



Input-Output Analysis of Food and Beverage Industry in East Java Province

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ABSTRACT

There are two important things which is interesting to study about the background of the food and beverage industry in East Java : (1) the contribution of the food and beverage industry in East Java and (2) Industry East Java in the constellation of national industrial policy. Based on the empirical phenomena as described above, the objectives of this study are: identify patterns in the food and beverage industry and to analyze the relationship of food and beverage among its subsectors in East Java Province. The used analytical tools in this study is input-output analysis. The results of analysis shows: (i) The sector that is able to move the economy in East Java Province is coming from the industrial sector. Referring to Table I-O of East Java Province in 2010, the ability to create output from the industrial sector is Rp. 652.71 trillion and accounted for 38.89% of the total output;(ii) Rice-based industry is the industry that has the largest value of input coefficient worth 0.7311 means that any increase or decrease of 1 rupiah from the industry will have a direct impact of 0.7311 in the economy; (iii) Subsectors with the highest backward linkages were the milk processing, milk and ice cream products with an associated value of 1,256; (iv) The largest direct forward linkage is the grain mill subsector (except rice), starch and starch with a figure of 2,802.

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PREFACE

The role that human capital and institutions play in the growth process is a contentious and intensely debated issue in the recent comparative economic development literature. The seminal empirical contributions of Knack and Keefer (1995), Hall and Jones (1999) and Acemoglu et al. (2001 and 2002) provided a major impetus to the primacy of the institutions hypothesis. However, Glaeser et al. (2004) report evidence suggesting that years of schooling, a proxy for human capital, is a better predictor of development than Constraints on the Executive, which is a main measure of political institutions used by Acemoglu et al. (2001 and 2005) and Acemoglu and Johnson (2005). The nature of economic development is actually a process in an effort to realize the ideals of a just and prosperous society. Economic development is the only economic process that make the community has to empower itself, and to improve its access to various aspects of development both political, economic, socio-cultural, and defense and security.

East Java Province is one of the provinces in Indonesia that has an important role in encouraging the acceleration of economic development in Indonesia. East Java Province from 2010-2015 has an average contribution of GRDP to the total national GDP of 14.4%. That number is the second highest after DKI Jakarta Province. The contribution of East Java Province is inseparable from the various policies and ease of regulations that have been given by the East Java provincial government, whether related to investment activities, infrastructure development, and trade for all business actors in East Java. East Java Province has undergone economic transformation from the agricultural sector to industrial sector, so that East Java Province is experiencing industrialization.

Table 1 shows the contribution of 17 sectors in East Java Province during 2014-2015. During this period the contribution of processing industry was highest compared to other sectors.

Table 1. East Java Province Sectoral Contributions 2014-2015 (in percent).

Sector	2014 *	2015* *
Agriculture, Forestry, and Fisheries	13.6 1	13.75
Mining and Quarrying	5.17	3.79
Processing industry	28.9 5	29.27
Procurement of Electricity and Gas	0.36	0.34
Water supply, Waste Management, and Recycling	0.09	0.09
Construction	9.47	9.5
Wholesale and Retail Trade; Car and Bicycle Repair	17.2 9	17.64
Transportation and Warehousing	3.25	3.36
Provision of Accommodation, Food and Drinking	5.19	5.41
Information and Communication	4.54	4.56
Financial Services and Insurance	2.68	2.75
Real Estate	1.57	1.63
Company Services	0.79	0.8
Administration of Government, Defense, and Social Security	2.32	2.31
Educational Services	2.73	2.72
Health Services and Social Activities	0.63	0.63
Other Services	1.38	1.43

Source: East Java Central Bureau of Statistics

*) Temporary Figures **)Very Temporary Figures

This condition shows two things: First, it is proof that the economic structure of East Java Province has undergone economic transformation into processing industry sector so that Provincial government is expected to give more attention to the sector. Second, the contribution of the high processing industry sector shows that the economic potential of the processing industry in East Java Province is relatively large, thus having higher employment and productivity levels than other economic sectors.

The largest contributing industrial sub-sector in East Java is the food and beverage industry sub-sector. The contribution of the food and beverage industry subsector from 2014 to 2015 amounted to 7.91 percent and 8.41 percent, respectively (Table 2). This shows that the food and beverage industry sub-sector has a big role to increase the processing industry sector of East Java Province. The capabilities shown in the formation of GRDP value in the food and beverage sub-sector provide indication that the potential development of the food and beverage industry subsector is very suitable to be done in East Java (Central Bureau of Statistics, 2011).

