (CARP) of 1988 aimed to provide land to landless farmers (Koirala et al., 2015). Despite this, affluent private landowners still control some of the most fertile agricultural lands (Landlinks, 2017). This has contributed to the slow development of the agricultural sector, which has been further hindered by the conversion of fertile lands into residential, industrial, and tourist zones (Statista, 2024). Additionally, private farmlands are often compulsorily purchased, with some landowners using land-use conversions (LUCs) or market-led agrarian reform (MLAR) to retain control over their land (Dy & Chau, 2023). Ultimately, these factors collectively demonstrate that the redistribution of land has yet to lead to a more equitable or productive

agricultural sector, suggesting that land area alone does not guarantee the improvement of agricultural outcomes or socio-economic benefits.

5.0 CONCLUSION AND RECOMMENDATIONS

This paper examines the impact of market access, international trade, and factor endowments on the Philippine agricultural sector. Regression results show that market access positively and significantly drives agricultural growth, offering Filipino farmers greater opportunities to profit from their products in global markets. This finding aligns with other studies highlighting the role of improved market access in fostering economic growth in developing countries like the Philippines. Similarly, international trade has a positive and significant influence, emphasizing its importance in enhancing agricultural productivity and economic stability. Globalization has amplified the role of trade, providing access to larger markets and enabling further development of the Philippine economy. These findings emphasize the critical role of market integration and global trade in the growth and resilience of agriculture in the Philippines.

5.1 Policy Implications

This analysis highlights the significant positive impact of market access and international trade on the Philippine agricultural sector, emphasizing the need for specific policy measures to harness these benefits. Policymakers should prioritize stabilizing agricultural imports by negotiating reduced tariffs on critical inputs such as fertilizers, machinery, and seeds, enabling lower production costs and enhancing global competitiveness for local Filipino farmers. These steps will allow the sector to increase its net exports while driving sustained economic growth. To capitalize on the advantages of international trade, the Philippines must diversify its export markets by identifying regions with high demand for tropical fruits and other Philippine agricultural products, supported by bilateral and multilateral trade agreements. Active participation in global trade forums like the World Trade Organization (WTO) can secure favorable trade policies, resolve disputes, and provide insights into emerging market trends. Additionally, enforcing stringent quality standards will ensure that Philippine agricultural products meet international requirements, boosting their competitiveness in global markets. Together, these strategies will enhance the profitability, resilience, and long-term sustainability of the Philippine agricultural sector in the global economy.

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Conflicts of Interest Declaration

The authors declare no interest, financial, or personal conflicts that could have influenced the research or findings on this research paper.