Could Palm Oil Plantation Increase Individual Expenditure? 
The Dutch Disease Implication in Indonesia

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Abstract

Indonesia is the largest palm-oil producing country, covering almost 80 percent of global production. With the extensive production capacity, this research seeks to analyze the linkages between palm oil production and its impact on the economy by the individual monthly expenditure. To reveal the connections, this research analyzes the Dutch Disease phenomenon in Indonesia, which explains how the non-tradable sector, palm-oil industry, affects the tradable sector like the manufacturing industry. The panel data variables are selected from 2011 to 2015 within 22 provinces to see the Dutch Disease's implications. As the model is suffered from the endogeneity, the correlation of explanatory variables with the error term, the research uses the Instrumental-Variable Regression method. The analysis indicates that Indonesia was not suffered from Dutch Disease. Therefore, palm oil production could increase individual expenditure. Finally, the extension of palm oil plantations could benefit Indonesia's economy without affecting other sectors.

Keywords:
individual expenditure, manufacture to service ratio, natural-resource abundance, palm oil production, the Dutch disease.

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Introduction

Palm oil plantation is one of the success stories in Indonesia's economic growth. It can increase the farmers' incomes, regional economic development, government revenue and generate foreign exchange, ceteris paribus. Data finds that the $39 billion of GDP benefits are attributable to palm oil exports, representing 2.9 million jobs worldwide (Vivek, 2019). Indonesia's situation is not much different from the world economic situation, which absorbs 8.4 million workers. It has increased four times compared to data in 2000 (PASPI, 2015). In terms of domestic consumption, because most Palm Oil is intended for export, Indonesia can enjoy up to 25 percent every year. As a major oil producer, Indonesia can also enjoy high economic growth and a controlled level of rupiah stability (Aprina, 2014).

Following the positive impact of Palm Oil production, many studies indicate that Indonesia is currently facing the Dutch Disease issue. The disease arises from a resource boom, which increases spending on non-tradable sectors disproportionately. With increased demand and opportunities in these sectors, workers leave tradable sectors like manufacturing. Thus, production in the decline of the tradable sector is not necessarily because they are costly but because they are not a priority in the short run. Consequently, labor that could develop the manufacturing sector is pulled into the service sector, and manufactured goods become more likely to be imported. Moreover, because manufacturing is more prone to learning and production process improvements, the potential gains in productivity accrue to foreign exporters. As a result, once the resource is diminished, there is less income to purchase the services, and, thus, the resource find can generate economic stagnation (Behzadan et al., 2017).

The first seed of palm oil was brought from West Africa by the Dutch colonialization and first planted on Bogor Botanical Garden in 1848. Faced with a steadily increasing population and poverty in Java, specifically, which at that time had the highest population densities in the world), the colonizers started to implement the “Kolonisatie Program” from 1905. Under this program, landless people from the island were forced to move to a less populated area, like Borneo and Sumatera. Besides reducing the population pressure on Java, the program aimed to utilize the labor to develop food-crop production in the designated provinces. The program, called the Dutch Moral Duty, can alleviate poverty in Java and secure rice supply on Java and Sumatera (Baudoin et al., 2017).

Meanwhile, Indonesia experienced a natural business cycle following the current governmental system. Each president had different concerns due to government priorities on various issues, such as what happened after the reform era. There was social unrest caused not only by the crisis but also by older grievances. The government faced a lack of clarity in its new regulation concerning export taxes, sales of new concessions, and business development hampered investment and proved detrimental to the companies. This confusion caused the palm oil industry's performance to start plummeting (Baudoin et al., 2017). The government responded by a drastic change in its industrial strategy, moving from a heavy intervention policy toward more indirect action. This shows the
government’s commitment to move away from controlling the companies, providing them with funds, land grants, and regulating exchange rates focusing instead on a ‘partnership’ approach in which it would “shape outcomes by establishing a regulatory framework and by providing the institutional context” (McCarthy, 2010).

