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Article

The Effect of Farmer's Export, Import, and Exchange Rate on Value-Added of Agricultural Sector in Aceh Province, Indonesia

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Abstract: As one of the agricultural countries, Indonesia's population is highly dependent on farming for a living. Thus, this study is written to analyze the relationship between farmers' exports, imports, and the exchange rate of farmers on the value-added of the agricultural sector in Aceh Province, Indonesia. This study uses secondary data from the Central Bureau of Statistics of Aceh Province. This study uses quarterly time series data from 2007 to 2021, as many as 60 data series. By using the multiple linear regression model with Ordinary Least Square (OLS), the results show a positive and significant relationship between the increase in the export value and the farmer's exchange rate towards the increase in the value-added of the agricultural sector in Aceh Province. Meanwhile, the imported variable does not show a significant relationship to the value-added agricultural sector in Aceh Province in this study. Taken together, the variables of exports, imports, and farmers' exchange rates significantly affect the agricultural sector's added value in the selected models.

Keywords: farmer export; import; exchange rate; value-added; agricultural sector; Aceh province

1. Introduction

Indonesia is an agricultural country where many people depend on farming for a living. The 2013 agricultural census (ST-2013) results show that the number of agricultural households in Indonesia is around 26.14 million, or about 40.82 percent of the total households in Indonesia (Central Bureau of Statistics, 2014b). The agricultural sector is also one of the sectors with the second-largest labor absorption in Indonesia after manufacturing, which is 9.23 million workers. The agricultural sector can contribute to the national economy by 13.28 percent in 2021 (Central Bureau of Statistics Indonesia, 2021). Aceh is one of Indonesia's many provinces with enormous agricultural potential. It was recorded that in 2020, the agricultural sector in Aceh contributed about 30.98 percent of GRDP from 17 categories of business fields (Central Bureau of Statistics Indonesia, 2021). Apart from being the largest contributor to the economy, the

agricultural sector in Aceh is also the sector with the largest employment absorption, which is around 37.22 percent of the 17 business fields in August 2020 (Central Bureau of Statistics Indonesia, 2021). It means that by optimizing the agricultural potential of Aceh, it will contribute to boosting economic performance and will ultimately improve the welfare of the community (see Table 1).

Table 1. Contribution of the business sector to the GRDP of Aceh province in 2020.

Category	Description	Contribution to GRDP
A	Agriculture, Forestry & Fishing	30.98
B	Mining & Quarrying	4.46
C	Manufacturing	4.56
D	Electricity & Gas	0.14
E	Water supply, Sewerage, Waste Management & Remediation Activities	0.05
F	Construction	10.67
G	Wholesale & Retail Trade; Repair of Motor Vehicles & Motorcycles	14.79
H	Transportation & Storage	4.6
I	Accommodation & Food Service Activities	1.59
J	Information & Communication	3.12
K	Financial & Insurance Activities	2.11
L	Real Estate Activities	4.31
M, N	Business Activities	0.64
O	Public Administration & Defense; Compulsory Social Security	10.27
P	Education	3.16
Q	Human Health & Social Work Activities	3.09
R, S, T, U	Other Services Activities	1.48

Source: Central Bureau of Statistics (2021)

Although the contribution of the agricultural sector in total has a significant contribution, when viewed from the ratio of value-added to the agricultural sector per labor in the agricultural sector, Aceh Province is ranked fifth-lowest in the Sumatra region. The value of the ratio of NTP to farmers in Aceh Province in 2021 is IDR 65.18 million per year per farmer. This value is still lower than the Provinces of North Sumatra, Riau Islands, Bangka Belitung Islands, Jambi, and Riau (Central Bureau of Statistics Indonesia, 2021). The low ratio of NTP value per farmer indicates that the average added value produced by each farmer is still not optimal. The increased added value, especially in the agricultural sector, will impact economic progress.

One of the basic indicators that can be used to measure a region's economic progress at a macro level is its economic growth (Mankiw, 2007). This economic growth will be created if there is an increase in the value of the Gross Regional Domestic Product (GRDP), which is calculated from the Gross Added Value (NTB) in each business field (GRDP by business field) (Central Bureau of Statistics Indonesia, 2021). In simple terms, it can be said that encouraging the increase in added value in the agricultural sector will increase the value of GRDP, which will increase economic growth. If you look at its growth, the agricultural sector is a sector that has relatively stable growth compared to other sectors.

Figure 1 shows the growth rate of gross value added in the agricultural sector and the economic growth of Aceh Province from 2010 to 2020. From 2010 to 2020, the growth of the agricultural sector has always been positive. The agricultural sector was also able to help Aceh's economy when there was a sharp decline in other sectors. For instance, in 2015, an oil and gas vacancy reduced 62.17 percent of the oil and gas industry in Aceh, with the still positive growth of the agricultural sector being able to suppress the decline in economic growth at a level that low. The same thing also happened in 2020 when the covid pandemic crisis occurred. The agricultural sector was able to help the Aceh economy, where this sector was still growing at around 3.47 percent (Central Bureau of Statistics Indonesia, 2021).

