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THE IMPACT OF TRANSPORTATION SECTOR ON THE ECONOMY OF CENTRAL JAVA PROVINCE, INDONESIA: INPUT OUTPUT APPROACH

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Abstract. The transportation sector has an important role in the economy of Indonesia, especially in the Central Java Province. This sector is the artery of the distribution of goods and people in the regions and countries, especially in supporting trade. In additionto the increasing share of Central Java's GRDP from year to year, this sector also absorbs a fairly high workforce. The businesses of this sector also include all levels of formal and informal community businesses from small to large scales. This study analyzes how the transportation sector supports the economy of Central Java by using the Input-Output approach. By applying the 2013 Central Java Input-Output table, the impact of transportation sector activities is examined through the input provider sector (including imported inputs other than domestic), as well as the product buyers' sector of the transportation sector. Based on the path analysis, it can be identified the dependence of other production sectors on the transportation sector. Then, it can be examined the impact of change in final demand and primary input in this sector on economic and sectoral output.

Keywords: transportation, input-output analysis, input coefficient, output coefficient output multiplier, input multiplier.

Introduction

The current pandemic has hit transportation sector very badly since the complex development of Indonesia rely heavily on this sector. All transportation modes in Indonesia are affected by the regulation of social distancing and physical distancing policies. The policies followed up with massive restriction to the people to work from home, learn from home, and worship from home, as well as the closure of tourist sites have limited the movement of people and lead to an extreme declination of passengers using transportations in all modes.

The development of economy aspects on transportationsector is defined as indicators to measure the impact of transportation sector on the economy of the country. It is higlighted the importance of maintaining the full spectrum of national transportation system capacity in broad economy. When ransportationsystems are efficient, they provide economic and social opportunities and benefits that result in positive multipliers effects, such as better accesibility to markets, employment and additional investments (Kuzmina-merlino, Skorobogatova, Schmidtke, & Behrendt, 2018). The economic and financial aspects of development ontransportation infrastructure are interconnected because the enhancement of the investment policies creates a favorable effect on economic growth of the country and improves the quality of life of the population (Irina, et al 2012). Investment and its effective use are required to provide the long-term development of this sector.

The important role of the transportation sector is usually indicated by the size of the output of the sector and its contribution in the economy. Like all industries, the transportation sector has strong linkages to other sectors. It is the road that create derivative demand in transportations and logistics industry, mainly because its function to connect and support the industry activities (Handayani, Mulyani, & Iqbal, 2019). The assimilation of investment in the transport sector,

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above all, in the transport infrastructure brings real economic benefits in the form of gross national product gowth and improvement of the life quality of people as evidences by official statistics (Kuzmina-merlino et al., 2018).

Productivity of a region is represented by domestic products, while the people welfare can be seen from its revenues, after net factor income abroad has been calculated. Gross Regional Domestic Product (GRDP) basically is the sum of value added to the products by all unit of production in a region or total value of final goods and services produced by all unit of economy in domestic region for final consumption purpose. It is a regional statistics income that can be used for economic development, planning, and also evaluation (BPS, 2019).

Table 1. Selected Indicators of Gross Regional Domestic Product of Central Java Province at Current Market Prices by Expenditure, 2015-2019 (Million Rp)

Expenditure	Year				
	2015	2016	2017	2018	2019
Transportation and Communication Consumption Expenditure	162,807,624.49	170,192,764.50	186,254,261.08	197,885,828.71	214,614,672.94
Gross Fixed Capital Formation - Buildings	262,657,557.47	285,665,294.88	313,778,521.65	348,207,109.97	376,637,221.79
Export of Goods and Services	386,061,414.34	409,662,211.80	465,273,262.09	538,430,694.44	578,019,141.38
Import of Goods and Services	414,974,439.46	424,465,130.06	498,879,893.01	578,944,062.86	618,240,864.57

Source: selected indicators (BPS, 2019)

According to the Indonesian Central Agency of Statistics or *Badan Pusat Statistik* (BPS), GRDP data is one of macro economy indicators that can provide the economic condition annualy. Java Island contributes about 59 percent of Indonesia GRDP, while in Central Java Province, GRDP of Transportation and Communication Expenditure at current market price reaches about 15 percent in 2019 (BPS, 2019).

