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Supply Response of Oil Palm in the Philippines

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Abstract:- This research study was conducted to determine whether oil palm farmers are responsive to price variations that occur from time to time due to supply and demand fluctuations. This study, therefore, analyzed the oil palm farmers' responsiveness from the period of 2005-2020. Specifically, it aims to (a) examine the oil palm trends in production (metric tons) and oil palm pricing in the Philippines from 2005 to 2020. (b)to identify the short run or long run relationship between oil palm production and oil palm pricing, (c)to estimate the supply elasticity of oil palm. When the Autoregressive Distributive Lag bound test is performed, it is discovered that there is a cointegrating connection, and the ARDL is then reparametrized and included in the Error correction model. The ARDL approach to cointegration estimation for the price of oil palm is inelastic in the short run and the long run. The researcher concludes that oil palm farmers are not responsive to fluctuations in their prices in the long and short run. The research study also concluded the trends of oil palm production and farmgate price of oil palm.

Keywords:- *ARDL Model, Cointegration, Demand, Error Correction Model, Oil Palm And Supply Response.*

I. INTRODUCTION

The oil palm (*Elais guineensis*) is a plant that native to West Africa. It has been used to create wine, medicines, and woven fabrics. Palm oil (derived from the fleshy section of the fruit) and palm oil are the primary products produced by large-scale farms today (which is obtained from the nut) (Corley, 2009).

According to the species of palm trees used, oil palm farms consisting of precisely selected land cloned variations of palm trees begin yielding fruit after four to five years, mature appropriately, and reach their optimum output when the plants are between 20 and 30 years old. The fruit bunches, which range in weight from 15 to 25 kg, are made up of 1000 to 4000 oval-shaped fruits that are three to five centimeters in length and weigh between 15 and 25 kilograms. Following harvesting, the fleshy component of the fruit is processed into oil using a variety of methods, whereas palm kernel oil is extracted from the nut of the same name (Corley, 2009).

In the last fifty years, research and development projects and technical innovations have assisted in increasing production while decreasing inputs, allowing oil palm to produce more from a less land area than other food crops. In world-wide, oil palm is presently a major source of renewable and sustainable raw materials for the food, oleochemical, and biofuel industries, among other applications.

Only around 70,000 hectares of land in the Philippines is dedicated to the production of oil palm. Nigeria imports large quantities of palm oil, which is the major processed product produced by oil palm trees. For the year 2011, it imported over 550,000 tons of refined palm oil, the vast bulk of which came from Malaysia and met almost 80% of the country's requirements. Local farmers provided the remaining 20%, or around 120,000 tons, of the supply.As the country develops, there will be an increasing need for palm oil for use in cooking, baking, and the food service industry (Dy, 2013).

As of December 2012, 12 registered oil palm farms are operating in the country, and most of this is in Mindanao. According with the Bureau of Agricultural Statistics (BAS, 2011), the Philippines' oil palm production area is gradually expanding at a standard rate of 7.62% per annum, from 38,599 hectares in 2008 to 53,014 hectares in 2012. The Philippines has eight existing palm oil mills with an overall evaluated limit of 265 metric tons of fresh fruit bunches (FFB) each hour owned by six companies with 265 metric tons each hour limit. The nation can produce 1,559,960 metric tons of oil palm each year.

This study will give a short description of the significance of the research about the supply response of oil palms in the Philippines. There are supply response studies in the Philippines about rice, rubber, corn, and seaweed. However, there is no published research study about the supply response of oil palms, so this study will provide additional literature about the supply response of oil palms in the Philippines. Supply response is utilized to assess the viability of price policies in the allotment of farmers' assets. The production and the stable supply of agricultural products are consistently the significant concerns of agricultural policymakers to develop policies and a better understanding of oil palm farmers' responses to price and other explanatory variables. The research study may help oil palm farmers, traders, public and private researchers, and policymakers.

The general objective of the research study is to estimate the supply response of oil palm in the Philippines. Specifically, this study aimed to (a) To analyze the oil palm trends in production (metric tons) and oil palm pricing in the Philippines from 2005 to 2020, (b) To identify short run or long run relationship between oil palm production and oil palm pricing, and (c)To estimate the supply elasticity of oil palm.