Table 2. Contribution of Processing Industry Sub-sectors of East Java Province in 2014-2015 (in percent).

Processing Industry Sub-sectors	2014*	2015**
Oil and Gas Processing Industry		
Coal Industry, Oil and Gas Refinery	1.06	0.05
Non Oil and Gas Processing Industry		
Food and Beverage Industry	7.91	8.41
Tobacco Processing Industry	7.55	7.68
Textile and Apparel Industry	0.46	0.45
Leather Industry, Leather Goods and Footwear	0.4	0.39
Wood Industry, Wood and Cork Goods, Goods from Bamboo and Rattan, and the like	1.83	1.71
Paper and Paper Industry; Printing and Reproduction of Recording Media	1.41	1.4
Industrial Chemical, Pharmaceutical and Traditional Medicines	2.57	2.62
Rubber Industry, Rubber and Plastic Goods	1.34	1.29
Industry of Minerals of Non-Metal Goods	1.25	1.24
Basic Metal Industry	1.2	1.1
Metal Goods Industry; Computer, Electronic Goods, Optics; And Electrical Appliances	1.36	1.35
Machinery and Equipment Industries	0.07	0.07
Industrial Transport Equipment	0.34	0.33
Furniture Industry	0.93	0.92
Other Processing Industry; Repair and Installation of Machinery and Equipment	0.29	0.28

Source: East Java Central Bureau of Statistics

*) Temporary Figures **) Very Temporary Figures

When the demand for the products of any sector is increased, the sector will need to purchase more items as an input from other sectors to produce any additional output. These purchases will stimulate additional output which in turn will require further purchases and so on. Thus, we can track these direct and indirect effects throughout the economy using the output, income, employment multipliers (Albqami, 2004).

Given the importance of the contribution of the food and beverage industry to the processing industry sector and the total GDP of East Java Province, it is deemed necessary to identify backward linkage or forward linkage. The purpose of identifying these so that can be used as a foundation in developing the leading sectors for each region, especially food and beverage industry.

Based on the background that has been described there are several things that underlie this research.

First, East Java Province is one of the provinces in Indonesia which has an important role in encouraging the acceleration of Indonesia's economic development as shown by the large contribution of GRDP to the national economy. Secondly, East Java Province undergoes economic transformation from agricultural sector to industrial sector, so that East Java Province undergoes industrialization. Third, the contribution of the processing industry is highest compared to other sectors. Fourth, the food and beverage industry sub-sector contributed the most in boosting the total PDRB of processing industry sector of East Java Province. Fifth, the contribution of the food and beverage industry to the manufacturing industry sector and the total GDP of East Java Province has the potential to be developed, so it needs to be identified agglomeration in the districts of East Java Province.

The method used in this study is the input output analysis method that aims to describe the interrelations between food and beverage industry sector in East Java Province. Based on the description of the background and several methods used, this research is written under the title "Analysis of Input-Output of Food and Beverage Industry at Regency / City in East Java".

LITERATURE REVIEW

Input-output analysis begins with the construction of a table, similar to the table of national/regional accounts, which shows the economy of the destination in matrix form. Each sector of the economy is shown in each column as a purchaser of goods and services from other sectors in the economy, and in each row as a seller of output to each of the other sectors (Rameezden, et.al, 2005). In practice, IO tables take a number of years to be published and construct, especially in developing countries where delays of five to seven years are common. It is reasonable to expect that structural coefficients change slowly in developing countries (Kweka, et.al, 2003).

Table I-O is a comprehensive measuring that describes the economy of a region in a given year in aggregate (macro). From this table can be derived a variety of economic data analysis that can be used as a basis of economic planning which is practical and quantitative. With the advantages of the table then the information / data contained therein can be used to view the general condition of the economy of a region through several variables or indicators as follows :

1. Analysis of the structure of supply and demand for goods and services in an area that can show the role of domestic and imported production to meet the demand for goods and services, both domestic and overseas;
2. The output structure, added value and final demand can illustrate the role of each sector in the economy;
3. The power of dissemination and degree of sensitivity using scatter plot chart can be determined the leading sectors of a region.

The main analysis that can be done using Table I-O is how the effect of a change in the final demand on output in the economy. Components of such final demand are household consumption, government consumption, investment, and exports and imports or so-called multiplier analysis. The multiplier analysis to be presented here is three that is the output multiplier, income multiplier and labor multiplier.

