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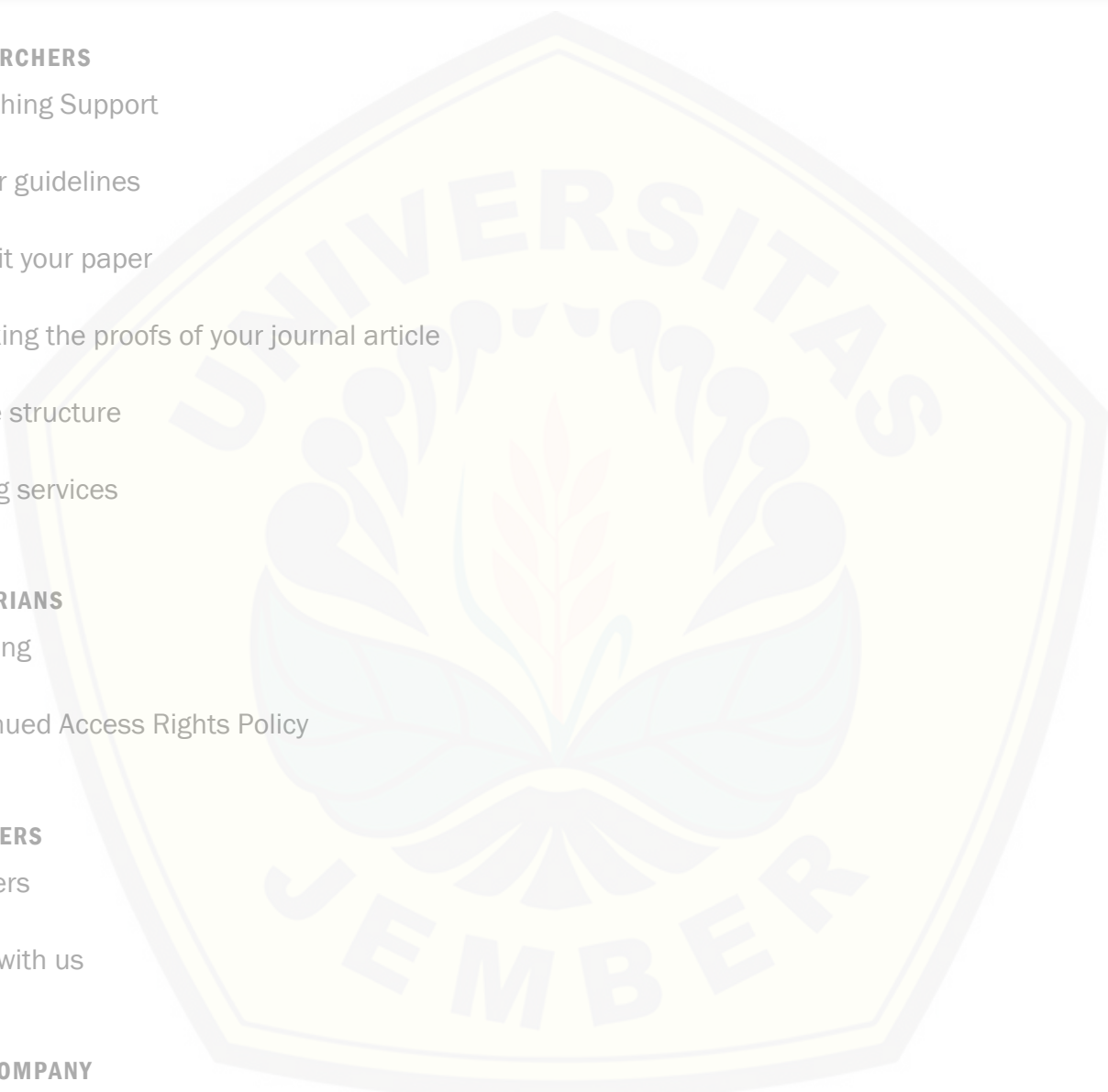
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Capability of coffee commodities through impact of multiplier and related sectors to the East Java Province economy

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Capability of coffee commodities through impact of multiplier and related sectors to the East Java Province economy

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Abstract. The roles of coffee commodities for the Indonesia economy are quite important. They are as a source of income for coffee farmers, foreign exchange sources, industrial raw materials producers, as well as employment providers through processing, and also marketing and trade (export and import). This research was conducted with the aims: (1) To know the impact of multiplier caused by coffee commodities to economy of East Java province.; (2) To know the value of coffee commodities sector relation to other sectors that support the economy in East Java province. The results showed: (1) Coffee commodities have an impact of multiplier on East Java province's economy of 1.115. It means that if there is a change in demand in coffee sector of one million rupiah while final demand in other sectors does not change; it will increase the use of output of other sectors either directly or indirectly Rp. 1.115.000,-. (2) Coffee commodities have direct and indirect inter-sectoral values of 1,854. It means that if there is an increase in demand for coffee commodities sector of one million rupiah. It will increase the supply of inputs among the whole in the economy of East Java province of 1.854 million rupiah or Rp. 1.854.000,-.

1. Introduction

The plantations in East Java Province continue to grow from year to year thereafter in terms of the formation of gross regional domestic product (GRDP). During the last five years, through the gross regional domestic product (GRDP) of the plantation sector value, it has contributed 2.10% of the total value of GRDP in East Java Province with an average gross regional domestic product (GRDP) value of Rp. 24.6 trillion. This is elucidated in Table 1. Coffee as one of the mainstay crops of plantation commodities plays a crucial role in the national economy, particularly as a source of income for coffee farmers, a source of foreign exchange, a producer of raw material industry, and a work placement provider through processing, marketing and trading activities (export and import). Coffee is a plantation product that has market opportunities, both domestically and abroad. The potential and role of coffee commodities are very influential in the region of East Java Province.

In the province of East Java, coffee as one of the plantation crop commodities has a very large production value. Based on the average value of plantation crop production, it can be seen that the coffee commodities ranks fourth as the commodity with the largest production value in East Java Province [1]. This is illustrated in Figure 1.



