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Multiplier Effect in East Jawa (Input-Output Analysis Approach)

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Abstract

This study aims to examine the fundamentals of the economy of East Java with an Interregional Input-Output analysis approach. Produce 5 leading sectors ($BL > 1$ & $FL > 1$) namely manufacturing industry, electricity supply, gas, transportation and warehousing, information and communication and company services. Changes in final demand (Household consumption, LNPR consumption, Government Consumption, Gross Fixed Capital Formation, Inventory Change, Overseas Exports, Exports Between Provinces) indicate that the processing industry is very dominant in experiencing changes. The multiplier impact 1) output is dominated by electricity, gas 2) income is dominated by the Defense Administration and Mandatory Social Security 3) Employment is dominated by agriculture, forestry and fisheries. The Impact of Spread including manufacture, procurement of electricity, gas, construction, transportation and warehousing, provision of accommodation and food and drink, information and communication, company services, health services, and social activities. The Degree of Sensitivity including agriculture, forestry and fisheries, manufacture, procurement of electricity, gas, wholesale and retail trade, car and motorcycle repair, transportation and warehousing, information and communication, company services.

Key words: I-O, Multiplier Effect, Final Demand.

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INTRODUCTION

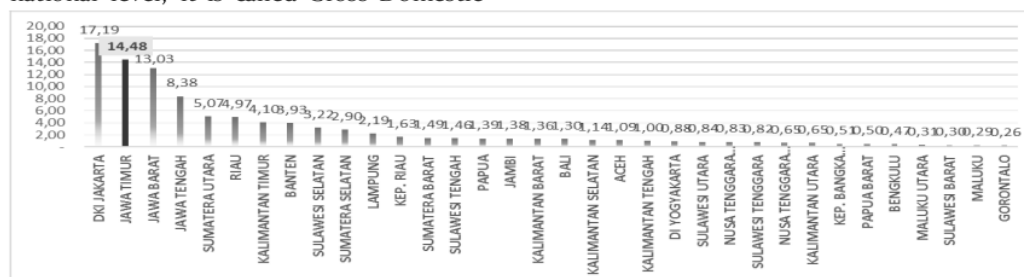
The economic condition of a region cannot be separated from the fundamental strength of the economy. Economic fundamentals are seen from various aspects of a region's macroeconomic variables including economic growth, inflation, unemployment, per capita income, foreign exchange reserves, the balance of payments, trade balance, health, education, exports, and imports (Amirudin, 2008).

However, in general, economic growth can show the final results of all economic activities in a region within a certain period, for example, 1 year, so economic growth is often used as an indicator of the strength of macroeconomic fundamentals. At the regional level, it is called Gross Regional Domestic Product (GRDP) and at the national level, it is called Gross Domestic

Product (GDP) to be one indicator that is easy to understand and interpret.

GRDP is often used as a measuring tool regarding the results of economic performance and activity of a region/ region in determining the success of a regional government in moving economic sectors to create growth and achieve community welfare (Arifah, 2021). However, the fundamental strength of economic growth in Indonesia is still experiencing classic problems, namely high inequality and economic disparities between regions in Indonesia, this can be seen in Figure 1.

It is seen that Indonesia's economic growth is mostly supported by the provinces on the island of Java. by 57.89%. East Java is the second largest contributor province at 14.48% after DKI Jakarta at 17.19% and West Java occupies the third position at 13.03% of Indonesia's total GDP in 2021.



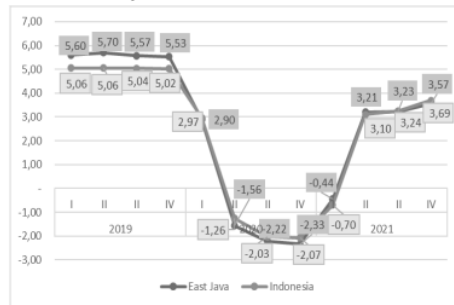
Source: Statistic Indonesia

Figure 1. Economic Growth of East Java

East Java as the contributor to the highest GRDP share number 2 out of 34 provinces also experienced a negative impact from the Covid-19 outbreak/ pandemic. The economic condition of East Java has experienced recovery (improvement) in a positive direction in the last 3 years (2019-2021) in line with the improvement of the Indonesian economy after being affected by the Covid-19 pandemic which caused the Indonesian economy to decline as shown in Figure 2. In the 2019 period, East Java's

economic growth was above the national average, which was a difference between 0.51 - 0.64%. Towards the end of Quarter IV (2019) - Quarter IV (2020) East Java and national economic growth experienced a very significant decline due to the impact of the Covid-19 pandemic. East Java's economic growth in 2019 (Q-IV) was always above the national average, experiencing a sharp decline from 5.53% to -2.33%. National growth also decreased from 5.02% to -2.07% even during the pandemic in Indonesia, East Java's economic growth was

below the national average with a difference of 0.21 - 0.27%.