The changing of the governmental system in Indonesia has a significant effect on palm oil production. This has direct implications for the presence of Dutch disease in Indonesia. The disease first occurred in the Netherlands in the 1960s. At the time, the Netherlands had discovered substantial natural gas deposits in the Northern Sea. In 1977, The Economists magazine introduced it as a negative impact on a country’s economy. Because of substantial natural gas deposit discovery, the Netherlands could receive large inflows of foreign income. It seemed to benefit the country’s economy, but it only applied in the short term. When the Netherlands received large inflows of foreign income, accompanying financial risks such as boom-bust cycles for domestic economies and causing currency appreciation deteriorated tradable sectors’ competitiveness. Assuming other variables are fixed, it is directly responsible for the sluggishness of the manufacturing sector. The SalterSwanCordenDornbusch model provided the theoretical framework for describing the Dutch Disease effect of ‘capital inflows’ in small open economies. The model has been applied to examine the economic impacts of foreign aids and emigrant remittances, and natural resource exports since they constitute the significant capital inflow elements (Taguchi & Khinsamone, 2018).

![Figure 1. The Theoretical Framework for Dutch Disease](source: Taguchi & Khinsamone (2018))

From the curve, the horizontal axis exhibits non-tradable while the vertical one shows the tradable allocation. The initial transformation of the non-tradable and tradable curve represents by the P-P curve. A is the initial equilibrium as the relative price of non-tradable and tradable, fixed at that point (Brahmbhatt et al., 2010). It assumes
three sectors: the natural resources sector, the non-resource tradable sector (agriculture and manufacturing), and the non-tradable sector (services and construction). The prices for both the natural resources sector and non-resource tradable sectors are set in the world market, and those in the non-tradable sector are set in the origin economy. Generally, there are two types of effects leading to Dutch Disease. First, the Spending Effect (P-PF) comes with the introduction of substantial natural resources, which will increase the domestic income, which leads to higher aggregate demand and spending by the public and private sector. Increased demand for the non-tradable sector leads to higher prices and output in the non-tradable sector. Therefore, wages in the economy will tend to rise, squeezing profits in the non-resource tradable sector, manufacturing, where prices are fixed at international levels. This effect is referred to as an appreciation of the exchange rate.

Second, the Resource Movement Effect (A' – B) occurs when a boom in the natural resource sector attracts capital and labor from other parts of the economy. It tends to reduce output in the rest of the economy. Reduced output in the non-tradable sector causes the price of non-tradable to rise relative to the price of tradable, which are set by the world market. This effect is less likely in low-income economies, where most inputs used in the natural resource “enclave” are imported from abroad.

The effects result in a fall of the output share of non-resource tradable relatives to the non-tradable. The rising non-tradable prices are relative to the tradable, which initiates the real exchange rate (Taguchi & Khinsamone, 2018). Experience from non-tradable booms worldwide, which supports the claims that in-resource abundant economies. Natural Capital appears to crowd out human capital, thereby slowing down the pace of economic development. There are two parts to support the statement: the income flows lower return to existing human capital, resulting in the absence of countervailing policies and reduces incentives to invest in new human capital. In the longer term, if this change of the human capital demand persists, then individuals currently in the education system will perceive that both the skill premium, the net earnings differential attributable to additional schooling, and the probability of a skilled job have fallen. On average, these will provide incentives to acquire skills through schooling (Coxhead & Shrestha, 2016).

In addition to the disease, figure 1 also describes how to manage the disease by taking a longer-term perspective. It considers the role of capital accumulation, which indicated the shift of the transformation curve further towards P'–P’ when an economy utilized capital inflows for domestic capital accumulation. As a result, the relative price of non-tradable might be expected to fall from point B to point C, thereby facilitating the tradable sector’s recovery. Thus, the capital accumulation effect can mitigate the economic damages caused by the original Dutch Disease effect (Taguchi & Khinsamone, 2018).

Figure 2 suggests that Indonesia is the largest palm oil-producing country in the world. Based on the data, Indonesia can compete with Malaysia in 2008 as the country with the biggest palm oil producer. Both countries controlled almost 86 percent of
world palm oil production in 2013. In the same year, the volume of exports of oil and palm oil derivative products in Indonesia was 20.8 million tons or 48 percent of the palm oil trade International, on the other hand, Malaysia exported 18.2 million tons or 42 percent of international palm oil trade value (Choong & McKay, 2014). Over 90 percent of Indonesia's vegetable oil used for food comes from palm oil, leaving very little to the coconut oil (or other oil) replaced in Indonesian diets. Any increases in palm-oil consumption come from higher overall vegetable-oil consumption rather than substitution. Substitution among vegetable oils accounted for half of Indonesia's growth in palm-oil consumption (Gaskell, 2015). As a superior plantation product, palm oil is experiencing increased production annually. On average, one of the affected industries, the Cooking oil industry, can absorb about 80 percent of the total national Crude Palm Oil (CPO) consumption.