At a glance, the figures describes differences in ownership of resources and limitations of each region in Indonesia in supporting the needs of residents of an area as the results of the exchanges of goods, service, information, people and funds between regions. This exchange refers again to economic theory through the process of demand and supply. To support this process, transportation facilities are needed.

Table 2. Growth Rate of Transportation and Storage Sector - GRDP of Central Java at 2010 Constant Market Price by Industry (Percent), 2016 – 2019

Sector and Sub Sectors	2016	2017	2018*	2019**
Transportation and Storage	4.91	6.30	7.55	8.49
Railways Transport	10.74	13.97	14.14	9.16
Land Transport	4.57	6.08	6.87	8.45
Sea Transport	7.05	5.03	11.19	11.32
River, Lake, and Ferry Transport	12.86	10.17	2.46	2.05
Air Transport	5.69	8.81	8.87	2.40

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Sector and Sub Sectors	2016	2017	2018*	2019**
Warehousing and Support Services for Transportation, Postal and Courier	4.62	8.28	11.61	9.80

Source: BPS, Central Java, 2020

Growth in the transportation sector can reflect the economic growth directly. This makes transportations have an important and strategic roles in the economy. The success of the transportation sector can be seen from the contribution of value added in the formation of Gross Domestic Product (GDP) and the ability of the sector to provide a multiplier effect that improves other sector as welland how this sector reduces the rate of inflation through the smooth distribution of goods and services throughout the country. Table 2 shows that the transportation sector in Central Java and its sub-sectors experienced positive growth in the 2016-2019 period. The growth of the transportation sector in 2019 had reached 8.49 percent. The transportation sub-sectors that are growing rapidly are the sea transportation sector (11.32 percent), the warehousing and supporting transportation services sector (9.8 percent) and the railroad transportation (9.16 percent).

Table 3 explains the proportion of the transportation sector among other economic sectors in contributing to the Central Java GDRP. The proportion of this sector in the economy in Central Java in 2019 reached 3.22 percent. There is an increase compared to the 2016-2018 period.

Table 3. Distribution of GRDP of Central Java at Current Market Price by Industry (Percent), 2016 – 2019

Industry	2016	2017	2018*	2019**
Agriculture, Forestry and Fishing	15.13	14.39	14.06	13.52
Mining and Quarrying	2.53	2.55	2.55	2.48
Manufacturing	34.69	34.58	34.41	34.42
Electricity and Gas	0.09	0.10	0.10	0.09
Water Supply, Sewerage, Waste Management and Remediation Activities	0.06	0.06	0.06	0.06
Construction	10.29	10.48	10.73	10.80
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	13.48	13.58	13.64	13.74
Transportation and Storage	3.11	3.11	3.12	3.22
1 Railways Transport	0.07	0.07	0.08	0.08
2 Land Transport	2.49	2.48	2.47	2.53
3 Sea Transport	0.23	0.22	0.23	0.24
4 River, Lake, and Ferry Transport	0.01	0.01	0.01	0.01
5 Air Transport	0.20	0.21	0.21	0.21
6 Warehousing and Support Services for Transportation, Postal and Courier	0.11	0.12	0.13	0.14
Accommodation and Food Service Activities	3.10	3.09	3.11	3.21
Information and Communication	3.04	3.34	3.47	3.64
Financial and Insurance Activities	2.93	2.98	2.96	2.89
Real Estate Activities	1.67	1.69	1.69	1.68
Business Activities	0.36	0.38	0.40	0.42
Public Administration and Defense; Compulsory Social Security	2.87	2.82	2.73	2.67
Education	4.27	4.41	4.50	4.62
Human Health and Social Work Activities	0.86	0.87	0.89	0.90
Other Services Activities	1.52	1.56	1.59	1.63

Source: BPS, Central Java, 2020

The development of the transportation sector in Central Java is supported by the construction of toll road infrastructure that drives direct and indirect economic growth. Toll road of Trans Java with a total length of 1,350 kilometers has been operated since 2019. This toll road infrastructure development will then be continued with the construction of 12 toll roads in Java through Central Java Province, namely: (1) Solo-Yogyakarta-NYIA (Kulonprogo) Section, with

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a road length of 93.2 kilometers and an estimated investment of Rp. 28,58 trillion. This investment status is still in the process of investment auction for the submission of bid proposal documents. (2) Yogyakarta-Bawen Section, 76.4 kilometers long, estimated investment of Rp. 17.38 trillion. The status of the investment auction is still in process with aandwidzing plan on June 17, 2020. (3) Balikpapan- North Panajam Paser section, 7.9 kilometers long, estimated investment of Rp. 15.53 trillion. The status in the investment auction is still in process, technical documents are adjusted to IKN Plan (Bisnis Indonesia, 28 June 2020).