Source: Statistic Indonesia

Figure 2. Economic Growth of East Java – Indonesia

The East Java economy began to experience a recovery period starting at the end of Q-IV 2020 and continued to experience a positive movement of economic growth. This can be seen in Q-IV 2020 of -2.07 moving positively until Q-IV 2021 recorded a growth of 3.57%. Given that East Java is the second largest contributor to the share of GRDP to GDP, positive economic growth in East Java can have a significant impact on the movement of economic growth at the national level in a positive direction as

well. East Java's economic growth moves parallel (parallel) with economic growth at the national level.

In an open economic system, each region requires other regions in terms of the need supply of raw materials and to promote their output to other regions. Regarding the complex depiction of the economy between regions, it will not only be done using GRDP data but additional analysis is needed to determine the relationship between East Java's economy and other provinces.

The formation of economic fundamentals in terms of economic growth will not be separated from the role of each sector that has links with other sectors in the form of forwarding linkage and backward linkage. This condition can provide added value to the total GRDP of East Java which is increasing from year to year. Able to describe the fundamental condition of East Java's economic growth which is getting stronger to maintain economic stability in the face of uncertain national and global economic problems, as well as in accelerating the process of East Java's economic recovery after the Covid-19 pandemic.

Table 1. Share DGRP and Employment

Code	Sectors	GDPR	Employment
A	Agriculture, Forestry, and Fisheries	10,40	33,01
B	Mining, and Excavation	5,02	0,63
C	Manufacture	30,31	14,62
D	Procurement of Electricity, Gas	0,28	0,16
E	Water Supply, Waste Management, Waste and Recycling	0,10	0,34
F	Construction	9,22	6,72
G	Wholesale and Retail Trade, Car, and Motorcycle Repair	17,98	18,49
H	Transportation and Warehousing	2,70	3,34
I	Provision of Accomodation and Food and Drink	5,18	7,19
J	Information and Communication	6,62	0,60
K	Financial Services and Insurance	2,57	1,11
L	Real Estate	1,83	0,17

Code	Sectors	GDPR	Employment
M, N	Company Service	0,76	1,12
O	Government Administration, Defense, and Social Security Mandatory	2,16	2,19
P	Education Service	2,84	4,22
Q	Health Service and Social Activities	0,76	1,22
R, S, T, U	Other Service	1,27	4,90
Total		100	100

Source: Statistic Indonesia

Table 1 describes the percentage share of GRDP and East Java workers from the business field in 2020, which in terms of GRDP share shows the 3 largest sectors, namely the manufacture at 30.31%, wholesale and retail trade, car and motorcycle repair at 17.98%, and agriculture, forestry and fisheries at 10.40%. In the share of labor, the 3 largest sectors are equal to the share of GRDP, namely agriculture, forestry and fisheries at 33.01%, wholesale and retail trade, car and motorcycle repair at 18.49%, and the manufacture at 14.62%. This condition shows that even though a sector can provide the largest share of GRDP, it is not necessarily able to absorb a high workforce and vice versa.

Even though East Java's GRDP share at the national level occupies the 2nd highest position after DKI Jakarta, in terms of East Java's economic fundamentals, its economic growth during the 2019-2020 period has decreased due to the impact of the Covid-19 pandemic. Economic growth will improve (recovery) in 2021. Although experiencing recovery, East Java's economy in terms of GRDP share and employment per sector is still dominated by 3 sectors, namely agriculture, forestry and fisheries, manufacture, and wholesale and retail trade, car and motorcycle repair.

Based on this description, it is necessary to take steps to maintain the fundamentals of

East Java's economic growth in the future by determining priority sectors as a step for development, strengthening, and equitable distribution of economic income between regions and between sectors. Strengthening the fundamentals of economic growth is one of the important elements in achieving public welfare.

Economic performance in an area can not only be seen through the contribution of a sector to the total economy in the area but can also be seen based on the relationship of the sector to other sectors. That is, how a sector can influence and give effect to the activities of other economic sectors in the area. The contribution of a sector to the total economy, as well as the linkages that occur between sectors, will provide a comprehensive picture of integration in economic development in a region. One of the tools that can be used is the Regional Input-Output Table (Regional I-O Table). Regional I-O tables are prepared to present an overview of the interrelationships and interrelationships between sectors in the economy in a region over a certain period (usually one year). In addition, to show the role of each region and the interdependence between these regions, the Inter-Regional Input-Output (IRIO Table) is also used (Hidayah & Sunarjo, 2021).

This study not only aims to determine the strengthening of economic fundamentals in terms of economic growth in East Java only through the role of inter-sectors (both from the use of output, distribution, and consumption)

but also aims to determine the multiplier effect on other regions. This research requires an analytical method approach and database in the analysis of direct and indirect linkages between sectors and knowing the effect of East Java's economic activity on other regions by using the 2016 Inter-Regional Input-Output (IRIO) analysis, where IRIO data can be obtained at the Statistic Indonesia (Statistic Indonesia., 2021).