This study is focused on looking for the implication of the Dutch disease in Indonesia. As the theoretical explanation about the disease, usually, natural resources play an essential role. One of them is the Palm Oil sector. Simultaneously, many previous studies analyzed the implication of the Dutch Disease or the palm oil plantation effect, especially on poverty and employment, partially. Therefore, the study aims to find the palm oil plantation effect on individual monthly expenditure as the Dutch disease’s implication. The research focuses on the disease is on the resource movement effect (Edwards, 2015). This research analyses the current situation of palm oil production, which is related to individual expenditure. Many previous studies analyzed the impact of palm oil production on the environment and economy, especially poverty. However, the research hypothesis is that the more palm oil manufactured could increase the level of expenditure. It can be considered in 2 scenarios. First, Indonesia's contribution to the palm oil supply chain increases the palm oil smallholders' income and the government
or cooperation labor expenditure. Second, as palm oil production increases, the higher percentage of domestic consumption on palm oil products.

**Method**

The data is collected from 22 provinces in Indonesia. The remainder 12 provinces are not included since there is no palm oil production data in 11 provinces, while the other 1, North Kalimantan, was a new province of Indonesia in 2012. All variables obtain from 2011 to 2015 because there is a predicament with the Central Bureau of Statistics data of Palm Oil production in 2016. As this study mentions the individual monthly expenditure, the variable represents a household member's social and economic situation. The relative conceptual and measurement advantages of using the variable are relatively more stable over time, as households tend to smooth out their consumption, and so is a better measure of living standards. It is also easier to understand conceptually and less sensitive and probably more accurately measured (Bui et al., 2014).

The source of monthly per-capita expenditure is from the Central Bureau of Statistics of Indonesia (Badan Pusat Statistika) as the series of Average expenditure per capita per month in urban and rural areas by province and group of goods (rupiah), 2011-2018. The source of palm oil production is from Tree Crop Estate Statistics of Indonesia Publication - Ministry of Agriculture as the Palm Oil Statistics series. The Monthly Per Capita Household Education and health expenditure source, primary, junior, senior secondary net enrollment ratio, and employment rate on Agriculture, fishery, and forestry sectors are from the INDDAPA (Indonesia Database for Policy and Economic Research) of World Bank Database. The employment rate in agriculture, fishery, and forestry is derived by dividing the number of people employed in Agriculture, Fishery, and Forestry by the labor force. The last variable is the manufacturing-service ratio. This variable is introduced as a proxy of tradable non-tradable production ratio for identifying the 'resource movement effect' in the Dutch Disease theory. The manufacturing services ratio is derived by dividing ‘manufacturing in the value-added term’ by ‘services in value-added one,’ both retrieved from the INDDAPA (Indonesia Database for Policy and Economic Research) of the World Bank Database.

The employment rate in agriculture, fishery, and forestry is derived by dividing the number of people employed in Agriculture, Fishery, and Forestry by the labor force. The last variable is the manufacturing-service ratio. This variable is introduced as a proxy of tradable non-tradable production ratio for identifying the ‘resource movement effect’ in the Dutch Disease theory. The manufacturing services ratio is derived by dividing ‘manufacturing in the value-added term’ by ‘services in value-added one,’ both retrieved from the INDDAPA (Indonesia Database for Policy and Economic Research) of World Bank Database. Next is to choose a proper data estimation model. First, the research uses the Breusch-Pagan test of Random-effects against Pooled – Ordinary Least Square (PLS). As a result, shows the null hypothesis of pool ability is rejected. This means that there is no within-unit correlation. Hence, the result suggests the use of a Random-effect model.
Table 1. Breusch-Pagan, Chow, and Hausman test

| Period     | Breusch – Pagan Test: $\chi^2$ | Chow test: F | Hausman test: $\chi^2$ |
|------------|---------------------------------|--------------|-------------------------|
| 2011 – 2015| 0.000                           | 0.000        | 0.000                   |

Source: Data processing.