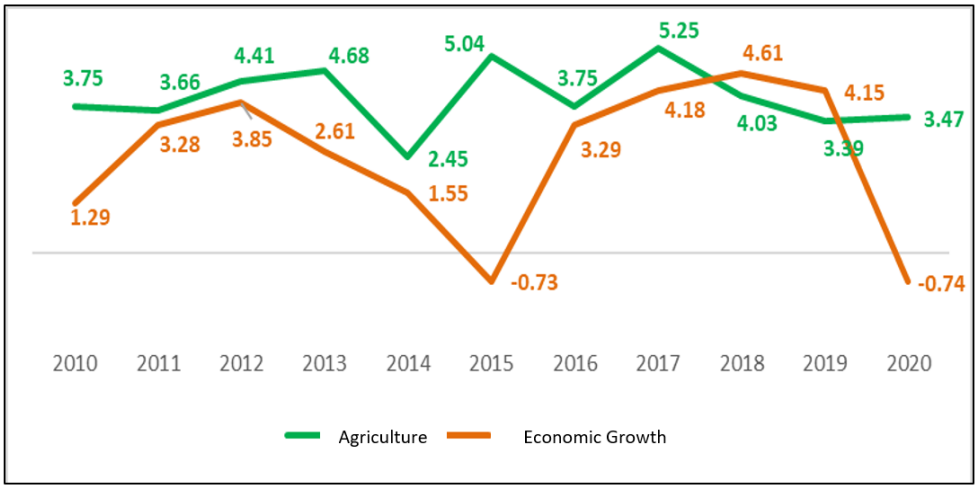

Figure 1. Agricultural sector growth and Aceh province economic growth from 2010 to 2020.
Source: Central Bureau of Statistics (2021)

It is not surprising that the agricultural sector improvement program has become one of the main focuses of the Aceh government's development planning. There are targets for sector improvement in the 2005-2025 Aceh Long Term Development Plan (RPJA) on its 3rd mission, namely strengthening the economic structure and quality of human resources and agriculture at four points, namely: developing the agricultural sector based on superior commodities, increasing the role of investment authority institutions to guarantee agricultural production results, improving the quality and competitiveness of the agricultural market, and increasing agribusiness centers in the provision of agricultural products (Aceh Development Agency, 2012).

The increase in agricultural added value will be influenced by many things, one of which is the condition of demand (demand) from the production of agricultural products itself. In the economic law of supply and demand, the supply of a product will increase along with the demand for the product. It can be analogized that the increase in the added value of the agricultural sector is an addition to supply from the side of the business field so that this value will be influenced by demand, both domestic (domestic) and export (foreign) demand. Of course, domestic demand alone will not be able to accommodate all agricultural commodity products, so the role of exports is very important in these production activities. Exports will provide a great opportunity for farmers to increase their production output because the demand in the international market is very broad. When the demand for agricultural commodities from abroad (exports) increases, the law of the economy will run wherever the output of agricultural commodities to be produced will also increase. It will certainly increase the added value in the agricultural sector, as well as if demand (exports) decreases, it will decrease production (Mankiw, 2007).

Judging from its development, total export activities in Aceh are still relatively low. The total value of foreign exports in 2020 is only 3.05 percent of the total GRDP. From this value, agricultural commodities only contribute less than 15 percent, most of which are mining commodities such as coal (Central Bureau of Statistics Indonesia, 2021).

In addition to exports, another variable that will affect the added value of agriculture is an import. Exports and imports are the bridge between the domestic and international economies, so what happens to exports and imports will impact the domestic and regional economies. How big the influence of exports and imports will depend on the role of both in the economy. Although, the imports are still a relatively low component of the Acehnese economy. Some agricultural needs are still imported from outside, such as raw materials in the form of spices, tea, salt, and commodities that support agricultural activities, such as fertilizers, chemicals, and machinery, with a fairly large percentage (Mankiw, 2007).

In addition to exports and imports, the increase or decrease in agricultural output and productivity is directly influenced by farmers' welfare. When the level of farmer welfare increases, agricultural employment becomes attractive and can encourage increased output by farmers. When the level of farmer welfare tends to be low, the output produced by farmers is also relatively low. The indicator that is commonly used to measure the level of farmers' welfare is the Farmer's Exchange Rate (NTP). According to Rachmat (2013), the higher the percentage value shown by NTP, the level of welfare and life of farmers also tends to be better and vice versa. It is because when there is an increase in FTT, income from agricultural businesses,

especially from the farmer's side, will also increase, which will increase the ability to meet basic needs such as education, health, and other basic household needs.