Input-Output Analysis is a comprehensive analysis model in looking at the interrelationships between economic sectors as a whole in the concept of a balance between total input (supply) and total output (demand) in the flow of transactions between actors in the economy of a region. Each economic sector has linkages to other sectors capable of providing a multiplier effect in terms of meeting the production input needs of that sector and as input to other sectors (Lestari, 2018)

Growth and development at the regional level is an illustration of the existence of regional autonomy in the concept of bottom-up planning by taking into account the goals and objectives of national development. Methods of measuring regional growth and development include using an input-output model that can measure economic linkages between sectors from the side of the pull and push towards upstream and downstream industries, which not only measures one region but also measures inter-regional linkages in the IRIO (Inter-regional Input Output) concept (Zuhri, 2018)

Armelly analyzed the leading sectors in the Indonesian economy through an input-output model approach by aggregating from 17 to 9 sectors which were analyzed using Microsoft Excel. The results of the analysis show that the manufacturing industry has the highest forward linkage, indicating that the agricultural sector can provide a very significant boost to Indonesia's economic

growth. There is a very close relationship with the agricultural sector, where the manufacturing sector is the largest contributor to inputs to the agricultural sector (Armelly et al., 2021).

Determining the potential/ leading sector or hereinafter referred to as the lever sector or the Lever sector requires other economic indicators that not only show the economic structure but can also comprehensively explain the inter-sector linkages and multiplier effects caused by the economic activity of the sector (Nugroho, 2020).

Sector linkages are not only calculated at the national level but also the regional level (provincial/ district-city). Calculations at the regional level in Southeast Sulawesi Province using input-output analysis and combining other analytical methods, namely Location Quotient (LQ) and Shift-Share. The research resulted in various criteria, namely the basic sector and sectors that experienced low and high growth. Meanwhile, in terms of the input-output model, it shows the criteria regarding the multiplier effect, forward and backward linkages (Subanti & Hakim, 2009).

The spreading power of a standard assessment of backward linkages between economic sectors in a region. Spreading power shows the amount of domestic output generated by economic activity due to an additional 1 unit of final demand from the supplier. Cause if there is an increase of 1 unit of final demand the greater the sector's output growth will be (Perwitasari et al., 2013).

The analysis of the Input-Output (I-O) model is to determine the intensity of the linkage between the productive sectors which is divided into 2 parts, namely the forward linkage (FL) and backward (BL). Based on these coefficients, business fields can be classified into 4 groups in quadrant format, namely (Arifah, 2021); (1) Leading sector: industry group that has high forward and backward linkages ($BL > 1$ and $FL > 1$), (2) Mainstay sector: industry group that has high forward but low backward linkages (BL

< 1 and $FL > 1$), (3) Potential sector: the industry group that has low forward linkage but high backward linkage ($BL > 1$ and $FL < 1$) and, (4) Lagging sector: industry group that has low forward and backward linkages ($BL < 1$ and $FL < 1$)

Input-output analysis has also been used to analyze the effect of investment on the tourism sector in the Maritime Province of Maluku which is expected to be able to contribute to the Maluku economy (Malba & Taher, 2016). I-O is also used to determine the linkage of upstream and downstream industries, as was done (Yunitasari & Priyono, 2021) by taking into account the sugarcane cultivation industry which shows that the sugar industry has high downstream linkages to increase the income of sugarcane farmers.

Many studies on inter-sector linkages and multiplier effects in the regional economy in the input-output model have been carried out, including (Wijaya et al., 2014; Muryani & Swastika, 2018; Widayawati, 2017; Ghani, 2021; Junari et al., 2020; Ariska et al., 2016; Widayawati, 2017; (Hotman, 2020; Amir & Nazara., 2005; Jannah & Tasriah, 2022; Muchdie et al., 2019). Which the majority still use the 2015 East Java Input-Output data and only determine the magnitude of the influence of direct and indirect (forward-backward) linkages.

The research conducted this time will provide an update on the 2016 Interregional Indonesia data released in 2021 and aims to determine the economic fundamentals of East Java as seen from the strength of each sector which is divided into 4 quadrants, namely Leading, Mainstay, Potential and Lagging.

It is hoped that it will be used as a reference by the government in making policies regarding the priority scale of the sector which will be encouraged by its development from the downstream and

upstream sides after the recovery of the Covid-19 pandemic.

This research refers to Santos (2020), which has similarities regarding post-pandemic prevention and improvement by looking at the workforce and Siala et al., (2019), which uses the same interregional table even though it discusses a sustainable European energy system, but this study has a difference, namely encouraging absorption from a post-pandemic workforce.

Haddad et al., (2022), this study uses the IRIO table but differs in the shock it uses, which is to map the interdependencies formed between the consumption decisions of drivers using the 99 app, a leading e-hailing provider, and other sectors and segments of the Brazilian economy.

There are similarities in the study conducted by Sauian et al., (2013), which discusses labor but has differences, namely in and labor productivity in Malaysia but in this study discusses the impact of labor absorption in each sector.

Liping & Bin (2010), include exogenous variables in the form of CO₂ reduction data focusing on supply chain emissions of CO₂ emissions from each sector, e.g, agriculture, industry, transportation and tertiary industry from its upstream.