Inter-sectoral linkages, comprising backward and forward linkages, reflect the interconnectedness between the sectors of an economy, with mutual interdependencies

between the sectors being decisive for the extent to which the growth in one sector contributes to the growth of other sectors as well as over-all growth. Backward linkages create additional demand for the output of upstream sectors which, in turn, induces an increased upstream investment and an increased level of capacity utilization, as well as a possible upstream technological upgrading. The overall effect on the economy depends on the kind of sectors to which a sector is backwardly linked (Tregenna, 2008). Changes in costs and productivity affecting an industry at the project level have broader economic repercussions for the locality or region (Weisbord, 1998).

Matrix multiplier or Leontief Inverse Matrix is a matrix composed of calculation $(I-A)^{-1}$ or also often named matrix B. This matrix is used to see how output occurs when there is a change in the final demand. The technological coefficient matrix is denoted by a_{ij} , the value $a_{ij} = x_{ij} / X_j$, where:

a_{ij} = coefficient of technology

x_{ij} = flow from industry i to j

X_j = total inputs for sector j

The output multiplier analysis aims to look at the impact of a sector's final demand change on all sectors of each multiplier type change. An increase in final demand in a sector j will not only increase output of sector j production, but it will also increase other outputs in the economy. Increased output of other sectors is created by the direct and indirect effects of increased demand for sector j (Miller and Blair, 1985). Thus the formula of the usual output (output multiplier) is :

$$O_{ij} = \sum_i^n \alpha_{ij}$$

where :

O_{ij} = output multiplier sector j

α_{ij} = the reverse matrix element of Leontief

i = line 1, 2,n

The Output Multiplier as generated above is called the Simple Output Multiplier or Type I output multiplier. This type of multiplier is obtained from the Input-Output Open Table. While multiplier analysis performed by using closed input-output analysis model will result in total multiplier or type II output multiplier. These total multiplier figures besides incorporating the direct and indirect impacts of a change in exogenous factors, also account the additional impact, ie, an induced effect due to the inclusion of households as a production sector in the economy. Total output multiplier is expressed as :

$$\bar{O}_{ij} = \sum_i^n \alpha'_{ij}$$

where :

O_{ij} = output multiplier sector j

α'_{ij} = Leontief's inverse elementary matrix that incorporates a household as an endogenous factor

i = line 1, 2,n

Interrelationship analysis was originally developed by Rasmussen (1956) and Hirschman (1958) to look at inter-sectoral linkages, especially to determine development policy strategies. There are two types of linkages: (1) backward linkages that are related to raw materials and calculated by column, and (2) forward linkages that are linkages to the sale of finished goods and are calculated on the line.

1. Backward Linkage

Increased output of sector i will increase input demand for the sector coming from the sector itself and from other sectors, which means there must be an increase in the output of the other sector.

The inter-sectoral linkages of the industry are referred to as backward linkages, as their relevance stems from the mechanism of input use. Backward linkages in mathematical formulas can be written as follows :

$$TBL_i = \frac{\sum_{i=1}^n b_{ij}}{1/n \sum_{i=1}^n \sum_{j=1}^n b_{ij}}$$

where:

TBLj = Total Backward Linkage sector j

Bij = element of Leontief's inverse matrix line i, column j

N = number of sectors

2. Forward Linkage

Increased output of sector i will increase the output distribution for that sector which makes other sectors (sector j) have more input, so that other sector will increase production process which in turn will produce more output. Such inter-sectoral industrial linkages are referred to forward linkage, since their linkage comes from the mechanism of output utilization. The forward linkage in the form of a mathematical formula can be written as follows:

$$TFL_i = \frac{\sum_{j=1}^n b_{ij}}{1/n \sum_{i=1}^n \sum_{j=1}^n b_{ij}}$$

dimana :

TFLi = Total Forward Linkage sector i

bij = element of Leontief's inverse matrix line i, column j

n = number of sectors

3. Key sectors analysis

Key Sector identification is based on the magnitude of inter-sectoral links either forward or backward which is indicated by the coefficient of variation from each sector. The coefficient of variation can be formulated as follows:

Coefficient of variation for backward linkage :

$$v_j = \sqrt{\frac{\frac{1}{n-1} \sum_i (b_{ij} - \frac{1}{n} \sum_i b_{ij})^2}{\frac{1}{n} \sum_i b_{ij}}} \quad (i, j = 1, 2, \dots, n)$$