Second, the chow test is run to choose between pooling and fixed-effect models. The result shows that the null hypothesis is rejected, which means that the research uses a fixed-effects model. Since one test suggests using a random-effects model and the other test suggests using the fixed-effects model, the Hausman test is run. The Hausman test is used to determine the use of a fixed-effect or random-effect model. The interpretation of the test is straightforward. Suppose the p-value is less than 0.05, then reject the null hypothesis. In Stata, this means that this study will use the fixed-effect model.

Given the above test result, before running the fixed-effect model, the endogeneity test is used. Endogeneity is a term used to describe the presence of endogenous explanatory variables that are correlated to the error term, either because of an omitted variable, measurement error, or simultaneity. To test the endogeneity, the study uses the regression equation specification error test, the Ramsey Test, which allows if the model suffers from omitted variable bias. The Ramsey Test result as such:

$H_0$: the model has no omitted variables

$F (3, 104) = 8.41$

$Prob > F = 0.0000$

From the result in Table 1, given that $P$-value $< \alpha$, 0.05, the null test is rejected, which said that the model has no omitted variable. Thus, there are possible missing variables, and the model suffers from endogeneity, which causing biased coefficient estimates. Since the model is suffered from endogeneity, the Fixed-effect cannot be used. Thus, the paper uses Instrumental-Variable Regression (IV Estimates) using the two-stage least squares estimator. In this model, four variables, such as the dependent variable, included exogenous variables, including endogenous variables, and instrumental variables. The two-stage least squares (2SLS) estimator itself exploits in the sample the orthogonality conditions from all exogenous regressors and the instruments. When the model has more orthogonality conditions than parameters cannot simultaneously be satisfied in small samples (Cai & Wang, 2014).

$log \, exppercapita_{it}$

$= \beta_0 + \beta_1 \, \log \, palmoil_{wit} + \beta_2 \, mos_{it} + \beta_3 \, \log \, educ_{it}$

$+ \beta_4 \, \log \, health_{it} + \beta_5 \, literate_{it} + \beta_6 \, sener_{it} + \beta_7 \, affer_{it} + \mu_{it}$

Where:

$log \, exppercapita$: Monthly Expenditure Per Capita (Log (exppercapita))

$log \, palmoil_{wit}$: Palm oil Production (Log (palmoil))

$Wit$: Exogenous regressor which is uncorrelated with $\mu_{it}$,

$mos$: Manufacture to Service Ratio
Results and Discussion

Empirical Result

Before estimating the connection between palm oil plantation and individual expenditure, first examine the measure of dispersion and volatility of the eight variables. Table 2 indicates that the average manufacture to service ratio during the sample period was 6.376991 units, with higher variability of up to 7.51364 over the sample period. The variable's high variability compared to the others is mostly due to the difference in these provinces’ manufacturing and service sector output. The same situation happened to the literacy rate (litrate) variable. Three parameters are applied by the Ministry of Education and Culture Indonesia to calculate the index for literacy rate, such as (1) low access to school, (2) low family literacy rate condition, and (3) low reading behavior compared to accessing other media. (Kementerian Pendidikan dan Kebudayaan, 2019).

Table 2. Summary Statistics

| Variable        | Mean    | Std. Deviation | Min    | Max    |
|-----------------|---------|----------------|--------|--------|
| lexppercapita   | 5.857282| 0.1037082      | 5.582  | 6.129  |
| lpalmoil        | 5.621036| 0.7558693      | 4.209  | 6.865  |
| mos             | 6.376991| 7.51364        | 0.468  | 32.218 |
| leduc           | 4.483355| 0.1378366      | 4.205  | 4.859  |
| lhealth         | 4.286291| 0.1510656      | 3.864  | 4.841  |
| litrate         | 94.65021| 6.472106       | 64.08  | 98.88  |
| sener           | 54.21367| 8.519343       | 30.06  | 71.228 |
| affer           | 0.7043273| 0.7623558    | 0.022  | 3.046  |

Source: Data processing

Next is the Net Enrollment Ratio of Senior Secondary (sener). This variable explains the continuing rate or transition after enrolled at the junior secondary level. The previous research indicates that first, household welfare level is a significant determinant of the low enrollment. Second, children in areas with relatively abundant employment opportunities have a higher probability of giving up schooling, and third, girls have a significantly lower chance of continuing (Prasetyia, 2019). Table 2 also suggests that the average palm oil output during the sample period is 417,865.003 (10(5.621036)) ton. The variable is selected from 22 provinces that produce palm oil. If it has compared to other variables,
the palm oil variability is lower. One scenario of the situation is due to the different natural resource conditions.