Zuhdi et al., (2014), to investigate the dynamics of the total output of the Japanese livestock sector caused by changes in final demand. This study uses input-output analysis as an analytical tool and two conditions to describe the changes which have similarities in analyzing the multiplier effect of changes in final demand but in terms of differences, this study only refers to commodities.

Zuhdi et al., (2013) to analyze the dynamics of the total output of the Japanese creative industry sector caused by changes in final demand.

Table I-O is a statistical description in the form of a matrix that presents information about transactions of goods and services as well as the

interrelationships between one sector and another, in an area at a certain period (Cahyo et al., 2014).

Table 2. Inter-Regional Input Output (IRIO) Indonesia

Description				Middle Demand				Final Demand								Output Total
				Province Aceh Industry/ Sector		Province Papua Industry/ Sector		Province Aceh				Province Papua				
								C	I	G	X	C	I	G	X	
				1	17	1	17	1	-	-	17	1	-	-	17	
Middle Input	Province Aceh	Industry	1	Z _{1.1A} A	Z _{1.17AA}	Z _{1.1AB}	Z _{1.17AB}	C ₁	I ₁	G ₁	X ₁	C ₁	I ₁	G ₁	X ₁	F ₁
		Industry	17	Z _{17.1A} A	Z _{17.17A} A	Z _{17.1A} B	Z _{17.17A} B	C ₁₇	I ₁₇	G ₁₇	X ₁₇	C ₁₇	I ₁₇	G ₁₇	X ₁₇	F ₁₇
	Province Papua	Industry	1	Z _{1.1BA}	Z _{1.17BA}	Z _{1.1BB}	Z _{1.17BB}	C ₁	I ₁	G ₁	X ₁	C ₁	I ₁	G ₁	X ₁	F ₁
		Industry	17	Z _{17.1B} A	Z _{17.17B} A	Z _{17.1B} B	Z _{17.17B} B	C ₁₇	I ₁₇	G ₁₇	X ₁₇	C ₁₇	I ₁₇	G ₁₇	X ₁₇	F ₁₇
	Primary Input				V ₁	V ₁₇	V ₁	V ₁₇								
	Impor				M ₁	M ₁₇	M ₁	M ₁₇								
Input Total				F ₁	F ₁₇	F ₁	F ₁₇									

An important aspect of the IRIO (Interregional Input-Output) model is its ability to measure and model economic interrelationships between regions. IRIO is good at tracking the effects of exogenous

changes on a region's economy. IRIO can see the movement of goods flows between sectors and between regions and estimate the effect of these movements on several regions.

Tabel 3. Input Output East Java

Description			Middle Demand		Final Demand	Output Total
			Industry	Industry		
			1	17		
			Quadrant I		Quadrant II	
Middle	Industry	1	Z _{1.1}	Z _{1.17}	F ₁	X ₁
Input	Industry	1	Z _{17.1}	Z _{17.17}	F ₁₇	X ₁₇
			Quadrant III			
Primary Input			V ₁	V ₁₇		
Impor			M ₁	M ₁₇		
Input Total			X ₁	X ₁₇		

The output of a region is not only used for production sectors in the region itself but is also exported to other regions, the inputs used by a region not only come from the region itself but are also imported from other regions. Thus, an analysis like this can describe inter-regional trade and regional production. In this analysis, it is also possible to capture the spillover effect and inter-regional feedback effect (Kartika, n.d.).

Identifying potential sectors in the economy of Banjar Regency using input-output analysis. The results show that (1) Manufacture; (2) Transportation, Warehousing, and Communication; (3) Finance, Real Estate, and Corporate Services; (4) Electricity, Gas, and Water, and (5) Construction is a potential sector in Banjar Regency. This sector needs to be developed because expanding this sector is

expected to encourage other sectors (Hafizh, 2021).

METHOD

Research with descriptive quantitative approach. The data used in this study is data sourced from the Central Statistics Agency, namely the Indonesian Interregional Input-Output Table (IRIo) 2016 with a classification of 17 sectors. The data used is the 2016 Interregional Input-Output Table Publication data for the 2021 Fiscal Year, this shows that the data used is the latest data released so that it is still suitable to be used as basic research data in the following year.