Table 1. Development of GRDP in Plantation Sector, East Java Province *

Tahun	GRDP of East Java (Million Rp)	PDRB of Plantation Sector in East Java (Million Rp)	Contribution of Plantation Sector (%)
2009	686.847.557,72	14.998.327,24	2,18
2010	990.648.840,00	20.785.150,00	2,10
2011	1.220.577.000,00	23.652.410,00	1,94
2012	1.248.767.290,00	26.836.260,00	2,14
2013	1.382.434.850,00	28.775.030,00	2,08
2014	1.540.696.530,00	32.961.920,00	2,14
Average	1.178.328.678,00	24.668.182,87	2,10

*Source: Statistic Indonesia of East Java, 2015

The value of coffee commodities production will affect the formation of Gross Regional Domestic Product (GRDP) or more precisely it will form the GRDP of the coffee sector in the East Java Province Input-Output Table [2]. Consequently, the value will also affect the GRDP of the plantation sector in particular and will have an impact on the GRDP of East Java province in general, which is a picture of the economic condition of the province of East Java.

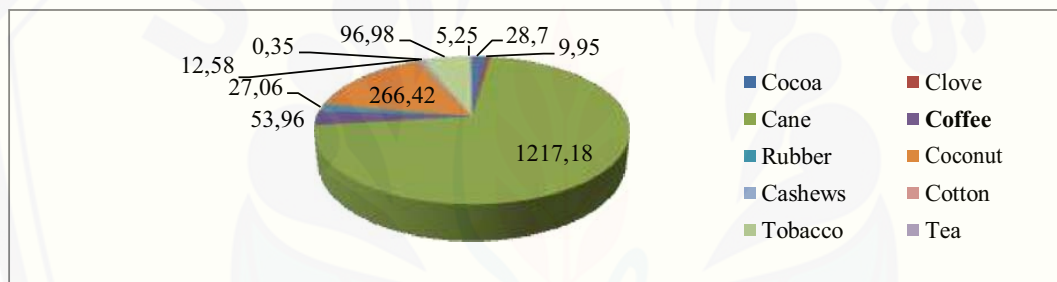


Figure 1. Production of Plantation Plants in East Java Province 2011-2015



Figure 2. Production of Coffee Commodities in East Java Province (Ton)

To make scientific, rational, practical analysis and guide on the whole economic process of agricultural production through information is useful for the development of strong agriculture and related industries [3]. Based on these facts, the researcher believes that the main four commodities above have the potential to support the economy of East Java in the future. The object of the research chosen by the researchers was coffee which ranks fourth as the largest plantation crop production in

East Java Province. Furthermore, in conducting this research, the main indicator used as the basis for describing the above phenomenon is through the input-output table for the province of East Java.

Regional equity is expounded by encouraging expansion in developing regions and maintaining development in developed regions. Given the multi-sector interdependence and spatial heterogeneity of several regions, sectors and key areas for industrial restructuring were identified [4]. Tables I - O, expands the economic table of monetary flows between industries by adding exchange vectors (e.g. water withdrawal or greenhouse gas emissions) between multiple industries and the environment. Meanwhile the bottom-up method allows for a much finer resolution of impacts down to a specific product level (problem for the I-O method, because it assumes only one highly aggregated product per industry), it loses a comprehensive range of processes in the economy (called the cutting problem, in LCA and can underestimate the impact (as much as 50%, depending on the product and impact) compared with the I - O method [5]. The I - O model provides a detailed treatment of the production and flow of real goods and services through the economy, and is generally applied to analyzing interactions and feedback effects between industrial sectors that are interdependent on one another. This aspect of I - O approach, which provides a detailed picture of the complex multisectoral economy, can be used to import more refined real economic analysis into the SFC framework. The IO approach can be traced back to classic authors [6].

The results of the Input-Output Table analysis can be decided which sectors are used as the leading sector or the leading sector in economic development. In other words, the analysis used to determine the output of each sector that makes up the economy of a region in terms of its contribution to supporting the economic growth of a region which based on the input-output table, both openly and privately. This analysis consists of the contribution of the coffee commodities and also an analysis of the impact of multipliers and inter-sectoral linkages [7].

This study aims to determine the value of the multiplier impact output and input as well as the linkage values of the coffee commodities sub-sector and other sectors. Other sub-sectors in the East Java province's input-output table in 2015 compared to the coffee commodities sub-sector in this study consisted of the food crops and horticulture sub-sector group, other plantation crops sub-sector group, livestock sub-sector group, forestry and fishery sub-sector groups, the mining sub-sector group, and the processing industry sub-sector group.

2. Method

The research was conducted in East Java Province. One of the considerations was that the potential for coffee commodities production in this province is quite large. As well as the province of East Java is one of the areas that has consistent GRDP growth. The research methods used were descriptive and analytical methods. The data research method used secondary data obtained from the central statistical agency. The data analysis method applied was the Analysis Input-Output Models. I-O table provides a static snapshot view of the economy, assuming constant returns to scale. I-O table is shown in matrix notation ('Leontief matrix'), where each column represents the input to a specific sector, while each row shows the output from a specific sector to the entire economy.