Although Aceh is a province with a large proportion of the agricultural sector in its GRDP, Aceh's NTP, compared to other provinces in the Sumatra region, is the lowest in 2021 (Mankiw, 2007). Most of the people job in Aceh are farmers, and the level of welfare of the farmers is still not satisfactory. It will impact the value of agricultural output, which is also relatively low compared to other regions on average.

As a province with a large potential for the agricultural sector as well as a strategic area for international trade, it should be able to provide a large enough opportunity to boost the economy in Aceh Province. However, the minimal contribution from import and export activities is an indication that international trade activities in Aceh Province have not developed optimally. In addition, farmers' welfare level also tends to be low, which further proves that this sector is still unreliable for economic progress, especially for farmers in Aceh Province.

The development of export, import and NTP activities can result in an increase in production in the agricultural sector which will have an impact on increasing output so that the added value of the agricultural sector also increases. Bengi (2019), examines the effect of the farmer's exchange rate, inflation, and agricultural sector credit on the gross value added of the agricultural sector in Aceh Province. The research shows that the farmer's exchange rate has an effect on the gross added value in Aceh Province. However, this research has not been able to explain how the influence of foreign trade on the development of the agricultural sector in Aceh Province, especially the added value of the agricultural sector. Therefore, researchers are interested in conducting research related to the effect that exports, imports, and farmers' exchange rates can have on the gross added value of the agricultural sector in Aceh Province.

2. Literature Review

The definition of agriculture in a broad sense does not only include cultivating plants but also cultivating and managing the livestock sector such as maintaining and cultivating livestock that are useful for meeting community needs, as well as the use of animals that can help the task of farmers (Rahmah, 2017; Tambunan, 1998; Winoto & Siregar, 2008). Agriculture is a sub-sector that occupies an important role in an economy regionally and globally. The agricultural sector is the driving force in the economic system, especially in areas with dominance in the agricultural sector.

The agricultural sector plays an important role in economic development, especially in terms of providing surplus food, expansion of the secondary and tertiary sectors, additional foreign exchange from agricultural exports, increasing the income of rural communities, and ultimately the increase in the agricultural sector will encourage increased community welfare. According to the production approach, the agricultural sector includes all businesses obtained from nature and are biological (living) objects or goods. Meanwhile, according to the Central Statistics Agency (BPS), the agricultural sector includes the agricultural sub-sectors of food crops, horticulture, plantation crops, fisheries, animal husbandry, and forestry (Central Bureau of Statistics, 2014a).

Value added in the national accounting system (SNN) is defined as the value created due to a production process. Gross Value Added (NTB) describes the contribution of production factors, both capital and labor, consisting of wages, salaries, taxes and depreciation, as well as a business surplus. NTB can be obtained from the reduction between the output value of a product and the intermediate costs used (BPS, 2013). Thus, on the basis of the added value obtained, the margin can be calculated and then the compensation for the factors of production can also be determined.

In short, the Gross Value Added (NTB) in the agricultural sector can be formulated as the total value of output in the agricultural sector minus consumption/intermediate inputs in the agricultural sector. The equation for calculating the Gross Added Value (NTB) in the agricultural sector according to Central Bureau of Statistics (2007) is as follows:

$$NTB_{(Agriculture)} = Output_{(Agriculture)} - Input_{(Agriculture)} \quad (1)$$

Output itself is defined as the entire value of goods and services produced in a production process, in this case agricultural output means all goods and services resulting from agricultural activities both carried out by households and by agricultural companies. Meanwhile, inputs between the agricultural sector are defined as the entire value of goods and services used in creating agricultural output. Goods that are categorized as intermediate inputs are goods that are consumable in the production process, such as: fertilizers, fuel for agricultural machinery, animal feed, and so on (Central Bureau of Statistics, 2007).

The total of this gross added value is calculated as Gross Domestic Product (GDP) or Gross Regional Domestic Product (GRDP). So, GDP/GDP is the total NTB of all sectors, starting from the agricultural sector, trade, manufacturing industry and so on. So that when there is an increase in the added value of agriculture, the GRDP will also increase and the economy will grow (Mankiw, 2007).

Silvia et al. (2016) suggest that oil palm farmers must have the right considerations related to agricultural strategies such as land, number of plants, capital, and so on. The factor that has a significant influence on the development of the agricultural sector is the increase in demand as a result of market expansion. Market expansion can occur when the supply that producers are able to provide is higher than the demand or the demand provided by the international market is more promising than the domestic market in Indonesia alone. Fathia et al. (2021) stated that exports have a close relationship with foreign investment. This foreign investment has a good impact on increasing production which will have an impact on improving the economy in general. Exports are part of foreign trade activities that function to release goods from one region to another (Utama & Muthmainah, 2019). Export activity itself basically aims to expand market reach so as to increase the productivity of both goods and services in a region. This goal is realized when the supply of goods and services in a region exceeds the amount of demand for these goods, so that a policy is needed to continue to increase productivity in a region in the form of market expansion in export policies. The increase in exports can increase economic growth in an area due to the increase in gross added value of goods and services in an area (Runtunuwu, 2021).