To analyze the implication of Dutch Disease in Indonesia by merely observing the relationship between palm oil plantation (lpalmoil) and the Monthly expenditure per-capita (lexppercapita). Table 3 shows a significant and positive result of the main predictor, which is palm oil production. Palm oil was by far the fastest-growing export during the boom years, and rapid expansion of the palm oil industry had the most considerable labor market impacts among other resource sectors. The implication of the employment sector, in turn, is a robust predictor of lower earnings for wage earners. Finally, with relatively fewer formal sector jobs being created, incentives for schooling are also diminished. These results tie the resource boom directly to individual earnings and human capital outcomes. They provide microeconomic evidence for Dutch Disease, a phenomenon usually modeled only at a much higher level of generality and seldom subjected to empirical verification in the household or individual data.

This is in line with one of the effects of the Dutch Disease, the Resource Movement Effect. From 2010 to 2015, it is not the resource boom period or theoretically explained by natural resources discovery. Nevertheless, by the range of time, the increasing production shows how expansive the sector is. The resource movement tends to reduce output in the rest of the economy, attracting capital and employment.

Table 3. The Variable Regression Result

| Variables | 2sls leppercapita |
|-----------|-------------------|
| lpalmoil  | 0.0642***         |
|           | (0.0260)          |
| mos       | 0.00278***        |
|           | (0.00106)         |
| leduc     | 0.258**           |
|           | (0.114)           |
| lhealth   | 0.276***          |
|           | (0.0807)          |
| litrate   | -0.00575***       |
|           | (0.00164)         |
| sener     | 0.00393***        |
|           | (0.00101)         |
| affer     | -0.0515***        |
|           | (0.0114)          |
| Constant  | 3.505***          |
|           | (0.363)           |
| Observations | 110               |
| R-squared | 0.617             |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Source: Processed on STATA 14
A 1 percent increase in palm oil production will increase monthly per-capita expenditure by 1.00027 percent. There are also positive and significant correlations between the Manufacture to Service Ratio and Monthly expenditure per-capita. A 1-point increase of manufacture to service ratio will increase monthly per-capita expenditure by 0.278 percent. Palm oil production is significant at a 5 percent significance level. The manufacture to services ratio is significant at a 1 percent significance level. If there is no change in the predictors, ceteris paribus, individual monthly expenditure will increase by 3.505 percent. The R squared of 0.617 means that the model can be explained by 61.70 percent of the model's variables, and the rest, 38.30 percent of the models, is explained by the variables outside the model. A previous study mentioned that more than 18 percent of the household had increased their real income 2 to 3 times after five years of engagement in palm oil cultivation (Budidarsono et al., 2012). The manufacturing industries can create employment, which helps boost agriculture and diversify the economy to increase its foreign exchange earnings (Ehinomen, 2012).

Palm Oil Plantation in Indonesia

Figure 3 shows the location of palm oil plantations per province in Indonesia. Both Sumatera and Kalimantan island represented approximately 96.67 percent of Indonesia’s Palm Oil output in 2015. Concerning the hypothesis before, the large number of productions can initiate higher employment in the concerned province. The total area of oil palm plantations in Indonesia before 2016 over the past five years has tended to show an increase, rising around 5.38 to 10.96 percent per year. In 2011, Indonesian oil palm plantations’ land was recorded at 9.13 million hectares, increasing to 10.75 million hectares in 2015 or 25.80 percent. In 2016 it was estimated that the area of oil palm plantations would decrease by 0.15 percent from 2015 to 11.12 million hectares.