For an economy with n sectors, an $n \times n$ matrix is used, where $a_{ij} \geq 0$ is the input flow produced by the sector to sector j to produce one unit of output j . To produce the gross output of various sectors represented as elements of the vector x , it is necessary to have different vector axes as intermediate inputs. Therefore, in each time period, gross output and final demand d (also known as net output or gross domestic product (GDP)) are added by:

$$x = ax + d, \quad (1)$$

$$x = (I - a)^{-1}d. \quad (2)$$

To obtain a unique and positive solution, (1-a) must be reversed and the primary must be positive, which is known as the Hawkins-Simon condition, to ensure that each subsystem is 'productive' and thus requires less input than it is produced in output [8]. The stages of implementing data were analyzed using the input-output analysis model. This study applied the analysis procedure as follows:

2.1. Income Multiplier

The income multiplier consists of 2 important concepts, namely the direct and indirect effect income multipliers. The income multiplier is the sum of the direct and indirect effects divided by the direct effects which are formulated as follows:

$$MI = \frac{Direct\ Effect + Indirect\ Effect}{Direct\ Effect} \tag{3}$$

In simple terms, it can be formulated as follows:

$$MI_j = \frac{\sum_{i=1}^n a_{n+1, i} C_{ij}}{a_{n+1, j}} \tag{4}$$

Notes :

MI_j = Coffee commodities Income Multiplier

C_{ij} = Element of open Leontief inverse matrix = (I-A)⁻¹

a_{n+1} = coefficient of salary / wage input for coffee commodities sector household

2.2. Output Multiplier

The output multiplier formula is:

$$MXS_j = \sum_{j=1}^n C_{ij} \tag{5}$$

Notes :

MXS_j = Simplified Output Multiplier for the coffee commodities sector

C_{ij} = Element of open Leontief inverse matrix

The total output multiplier formulation can be formulated as follows:

$$MXS_j = \sum_{j=1}^n D_{ij} \tag{6}$$

Notes :

MXS_j = Simplified Output Multiplier for the coffee commodities sector

D_{ij} = Element of closed Leontief inverse matrix

After obtaining the value for each output and input multiplier impacts, then comparing these values based on the composition of coffee commodities sector value with sectors including to food crops and horticulture, other plantations, livestock, forestry and fisheries, mining and processing industry.

The direct and indirect inter-sectoral linkage values then are compared with these values based on the composition of the value of the coffee commodities sector with sectors belonging to food crops and horticulture, other plantations, livestock, forestry and fisheries, mining and processing industries.

2.3. Forward Linkages

Forward linkages consist of direct forward linkage and indirect forward linkages. The forward linkage formula is:

$$F_i = \frac{\sum_{j=1}^n X_{ij}}{X_i} = \sum_{j=1}^n a_{ij} \tag{7}$$

Notes :

F_i = Direct forward linkage

X_{ij} = The number of coffee commodities sectors used by other sectors

X_i = Total output of the coffee commodities sector

a_{ij} = Technical coefficient matrix element

The formulas for the direct and indirect forward linkages are as follows:

$$FLTL_i = \sum_{j=1}^n C_{ij} \tag{8}$$

Notes :

$FLTL_i$ = Direct and indirect linkages to the forward of coffee commodities

C_{ij} = Element of open Leontief inverse matrix

2.4. Backward Linkages

Backward linkages consist of direct and indirect backward linkages. The formulation of direct backward linkage is:

$$B_j = \frac{\sum_{i=1}^n X_{ij}}{X_j} = \sum_{i=1}^n a_{ij} \tag{9}$$

Notes :

B_j = Direct backward linkage

X_{ij} = The number of other sectors used by the coffee commodities sector

X_j = Total output of other setors

a_{ij} = Tehnical coefficient matrix element

The formulas for direct and indirect backward linkages are as follows:[9]

$$BLTL_i = \sum_{i=1}^n C_{ij} \tag{10}$$

Notes :

$BLTL_i$ = Direct and indirect backward linkages to the coffee commodities

C_{ij} = Element of open Leontief inverse matrix

2.5. The linkage value of the coffee commodities sector has a low value:

The linkage value of the coffee commodities sector is less or equal to (\leq) the value of the linkage of other sector groups (food crops and horticulture, other plantations, livestock, forestry and fisheries, mining and processing industries).

2.6. The linkage value of the coffee commodities sector has a high value:

The linkage value of the coffee commodities sector is greater than or equal to (\geq) the value of the linkage of other sector groups (food crops and horticulture, other plantations, livestock, forestry and fisheries, mining and processing industries).

3. Result and Discussion

3.1. The Output and Income Multipliers Impact as well as the Linkage Value of the Coffee Commodities Sector to the Food Crops and Horticulture Sector

In more detail, the value of the output and income multiplier impacts of the food crop and horticultural commodity sector and the coffee commodities sector were described in Table 2.

Table 2. Composition of the Linkage Value of the Coffee commodities Sector to the Food Crops and Horticulture Sector in East Java Province

Rank	Sector	Sector Name	NDP	Sector Code	NDP
			Output		Income
1	3	Soybean	1,373	2	0,416
2	2	Corn	1,352	3	0,373
3	1	Rice	1,351	1	0,363
4	4	Other Food Crops	1,287	9	0,358
5	5	Seasonal Horticulture Plants	1,117	4	0,353
6	12	Coffee	1,115	12	0,285
7	9	Annual Horticulture Plants	1,058	10	0,258
8	10	Other Horticulture Plants	1,053	5	0,234

Source: Input Output Table of East Java Province, 2015 (processed)

Table 2 reveals that three main sectors had high output multiplier impact values. The soybean commodity sector had the highest output multiplier impact with the value of 1.373. The second was the corn commodity sector which had an output multiplier impact value of 1.352. The third was the rice commodity sector which had an output multiplier impact value of 1.351. Compared to the value, the multiplier impact of the coffee commodities sector output was still greater than the three main commodity sectors above. Moreover, when compared as a whole, it can be seen that the value of the output multiplier impact of the coffee commodities sector was still greater than other sectors. The sectors were classified as food crops and horticulture plants consisting of the annual and other horticultural crop commodity sectors. The annual horticultural crop commodity sector had an output multiplier impact value of 1.058, while the other horticultural crop commodity sector only had an output multiplier impact value of 1.053.