Export itself can be in the form of trade between regions or between companies between regions. Increasing exports in a region is the desire and hope of each region, especially exports of finished goods that have added value to these goods. An area that has a high level of exports can indirectly describe a healthy production system in a region because it can meet the needs of the region so that an export policy is needed. Exports can be successful when various policies are able to support export activities such as simplifying binding rules, being able to provide goods or services according to international market demands, and so on. Economic developments that occur in a region today cannot be separated from international market movements caused by global economic conditions. International market movements cause economic relations between regions to become a factor in the success of a region in increasing export activities. This condition illustrates that it takes the ability to compete between regions to generate profits between regions that export and regions that import. Regions that export can increase regional foreign exchange while regions that import can cover the needs or demand in the region to stimulate local markets in production (Naf'an, 2014).

Export in the Big Indonesian Dictionary (KBBI) is defined as the activity of sending merchandise abroad. Exports are part of international trade activities that can stimulate the growth of industries, both small scale and large factories (Kemendikbud, 2022). From the description above, it can be seen that export activities can be a driving force for economic progress, especially in developing countries, especially in international trade, so that in the end these countries achieve economic stability like more developed countries. Good exports are export activities that are sustainable and have optimal added value. (Roylita et al., 2019), in his research, it is stated that increasing production will be able to increase the supply that can be provided so that it will expand market reach in the trade transaction process so that it will open options for export activities. This will certainly have an impact on increasing gross value added in general as a result of the increase in exports that occurred.

Exports are part of national income so that an increase in the value of exports will have a direct effect on total national income. However, national income itself can be influenced by many things, such as household consumption, government consumption, company investment, as well as imports of goods and services from abroad. So that an increase in national income does not always lead to an increase in the value of exports. The difference between total exports minus total imports is shown in the trade balance. When the trade balance shows a positive value, it means that the value of exports is greater than the value of imports. Meanwhile, if the trade balance shows a negative value, it means that the value of exports is smaller than the value of imports (Risa, 2018).

Exports can be seen as demand from abroad where exports will be created when there is demand from foreign (international) markets. When the export value increases, the demand for a product also increases as well as local agricultural products which are widely exported to other countries. When demand increases, the production process will also be pushed up to meet the demand so that the output created will also increase (Mankiw, 2007). When output increases, the gross value added will also increase because the gross value added will depend on the amount of output created. Gross value added is calculated from the total output minus the total intermediate costs used.

The level of exports achieved by a country will be influenced by several things, such as: competitiveness in foreign markets, economic conditions in other countries, protection policies in foreign countries, and foreign exchange rates. Global economic conditions also greatly affect the level of exports, when there is a global crisis (recession) or the unemployment rate in many countries increases, the world demand for a country's exports will decrease. On the other hand, when the global economy is growing rapidly, exports will also increase. According to the Big Indonesian Dictionary (KBBI) Import means the entry of goods and so on from abroad (Kemendikbud, 2022). Import is also defined as the process of buying various types of goods and services from one country to another. From the buying and selling process, a cooperation agreement between two or more countries will be created. In short, imports are goods and services that are produced abroad and sold domestically (Makiw, 2007).

Imports have an important role in an international trading system. The main purpose of import activities is to meet the needs of the people. In general, goods imported from import activities are goods that cannot be produced or produced domestically or goods that are rare and insufficient to meet the needs of the people. Imports can occur due to several things, such as: a country is unable to produce so it must bring it from outside, the cost of production when done domestically is much more expensive than bringing in goods from abroad, or domestic needs are insufficient (Arifin & Juniawaty, 2022; TY & Tarmidi, 2021). So that import activities generally aim to maintain the availability of various community needs so that they can maintain price movements that are likely to occur in an area.

With international trade, economic efficiency can be created, this is because each country can meet needs that may be different in nature more easily, such as differences in natural resources, economies of scale, and tastes. Countries that are involved in international trade will benefit each other (Naf'an, 2014). International trade can also stimulate an increase in foreign investment which will have an impact on increasing production and output so that the economy will also increase. Fathia et al. (2021) found that international trade had a positive and significant effect on investment in Indonesia. Hariwijaya (2020) also shows that international trade can encourage an increase in GDP per capita in the long term.