Coefficient of variation for forward linkage :

$$v_i = \sqrt{\frac{\frac{1}{n-1} \sum_j (b_{ij} - \frac{1}{n} \sum_j b_{ij})^2}{\frac{1}{n} \sum_j b_{ij}}} \quad (i, j = 1, 2, \dots, n)$$

The lower the value of v_j , the greater the number of sectors associated with demand caused by sector j. Thus, if a sector has a high backward linkage ($TBL > 1$) and a low v_j value, it means that the sector has a strong backward linkage, and this achieves a number of inverse elements of Leontief. Conversely, the lower the value of v_j , the more sectors that are satisfied by sector i, if sector i has a high forward linkage ($TFL > 1$) and a low v_i , it's the inverse matrix element. Thus, the leading sector is defined as the sector having TBL_j and TFL_i over one unit, and v_j and v_i relatively low.

This study, has similarities with previous research, but the difference is : this study focuses on observations, especially on food and beverage industry regency / city in East Java Province which has not been studied in depth. The selection of this industry is due to the contribution of the food and beverage industry in the main performance of the

processing industry in East Java, in addition to the different character of the food and beverage industry which is resource-based industries. Furthermore, as a comprehensive overview of the food and beverage industry in East Java, researchers also discussed backward and forward linkages with other sectors, so that multiplayer effects can be seen on other sectors affecting the economy of East Java by using the input output table year 2010.

RESEARCH METHODS

The research method used in this study is quantitative research method. This research includes the type of descriptive quantitative research with mathematical approach to describe input-output analysis of food and beverage industry in East Java. This study uses secondary data from the Central Bureau of Statistics (BPS) industry survey in 2013, East Java Input Output data of 2010. The secondary data is based on industry survey in the form of time series data of 2010 - 2012 and cross section of 38 regencies / cities in East Java, where the data were obtained from Central BPS and East Java BPS.

The output referred in this study shows that the output value of the goods production process in the food and beverage industry sector in each regency / city in East Java within one year, which is stated in rupiah. Furthermore, the sectoral linkage of the food and beverage industry in East Java Province with other sectors is done using Input Output (I-O) method, the methodology stages are as follows:

1. Multiplier analysis

The main analysis that can be done using Table I-O East Java Year 2010 is how the effect of a change in the final demand on output in the economy. Components of such final demand are household consumption, government consumption, investment, and exports and imports or so-called multiplier analysis. The multiplier analysis to be presented here is three, those are the output multiplier, income multiplier and labor multiplier.

Output Multiplier

The output multiplier analysis aims to look at the impact of a sector's final demand change on all sectors of each multiplier type change. An increase in final demand in a sector *j* will not only increase output of sector *j* production, but it will also increase other outputs in the economy. Increased output of other sectors is created by the direct and indirect effects of increased demand for sector *j* (Miller and Blair, 1985).

Penganda Pendapatan (Income Multiplier)

The income multiplier analysis is an analytical tool to see the effect of changes in the final demand within a sector on income in that sector in the economy (as reflected in the gross added value in table I-O). So the value of the income multiplier of sector *j* shows the total total household income created by the addition of one unit of final demand in the sector *j*. That influence is called the multiplier income household (household income multiplier) is often referred to as the effect of income (income effect).

Employment Multiplier

The employment multiplier shows the total effect of a job change due to a unit of money changing on the final demand in a particular sector. Employment multiplier analysis is used to see the role of a sector in increasing the amount of labor absorbed by the economy.

2. Inter-sectoral Linkage Analysis

Interrelationship analysis was originally developed by Rasmussen (1956) and Hirschman (1958) to look at inter-

sectoral linkages, especially to determine development policy strategies. Two types of linkages are known: (1) backward linkages that are related to raw materials and calculated by column. (2) forward linkages which are the interrelations of the sale of final goods and are calculated on the line.

RESULTS AND ANALYSIS

The I-O analysis shows the inter-sectoral role in the food and beverage industry sector in East Java Province, through the component of demand allocation, both of intermediate and final demand, input structure, import, and forward-to-back linkage analysis between sub-sectors. In addition, it can also show what happens to endogenous variables, ie sectoral output, in the case of changes in exogenous variables, such as demand in the economy. This can be seen through the multiplier analysis.