Besides, Table 2 indicates that three main commodity sectors had high income multiplier impact values. The corn commodity sector had the highest income multiplier impact with the value of 0.416. The second was the soybean commodity sector which had the income multiplier impact value of 0.373. Then the rice commodity sector had the third higher income multiplier impact value of 0.363. Compared with these three main commodity sectors, the coffee commodities sector still had the greatest income multiplier impact value. Further, as a whole compared, it can be seen that the value of the income multiplier impact of the coffee commodities sector was still greater than other sectors. The sectors were classified as food crops and horticulture consisting of the seasonal and other horticultural crop commodity sectors. Other horticultural crop commodity sectors had an output multiplier impact value of 0.258. Then the horticultural crop commodity sector for other seasons only had an output multiplier impact value of 0.234. The multiplier impact on food crops above is supported by the previous research which illustrates that when world food prices are at the middle level, the government does not provide incentives in the form of the use of active trade policies, and the multiplier effect is inactive. Conversely, when the world price hike decreases, the government increases protection of consumers and producers (for example in protected areas), then the multiplier effect will characterize trade policy [10].

In more detail, the inter-sectoral linkage values of the food crop, the horticulture, and the coffee commodities sectors were described in Table 3.

Table 3. Composition of Inter-Sectoral Linkage Values of Coffee, Food Crops, and Horticulture Sectors in East Java Province

Rank	Sector Code	Sector Name	Forward Linkage (Total)	Sector Code	Backward Linkage (Total)
1	1	Rice	2,684	3	1,373
2	10	Other Horticulture Plants	2,166	2	1,352
3	4	Other food crops	1,886	1	1,351
4	12	Coffee	1,854	4	1,287
5	9	Annual Horticulture Plants	1,668	5	1,117
6	2	Corn	1,615	12	1,115
7	5	Seasonal Horticulture Plants	1,531	9	1,058
8	3	Soybean	1,123	10	1,053

Source: Input Output Table of East Java Province, 2015 (processed)

Table 3 shows that three main sectors had inter-sectoral forward linkages. The rice commodity sector had the highest inter-sectoral forward linkage with the value of 2.684. Next was the other horticultural crop commodity sector which had a forward linkage value of 2.166. Then the other food crops commodity sector which had a forward linkage value of 1.886. Compared with the three main commodity sectors above, the inter-sectoral forward linkage of the coffee commodities sector still had greater inter-sectoral forward linkage. Besides, when compared as a whole, the inter-sectoral forward linkage value of coffee commodities sector was still greater than other sectors. The sectors were classified as food crops and horticulture consisting of the annual horticultural crops, the corn, the seasonal horticultural crops, and the soybean commodity sectors. The annual horticultural crop commodity sector had an inter-sectoral linkage value of 1.668. Furthermore, the corn commodity sector only had an inter-sectoral linkage value of 1.615. Then the seasonal horticultural crop commodity sector had an inter-sectoral linkage value of 1.531 as well as the soybean commodity sector which only had an inter-sectoral linkage value of 1,123.

Also, three main commodities had backward linkage values; the soybean commodity sector, the corn commodity sector, and the rice commodity sector. The soybean commodity sector had a value of 1.373, the corn commodity sector had a value of 1.352, and the rice commodity sector had 1.351. These three commodities had greater value of the backward sector linkage than coffee commodities did. However, when compared as a whole, the value of the backward sector linkage of the coffee commodities has a greater value than the sector of annual horticultural crops and other horticultural crops.

3.2. The Impact of Output and Income Multipliers and the Linkage Value of the Coffee commodities Sector to Other Plantation Sectors

Table 4 yields that three main sectors had high output multiplier impact values. The tobacco commodity sector has the highest output multiplier impact with the value of 1,417. The second was the sugarcane commodity sector which had an output multiplier impact value of 1.366. The third was the seasonal plantation commodity sector which had an output multiplier impact value of 1.295. The output multiplier impact of the coffee commodities sector was still greater compared to the three main sectors. Moreover, when compared as a whole, the output multiplier impact value of the coffee commodities sector was still greater than other sectors. Sectors were classified under other plantation crops consisting of the cocoa commodity sector, the other annual plantation commodity sector, and the coconut commodity sector. The cocoa commodity sector had an output multiplier impact value of 1.109. Furthermore, the other plantation crop commodity sector only had an output multiplier impact value of 1.108. Then the coconut commodity sector had an output multiplier impact value of 1.105.

Besides, three main commodity sectors had high income multiplier impact values. The tea commodity sector had the highest income multiplier impact with the value of 0.464. Next was the rubber commodity sector which had an income multiplier impact value of 0.419. Then the third was the tobacco commodity sector which had a multiplier impact value of 0.346. The income multiplier impact value of the coffee commodities sector was still greater than the three main commodity sectors. Besides, when compared as a whole, the value of the income multiplier impact of the coffee commodities sector was still greater than the other sectors. The sectors were classified into other plantation crops consisting of the other annual plantation commodity sector, the cocoa commodity sector, the other seasonal plantation crop commodity sector, and the sugarcane commodity sector. The

other plantation crop commodity sector had an output multiplier impact value of 0.250. Furthermore, the cocoa commodity sector only had an output multiplier impact value of 0.234.

Then the other seasonal plantation crop commodity sector only had an output multiplier impact value of 0.149. As well as the sugarcane commodity sector only had an output multiplier impact value of 0.113. Then, compared to the production data of plantation crops in East Java province, it was noted that the highest production amount does not necessarily indicate the ability of a sub-sector to have a multiplier impact on the economy of East Java province. Especially for the coffee commodities sub-sector which has a greater output multiplier impact value than the coconut commodity sub-sector. Viewed from the production capacity, the coffee sub-sector was still lower than the coconut sub-sector. However, seen from the value of the output multiplier impact, the coffee commodities sub-sector value was greater than the coconut sub-sector. This was because the ability of the coffee sub-sector to contribute through the output multiplier impact was greater than the coconut commodity sub-sector, in other words, the absorption capacity of the coffee sub-sector increased in demand for coffee sub-sector production compared to the same increase in coconut production, the coffee sub-sector provided a greater value in the absorption or usage of output from other sub-sectors in carrying out production activities compared to the coconut sub-sector.