Farmers are defined as people who undertake/conduct business activities in the agricultural sector at their own risk with the aim of being sold, both as owner farmers and sharecroppers (rent/contract/profit sharing). Farmers do not include people who work in other people's fields/fields expecting wages (farm labour) (Mankiw, 2007). Farmer's Exchange Rate (NTP), is an indicator to measure the level of farmer's welfare. Conceptually, NTP measures the ability of the exchange rate of agricultural goods produced by farmers (agricultural output) with the value of goods or services needed to meet the needs of farmers' living such as household consumption needs and the need to produce agricultural output. Mathematically, the FTT index is calculated from the ratio between the Price Index Received by Farmers (It) and the Price Index Paid by Farmers (Ib). The price index received by farmers is a price index that shows the development of producer prices for farmers' products (agricultural output produced). Meanwhile, the price index paid by farmers is a price index that shows the price development of farmers' household needs, both for consumption and for the production process (Rachmat, 2013).

The price received by farmers is the average price of agricultural commodities produced by farmers before adding transportation/transportation costs and packing costs or called Farm Gate (rice field prices after picking). The price paid by farmers is the average retail price of goods/services that are consumed or purchased by farmers both to meet the needs of their household consumption and for the purposes of agricultural production costs. Data on prices of goods for agricultural production and prices of goods/services for household consumption are recorded from direct interviews with traders or service sellers in selected markets. The wage data for farm laborers is collected from the results of direct interviews with farmers (Mankiw, 2007). The first index needed to calculate the value of NTP is the index of prices received by farmers or It. The weight used for It is the production value sold by farmers from each type of agricultural product. As the main data for calculating the scale diagram, three kinds of data are needed, namely the quantity of production, producer prices, and the percentage of goods sold (marketed surplus).

Weighing each type of goods included in household consumption expenditures, production costs and additional capital goods is the value of each type of goods purchased by farmers and this means that it does not include the value of goods produced by themselves called the price index paid by farmers (Mankiw, 2007). Research on the effect of exports and imports on Gross Domestic Product (GDP) has been carried out by Bashir et al. (2019). By using quarterly time series data from 1995 to 2011 and using the Vector Autoregression (VAR) analysis method, the results show that the relationship between agricultural exports and agricultural economic growth (GDP) is a positive and significant two-way causality where agricultural exports can encourage economic growth. or vice versa agricultural economic growth can increase export

potential in the agricultural sector. The relationship between agricultural imports and agricultural GDP is only negative and significant in one direction, but not vice versa.

Sandström et al. (2014) in his research stated that agricultural products and raw materials originating from the agricultural sector have become something that has a higher distribution towards the level of exports and imports in a region. This increase in exports and imports of the agricultural sector must also be supported by the availability of land to maintain the amount of production to meet domestic and foreign demand. The high demand will be able to provide optimal welfare to farmers as long as the policies initiated are always in favor of the farmers. This research is supported by research conducted by Olayungbo (2021) which states that the right agricultural policy will be able to promote food prices that can benefit farmers in particular and the country in general. Other research has also been carried out by Siregar (2016) using time series data from 1985 to 2016 and processed using the multiple linear regression method, the results show that the export value has a significant effect on growth in the agricultural sector, while the import value has no significant effect.

Another study was conducted by Marwanti & Irianto (2017) using quarterly time series data from 2000 to 2015 and by using the Vector Autoregression (VAR) analysis method to see the effect of export, import and investment variables on agricultural GRDP growth and vice versa (autoregression). The results show that exports, imports and investment have no significant effect on GRDP growth in the agricultural sector because of their small contribution, but the growth in the agricultural sector has an effect on increasing exports, imports and investment. Hardiwan et al. (2019) and Shernik (2021) have investigated the effect of Farmer's Exchange Rate (NTP) on economic growth in Jambi Province, using time series data from 2011 to 2020 and by using multiple linear regression analysis methods, it is obtained that the Minimum Wage and NTP have an effect on economic growth in Indonesia. Jambi.

Another study related to export activities was carried out by Syam et al. (2021) which states that the factors that can affect export activities are prices and exchange rates which have a negative and significant influence. In addition, GDP per capita has a positive influence on export activities while economic distance has not yet had a significant impact on export activities. The influence of GDP per capita on export activities also has a causal effect, namely mutual influence so that any increase in exports is also able to increase overall GDP which will have an impact on increasing GDP per capita. Long (2021), in his study stated that the competitiveness of exports of agricultural products in China is weak and tends to worsen. Therefore, China tends to focus on the production of agricultural sectors that have regional characteristics that tend to be distinctive, such as tea and live pigs. In addition, the Chinese government has pursued various policies to strengthen various agricultural product commodities which are still weak in the international market to achieve harmony between the high gross value added of the agricultural sector and the level of farmers welfare.