The Input Coefficient Matrix is a matrix that describes the amount of input needed by a sector in producing output, both inputs from other sectors and from the sector itself Daryanto & Hafizrianda (2010), which are formulated as follows:

$$A_{ij} = Z_{ij} / X_j \quad (1)$$

Information:

a_{ij} : Coefficient of input sector j of sector i

Z_{ij} : Use of sector j input from sector i

X_j : sector output j

The Leontief Inverse Matrix is a multiplier that determines the magnitude of the change in the overall sector if the total production of a sector changes. Then the multiplier can be calculated using the following formula (Daryanto & Hafizrianda, 2010).

$$X = [I - A]^{-1} Y \quad (2)$$

Information:

X : total output vector

Y : final demand column vector

I : identity matrix of size n sectors

A : technology matrix or input coefficient matrix

The direct forward linkage shows the effect of a particular sector on the sectors that use a portion of the output of that sector

directly per million of the total increase, formulated as follows.

$$FL_i = \sum_{j=1}^n a_{ij} \quad (3)$$

Information:

FL_i : Direct forward linkage to sector i

a_{ij} : Technical coefficient matrix element or direct coefficient

The direct backward linkage shows the effect of a particular sector on the sectors that provide intermediate inputs for the sector, formulated as follows.

$$BL_i = \sum_{i=1}^n a_{ij} \quad (4)$$

Information:

Bli : Direct link behind the j sector

a_{ij} : Technical coefficient matrix element or direct coefficient

The forward indirect direct relationship shows the impact of a particular sector on sectors that use the output for that sector directly or indirectly per million increase in total demand, formulated as follows.

$$FLTL_i = \sum_{j=1}^n a_{ij} \quad (5)$$

Information:

$FLTL_i$: Direct and indirect link to the i sector

a_{ij} : Leontief inverse matrix element in open model

The direct backward linkage shows the effect of a particular sector on the sectors that provide intermediate inputs for that sector directly or indirectly per million increase in total demand. formulated as follows.

$$BLTL_i = \sum_{i=1}^n a_{ij} \quad (6)$$

Information:

$BLTL_i$: Direct and indirect link to the j sector

a_{ij} : Elements of an open model leontief inverse matrix

The analysis of the Input-Output (I-O) model is to determine the intensity of the linkage between the productive sectors which is divided into 2 parts, namely the forward linkage (FL) and backward linkage (Backward Linkage/BL). Based on these coefficients,

business fields can be classified into 4 groups in quadrant format, namely Arifah (2021), leading sector is a industry group that has high forward and backward linkages ($BL > 1$ and $FL > 1$), mainstay sector is a industry group that has high forward but low backward linkages ($BL < 1$ and $FL > 1$), potential sector is a industry group that has low forward linkage but high backward linkage ($BL > 1$ and $FL < 1$), lagging sector is a industry group that has low forward and backward linkages ($BL < 1$ and $FL < 1$).

The dispersion power index is a comparison of the linkages of a sector to the average linkage of sectors in an economy which can be calculated using the following formula (Daryanto & Hafizrianda, 2013).

$$a_{ij} = (\sum_i i^{n-1} a_{ij}) / (1/n \sum_i \sum_j a_{ij}) \quad (7)$$

Where ij is the index of the dispersion of sector j , which is the result of the divisor of the number in the inverse Leontief matrix column to the total linkage of the average sector j .

$$B_{ij} = (\sum_i i^{n-1} a_{ij}) / (1/n \sum_i \sum_j a_{ij}) \quad (8)$$

Where ij is the index of the degree of sensitivity of sector j , which is the result of dividing the number of rows of the inverse Leontief matrix to the total linkage of the average sector j .

Aims to find out how far the influence/ impact of the increase in final demand in a sector in the economy of a region is on the output of other sectors (including the sector itself), either directly or indirectly.

$$MOS_j = \sum_{i=1}^n a_{ij} \quad (9)$$

Information:

MOS_j : j sector output multiplier

a_{ij} : Leontief inverse matrix element in open model

The magnitude of the increase in income in the economic sector due to an increase in the final demand for the output

of a sector by one indicates that if the demand for the output of a sector increases by 1 unit, it will increase the income of households working in all sectors of the economy by the value of the income multiplier of the relevant sector.

$$MPS_j = \sum_{i=1}^n (\alpha_n + 1, i \cdot a_{ij}) / (\alpha_n + 1) \quad (10)$$

Information:

MPS_j : j sector revenue multiplier

$n+1, j$: Coefficient of input salary/ wages of household sector j

a_{ij} : Leontief inverse matrix element in open model

A large number of job opportunities are available in this sector and other sectors as a result of an increase in the final demand from a sector by one unit directly or indirectly.

$$MLS_j = \sum_{i=1}^n (W_n + 1, i \cdot a_{ij}) / (W_n + 1) \quad (11)$$

Information:

MPS_j : j sector revenue multiplier

$n+1, j$: Coefficient of input salary/ wages of household sector j

a_{ij} : Leontief inverse matrix element in open model

This simulation aims to see the impact of changes in final demand on output. The final demand in the input-output model consists of household consumption, consumption of non-profit institutions, government consumption, capital formation, investment changes, and exports.

Final demand is a product of goods and services used as an indicator of public welfare. Simulation analysis is used to determine changes in exogenous variables to the endogenous balance in Table I-O where the simulation results will be used as the formulation of policy implications.

$$O = \hat{O} [I-A]^{-1} FD \quad (12)$$

Information:

O : Output matrix

\hat{O} : Output coefficient matrix

$[I - A]^{-1}$: Multiplier matrix

FD : Final Demand

1 RESULTS AND DISCUSSION

Table 4 describes the condition of the framework for the demand and supply of goods and services in East Java Province in 2016. Based on the final demand structure (use) shows the results where the majority of products from goods and services are re-used as inputs in the production process or better known as demand between by 36.20%.