The development of transportation infrastructures will directly increase the share of the transportation sector for regional economic growth., Since it will indirectly create new jobs, there will be an increasing in the amount of employment and reducing unemployment (Silondae, 2016; Jain, 2017; Farurida & Oktavilia, 2020). In the end, an increase in the number of workers and a faster distribution of output can boost regional income.

In Input Output Analysis, the transportation sector covers and analyzes Rail Transport Service, Road Transport Service, Sea and Coastal Transport Service, Air Transport and transportation support service.

Some problems that arise in the transportation sector are the level of regional economic growth that has not been optimal compared to the rapid development of transportation infrastructure investment problems and policy instruments that do not fully support the related sectors, and the practice of high cost economy.

The purpose of this study is to analyze how the transportation - especially Road and Railway transportation - sector input provider lines (including non-domestic import inputs), as well as the buyers of the transportation sector output, provide support (impact) on sectoral and total economy in Central Java if this sector changes.

Literature Review

The economic theory of development presented by Lewis states that optimal pareto conditions will be achieved if the mobility of the production factor such as labor moves without obstacles. This can spur economic growth (Jhingan, 2007). If the mobility of production factors is low, an area will experience slowing economic growth.

According to Lewis, regions with high poverty rates usually have low factor mobility between regions. Therefore, the role of transportation is needed as a medium of interaction between regions, namely moving goods and services from one place to another (Marlok, 1991).

Transport sector activities, in addition to playing an important role in the distribution of goods and services within the country and between countries, are also strategic components in the distribution and economic growth, flow of people and goods, information flow, flow of funds (financial flow) that need to be managed quickly and accurately to meet the demand of timelines (Silondae, 2016). The existence of quality transportation requires adequate transportation infrastructure. In every economic activity, transportation infrastructure acts as a basis to ensure the smooth flow of goods and public movement as input and output from all economic sectors. Therefore, the availability of transportation services and the improvement of transportation services are inseparable from the development of quality transportation infrastructure (Jain & Kumar, 2017).

The role of government in infrastructure provision is discussed in Wagner's Law. This law states that there is a positive relationship between economic growth and the amount of government spending on public infrastructure development. Wagner states that government spending will grow faster than GDP, or the elasticity of government spending on GDP is greater than one. If per capita income increases, government spending will relatively increase.

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Wagner's law takes evidence of empirical observations from developed countries (Akitoby, Clements, Gupta & Inchauste, 2006). Government spending has increased to fund community demands for mobility that supports economic activities.

Several studies examining transportation as an important part of a country's economic activities,is presented by Pupavac and Golubovic (2015). They state that developing countries need to invest maximally in the field of transportation infrastructure and trade logistics to enhance recovery from the current economic crisis so that the commodities of these countries become more competitive. This is supported by Slack's (2003) study which states that in the context of global logistics network, every country or region that has beaches and seas, needs to strengthen the transportation network and infrastructure of each coastal port because economic activity in the world is almost an integral part of a network. In addition to land and air transportation, in recent periods, the function of the port has become increasingly important as a node and backbone of the transportation, trade and logistics network, because it plays a very important role as a node in the global supply chain (Bichou & Gray, 2004; Wang, 2011). The greater economic activity will increase the mobility of people or goods between countries.

The transportation sector has five sub sectors, namely rail transportation, land transportation, sea transportation, air transportation, and transportation support services (Vanany, 2015). The Five transportation sub-sectors aside from being the main supporters of distribution activities can also be used to promote regional competitiveness, solve economic, social, various environmental problems, facilitate and support the management of supply chains of goods and services (Muromachi, et.al 2018). Panayides & Song (2009) and Patalinghug (2015) stated that supply chain management activities require good transportation infrastructure as a way of integrating business, especially in the distribution of goods, starting from the place of raw materials to consumers or end users. Transportation activities supporting supply chain management activities are ranging from the supply of raw materials, production processes, distribution, retail, consumer, warehousing and transportation. They are conducted through information system to increase the value of the parties concerning to meet the needs. In addition to the role of the transportation sector in strengthening supply chains, previous research was also developed for the purpose of making transportation models within an inter-sectoral analysis framework. Assessment of the impact of transport and transportation has supported the services to the economy of a region (Brocker, 1998; Kim et al., 2004, 2011; Munk, 2006; Oosterhaven and Knaap, 2003)

Method

The input-output is a general equilibrium approach that can show the overall impact of a production sector on the economy and welfare on the basis of inter-sectoral linkages. The data used in this analysis are the most recent data published by the BPS, namely 2013 Central Java I-O Table.