3. Materials and Methods

This study aims to study the effect of exports, imports and farmers' exchange rates on the gross value added of the agricultural sector (NTB) in Aceh Province through multiple regression analysis modeling using Ordinary Least Squares (OLS). The dependent variable (bound) in this study is the added value of the agricultural sector. For the independent variable (free) the value of exports, imports, and the farmer's exchange rate (NTP) is used. The data used in this study is secondary data obtained from the Central Bureau of Statistics (BPS) both the BPS for the Republic of Indonesia and the BPS for the Province of Aceh. The data structure used is time series data from 2007 to 2021 and quarterly data is made so that 60 data series are formed.

Furthermore, in this study, descriptive analysis and inferential analysis methods will be used. Descriptive analysis is a method of how to get data, process it, to analyze it by interpreting or providing interpretations in order to describe the situation that occurs (Silvia, 2020). This analysis can be used to provide an overview both bivariate and univariate using tables, graphs and thematic maps. This study uses descriptive analysis in the form of tables and graphs to be able to describe various phenomena in general that occur during the research period.

Inferential analysis in this study using Multiple Linear Regression with Ordinary Least Square (OLS). Inferential analysis is a type of analysis that has a broader meaning so that the collected phenomena can be processed and obtain a decision regarding the influence and how much influence an independent variable can have on the dependent variable. RLB in this study was used to analyze the relationship between the variables of the value of exports, imports, and the exchange rate of farmers to the added value of agricultural commodities in Aceh Province.

Regression analysis is a statistical technique used to explain the form of a statistical relationship between variables through a mathematical equation, where one variable is called the dependent variable whose value is thought to be influenced by other variables (independent variable). Regression analysis aims to determine the form of the relationship between the variables expressed in a mathematical model. Regression analysis can also be used to determine how much influence one variable (independent variable) has on other variables (independent variable) and can be used to make forecasts/estimates. The relationship measured in the regression analysis can state a cause-and-effect relationship. Regression analysis can be used on time series data and cross-sectional data (Gujarati & Porter, 2009).

Multiple linear regression model is a regression model, this model contains more than one independent variable in the equation. The term "linear" means that the model (Y) is a linear function of the regression coefficient parameter. In general, the Multiple Linear Regression model can be expressed as follows (Silvia, 2020):

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon_i \quad (2)$$

Where**,** i = 1, 2, …, n. Y is the value of the dependent variable on the i-th observation which is assumed to be random/stochastic. X_1, X_2, X_3 is the value of the independent variable X in the 1st, 2nd, and 3rd observations which are assumed to be fixed/nonstochastic. α is the intercept value or constant when the value of the independent variable is zero. β_1, β_2, and β_3 is a model parameter also called a regression coefficient or slope (line gradient) which states the change in the value of Y for every one unit increase in X. ε_i is an error component that is random (contains the influence of other independent variables other than the X variable), and is assumed to be: E(ε_i) = 0, Var (ε_i) = σ^2, or also called homoscedastic, Cov (ε_i , ε_j) = 0; for all i, i, where i ≠ j. This assumption is also called non-autocorrelation. $\varepsilon_i \sim Niid$ (0, σ^2), The error term is freely distributed following the Normal distribution with a mean of 0 and variance σ^2. Based on the above equation, the model used as a model in explaining the determinants of poverty in Aceh Province with the following equation:

$$NTBPertanian_t = \alpha + \beta_1 Eksport_t + \beta_2 Import_t + \beta_3 NTP_t + \varepsilon_t \quad (3)$$

Where: NTBAgriculture: Gross value added of agricultural commodities quarterly (million rupiah), α: Intercept value or constant, $\beta 1$, $\beta 2$, $\beta 3$: Coefficient value, Export: Quarterly export value (million rupiah), Import: Quarterly import value (million rupiah), NTP: Farmer's Exchange Rate (percent), ε: Error, t: Year-t.

4. Results and Discussion

Descriptively, Figure 2 shows a comparison of the value of the export, import, and gross value-added variables of the agricultural sector in Aceh Province on a quarterly basis from 2010-2021. The gross added value of the agricultural sector shows an increasing pattern, this means that agricultural production continues to increase in Aceh Province. Meanwhile, the export value has two patterns where from the first quarter of 2010 to the second quarter of 2016 it shows a declining pattern, this is due to the decline in exports related to oil and gas. Furthermore, the export value showed a pattern that tends to increase until the fourth quarter of 2021, where exports of agricultural commodities played a significant role after the oil and gas vacancy in Aceh. Imports have a very fluctuating pattern so that from the graph it is impossible to determine which pattern is formed. The lowest imports occurred in the third quarter of 2011, while the highest imports occurred in the third quarter of 2019. The lowest exports occurred in the second quarter of 2016 and the highest exports occurred in the first quarter of 2012.