Then household consumption (23.99%), LNPRT consumption (0.53%), government consumption (2.42%), gross

fixed capital formation (12.43%), changes in inventory (0.74%). On the other hand, East Java also carries out economic activities, namely exports between other provinces of 17.70% where this percentage is greater than foreign exports which only amounted to 5.98%. However, the supply structure only consists of 3 components, namely the source of goods and services in East Java, which is dominated by domestic output of 81.06%. As well as goods and services originating from other provinces by 12.14% while those from foreign imports amounted to 6.80%.

Tabel 4. Structure of Demand - Supply of Goods and Services East Java Province

Code	Descriptions	Value (Billion Rp)	Distribution to Final Demand (%)	Distribution of Gross Domestic Product (%)
3011	Household consumption	1.007.529.511	37,60	29,59
3012	LNPRT consumption	22.102.204	0,82	0,65
3020	Total Government Consumption	101.832.094	3,80	2,99
3030	Gross Fixed Capital Formation	522.200.013	19,49	15,34
3041	Inventory Change	31.259.988	1,17	0,92
3071	Total Overseas Exports	251.204.339	9,37	7,38
3072	Total Exports Between Provinces	743.544.965	27,75	21,84
3090	Total Final Consumption	2.679.673.114	100	
2000	Input Middle Import Overseas	285.774.587		8,39
2001	Input Middle Inter-Province Imports	509.791.126		14,97
GDRP Expenditure		3.404.869.618		100

Source: Interregional Input-Output Indonesia

The table shows that the rotation of the economy in East Java both from the demand and supply side is still dominated by domestic activity which is reflected in the intermediate demand (36.20%), household consumption (23.99%) and domestic output (81.06%).

Table 5 shows the results of direct and indirect linkages to the upstream and downstream industries of the 17 business fields. Where in the analysis of direct linkages in a sector of IDR (million) will indicate that every increase in 1 output will increase output

in other sectors originating from the output of that sector which is known as an intermediate input in the production process by IDR (million).

Simultaneously, it will trigger an increase in the use of other sector outputs as inputs (indirect linkages in the future) of IDR (million). So, it is assumed that the increase in final demand by 1 output of the sector will, directly and indirectly, encourage the development of the downstream industry by IDR (million). Simultaneously, it will also trigger an increase in the use of other sector outputs as inputs

(indirect backward linkage) of IDR. This condition illustrates that when there is an increase in final demand for 1 output, it will, directly and indirectly, encourage the development of the upstream industry by IDR (million).

Analysis of several sectors was able to show positive results that were able to provide additional value from the additional amount of output as well as the direct linkage of the manufacturing industry sector of 1.23 million, indicating that every increase in 1 output will increase the output of other sectors originating from the output of that sector as intermediate inputs in the production process amounted to 1.23 million.

Simultaneously, it will trigger an increase in the use of other sector outputs as inputs (indirect linkage going forward) by 1.59 million. So, it is assumed that the increase in final demand by 1 output of the manufacturing sector will directly and indirectly encourage the development of the downstream industry by 2.81 million. Simultaneously, it will also trigger an increase in the use of other sector outputs as inputs (indirect backward linkage) of 0.29 million. This condition illustrates that when there is an increase in final demand for 1 output, it will directly and indirectly encourage the development of the upstream industry by 1.52 million, as well as other sectors.

Table 5. Direct and Indirect Linkages (Forward – Backward)

Code	Direct Linkage	Backward Linkage			Forward Linkage		
		Indirect	Value	Coefficient/ Impact of Spread	Indirect	Value	Coefficient/ Impact of Spread
A	1,05	0,16	1,21	0,84	0,38	1,43	1,00
B	1,01	0,21	1,22	0,85	0,37	1,38	0,96
C	1,23	0,29	1,52	1,06	1,59	2,81	1,96
D	1,58	0,39	1,98	1,38	0,66	2,25	1,56
E	1,01	0,40	1,40	0,98	0,00	1,01	0,70
F	1,04	0,54	1,58	1,10	0,13	1,17	0,81
G	1,02	0,29	1,31	0,91	0,81	1,83	1,27
H	1,05	0,39	1,44	1,00	0,43	1,48	1,03
I	1,01	0,47	1,48	1,03	0,19	1,20	0,84
J	1,19	0,34	1,53	1,06	0,40	1,59	1,11
K	1,06	0,20	1,25	0,87	0,31	1,36	0,95
L	1,01	0,20	1,22	0,85	0,23	1,24	0,86
M, N	1,07	0,48	1,56	1,08	0,39	1,46	1,02
O	1,00	0,43	1,43	0,99	0,03	1,03	0,71
P	1,01	0,38	1,39	0,97	0,01	1,03	0,71
Q	1,01	0,51	1,52	1,06	0,04	1,06	0,74
R, S, T, Y	1,01	0,41	1,42	0,99	0,10	1,11	0,77

Source: Interregional Input-Output Indonesia

Table 5 show the classification of 4 quadrants with 17 sectors using the results of the backward linkage coefficient and forward linkage too.