Then the interesting thing was also found when comparing the data on plantation production with the value of the income multiplier impact of plantation crops in East Java. Particularly, for the coffee commodities sub-sector which has a higher income multiplier impact value than the sugarcane sub-sector. Seen from the production capacity, the coffee sub-sector was still lower than the sugar cane sub-sector, but if seen from the value of the income multiplier impact, the coffee commodities sub-sector was greater than the sugar cane sub-sector. It was due to the ability of the coffee sub-sector to contribute through the income multiplier impact was greater than the sugarcane commodity sub-sector, it means that if the coffee sub-sector production increased in demand comparing to the same increase in sugarcane production, hence the coffee sub-sector provided a greater value than the sugarcane sub-sector in terms of increasing the impact of producer's income.

In more detail, the value of the output and income multiplier impact values of sectors which classified into the other plantation commodity sector and the coffee commodities sector were described in Table 4.

Table 4. Composition of the Multiplier Impact of Output and Income in the Coffee and Other Plantation Sector in the province of East Java

Rank	Sector	Sector Name	NDP	Sector Code	NDP
			Output		Income
1	7	Tobacco	1,417	13	0,464
2	6	Sugarcane	1,366	15	0,419
3	8	Other Seasonal Plantations	1,295	7	0,346
4	13	Tea	1,163	11	0,310
5	15	Rubber	1,123	12	0,285
6	12	Coffee	1,115	16	0,250
7	14	Cocoa	1,109	14	0,227
8	16	Other Annual Plantations	1,108	8	0,149
9	11	Coconut	1,105	6	0,113

Source: Input Output Table of East Java Province, 2015 (processed)

The coffee commodities sector had a greater forward linkage value than the tobacco commodity sub-sector. Viewed from the production capacity, the coffee sub-sector was still lower than the tobacco sub-sector. However, if seen from the linkage value of the coffee commodities sub-sector, it was greater than the tobacco sub-sector. It was due to the ability of the coffee sub-sector to contribute through the value of the forward linkage of the sector was greater than that of the tobacco commodity sub-sector. In other words, the ability of the coffee sub-sector if the coffee sub-sector production increased in demand comparing the same increase in tobacco production, the coffee sub-sector provided a greater supply of inputs to other sub-sectors in carrying out the production activities than the tobacco sub-sector. Then it can also be seen that this can happen in East Java Province due to the limited ability of the forward linkage value of the tobacco sub-sector which can only supply input to the cigarette industry.

The interesting thing was when comparing the data on plantation production with the linkage value among the plantation sectors in East Java. Particularly, the coffee commodities sub-sector had a greater backward linkage value than the coconut commodity sub-sector. Viewed from the production

capacity, the coffee sub-sector was still lower than the coconut sub-sector. However, if seen from the value of the linkage of the coffee commodities sub-sector, it was greater than the coconut sub-sector. It was due to the ability of the coffee sub-sector in contributing to the economy of East Java Province through the value of backward sector linkages which was greater than the coconut commodity sub-sector. It means that if the coffee sub-sector production increased in demand at the same increase of coconut production, the coffee sub-sector provided a greater value than the coconut sub-sector regarding the impact on the increase of output formation by other sectors. So that indirectly, the coffee sub-sector had a greater influence on improving the economy of East Java province than the coconut sub-sector. Based on the territory, Indonesia is one of the countries that has succeeded in developing backward linkages and forward linkages in the plantation commodity sector. This is from the collaboration of the abundant natural resources, policies, social, economic and political characteristics of the country [11].

In more detail, the inter-sectoral linkage values of other plantation crops and the coffee commodities sector were described in Table 5.

Table 5. Composition of Inter-Sectoral Linkage Values of Coffee and Other Plantation Sectors in East Java Province

Rank	Sector Code	Sector Name	Forward Linkage (Total)	Sector Code	Backward Linkage (Total)
1	6	Sugarcane	2,674	7	1,417
2	11	Coconut	2,522	6	1,366
3	13	Tea	2,442	8	1,295
4	8	Other Seasonal Plantations	2,422	13	1,163
5	14	Cocoa	2,378	15	1,123
6	16	Other Annual Plantations	2,266	12	1,115
7	15	Rubber	2,123	14	1,109
8	12	Coffee	1,854	16	1,108
9	7	Tobacco	1,461	11	1,105

Source: Input Output Table of East Java Province, 2015 (processed)

3.3. The Output and Income Multiplier Impacts and the Linkage Value of the Coffee commodities Sector to the Livestock Sector

Table 6 reveals that three main sectors had a high output multiplier impact value. The egg commodity sector had the highest output multiplier impact with the value of 1.565. The second was the chicken commodity sector which had an output multiplier impact value of 1.564. Then the third was the agricultural and hunting services commodity sector which had an output multiplier impact value of 1.553. The output multiplier impact of the coffee commodities sector was still greater compared to the three main commodity sectors above. Further as a whole compared, the coffee commodities sector had the smallest output multiplier impact value.

Also, three main commodity sectors had high-income multiplier impact values. The cattle commodity sector had the highest impact of the income multiplier with the value of 0.579. The second was the other livestock commodity sector which had an income multiplier impact value of 0.373. Then the third was the agricultural and hunting services commodity sector which had an income multiplier impact of 0.354. The value of the coffee commodities multiplier impact was still greater than the three main commodity sectors above. However, as a whole compared, it was noted that the multiplier impact value of the coffee sector commodity was still greater than other sectors. Sectors were classified into the livestock sector consisting of the goat commodity sector, the other poultry commodity sector, the chicken commodity sector, the fresh milk commodity, the buffalo commodity sector, and the egg commodity sector. The sheep and goat commodity sector only had an income multiplier impact value of 0.231. Moreover, the other poultry commodity sectors only had an income multiplier impact value of 0.207. The chicken commodity sector had an income multiplier impact value of 0.199. Furthermore, the fresh milk commodity sector had an income multiplier impact value of 0.144. The buffalo commodity sector had an impact on the income multiplier of 0.140. Then the egg commodity sector only had an income multiplier impact value of 0.137.

In more detail, the output and income multiplier impact values of the sector which are classified in the livestock commodity sector and the coffee commodities sector were described in Table 6.