The 2013 I-O Table of Central Java is broken down into 88 sectors, and the focus of observation in this study is the land transportation sectors with thecodes 74 and 75. Sector 74 is the Railway Transport Mass Sector, and sector 75 is the Road Transportation Service. Information on the 2013 Central Java Province I-O sectors is presented in Table 3.

Table 3. 88 Classification Sectors of 2013 Input-Output of Central Java Province

Code	Sector	Code	Sector
1	Paddy	45	Yarn Spinning
2	Maize	46	Manufacture of Textile
3	Cassava	47	Manufacture of Final Textile and Other

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Code	Sector	Code	Sector
			Textile
4	Orther Tubber	48	Manufacture of Wearning Apparel
5	Onion	49	Manufacture of Leather And Footwear
6	Vegetables	50	Manufacture of Wood and Wood Material Construction
7	Banana	51	Manufacture of Wooden Household Furniture
8	Fruits	52	Manufacture of Paper and Paper Goods
9	Peanut	53	Publishing an Printing
10	Other Bean	54	Manufacture of Pharmacy and Herb
11	Other Food Material	55	Manufacture of Fertilizer and Pesticide
12	Rubber	56	Petroleum Refinery
13	Sugarcane	57	Manufacture of Rubber and Rubber Goods
14	Coconut	58	Manufacture of Plastic wares
15	Tobacco	59	Manufacture of Non Ferrous Basic Metalic Mineral Products
16	Coffe Beans	60	Manufacture of Cement
17	Clove	61	Manufacture of Calcium and Cement Goods
18	Fiber Plant Product	62	Manufacture of Basic Iron and Steel
19	Tea	63	Manufacture of Non Ferrous Basic Metal
20	Other Estate Crops	64	Manufacture of Machine, Electrical Machinery and Apparatus
21	Other Agriculture Product	65	Manufacture of Transport Equipment and its Repair
22	Livestock and its Product	66	Manufacture of Other Products Not Elsewhere Classified
23	Poultry and its Product	67	Electricity and Gas Supply
24	Wood	68	Water Supply
25	Other Forestry Product	69	Residential and Non-Residential Construction
26	Fish and Other Fishing Products	70	Other Construction
27	Aquaculture and Freshwater Fish Products	71	Trade
28	Agricultur Service	72	Restarurant
29	Mineral Salt	73	Hotel
30	Other Minning	74	Railway Transport
31	Quarrying Product	75	Road Transport
32	Manufacture of Food Processing and Preserving	76	Water Transport
33	Manufacture of Oil and Fat	77	Air Transport
34	Rice Milling	78	Services Allied to Transport
35	Manufacture of Flour, All Kinds	79	Communication
36	Bakery and Farinaceous Products	80	Bank
37	Manufacture of Milled Coffee and Peel	81	Other Financial Institution
38	Manufacture of Other Food Products	82	Real Estate and Business Service
39	Manufacture of Food Seasonings and Flavors	83	General Government and Defence
40	Manufacture of Fodder	84	Private Education

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Code	Sector	Code	Sector
41	Cane and Coconut Sugar Factory	85	Private Health
42	Manufacture of Beverages	86	Entertainment Services
43	Manufacture of Cigarettes	87	Other Services
44	Manufacture of Tobacco Processing Besides Cigarettes	88	Unspecified Sector

Source: BPS (2014).

The tables used in this study are two tables on the economy of Central Java; a. the Total Transaction Table and b.The Domestic Transaction Table, which are measured based on producer prices. Total transactions in Table I-O show that the value (in Rupiah) of transaction between measured sector includes domestic or local goods and imported goods from outside the intended area. In the domestic transaction table, the measured transaction value is only the transactions involving domestic or local goods and services, and the import transaction value is divided into separate transactions. Producer price means that the value of goods measured does not contain the value of distribution margins, therefore the transportation sector which acts as a distribution sector has its own output values, such as sector 74 and 75.