Leading sectors: manufacture, procurement of electricity, gas, transportation and warehousing, information and communication, company services.

Mainstay sectors: agriculture, forestry and fisheries, wholesale and retail trade; car and motorcycle repair.

Potential sectors: construction, provision of accommodation and food and drink, health services and social activities.

Lagging sectors: mining and excavation, water supply, waste management, waste and recycling, financial services and insurance, real estate, government administration, defense and social security mandatory, education services, other services.

Table 6. Quadrants Backward Linkage and Forward Linkage

Forward Linkage (FL) Backward Linkage (BL)	Backward Linkage > 1	Backward Linkage < 1
	Leading Sectors	Mainstay Sectors
Forward Linkage > 1	<ul style="list-style-type: none"> - Manufacture - Procurement of Electricity, Gas - Transportation and Warehousing - Information and Communication - Company Service 	<ul style="list-style-type: none"> - Agriculture, Forestry and Fisheries - Wholesale and Retail Trade, Car and Motorcycle Repair
Forward Linkage < 1	Potential Sectors <ul style="list-style-type: none"> - Construction - Provision of Accommodation and Food and Drink - Health Services and Social Activities 	Lagging Sectors <ul style="list-style-type: none"> - Mining and Excavation - Water Supply, Waste Management, Waste and Recycling - Financial Services and Insurance - Real Estate - Government Administration, Defense and Social Security Mandatory - Education Services - Other Services

Source: Interregional Input-Output Indonesia

The Impact of Spread indicates more than (> 1) that the sector can attract the development of its upstream industry and stimulate the growth of other sectors when there is an increase/ change in output including manufacture, procurement of electricity, gas, construction, transportation and warehousing, provision of accommodation and food and drink, information and communication, company services, health services, and social activities.

Meanwhile, in conditions that indicate less than (< 1) that the sector is unable to attract the development of its upstream industry and stimulate the growth of other sectors when there is an increase/ change in output, including agriculture, forestry and

fisheries, mining and excavation, water supply, water supply, waste management, waste and recycling, wholesale and retail trade, car and motorcycle repair, financial services and insurance, real estate, government administration, defense and social security mandatory, education services, and other services.

The degree of sensitivity indicates more than (> 1) that the sector can meet the final demand above the average and is able to stimulate the growth of its downstream industry when there is an increase/ change in output including agriculture, forestry and fisheries, manufacture, procurement of electricity, gas, wholesale and retail trade, car and motorcycle repair, transportation and warehousing,

information and communication, company services.

While in conditions that indicate less than (<1) that the sector does not meet final demand and fails to stimulate the growth of its downstream industry when there is an increase/ change in output including mining

and excavation, water supply, waste management, waste and recycling, construction, provision of accommodation and food and drink, financial services and insurance, real estate, government administration, defense and social security mandatory, education services, health services and activities social, other service.

Table 7. Impact of Changes in Output on Components of Final Demand

Code	Household consumption	LNPR T consumption	Total Government Consumption	Gross Fixed Capital Formation	Inventory Change	Total Overseas Exports	Total Exports Between Provinces
A	92.313.593	440.371	1.901.270	25.493.265	9.669.051	25.785.999	122.755.561
B	7.534.459	116.686	655.879	32.136.593	332.115	15.942.347	57.804.118
C	317.548.004	2.658.937	11.855.730	138.252.346	14.820.509	225.833.947	526.874.037
D	40.512.274	747.617	3.382.804	7.155.343	499.105	7.541.855	29.774.179
E	2.197.844	22.334	78.796	45.385	3.388	74.565	400.167
F	6.635.920	137.261	2.313.525	384.953.313	39.306	644.997	1.703.612
G	128.807.916	883.924	5.643.764	60.433.868	3.589.003	47.583.105	129.924.640
H	75.150.778	576.484	5.191.110	14.598.184	920.732	15.907.578	47.257.321
I	106.958.929	460.720	3.166.878	1.615.869	112.599	3.659.984	34.733.557
J	68.991.693	851.421	2.793.751	5.312.750	235.044	4.971.319	32.554.467
K	40.485.994	197.696	1.621.337	5.341.909	332.061	4.442.182	24.592.462
L	73.264.749	425.414	1.378.644	3.757.590	168.056	2.735.068	10.287.450
M,N	19.280.050	233.040	3.275.645	8.462.846	245.257	7.429.742	21.168.437
O	1.211.018	9.142	56.972.314	1.660.830	13.438	808.339	691.517
P	41.315.412	1.346.615	29.596.420	154.936	9.742	252.075	2.465.710
Q	24.902.665	703.295	8.767.132	511.323	22.395	891.945	5.076.225
R, S, T, U	41.016.131	18.013.297	729.591	2.604.059	203.236	3.058.060	10.261.332
Total	1.088.127.429	27.824.255	139.324.590	692.490.409	31.215.038	367.563.106	1.058.324.792

Source: Interregional Input-Output Indonesia

Analysis of changes in final demand in terms of household consumption, investment, and exports showed positive results, indicating that public consumption activities, business investment, and exports abroad were able to move the wheels of the economy.