Figure 3. Palm Oil Production per Province in 2015

For example, Riau, the highest palm-oil producing province, is blessed with a wide variety of abundant natural resources. The main one is palm oil (Susanti & Burgers,
The province has the largest area of oil palm plantations in Indonesia, which is 2.29 million hectares in 2014, or 21.30 percent of Indonesia’s total area of palm-oil plantations. According to the status of the concession, most oil palm plantations in 2015 were managed by large private plantations, amounting to 5.98 million hectares (53.79%), while community plantations managed 4.65 million hectares (41.88%) and large state plantations only 0.73 million hectares (6.78%) (Directorate General of Plantation, 2015).

A previous study reveals that forest-related labor (logging, non-timber forest product collection) can support up to five people per km², while a small-scale palm oil plantation can absorb 40 – 60 people per km² (Susanti & Burgers, 2011). It means increasing employment opportunities, especially when the population increases. The combination of high earning potential, supportive road infrastructure and the ideal market leads to an influx of ever-increasing employment numbers. Besides, the palm oil plantation contributes substantially to regional incomes, mostly for rural dwellers. Moreover, the high income obtainable from palm-oil plantation means it is easier to buy food than cultivate it. So, it will increase the level of individual expenditure, regardless of the producing provinces or not. The statement is supported by the individual expenditure (lexppercapita) in Table 2, indicating lower variability over the sample period.

The Implication of Dutch Disease in Indonesia

Table 3 introduced the Monthly Per Capita Household Education Expenditure variable to know Dutch Disease’s implication in Indonesia. The variable is expected to have a positive correlation with the individual monthly expenditure. Education is a significant factor contributing to economically sustainable development, owing to its potential for improving cognition and skill levels, enhancing labor productivity. A previous study indicated that natural resource dependence’s crowding-out effect only affects public education in some regions due to different regional development (Sun et al., 2019). The study also suggested that the government promote transfer payment among regions through economic and social policies.

The situation is in line with the Monthly Per Capita Household Health Expenditure, which positively correlates with the regression results. Theoretically, the abundance of natural resources can boost economic growth because resource abundance can help the economy by investing more in the public sector like health care. However, the previous study mentioned that the dependence on natural resources or the abundance of resources that affect health indicators lies in its mandate. They can increase financial independence by exploiting natural resources. As a result, it can reduce the public sector’s reliance on taxes and discourages efficient healthcare provision (Nikzadian et al., 2019). To support this statement, the healthcare sector’s provision affects the total household expenditure that simultaneously affects the healthcare sector’s household expenditure. It is supported by the previous study from Molla et al. (2017), which presented a high level of health expenditure effect to the total household expenditure.
The next variable is the literacy rate. The literacy rate is defined as identifying, understanding, interpreting, creating, communicating, and computing, using printed and written materials associated with varying contexts. This variable is introduced as a continuum of learning in enabling individuals to achieve their goals, develop their knowledge and potential, and participate in their community and broader society. The research is trying to examine how the impact of literacy rate on monthly household individual expenditure. The literacy rate itself is a comprehensive concept that most previous research correlated the variable to the educational attainment from a formal institution. One of the types of literacy rate is financial literacy. A previous study examined the relationship between household consumption and financial literacy for Dutch households. The paper provided evidence for a strong positive association between couples' non-durable consumption and the male partner's financial literacy level. However, the research did not find evidence for an association between consumption growth and financial literacy (Navickas et al., 2014). As the regression result in table 3 introduced its negative correlation to monthly expenditure per-capita.

The next variable is the net enrollment ratio of senior secondary, which is introduced as the ratio of children of official school age based on the International Standard Classification of Education 1997 who are enrolled at the senior secondary level (Bietenbeck et al., 2019). This variable expectedly has a significant effect on the individual monthly expenditure. It has indirectly linked to the impact of formality earnings, which is the main predictor of the employment type. Formality is associated not only with significantly higher earnings but also with greater security and benefits. A previous study found that the formal employment premium in earnings is about 40 percent once other variation sources have been controlled, so a lower probability of formal sector employment is associated with lower expected income. Lower formality, in turn, is a predictor of lower earnings for labor. As a result, with relatively fewer formal sector jobs being created, schooling incentives are also diminished. It ties the resource boom directly to individual expenditure and human capital outcomes (Coxhead & Shrestha, 2016).