Table 6. Composition of the Output and Income Multiplier Impacts of Coffee and livestock Sectors in East Java Province

Rank	Sector	Sector Name	NDP	Sector Code	NDP
			Output		Income
1	23	Egg	1,565	17	0,579
2	20	Chicken	1,564	24	0,373
3	25	Agricultural and Hunting services	1,553	25	0,354
4	22	Fresh Milk	1,472	12	0,285
5	21	Other Poultry	1,455	19	0,231
6	17	Cow	1,363	21	0,207
7	24	Other Livestock	1,328	20	0,199
8	18	Buffalo	1,317	22	0,144
9	19	Sheep and Goat	1,282	18	0,140
10	12	Coffee	1,115	23	0,137

Source: Input Output Table of East Java Province, 2015 (processed)

In more detail, the inter-sectoral linkage values of the livestock commodity and the coffee commodities were described in Table 7.

Table 7. Composition of Linkage Values between Coffee and Animal Husbandry Sectors in East Java Province

Rank	Sector Code	Sector Name	Forward Linkage (Total)	Sector Code	Backward Linkage (Total)
1	25	Agricultural and Hunting services	3,051	23	1,565
2	24	Other Livestock	2,931	20	1,564
3	21	Other Poultry	2,624	25	1,553
4	20	Chicken	2,472	22	1,472
5	19	Sheep and Goat	2,254	21	1,455
6	22	Fresh Milk	2,238	17	1,363
7	18	Buffalo	2,224	24	1,328
8	12	Coffee	1,854	18	1,317
9	23	Egg	1,690	19	1,282
10	17	Cow	1,350	12	1,115

Source: Input Output Table of East Java Province, 2015 (processed)

Three main sectors had inter-sectoral forward linkages. The agricultural and hunting service commodity sector had the highest inter-sectoral forward linkages. The agricultural and hunting service commodity sector had a forward linkage value of 3.051. The second is the other livestock commodity sector which had a forward linkage value of 2,931. Then the third is the other poultry commodity sector which had a forward linkage value of 2,624. The inter-sectoral forward linkage value of the coffee commodities sector was still greater than the three main commodity sectors. Moreover, as a whole compared, it was noted that the inter-sectoral forward linkage value of the coffee commodities sector was still greater than the other sectors. Sectors were classified into the livestock commodity sectors; the egg and the cattle commodity sectors. The egg commodity sector only had an inter-sectoral linkage value of 1.690. Then the cattle commodity sector only had an inter-sectoral linkage value of 1.350. Based on the overall value of the linkage of the sector to the back of the coffee commodities sector, it had a smaller value than the value of the linkage of the livestock sector.

3.4. The Output and Income Multiplier Impacts and the Linkage Value of the Coffee commodities Sector to the Forestry and Fisheries Sectors

Three main sectors had high output multiplier impact values. Inland water fish and fishery product commodities sectors had the highest output multiplier impact value. Inland water fish and fishery product commodities sector had an output multiplier impact value of 1,424. The second was the forest wood commodity sector which had an output multiplier impact value of 1.284. Then the third was the marine fish and fishery products commodity sector which had an output multiplier impact value of 1.274. The output multiplier impact of the coffee commodities sector was still greater compared to the

three main commodity sectors above. In addition, as a whole compared, it was noted that the value of the multiplier impact of the output of the coffee commodities sector was still greater than the other sectors. The forestry and fisheries commodity sectors are the Other Forest Products commodity sector. The Other Forest Products commodity sector only had an output multiplier impact value of 1.056.

Besides, three main commodity sectors had high-income multiplier impact values. The corn commodity sector had the highest income multiplier impact value. The Saltwater Fish and Fishery Products commodity sectors had an income multiplier impact value of 0.379. The second was the forest wood commodity sector which had an income multiplier impact value of 0.354. Then the third was the inland water fish and fishery products sectors had an income multiplier impact value of 0.351. The income multiplier impact value of the coffee commodities sector was still greater compared to the three main commodity sectors above. Moreover, as a whole compared, it was noted that the income multiplier impact value of the coffee commodities sector was still greater than the other sectors. The sector that belong to the forestry and fisheries commodity is the teak wood commodity sector. The teakwood commodity sector only had an output multiplier impact value of 0.219.

In more detail, the output and income multiplier impact values of forestry and fishery commodity sectors and the coffee commodities sector were described in Table 8.

Table 8. Composition of the Output Multiplier Impact and Income of Coffee and Forestry and Fisheries Sectors in East Java Province

Rank	Sector	Sector Name	NDP	Sector Code	NDP
			Output		Income
1	30	Inland Water Fish and Fishery Product	1,424	29	0,379
2	27	Forest Wood	1,284	27	0,354
3	29	Marine Fish and Fishery Product	1,274	30	0,351
4	26	Teak Wood	1,254	28	0,302
5	12	Coffee	1,115	12	0,285
6	28	Other Forest Products	1,056	26	0,219

Source: Input Output Table of East Java Province, 2015 (processed)

Three main sectors had inter-sectoral forward linkages. The forest wood commodity sector had the highest inter-sectoral forward linkage with the value of 2.477. The second was the teak commodity sector, which has a future linkage value of 2.453. Then the third is the other forest product commodity sectors which have a forward linkage value of 2.412. The inter-sectoral forward linkage value of the coffee commodities sector was still greater when compared to the three main commodity sectors above. Further, as a whole compared, it was admitted that the inter-sectoral forward linkage value of the coffee commodities sector was still greater than that the other sectors. The sectors that belong to the forestry and fishery commodity sector were the inland water fish and fishery products commodity sectors and also saltwater fish and fishery product commodity sectors. The inland water fish and fishery products commodity sectors only had an inter-sectoral linkage value of 1.530. The saltwater fish fishery products commodity sectors only had an inter-sectoral linkage value of 1.303.

Furthermore, three main commodities had backward linkage values; the inland water fish and fishery products sector, the forest wood sector, and the marine fish and fishery products sector. Each of them had a backward sector linkage value of 1,424, 1,284, and 1,274. Compared to the three main commodities above, the coffee commodities had a lower value. However, as a whole compared, the coffee commodities value was greater than the other forest product sectors. The value of the backward linkage of other forest product commodity sectors was 1.056.