Indonesia I-O Table consists of 3 main quadrants (Table 4), i.e quadrant 1 shows the flow of transactions between production sectors (Firmansyah, 2006). The column can be interpreted as the value of the inputs of a sector purchased from another sector. The rows, can be read as the distribution of a sector's output to other sectors. Quadrant II is the final demand, which is the matrix of the final demand for a particular sector based on each component of consumption, investment, government spending and exports (this can be read from row's view). Quadrant III is the primary input matrix or value added (column view's), which is the distribution of wage and salary components, indirect tax value, business surplus, and others.

Table 4. Structure of Input Output Table (3 Sectors)

Input allocation \ *Output allocation*		Intermediary Demand			Final Demand	Total Output
		Sector 1	Sector 2	Sector 3		
Intermediary Input		*Quadrant I*			*Quadrant III*	
	Sector 1	x_{11}	x_{12}	x_{13}	Y_1	X_1
	Sector 2	x_{21}	x_{22}	x_{23}	Y_2	X_2
	Sector 3	x_{31}	x_{32}	x_{33}	Y_3	X_3
		Quadrant III				
Primary Input		V_1	V_2	V_3		
Import		M_1	M_2	M_3		
Total Input		X_1	X_2	X_3		

Sumber: BPS (2000)

This study analyzes the input coefficient, output coefficient, output multiplier and input multiplier, as well as the comparison of these indicators in the two tables used. The input coefficient (Equation1) followed by the estimated output multiplier (Equation2) , and the output coefficient (Equation3) followed by the input multiplier estimation (equation4) can be seen more fully in Firmansyah (2020).

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According to x_{ij} dan X_j on Table 4, the input coefficient can be calculated as follows:

$$a_{ij} = \frac{x_{ij}}{X_j} \quad (1)$$

The input coefficient or technology coefficient can be read as the bumber of sector 1 inputs needed to produce one unit of output sector j.

The output mutiplier is calculated using the following formula:

$$(I - A)^{-1} \quad (2)$$

The matrix $(I - A)^{-1}$ is known as the Leontief Inverse Matrix, and A is the input coefficient matrix. The output multiplier for a sector j is the total value of output produced by the economy to meet (or as a result) a change in one unit of the sector's final money demand. The output multiplier is the number of columns of the Leontief Inverse Matrix element.

For the output coefficient, the supply side approach was developed by Gosh (Miller and Blair, 2005; Firmansyah, 2020) as follows:

$$\vec{a}_{ij} = \frac{x_{ij}}{X_i} \quad (3)$$

$\vec{a}_{ij}$ shows the quotient of the demand (output) between a sector and the total output of the sector using the intermediate outputs. This coefficient is called the output coefficient. If all $\vec{a}_{ij}$ are calculated, an output coefficient matrix will be obtained.

The output multiplier is calculated using the following formula:

$$(I - \vec{A}) \quad (4)$$

The Matrix $(I - \vec{A})^{-1}$ is called the output multiplier matrix, in which the matrix $\vec{A}$ is the output coefficient matrix. Add in rows from the input multiplier matrix. The input multiplier shows the total change in economic output due to changes in one unit of primary input money in a particular sector. The input multiplier number for a sector is the sum of the row elements from the matrix.

Discussion and Result

Table 5 shows that sector 74 and 75 directly contribute to economy. Input coefficient of the Sector 74 can be interpreted as; every 1 million changes of final demand on transportation services of the train sectors will be directly affecting economy by 0.624 million rupiah; and, increasing of the primary inputs of 1 million rupiah will also increase directly to the economy by 0.327. The increasing economy that caused by these final demand shock and primary inputs of each sectors will have bigger effect to the economy with import transaction (total transaction) than to the economy without import transaction (domestic transaction).

Table 5. Input Coefficient and Output Coefficient

Code	Sector	Total Transaction		Domestic Transaction	
		Input Coef.	Output Coef.	Input Coef.	Output Coef.

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74	Railway Transport	0.624	0.327	0.508	0.219
75	Road Transport	0.550	0.377	0.494	0.377

Source: Output estimation, processed with IO-F software

Table 6. Output Multiplier and Input Multiplier

		Total Transaction		Domestic Transaction	
Code	Sector	Output Mult.	Input Mult.	Output Mult.	Input Mult.
74	Railway Transport	1.248	1.533	1.017	1.310
75	Road Transport	1.100	1.603	0.989	1.525

Source: Output estimation, processed with IO-F software

Table 6 shows the changes in final demand of 1 million rupiah in each of the 74 and 75 sectorsthat improve the overall economy (directly and indirectly) greater than 1 million rupiah, except for sector 75 (Road Transport) if the economy is without imports. Likewise, if there is a change in primary input of 1 million rupiah in each of the land transportation sectors, it will increase the economic output of more than 1 million rupiah as a whole.