Household Consumption: Changes in output will greatly affect the final demand of the highest household consumption component in the manufacture sector (29.18%).

Consumption of LNPR T: Changes in output will greatly affect the final demand of the highest consumption component of LNPR T in other services sector (64.74%).

Gross Fixed Capital Formation: Changes in output will greatly affect the final demand

of the highest gross fixed capital formation component in the construction sector (55.59%).

Changes in Inventory: Changes in output will greatly affect the final demand of the highest component of inventory changes in the manufacture sector (47.48%).

Overseas Exports: Changes in output will greatly affect the final demand of the highest component of foreign exports in the manufacture sector (61.44%).

Inter-Provincial Exports: Changes in output will greatly affect the final demand of the highest inter-provincial export component in the manufacture sector (49.78%).

Changes in all components of final demand, several sectors can show the highest impact of changes in moving the economy. These include the manufacture, other services,

construction and government administration, defense and social security mandatory.

The manufacturing sector is the most dominant in changing final demand output,

where 4 components excel, namely household consumption, changes in inventory, foreign exports, and inter-provincial exports.

Table 8. Multiplier Effect (Output, Income dan Employment)

Code	Sector-Sector	Multiplier Effect		
		Output	Income	Employment
A	Agriculture, Forestry and Fisheries	1,210	0,425	0,027
B	Mining and Excavation	1,216	0,344	0,002
C	Manufacture	1,519	0,265	0,006
D	Procurement of Electricity, Gas	1,978	0,185	0,002
E	Water Supply, Waste Management, Waste and Recycling	1,404	0,271	0,008
F	Construction	1,583	0,367	0,006
G	Wholesale and Retail Trade, Car and Motorcycle Repair	1,307	0,404	0,009
H	Transportation and Warehousing	1,440	0,287	0,006
I	Provision of Accommodation and Food and Drink	1,478	0,414	0,011
J	Information and Communication	1,530	0,368	0,002
K	Financial Services and Insurance	1,252	0,345	0,004
L	Real Estate	1,216	0,101	0,001
M,N	Company Services	1,555	0,372	0,005
O	Government Administration, Defense and Social Security Mandatory	1,429	0,594	0,010
P	Education Services	1,390	0,548	0,014
Q	Health Services and Social Activities	1,522	0,359	0,008
R, S, T, U	Other services	1,424	0,440	0,012

Source: Interregional Input-Output Indonesia

Based on table 8 shows the results of the calculation of the impact of the multiplier on 17 sectors in the province of East Java, it shows positive results, this indicates that every increase in final demand by 1 output will be able to increase in terms of output, income and employment opportunities.

Output, the analysis of the output multiplier, it shows that an increase in final demand by 1 output will increase the production of other outputs in each sector. The procurement of electricity, gas sector became the sector that had the largest output multiplier impact of 1.978 million. Meanwhile, the lowest sector is agriculture, forestry, and fishery, which is only 1.210 million.

Income, the analysis of the income multiplier, it shows that an increase in final demand by 1 output will increase the production of other outputs in each sector. The government administration, defense and social security mandatory sectors are the sectors that have the largest revenue multiplier impact of 0.594 million. While the lowest sector is real estate, which is only 0.101 million

Employment, the analysis of the employment multiplier, it shows that an increase in final demand by 1 output will increase the production of other outputs in each sector. The agriculture, forestry, and fisheries sectors are the sectors that have the largest employment multiplier impact of 0.027 million. While the lowest sector is the mining and

quarrying sector, and information and communication only 0.002 million.

CONCLUSION

Based on the results of research conducted on the fundamentals of economic growth based on the ability of the linkages of each sector by using an input-output interregional aggregation analysis approach that focuses on the province of East Java, including.

Based on the quadrant results from the classification of forward and backward linkages, only 4 sectors are categorized as superior, namely the processing industry, electricity and gas supply, transportation and warehousing as well as information and communication.

Outcomes of Dissemination Power include the processing industry, supply of electricity and gas, construction, transportation and warehousing, provision of accommodation and food and drink, information and communication, company services, health services, and social activities.

The results on the degree of sensitivity include agriculture, forestry and fishery, processing industry, electricity and gas supply, wholesale and retail trade; Car and Motorcycle Repair and Maintenance, transportation and warehousing, information and communication, corporate services.

The results of changes in final demand show that the manufacturing sector is able to have a significant impact and dominate all elements of final demand when changes occur.

The highest yield of multiplier impact from the output side is the provision of electricity and gas. The revenue side is government administration, defense and

compulsory social security. The work side is agriculture, forestry, and fisheries

Based on the conclusions that have been made, it is hoped that it will be able to provide an overview and a reference to the East Java provincial government in taking/ determining a policy regarding economic growth.

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