The supply response of oil palm in the Philippines is the primary focus of this research. This study used secondary data from the year 2005 to 2020 quarterly from the PSA for the volume of production (metric tons) and oil palm pricing.

II. THEORITICAL FRAMEWORK

The theory of supply serves as the basis for the study. Supply theory is the relationship of the supply between a good and its price.

A. Law of Supply

The supply is an amount of an item that a maker is willing and able to supply on the market at a given cost in each period. The law of supply expressed that different element stayed consistent, price and amount of decent provided are related. It states that, if the value is higher, the sum or quantity of goods supplied by firms or producers is also high. Conversely, the lower the deal, the lower the amount of a good purchased to the market. Thus, the cost and quantity supplied of goods are decidedly or straightforwardly related. It is possible that a rise in one variable will lead to an increase in the other. In a free market, producers rival each other for profits. Since profits are never steady across time or across various products that are more beneficial away from less productive merchandise, there's a caused that it increases in the supply of highly valued goods and decreases in the supply of the less valued goods (Dela Paz, 2019).

B. Price Elasticity of Supply

The elasticity estimates experienced so far identified with the demand side of the market. It is also helpful to realize how responsive the amount provided is to adjusting cost. The value elasticity of supply is an action utilized in economics to show the responsiveness, or elasticity, of the amount supplied of a goods or a service to an adjustment of its cost. The mathematical framework considers elasticity, which is defined as the change in percentage in the amount produces measures the change in percentage in the cost (Dela Paz, 2019)

The price elasticity is a estimate of how price changes affect the quantity supplied. In other words, if the firm's price elasticity is more significant, it will be able to increase production when prices rise and decrease output when prices fall. The following is an illustration of the equation:

$$Elasticity\ of\ Supply = \frac{\%change\ in\ Q}{\%change\ in\ P}$$

A complement good has a positive cross-price elasticity because if the percent change in price is positive, the difference in percentage is underway will be positive, and the other way around, whereas a substitute good has a negative cross-price elasticity because if the percent change in price is positive, the difference in percentage is underway will be negative, and the other way around, and substitute goods have a positive cross-price elasticity because if the percent change in price is positive, the difference in percentage is underway will be (Dela Paz, 2019).

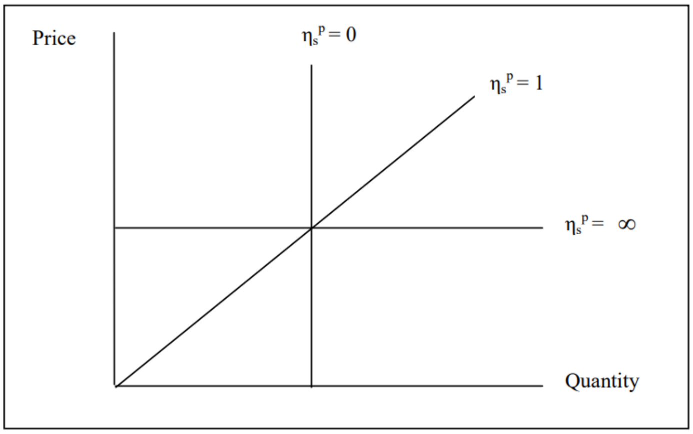

Fig 1. Price Supply Elasticities
(Source: Case and Fair, 2003)

The different elasticities are presented in Figure 1. Unitary elastic supply(ε=1) is the estimated elasticity is equal to one, saying that the a price change is comparable to a change in quantity supplied. Perfectly inelastic supply(ε=0) does not change in response to price changes. And last, Perfectly elastic supply(ε=∞) is the goods with a price elasticity of supply equal to infinity.

III. CONCEPTUAL FRAMEWORK

Figure 2 depicts the supplied answer concerning the price of oil palm. According to supply theory, farmers want to raise plantings when they expect prices to rise and decrease plantings when they expect prices to fall. The impact of an alternative or rival crop's expected cost, on the other hand, is harmful. Mainly, supply response refers to the production response when the product's price is change.