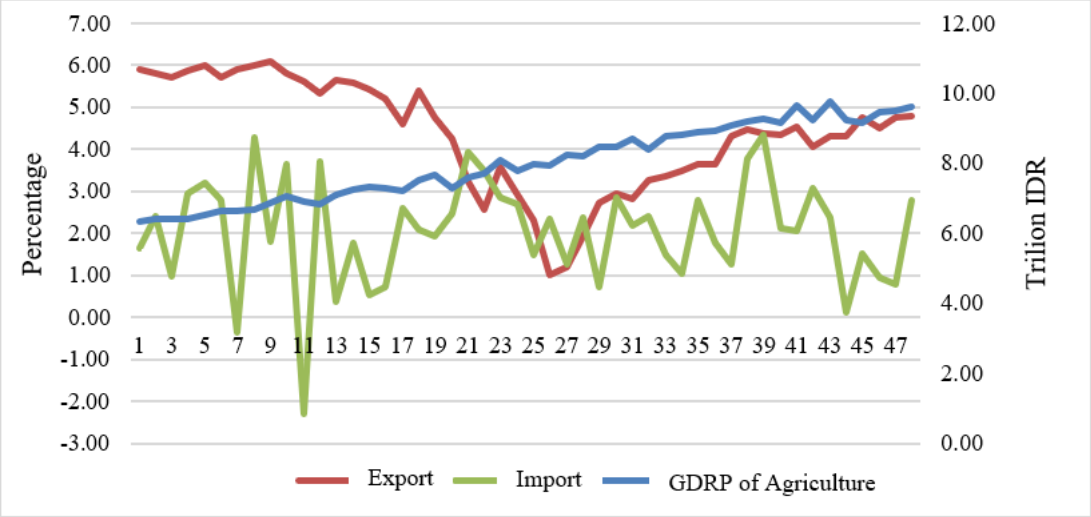

Figure 2. Data on exports and imports (percent) and gross value added of agriculture sector (trillion rupiah) quarterly (2010-2021).

Source: Central Bureau of Statistics (2021)

Figure 3 shows the comparison between the farmer's exchange rate and the gross value added of the agricultural sector in Aceh Province. Graphically, the average farmer's exchange rate has two patterns, which shows an increasing pattern from the first quarter of 2010 to the first quarter of 2013. Furthermore, even though it fluctuated, the pattern in the farmer's exchange rate showed a decline, although in a fairly low range. The decline in the farmer's exchange rate indicates that the level of income from the agricultural sector compared to expenditure continues to decline.

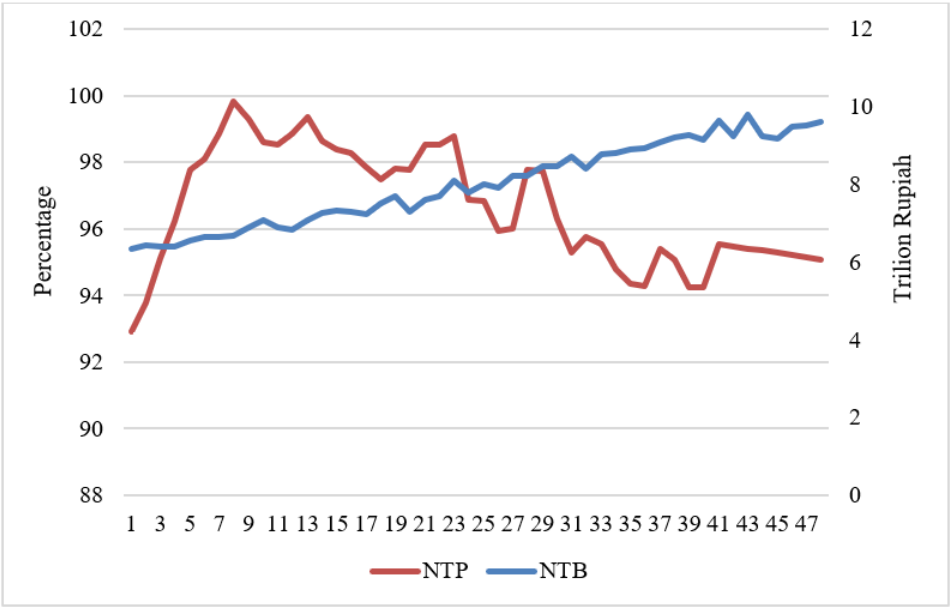

Figure 3. Farmer's exchange rate data (percent) and the gross added value of the agricultural sector (trillion rupiah) quarterly (2010-2021).

Source: Central Bureau of Statistics (2021)

The next analysis is inferential to provide a more in-depth picture of the relationship between the independent variable and the dependent variable. The inferential analysis used in this study is Ordinary Least Square (OLS) linear regression. Through this analysis, it will be found how much influence can be given by the variables of exports, imports, and the exchange rate of farmers on the gross added value of the agricultural sector in Aceh Province so that later it can help various parties to be able to formulate various policies related to the development of the agricultural sector in Aceh Province.