The analysis shows that the total demand of goods and services in the food and beverage industry sector in East Java is Rp 266.15 trillion consisting of intermediate demand of Rp 68.97 trillion and final demand of Rp 197.18 trillion. Meanwhile, in the food and beverage industry sector, the rice industry sub-sector is the largest contribution to total demand of Rp 57.37 trillion. This figure is derived from the contribution of the rice subsector to demand is Rp 9.46 trillion, then from its contribution to the final demand of Rp 47.91 trillion. This shows the ability of the rice subsector to meet demand and final demand is Rp 9.46 trillion and Rp 47.91 trillion respectively. This figure indicates the significant contribution of rice subsector to demand. While the food beverage industry that contributes the smallest output level is derived from the processing and preservation of meat with the level of output of Rp. 4.13 trillion.

Table 3. Composition Structure of Input at Food & Beverage Industry Sectors East Java Year 2010.

No	Subsector	Intermediate Input
37	Animal slaughtering	0.7031
38	Processing And Preservation Meat	0.4500
39	Processing And Preservation Of Fish And Biota	0.5994
40	Processing and Preservation of Fruits and Vegetables	0.3337
41	Eating Oils, Vegetable and Animal Fats	0.5154
42	Milk Processing, Products Of Milk And Ice Cream	0.6159
43	Rice	0.7312
44	Rice Milling (Except Rice), Flour And Starch	0.6663
45	Bread and Cakes	0.5086
46	Sugar	0.1700
47	Other Food Industry	0.5539
48	Animal Feed	0.6638
49	Drinks	0.3249

Source: Table I-O Food & Beverage Industry East Java Province 2010

The linkage analysis is used to see the inter-subsector linkages, especially to determine the development policy strategy. There are two types of linkages, ie backward linkages that are linked to raw materials and calculated by column, and future linkages that are linkages of finished goods sales and are calculated by line (BPS, 2010: 48).

The emphasis on input-output analysis is based on a high degree of interconnection. Sectors with a high degree of linkage are considered to have the ability to drive the economy primarily to drive other sectors. Such high linkage capabilities include backward linkages or linkages to drive sectors that support the input needs of a sector and forward-

linkages or linkages to sectors that utilize the output of a sector useful as intermediate inputs. Based on the analysis of input-output calculation of East Java Province 2010, obtained the amount of linkage from the food and beverage industry sector.

Table 4 shows the backward linkages between subsectors of production either directly or indirectly. Subsectors with the highest correlation were the sub-sector of milk processing, milk and ice cream products with the corresponding value of 1,256. Judging from the direct linkage it can be seen that other food industry sub-sectors have the highest value of direct linkage that is equal to 2,219.

Table 4. Backward Linkage of Food and Beverage Industry Sectors East Java Province Year 2010.

No.	Subsector	Direct Linkages	Direct and Indirect Linkages
37	Animal slaughtering	0.006	0.830
38	Processing And Preservation Meat	1.726	1.080
39	Processing And Preservation Of Fish And Biota	0.200	0.860
40	Processing and Preservation of Fruits and Vegetables	0.134	0.851
41	Eating Oils, Vegetable and Animal Fats	1.339	1.074
42	Milk Processing, Products Of Milk And Ice Cream	2.002	1.256
43	Rice	0.121	0.847
44	Rice Milling (Except Rice), Flour And Starch	0.103	0.844
45	Bread and Cakes	2.103	1.179
46	Sugar	0.067	0.839
47	Other Food Industry	2.219	1.185
48	Animal Feed	2.000	1.180
49	Drinks	0.980	0.975

Source: Table I-O Food & Beverage Industry East Java Province 2010

Table 5. Forward Linkage of Food and Beverage Industry Sectors East Java Province Year 2010.

No.	Subsector	Direct Linkages	Direct and Indirect Linkages
37	Animal slaughtering	1.532	1.049
38	Processing And Preservation Meat	0.024	0.833
39	Processing And Preservation Of Fish And Biota	0.241	0.866
40	Processing and Preservation of Fruits and Vegetables	0.067	0.840
41	Eating Oils, Vegetable and Animal Fats	2.004	1.216
42	Milk Processing, Products Of Milk And Ice Cream	2.058	1.263
43	Rice	0.234	0.865
44	Rice Milling (Except Rice), Flour And Starch	2.802	1.261
45	Bread and Cakes	0.019	0.832
46	Sugar	2.156	1.188
47	Other Food Industry	1.109	1.005
48	Animal Feed	0.709	0.945
49	Drinks	0.047	0.837

Source: Table I-O Food & Beverage Industry East Java Province 2010

The forward linkage of the food and beverage industry sector is shown in Table 5 below. The sub-sectors with the largest direct linkage figures are Rice Milling (Except Rice), Flour And Starch with a figure of 2.802. This shows that the output of the Rice Milling (Except Rice), Flour And Starch is consumed and used as input for production activities in other production sub-sectors. As for direct and indirect linkages, the highest number is owned by the sub-sector of Milk Processing, Products of Milk And Ice Cream with a value of 1,263. It shows that if there is an increase of production output from the Milk Processing, Products Of Milk And Ice Cream, then the additional output will be distributed to other production subsector in food and beverage industry sector.