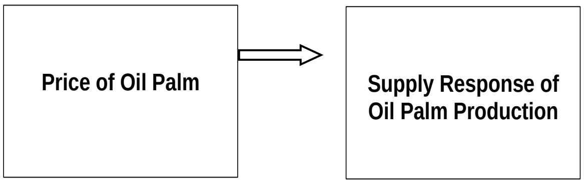

Fig 2. Supply Response Relationship

IV. METHODOLOGY

This study used a descriptive-quantitative research method of analysis to interpret the result of the study. The data was analyzed the oil palm trends in production (metric tons) and oil palm pricing and this study used secondary data, oil palm volume of production and oil palm pricing gathered on PSA from 2005 to 2020.

To determine the integration order of the time series variables, a unit-roots analysis was done on each of the time series variables. Prior to doing co-integration analysis, it is necessary to identify the order of integration for all variables, at the very least, to ensure that no variable is integrated with an order greater than one before proceeding (Dela Paz, 2019). To identify the integration order of each time series, an Augmented Dickey-Fuller (ADF) unit root test must be performed using the Stata software, whether there is a deterministic trend in the series.

Equation 1 depicts the ADF's test formula.
$\Delta Yt = \alpha + \rho Yt - 1 + \sum \gamma \Delta j\, t - 1\, Yt - 1 + \mu t$ Eq.2

where:
Y = the series to be tested
$\boldsymbol{\rho}$ = coefficient
j = lag length chosen for ADF such that
$\boldsymbol{\mu}$t = empirical white noise.

The significance of is determined by comparing the t-statistics produced from the OLS estimates to the null hypothesis. It is necessary to difference the variables until they become stationary, for example, until the presence of a unit root is proven, before testing for co-integration of the variables.

The multi-annual production decision-making process for oil palm supply leads to the creation of the long-run connection as follows:
$Qt = \propto 1 + \alpha 2Qt - 1 + \alpha 3Pt - 1 + \varepsilon t$
Eq.3
The relevant variables are:
Qt = Oil palm production in quarter t in metric tons
Qt-1 = Oil palm production in quarter t-1 in metric tons
Pt-1 = Price of oil palm per kg in quarter t-1

A. Autoregressive Distributed Lag (ARDL) to Cointegration Test

The ARDL equation that was used in this study is described below.

$\Delta \ln Yt = a0 + \sum_{j=1}^{k} \omega j\, \Delta \ln Yt + \sum_{j=1}^{k} \gamma j \Delta \ln Pt + \mu t$ Eq. 3
where:
Δ= change operator
ln= natural logarithm
k=3= number of lags
Yt = Oil palm volume of production in metric tons
Pt = Price of oil palm
ω, γj, and δj = parameters to be estimated
μt = error term or the regression

Correspondingly, the null hypothesis of no cointegration is specified in Equation 3 as H0 =f1 =f2 =f3 = 0. Defining the null hypothesis of no cointegration as H0 =f1 =f2 =f3 = 0, the null hypothesis of no cointegration is defined as To test for no co integration between the oil palm supply and prices in the equation, F statistics are used, and the critical value is derived from the bound test developed by Pesaran et al. (2001) for large sample sizes and later extended by Narayan (2005) to cover studies with small sample sizes (Pesaran, 2001; Narayan, 2005). (See Figure 1).

B. Cointegration Analysis

As previously stated, the study seeks to assess oil palm supply response to prices using cointegration technique, which does not limit the short run behavior of prices and quantities. Because cointegration analysis just needs output co-movement,

The following sections cover supply and pricing in the long run, a typical long-run equilibrium, and short-run dynamic supply response functions in the context of cointegration analysis for this study.

B. 1. The Equilibrium Supply Function in the Long Run

It is possible to express the long-run equilibrium supply function for the research in the following way:

$$\ln \gamma t^{oil\ palm} = \iota 0 + \varphi \ln Pt^{\text{oil palm price}} + \varpi t \quad \text{Eq.4}$$

where:
ln = natural logarithm
$Yt^{oil\ palm}$ = oil palm output supply in metric tons
$Pt^{oil\ palm}$ = prices per kilogram of oil palm