The model found in this study has gone through various classical assumptions including the normality assumption test, the multicollinearity assumption test, the heteroscedasticity assumption test, and the autocorrelation assumption test. Based on these tests, it is concluded that the model formed does not violate the specified assumptions to obtain the best linear unbiased estimator (BLUE) parameter. All classical assumption tests indicate that the data and variables used in this study have met the requirements for analysis using multiple linear regression, namely Ordinary Least Square (OLS). The results of the model formed in this study are as follows:

Table 2. Results of regression model using ordinary least square (OLS).

Variable	Coefficient	Std. Error	t-Statistic	Prob.
NTP	0.208	0.059	3.532	0.001
IMP	0.002	0.006	0.382	0.704
EXP	0.005	0.001	6.390	0.000
C	28.771	5.645	5.097	0.000
R-squared	0.635	F-statistic		25.542
Adjusted R-squared	0.610	Prob(F-statistic)		0.000

Note: NTB: agricultural sector gross exchange rate, NTP: farmer's exchange rate, IMP: import EXP: export.

The form of the equation based on the results of the regression model using OLS (Table 1) is as follows:

$$NTB = 28{,}77133 + 0{,}208024\, NTP* + 0{,}002173\, Imp + 0{,}004874\, Eks* \quad (4)$$

Table 2 shows the results of regression model using ordinary least square (OLS). The model that was formed was fit where the prob value of the F-statistics was 0.00000000 and smaller than the alpha value of 5 percent. From the F value, it can also be concluded that the independent variables used in the model together have a significant influence on the dependent variable, namely the gross added value of the agricultural sector in Aceh Province. The value of R-squared in Table 1 shows how much the independent variable used in the model can explain the dependent variable under study. The R-squared value in the model formed is 0.635234, so it can be concluded that the independent variables used in the model, namely exports, imports and farmers' exchange rates are able to explain the variation of the value of the dependent variable, namely the gross added value of the agricultural sector by 63.52 percent. While the rest is explained by other variables that are not included in the model formed.

From the model formed, the relationship between the export variable and the gross value added of agriculture shows a probability value (P-value) which is smaller than 5 percent alpha with a positive coefficient value. So, it can be said that the results of the study indicate that there is a positive and significant influence between the value of exports on the gross value added of the agricultural sector in Aceh Province (H0 is rejected). Every 1 percent increase in exports can increase the gross value added of the agricultural sector in Aceh Province by 0.005 percent. This is in accordance with the theory that an increase or expansion of market reach will be able to stimulate an increase in output which has an impact on increasing gross added value, one of which is the agricultural sector. However, the low influence exerted cannot be separated from the still minimal contribution of exports to the economy of Aceh Province.

Furthermore, the relationship between the import variable and the gross value added of the agricultural sector shows a probability value that is greater than the 5 percent alpha value, which is 0.7041 with a positive coefficient value. It can be concluded that in this study the import variable has not significantly affected the gross added value of the agricultural sector in Aceh Province (H0 is accepted). This is understandable because apart from the low contribution of imports to the economy, which is around 3.05 percent, almost most of the imported commodities imported to Aceh Province are dominated by machine tools and non-agricultural goods, which is around 73 percent of total imports (BPS, 2022).

The results of this study are also in line with the findings of Marwanti & Irianto (2017), where the import variable does not affect the GDP of the agricultural sector because the import value of agricultural commodities is still low in value. In addition, most of the agricultural commodities in Aceh Province are still dependent on ports in North Sumatra Province, which has resulted in not yet developed with a significant demand for agricultural sector output from abroad in Aceh Province.

The next variable relationship is the farmer's exchange rate to gross added value. From Table 1, it is obtained a probability value (P-value) of 0.001 which is lower than the alpha value of 5 percent with a positive coefficient value which means that the results of this study indicate that there is a positive and significant relationship between the farmer's exchange rate and the gross added value of the agricultural

sector in the province. Aceh (H0 rejected). Every 1 percent increase in the farmer's exchange rate can increase the gross added value of the agricultural sector in Aceh Province by 0.21 percent. This finding is in accordance with the results of research conducted by Hardiwan et al. (2019), where an increase in the welfare level of farmers has an impact on increasing the productivity of these farmers so that it will affect the increase in gross added value of the agricultural sector. In addition, another study conducted by Nurhadi (2019), stated that the farmer's exchange rate is an illustration of the impact of increasing agricultural output and decreasing operational costs from agricultural activities so as to stimulate an increase in the gross added value of the agricultural sector.

5. Conclusions

In conclusion, this study has identified the influential factor of the gross added value of the agricultural sector in Aceh Province. The variable of farmer's exports and the exchange rate has a significant positive effect on the gross value added of the agricultural sector. Besides that, the variable of import has no statistically significant effect on the gross added value of the agricultural sector in Aceh Province. The findings of this study are also expected to provide the benefit for the community and academics, both as a policy reference and the development of further research.

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