In more detail, the inter-sectoral linkage values of the forestry and fishery commodity sectors and the coffee commodities sector were described in Table 9.

Table 9. Composition of Inter-Sectoral Linkage values of Coffee and Forestry and Fisheries Sectors in the East Java Province

Rank	Sector Code	Sector Name	Forward Linkage (Total)	Sector Code	Backward Linkage (Total)
1	27	Forest Wood	2,477	30	1,424
2	26	Teak wood	2,453	27	1,284
3	28	Other Forest Products	2,412	29	1,274
4	12	Coffee	1,854	26	1,254
5	30	Inland Water Fishand Fishery Product	1,530	12	1,115
6	29	Marine Fishand FisheryProduct	1,303	28	1,056

Source: Input Output Table of East Java Province, 2015 (processed)

3.5. The of Output and Income Multiplier Impacts and the Linkage Value of the Coffee commodities Sector to the Mining Sector

Three main sectors had high output multiplier impact values. The metal ore mining sector had the highest output multiplier impact value. The egg commodity sector had an output multiplier impact value of 1.693. The second was the other mining and excavation sectors which had an output multiplier impact value of 1.282. Then the third was the petroleum mining sector which had an output multiplier impact value of 1.245. The output multiplier impact of the coffee commodities sector was still greater compared to the three main commodity sectors above. Then, as a whole compared, the coffee commodities sector had the smallest output multiplier impact value.

Besides, three main commodity sectors had high-income multiplier impact values. The mining and excavation sectors had the highest income multiplier impact values. The mining and excavation commodity sector had an income multiplier impact value of 0.655. The second was the coffee commodities sector which had the income multiplier impact value of 0.285. The petroleum mining sector had the income multiplier impact value of 0.272. Then, as a whole compared, the income multiplier impact of the coffee commodities sector was still greater than other sectors except the metal ore mining sector.

In more detail, the output and income multiplier impact values of the mining commodity sector and the coffee commodities sector were described in Table 10.

Table 10. Composition of the Output and Income Multiplier Impact values of the Coffee and Mining Sectors in East Java Province

Rank	Sector	Sector Name	NDP	Sector Code	NDP
			Output		Income
1	33	Metal Ore Mining	1,693	34	0,655
2	34	Other Mining and Excavation	1,282	12	0,285
3	31	Petroleum Mining	1,245	31	0,272
4	32	Natural Gas and Geothermal Mining	1,245	33	0,142
5	12	Coffee	1,115	32	0,068

Source: Input Output Table of East Java Province, 2015 (processed)

In more detail, the inter-sector linkage values of the mining sector and the coffee commodities sector were described in Table 11.

Table 11. Composition of Inter-Sector Linkage Values of Coffee and Mining Sectors in East Java Province

Rank	Sector Code	Sector Name	Forward Linkage (Total)	Sector Code	Backward Linkage (Total)
1	32	Natural Gas and Geothermal Mining	2,817	33	1,530
2	33	Metal Ore Mining	2,747	34	2,477
3	31	Petroleum Mining	2,143	31	1,303

4	34	Other Mining and Excavation	1,990	32	2,453
5	12	Coffee	1,854	12	1,854

Source: Input Output Table of East Java Province, 2015 (processed)

Table 11 yields that three main sectors had inter-sectoral forward linkages. The natural gas and geothermal mining commodity sector had the highest inter-sectoral forward linkages. The natural gas and geothermal mining commodity sector had a future linkage value of 2,817. The second was the metal ore mining commodity sector which had a future linkage value of 2,747. Then the third was the petroleum mining commodity sector which had a future linkage value of 2.143. The inter-sectoral forward linkage value of the coffee commodities sector was still greater compared to the three main commodity sectors above. Besides, as a whole compared, it was confirmed that the inter-sectoral forward linkage value of coffee commodities had the lowest value. Further, the backward linkage value of the mining sector had a greater value than the coffee commodities sector.

3.6. The Output and Income Multiplier Impacts and the Linkage Value of the Coffee commodities to the Sector

In more detail, the output and income multiplier impact values of sectors that belong to the manufacturing sector and the coffee commodities sector were described in Table 12.

Table 12. Composition of the Output and Income Multiplier Impacts of Coffee commodities and Processing Industry Sectors in East Java Province

Rank	Sector	Sector Name	NDP	
			Output	Sector Code Income
1	37	Fish and Water Biota Processing Industry	2,116	12 0,285
2	35	Coal Industry and Gas Refining	2,078	42 0,228
3	40	Milk Processing Industry, Milk products and Ice cream	2,072	41 0,207
4	43	Bakery and Cake Industry	2,068	38 0,199
5	36	Meat Processing and Preservation Industry	2,012	43 0,160
6	38	Fruit and Vegetable Processing and Preservation Industry	1,889	36 0,152
7	41	Rice Industry	1,87	37 0,140
8	39	Edible Oil, Vegetable and Animal Fats Industry	1,869	39 0,109
9	42	Grain, Flour and Starch Milling Industry	1,815	35 0,085
10	12	Coffee	1,115	40 0,074

Source: Input Output Table of East Java Province, 2015 (processed)

Table 12 reveals that three main sectors had high output multiplier impact values. The fish and water biota processing industry sector had the highest output multiplier impact with the value of 2.116. The second was the coal and gas refining sector, which had an output multiplier impact value of 2.078. Then the third was the milk, milk products, and ice cream processing industry sector which had an output multiplier impact value of 2.072. The output multiplier impact of the coffee commodities sector was still greater compared to the three main commodity sectors above. Then, as a whole compare, the coffee commodities sector had the smallest output multiplier impact value.

Moreover, there was something interesting from the comparison of the coffee commodities sector with the manufacturing sectors which was based on the income multiplier value that the coffee commodities sector had the lowest income multiplier value compared to sectors of manufacturing.