B. 2. Short-run Equilibrium Function

The relationship shown below can be used to create a typical short-run dynamic function for the purpose of assessing short-run elasticity:

$$\Delta lnYt^{oil\ palm} = \sigma 0 \sum_{j=1}^{k} \theta j\, \Delta lnYt_{t-j}^{oil\ palm} + \sum_{j=1}^{k} \beta j\, \Delta lnP_{t-j}^{oilpalm} + \varsigma ECT_{t-1} + \varpi t \quad \text{Eq.5}$$

where:
$ECTt{-}1$ = ût-1 = the lagged values of the error term from equation 4.
K=3 = number of lagged used
βj, and θj = supply price elasticity in the short run
ζ = Adjustment rate to long-run equilibrium. Long-run equilibrium supply of oil palm is estimated by changes in supply and price.
ϖt = the error term of the regression

V. RESULT AND DISCUSSION

A. Trend Analysis

➢ *Production of Oil palm*

From 2005 to 2020, the trend in oil palm output in the Philippines is depicted in the diagram below. Despite the environmental and socioeconomic concerns, the Philippine Palm Oil Development Council, INC (PPDCI) lobbied for the expansion of oil palm plantations on vacant and unproductive lands such as cogonal and grassland, as well as logged-over areas, among other things, across the country.

The oil palm production of the Philippines increased its output from 354,811.47 metric tons (MT) in 2005 grew to 493,06.79 MT in 2020. As previously stated, Visayas had a small production volume in the years 2005 but saw a rise in production in 2007 because the area of oil palm production also increased constantly from the year 2007 to 2020. From the year 2005 to the year 2013, there was no production volume in Luzon because there was a small area planted of oil palm in Luzon; however, from the year 2013, there has been a minor rise in production volume through the year 2020 as the area planted increases. Between the years 2005 and 2010, the production volume of Mindanao grew because it had a considerable number of areas planted, after which it began to increase continued until 2016. It was stable in 2015 and 2016 and then saw a significant fall in 2017 because of its limited palm oil production and the coconut industry's numerous issues, including senile trees, low productivity, followed by a vast recovery the following year. Mindanao produces most of the oil used in the Philippines, accounting for about half of the total output.

In 2010, it overtook coconut oil as the top-selling oil in most Philippines ' markets because it was used for technical reasons, most of it in the chemistry industry for biofuel generation. In 2020, Mindanao was the highest contributor of oil palm production in the Philippines accounted 92.2%, followed by the Visayas with 5%, and Luzon contributed 2.8% of the total contributed.

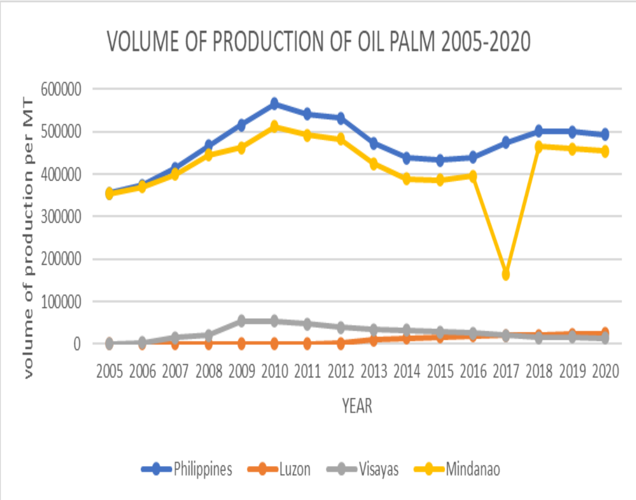

Fig 3. Production of oil palm in the Philippines, by island (2005-2020) Source: Philippine Statistics Authority.

Figure 4 illustrates that the price of an oil palm does not differ among the islands and that the price has remained unstable throughout time because of the increasing demand for oil palm. A 27 percent increase in price was observed in the second quarter of 2011. Since palm oil accounts for about a quarter of worldwide vegetable oil consumption in 2010, it was in high demand in 2010. More than two-thirds of palm oil is utilized for technical reasons, with the vast majority of it being used in the chemical sector for the production of biofuel. Oil palm growers will benefit from a favorable market price and demand in 2011, which will prove to be a positive year for them because of the substantial price increase—the price of oil decreased by 25.8 percent in the second quarter of 2019. A variety of factors or environmental issues, such as weather conditions or pests, might be responsible for this situation. On the island of Mindanao, it showed an upward tendency from 2005 to 2011, then a downward trend after that. The price of oil palm in Luzon has been stable, whereas the price of oil palm in the Visayas has fluctuated between an upward and a decreasing trend in 2012.