Based on the results of the analysis from Table 6, the sub-sector with the highest output multiplier is Milk Processing, Products of Milk, and Ice Cream sub-sector with the figure of 1.4644. This shows that if there is an increase of final demand in the Milk Processing, Products of Milk, and Ice Cream is one rupiah, the output in all subsectors in food and beverage industry will increase by Rp 1.4644. The result of output multiplier analysis shows that from 13 subsectors of food and beverage industry, 12 subsectors have high output multiplier value (more than one). The output multiplier is the increase in total value of production in all subsectors Food and beverage industry due to the increase of one unit of final demand in one sub-sector.

Table 6. Multiplier Value of Output and Income at Food and Beverage Industry Sector in East Java Year 2010.

No.	Subsector	Direct Linkages	Direct and Indirect Linkages
37	Animal slaughtering	1.3862	4.9155
38	Processing And Preservation Meat	1.2553	0.7043
39	Processing And Preservation Of Fish And Biota	1.3035	3.1292
40	Processing and Preservation of Fruits and Vegetables	1.0060	0.7450
41	Eating Oils, Vegetable and Animal Fats	1.2582	1.8590
42	Milk Processing, Products Of Milk And Ice Cream	1.4644	2.7117
43	Rice	1.3849	3.4764
44	Rice Milling (Except Rice), Flour And Starch	1.2945	3.3912
45	Bread and Cakes	1.2820	1.0621
46	Sugar	0.8636	0.4291
47	Other Food Industry	1.2540	2.9894
48	Animal Feed	1.4551	5.6300
49	Drinks	1.0473	0.6445

Source: Table I-O Food & Beverage Industry East Java Province 2010

The subsector with the highest income multiplier is the animal feed subsector with an income multiplier of 5.6300. This figure indicates if there is an additional final demand of one rupiah in the animal feed, there will be a change in income of Rp 5.6300. The results of income multiplier analysis show that 9 out of 13 food and beverage industry sub-sectors have high income multiplier (more than one).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The results of input output analysis of food and beverage industry are as follows:

- The sector that is able to move the economy in East Java Province is derived from the industrial sector. Referring to Table I-O of East Java Province in 2010, the ability to create output from the industrial sector is Rp. 652.71 trillion and accounted for 38.89% of the total output. While the role of the food beverage industry is a major contributor in the industrial sector where the value of output that can be produced by the food beverage industry is Rp. 266.16 trillion or accounted for 40.77% of the total output of the industrial sector. This indicates the role and potential of the food and beverage industry is very significant in the province of East Java;
- Rice-based industry is the industry that has the largest value of input coefficient worth 0.7311 means that any increase or decrease of 1 rupiah from the industry will have a direct impact of 0.7311 in the economy. The smallest direct impact is from the beverage industry where the input coefficient value is only 0.324, which means that any 1 rupiah change from the industry will have a direct impact of 0.324;
- Subsectors with the highest backward linkages were the Milk Processing, Products of Milk and Ice Cream with a linkage value of 1.256. This suggests that the milk processing sub-sector, the Milk Processing, Products of Milk and Ice Cream has the ability to influence the output of other subsectors directly and indirectly when the final demand of other industrial subsectors is increased.
- The largest direct forward linkage is the Rice Milling (Except Rice), Flour and Starch with a figure of 2.802. This shows that the output of the Rice Milling (Except Rice), Flour and Starch is consumed and used as input for production activities in other production sub-sectors. As for direct and indirect linkages, the highest number is owned by the sub-sector of Milk Processing, Products of Milk and Ice Cream with a value of 1,263. It shows that if there is an increase of production output from the Milk Processing, Products of Milk and Ice Cream, then the additional output will be distributed to other production subsector in food and beverage industry sector.

Recommendations

In relation to the policy, the Government should be more focused to keep empowering food and beverage SMEs into their respective budgeting schemes in order to keep the food and beverage industry in East Java competitive, such as the facilitation of product and service standardization (SNI and ISO), Permissions (IPR), Human Resources Competency Certification;

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