In more detail, the inter-sectoral linkage values of the manufacturing and the coffee commodities sector were described in Table 13.

Table 13. Composition of Inter-Sectoral Linkage Values of Coffee and Processing Industry Sectors in East Java Province

Rank	Sector Code	Sector Name	Forward Linkage (Total)	Sector Code	Backward Linkage (Total)
1	12	Coffee	1,854	37	2,116
2	39	Edible Oil, Vegetable and Animal Fats Industry	1,776	35	2,078
3	41	Rice Industry	1,691	40	2,072
4	37	Fish and Water Biota Processing Industry	1,678	43	2,068
5	43	Bakery and Cake Industry	1,558	36	2,012
6	38	Fruit and Vegetable Processing and Preservation Industry	1,551	38	1,889
7	42	Grain, Flour and Starch Milling Industry	1,508	41	1,873
8	36	Meat Processing and Preservation Industry	1,475	39	1,869
9	40	Milk Processing Industry, Milk Products and Ice Cream	1,213	42	1,815
10	35	Coal Industry and Gas Refining	1,183	12	1,115

Source: Input Output Table of East Java Province, 2015 (processed)

Table 13 indicates that three main sectors had inter-sectoral forward linkages. The coffee commodities sector had the highest inter-sectoral forward linkage with the value of 1.854. The second was the edible oil, vegetable and animal fat industrial commodity sector which had a future linkage value of 1.776. The third was the rice industrial commodity sector which had a future linkage value of 1.691. Then, as a whole compared, the inter-sectoral linkage value of coffee commodities sectors had the highest or greatest value than the other sectors classified in the manufacturing. Thus, it can be concluded that the inter-sectoral linkage value of the coffee commodities was more dominant than the inter-sectoral linkage value of the manufacturing sector. Nevertheless, the backward linkage value of the coffee commodities sector was contradictory to the overall values of the manufacturing sector. It is due to the output value of the manufacturing sector was not used as input for coffee commodities production activities.

4. Conclusion

Based on the research results and discussion of the output multiplier impact in East Java Province, it was admitted that the coffee commodities sector had a multiplier value of 1.115, which means that if there is a change in final demand of the coffee sector by one million rupiahs while the final demand in other sectors does not change, it will increase the use of the output from other sectors, either directly or indirectly, by Rp. 1,115,000, -. With the Initial Impact of Rp. 1,000,000.-, then the Direct Effect and Indirect Effect on all sectors of the economy in East Java province of Rp. 115,000,-. Therefore, it can be interpreted that if the development of the coffee commodities is more optimized and more focused, the coffee commodities sector will certainly be able to have a greater impact on the economy of East Java Province. This is what the East Java provincial government needs to do.

The development of the coffee commodities sector can be carried out in some ways, for example, not only focusing on development in the upstream sector within the coffee commodities sector but also developing the downstream sector as well. From the upstream sector aspect, the coffee commodities can be developed through intensification and extensification activities in order to increase output considering that many final demands are not balanced by the output produced by the coffee commodities sector. Then from the downstream sector aspect, the first to be done is to remember that many sectors have not utilized and absorbed the output of the coffee commodities sector optimally, therefore, it is necessary to do stimulating or spurring other sectors to use the output of the coffee commodities sector by the East Java provincial government, especially sectors that have not used the output of the coffee commodities sector in East Java Province. As a result, the development of coffee commodities can take place in two directions involving upstream and downstream aspects, it is expected that it will be able to optimize the development of good coffee commodities output that can

be produced directly and prepare sectors that are able to accommodate the output produced by the output of the coffee commodities sector.

From the input provider side, there were sectors consisting of the cattle commodity sector, the buffalo commodity sector, the other livestock commodity sector, the agricultural and hunting service commodity sector, the forest wood commodity sector, the inland water fish and fishery commodity sector, the petroleum mining sector, the mining and other excavation sectors, and the coal and gas refining industry sector. There were three main sectors which were dominant or capable of providing very large inputs to the coffee commodities sector. These sectors were the agricultural and hunting commodity services sector which can provide direct and indirect input for the coffee commodities sector of Rp. 399.39 million. Furthermore, the cattle commodity sector which was able to provide direct and indirect input for the coffee commodities sector of Rp. 312.12 million. Then the forest wood commodity sector which was able to provide input both directly and indirectly to the coffee commodities sector of Rp. 192.36 million.

There were sectors that affected the coffee commodities sector in terms of using the output of the coffee commodities sector. This sector was the industrial sector for milling grains (except rice), flour and starch. This sector used the output of the coffee commodities sector for its production activities either directly or indirectly of Rp. 1.7 trillion. Thus, as a whole view, the directly and indirectly inter-sectoral linkage values of coffee commodities does have a large enough value, but regarding the number of sectors that support the economy of East Java province, the use of the output from the coffee commodities sector is still minimal, there are only industrial sector milling grains (except rice), flour and starch. Accordingly, this can be used as an illustration that the development of the coffee commodities sector so far is still not optimal.

Furthermore, the directly and indirectly inter-sectoral linkage values of the coffee commodities sector were 1.854, which means that if there is an increase in final demand in the coffee commodities sector by one million rupiahs, it will increase the overall supply of intermediate inputs in the economy of East Java Province by 1.854 million rupiahs or Rp. 1,854,000, -.

Therefore, it is expected that the prospects for the development of the coffee commodities sector in the future must be oriented towards efforts to develop in the form of optimizing and enhancing economic sectors in East Java to take benefits of the output of the coffee commodities sector, especially optimization in the manufacturing sector. This certainly can be used as a recommendation for the East Java provincial government in an effort to develop coffee commodities to make it better. So far, the East Java provincial government program concerning the efforts to develop coffee commodities through the intensification and extensification program of the coffee commodities still shows a very slow impact. It is due to the provincial government of East Java is still too focused and partial in carrying out coffee commodities development programs, which only focusing on the upstream sector of the coffee commodities sector, not optimizing in the downstream sector towards the coffee commodities sector.

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