In 2020, the average price per kilogram is 3.34php/kg. The date when the PHP/kg reached an all-time high of 7.00 Php/kg in May 2011 and the day when it reached a record low of 2.41 Php/kg in January 2006 were recorded.

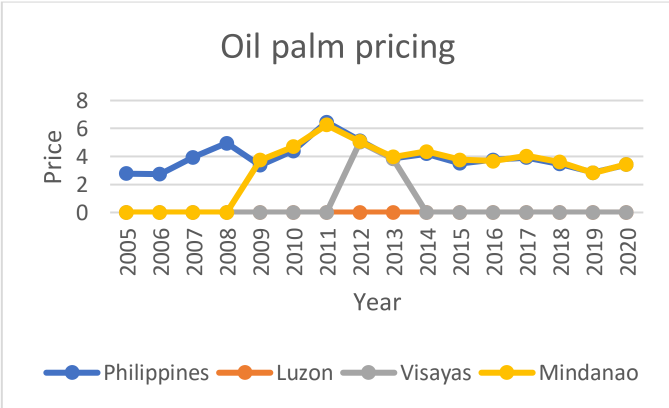

Fig 4. Farmgate Price of oil palm in the Philippines, by island (2005-2020)
Source: Philippine Statistics Authority

B. *Stationary Tests*

The following table presents a concise summary of the unit root test findings for each of the separate series utilized in the estimation. The criteria of identifying if the series are stationary or non-stationary by looking at its critical values. The production of oil palm is stationary at a 1% level because the p-value of 0.0022 is less than 0.01. The farmgate price of oil palm is non-stationary at its level form, and it was subjected to differencing. Because the p-value of 0.0000 is less than 0.01 when using the first difference value, the cost of oil palm was stationary at the 1 percent level.

TABLE 1. Augmented Dickey- Fuller (ADF) Unit Root Test Result

VARIABLES	F-STATISTICS	1% CRITICAL VALUE	5% CRITICAL VALUE	10% CRITICAL VALUE	P-VALUE
PHILIPPINES					
Lprod	-3.878	-3.750	-3.000	-2.630	0.0022
Lprice	-2.959	-3.750	-3.000	-2.630	0.0389

This finding is supported by study undertaken by Waqas.M.(2019), who claims that the Model is based on data stationarity and hence supports the result. The ECM or VECM will be applied further if the data is stationary at level I (0) and the data is stationary at level I (1). If the data is stationary at level I (1), the ECM or VECM will be applied further (1). When some of the data is stationary at a certain level, I (0), and some of the data is stationary at the first difference, I (1), the ARDL method is applied (1).

C. Lag order selection

The results of vector autoregression for the purpose of lag order selection are shown in Table 2. (VAR). The VAR model's four lags were generated using the FPE, AIC, and HQ, together referred to as the "information criterion" for lag selection. Although the LR test results indicated that there was no lag, the Schwarz criteria revealed one. Four delays were used in the model to predict the long- and short-term elasticities. The lags with the largest number of asterisks in relation to the criterion would be the most appropriate lags to utilize for the variable's selection when using the varsoc function.

TABLE 2. Lag order selection

Lag	LL	LR	df	P	FPE	AIC	HQIC
0	15.718				0.0003	-2.286	-2.316
1	21.781	12.127	4	0.016	0.0003	-2.63	-2.72
2	29.543	15.522	4	0.004	0.0001	-3.257	-3.407
3	38.033	16.982*	4	0.002	0.000087*	-4.00555*	-4.21501*
4	40.972	5.8763	4	0.209	0.0002	-3.829	-4.098

D. Cointegration Test

As seen in Table 3, the ARDL bound test resulted in a computed F-statistic of 24.472, suggesting that the test was successful. The conclusion is bigger than both the lower bound I (0) and the upper bound I in this example (1). With this finding, we may infer that the null hypothesis of no cointegration between oil palm production and price has been rejected in the research of oil palm output and price (see Figure 1). The bound test established cointegration and established that the series exhibit a long-run relationship, which was verified by the data. This indicates that the series are related and may be combined linearly. Due to these variables, even if there are short-term shocks that affect the movement of the distinct series, they will eventually converge in the long run. With the use of ARDL and ECM, it is feasible to estimate both short-run and long-run models.