The last variable, Agriculture, Fishery, and Forestry Employment Rate, has a significant effect on individual monthly expenditure. The variable represents the palm oil sector's total employment rate, one of the agriculture sectors. The agriculture sector is diverse and remains central to the lives of many people. As a previous study suggested, the significant role of agriculture in a regional economy involves the outputs and is linked to other antecedents like those of production and labor required by other sectors (Loizou et al., 2019). Although it seems clear that economic growth entails a reduction in the relative importance of agriculture in an economy, the causal mechanism in the process by which this transformation takes place is not fully clear. There has been written about the role of innovation and economic growth in agriculture as a means of priming the pump for broader economic growth by generating an economic surplus, releasing resources to and demanding inputs from the rest of economic surplus, releasing resources to and demanding inputs from the rest of the economy (Alston & Pardey, 2014).
As previously mentioned, Dutch disease implication by palm oil production correlation to monthly expenditure per-capita is not enough to explain the disease itself. Based on the regression result, the manufacture of service ration positively and significantly affects individual monthly expenditure. This variable is introduced to show the resource movement effect. A previous study mentioned that the increase of non-tradable resources tends to make manufacture uncompetitive (Boyce & Herbert Emery, 2011). This sector is a constant-returns-to-scale industry, with output depending upon the amount of labor used. Every natural resource-abundant economy is on its way to becoming a resource-poor manufacturing economy. The same effect is looked at in the service sector. In Indonesia, this sector has emerged as a new source of growth. This sector alone contributes to Indonesia’s GDP by 51 percent in 2014. The service sector also has become the most significant source of job creation, constituting 43 percent of the total employment in the same year (Damuri, 2016).

From the perspective of the manufacture to service ratio, the study can argue that Indonesia economies in 2011 – 2015 were not suffered from the disease in which palm oil production did not cause the resource movement effect from the tradable sector to the non-tradable sector, which is manufacturing and services sector. It is supported by the previous study, which discussed the Dutch disease implication on Asia countries from 1980 – 2014 (Taguchi & Khinsamone, 2018). Finally, it can answer this research’s primary purpose based on the previous section’s two scenarios. First, Indonesia’s contribution to palm oil production increases the palm oil smallholders’ income and the government or cooperation labor expenditure. It is in line with the resource movement effect as the explanation before. Second, as palm oil production increases, the higher percentage of domestic consumption on palm oil products. Both scenarios support the increasing palm oil plantation that could increase Indonesia’s monthly expenditure during the sample years.

Conclusion

The Indonesian economy grew steadily with the expansion of palm oil production. The main findings are as follows, firstly, the Dutch disease was not identified from 2011 – 2015, from natural-resource abundance in Indonesia. Secondly, as the palm oil plantation was expanded, they are empowered more employment into the sector. It supports the first point where employment in the palm oil sector not negatively affects the tradable sector, which is represented by the manufacture to services ratio. The analysis indicates that Indonesia was not suffered from Dutch Disease. Therefore, palm oil production could increase individual expenditure. The extension of palm oil plantations could benefit Indonesia’s economy without affecting other sectors.

However, the research should take into account some of the limitations that arise. First, the 22 provinces are selected because of the applicable data from the Central Bureau of Statistics as the research examines the level of expenditure for Indonesia as a whole. Second, the data are selected from 2011 to 2015, when two different presidents
had a different palm oil production policy. It is essential to take institutional change as a result of different palm oil production capacity.

Many previous studies indicated that Indonesia was facing Dutch disease concerning natural resource abundance. Nevertheless, based on this research was not, probably because of the institutional improvements. The capital accumulation effect has initiated it in institutional quality and its reformation. As long as Indonesia had accepted capital inflows in any form, the economy had been accompanied by the Dutch Disease risk.

To avoid the disease, the Indonesian government should prioritize infrastructure development, human resource development, and industrial policies to facilitate manufacturing production. First, the action policy must specify how the local production fulfills the household needs to increase household expenditure. Second, the government should focus on how to increase labor productivity through educational attainment projected by the enrollment ratio. These policy initiatives can be possibly realized under qualified institutions with good governance regarding government effectiveness, regulatory quality, and law rule.

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