The Bound test was used to assess the long-term relationship between two variables, according to Waqas.M.(2019). Because the estimated F value was more significant than the upper limit value at all levels of significance, the bound test results indicated the presence of a long run relationship between the dependent and explanatory variables. Narayan (2005) also compiles a table of critical values for various regressor counts and the presence or absence of an intercept or trend in the model. According to Banmani-Oskooee and Nasir, this set of "critical values" consists of an upper and lower band that encompasses all potential classifications of the variable as I(1), I(0), or even fractionally integrated (2004). If the estimated F-statistic exceeds the upper bound for a particular significance level, the null hypothesis of no co-integration can be ruled out thus, if the F-statistic is less than the lower bound. As a result, rejecting the null hypothesis, which claims no link, will be challenging.

TABLE 3. ARDL Bound test result (F-statistics)

	F-STATISTICS	10% CRITICAL VALUE		5% CRITICAL VALUE		1% CRITICAL VALUE	
PHILIPPINES		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	24.472	4.04	4.78	4.94	5.73	6.84	7.84

Pesaran/Shin/Smith (2001) ARDL Bounds Test
accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

E. Supply response estimation

The supply response of oil palm was estimated using the Autoregressive Distributed Lag (ARDL) model, which was based on the price behavior of oil palm production and the price of oil palm. Due to the discovery of cointegrating vectors in Table 3, the ARDL model was reparametrized into ECM. The reparametrized solution includes both short-run dynamics (i.e., typical ARDL) and the long-run relationship between the variables.

The supply response and price structure of the oil palm are depicted in Table 4. The obtained R squared value is 0.9605, indicating that the price of oil palm accounts for 96% of the variance in the annual quantity of oil palm produced. The error correction coefficient is -1.03 and statistically significant at the 1% level due to the p-value of 0.010, indicating that the rate of adjustment towards long-run equilibrium is negative, as predicted. As demonstrated by the coefficient, the previous year's deviation from long-run equilibrium is compensated for at a rate of -1.03 percent convergence within the current year.

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TABLE 4. ARDL to Error correction model

VARIABLES	COEFFICIENT	STANDARD ERROR	P-VALUE
Short-run elasticity			
Lprod	-0.0263625^{ns}	0.1773206	0.891
Lprice	0.5652255*	0.0729919	0.004
Long-run elasticity			
lprice	-0.4590519*	0.901793	0.015
Constant	14.11953*	2.368291	0.009
ECt	-1.026362*	0.1773206	0.010
R^2	0.9605		

(*) significant at 1% level
variables in ns are not significant

The variable lprod has a minimal negative effect on production in the short term, with a coefficient of (-0.0264) and a p-value of 0.891, showing that the variable has a negligible negative effect on output. The production lag price is a statistically significant variable that has a considerable impact on production, as indicated by its p-value of less than 0.01. Due to its long-term detrimental effect on display, the variable lprice has a coefficient of (0.4590), a p-value of 0.015, and a coefficient of (0.4590). More precisely, the projected elasticity indicates that for every one percent increase in the price of oil palm, the supply of oil palm decreases by 0.46 percent.

The short-run elasticity of oil palm is inelastic concerning its price. This indicates that the Philippines oil palm farmers do not respond well to the changes of oil palm. This may be affected by uncertain weather conditions, demand and supply, and the price of other substitutes, in the long-run, own-price elasticity -0.46 and significant at 1% level, which is expected when the inputs vary through time. The farmer has a longer time to adjust to oil palm prices. This indicates that long run price policies effectively support oil palm production.

Mesike (2011) conducted a research study that confirms this conclusion, stating that the supply of cocoa is favorably impacted by the producer's price and structural break, respectively. In the short run, increasing the producer price to match international prices increases output, as seen by the positive sign of the producer price in the short run. Additionally, the long-term beneficial effect of export prices demonstrates that as farmers' prices increased on the global market, they were driven to increase their output. As the magnitudes of negative exchange rate coefficients rise, so do the corresponding declines in production. Surprise! A reduction in the exchange rate indicates a strengthening of the naira, which serves as a disincentive to local manufacturing and commerce.

F. Diagnostic Test on the Supply Response Model

Table 5 shows some of the diagnostic tests made after performing ARDL. The computed results for Durbin-Watson statistics for the Philippines show no serial correlation, and Breusch-Godfrey LM test results for autocorrelation support it. The White test result indicates that there is no heteroskedasticity.

TABLE 5. Diagnostic test result

	Dwatson	Bgodfrey	White
Philippines	2.33473	0.0514	0.3575

VI. CONCLUSIONS AND RECOMMENDATIONS

The oil palm production of the Philippines increased its output from 354,811.47 metric tons (MT) in 2005 grew to 493,06.79 MT in 2020. In 2010, it overtook coconut oil as the top-selling oil in most Philippines ' markets because it was used for technical reasons, most of it in the chemistry industry for biofuel generation. It was stable in 2015 and 2016 and then saw a significant fall in 2017 because of its limited palm oil production and the coconut industry's numerous issues, including senile trees, low productivity, followed by a considerable recovery the following year. Although the price of an oil palm does not vary between islands and has stayed unstable over time due to rising demand for oil palm, a 27% increase in price was noted in the second quarter of 2011. The oil price decreased by 25.8 percent in the second quarter of 2019. A variety of factors or environmental issues, such as weather conditions or pests, might be responsible for this situation.

An Autoregression with Distributed Lag approach is used in this study to determine the responsiveness of oil palm supply to price fluctuations in the Philippines. By evaluating the supply response of the oil palm crop in the Philippines, this study assessed the responsiveness of oil palm growers to price fluctuations. The Unit Root test was used because it was necessary to determine the number of unit roots in the series in question. According to the findings, the series comprises several distinct orders. To put it another way, it is a blend of both levels- and first-difference stationary models. To discover the relationship between the two series, it was essential to build a cointegration connection between them after identifying the presence of a unit root. The relationship between oil palm supply and price was explored in both the short-run and the long-run using the ARDL approach to cointegration, with inconsistent findings. When the data is subjected to the ARDL bound test, it is discovered that there is a cointegrating relationship. Therefore, the ARDL model is reparametrized and added to the ECM.

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In contrast to the usual approach, the ARDL estimation of cointegration for the own price of oil palm is inelastic in the near run, whereas the conventional technique is elastic. There is an unbalanced link between the availability of oil palm and the factors that determine its production. Furthermore, the price of oil palm is inelastic in the long term due to its low elasticity of demand. According to the findings of the study, oil palm producers are not responsive to swings in their pricing, both short- and long-term in nature.

Summarizing the findings and recommendations, it is highly recommended that the government devote its resources to issues that lead to long-term instability rather than concerns that have a short-term impact on the economy. On the long term, the government should concentrate its efforts on measures that will ensure that producers receive a profitable price for their products. However, rather of focusing primarily on pricing reforms, the price of a product or service in the market now includes the cost of the environment as well as the advantages connected with it. It is recommended by the research that policies be implemented with a strong commitment to long-term policy packages that incorporate both price and non-price incentives. A policy package of this like would almost certainly play a major role in persuading oil palm producers in the Philippines to respond more positively to the proposed project. The provision of high-quality planting materials, such as seedlings, to increase productivity, the improvement of farmers' access to ready and affordable credit support, the establishment of post-harvest facilities, such as oil palm plantations, to improve the quality of oil palm, are examples of what could be done.

In the oil palm industry, the market has climbed to the top of the hierarchy to become the dominant governing instrument. Farmers, trade agents, and processors are all self-interested stakeholders in a market-based governance system, and the pricing mechanism helps them coordinate their operations in order to maximize profits. Several market factors, including the cost of living, demography, supply and demand dynamics, and mortgage rates, have lately affected the oil palm business in the Philippines. The fluctuating value of commodities has interfered with the proper operation of the market mechanism, resulting in disruptive market behavior such as the harvesting of crops before their harvesting dates and the speculating in commodity prices. Through the consolidation of farmers into farm companies (e.g., plantations or oil palm mills), the promotion of strategic partnerships among them, and the establishment of direct links between farm enterprises and processors, it is advocated that "market governance" be replaced with "relationship governance."

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