Both the Railway Transport (74) dan Road Transport (75) highly depend on the Petroleum Refinery sector as the largest supplier of their respective inputs from other production sectors. Tables 7 and 8 show the 5 main supplier sectors for sectors 74 and 75 in Central Java. A change in final demand of 1 million rupiah in each of the 74 and 75 sectors will cause these sectors, input suppliers, to be directly affected by each of the input. Coefficient numbers (Table 7) show the total impact including the components of imported inputs, and Table 8 shows the domestic impact or only the non-imported domestic sector).

Table 7. Input Supplier Sectors for Sector 74 and 75: Total Transaction

Code	Sector	74	Code	Sector	75
56	Petroleum Refinery	0.181	56	Petroleum Refinery	0.259
67	Electricity and Gas Supply	0.092	87	Other Services	0.124
71	Trade	0.062	71	Trade	0.052
69	Residential and Non-Residential Construction	0.061	57	Manufacture of Rubber and Rubber Goods	0.021
65	Manufacture of Transport Equipment and its Repair	0.048	64	Manufacture of Machine, Electrical Machinery And Apparatus	0.016

Source: Output estimation, processed with IO-F software

Table 8. Input Supplier Sectors for Sector 74 and 75: Domestic Transaction

Code	Sector	74	Code	Sector	75
56	Petroleum Refinery	0.181	56	Petroleum Refinery	0.259
67	Electricity and Gas Supply	0.092	87	Other Services	0.099
71	Trade	0.062	71	Trade	0.052
69	Residential and Non-	0.061	57	Manufacture of Rubber	0.021

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	Reesidential Construction			and Rubber Goods	
70	Other Construction	0.015	75	Road transport	0.015

Source: Output estimation, processed with IO-F software

Table 9 shows the distribution of output of each Railway Transportation sector (74) and Road Transport (75) to other sectors as in sector 74 and 75. Users of these two sectors are the trade sector User of sector 74 other than the trade sector are the Government, while sector 75 users in Central Java are the cigarette industries.

Table 9. Output distribution of Sector 74 and 75: Total Transaction

Code	Sector	74	Code	Sector	75
71	Trade	0.104	71	Trade	0.096
83	General Government and Defence	0.075	43	Manufacture of Cigarettes	0.029
70	Other Construction	0.009	83	General Government and Defence	0.027
46	Manufacture of Textile	0.008	70	Other Construction	0.026
79	Communication	0.008	75	Road Transport	0.015

Source: Output estimation, processed with IO-F software

Table 10. Output distribution of Sector 74 and 75: Domestic Transaction

Code	Sector	74	Code	Sector	75
71	Trade	0.069	71	Trade	0.096
83	General Government and Defence	0.050	43	Manufacture of Cigarettes	0.029
70	Other Construction	0.006	83	General Government and Defence	0.027
46	Manufacture of Textile	0.005	70	Other Construction	0.026
79	Communication	0.005	75	Road Transport	0.015

Source: Output estimation, processed with IO-F software

Table 11. Impact of Final Demand Changes on Other Sectors: Total Transaction

Code	Sector	74	Code	Sector	75
74	Railway Transport	1.002	75	Road Transport	1.024
30	Other Minning	0.253	56	Petroleum Refinery	0.279
56	Petroleum Refinery	0.223	30	Other Minning	0.178
67	Electricity and Gas Supply	0.104	87	Other Services	0.131
71	Trade	0.093	71	Trade	0.076

Source: Output estimation, processed with IO-F software

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Table 12. Impact of Final Demand Changes on Other Sectors: Domestic Transaction

Code	Sector	74	Code	Sector	75
75	Road Transport	1.020	76	Water Transport	1.010
56	Petroleum Refinery	0.273	56	Petroleum Refinery	0.357
87	Other Services	0.103	71	Trade	0.094
71	Trade	0.065	78	Services Allied to Transport	0.032
57	Manufacture of Rubber and Rubber Goods	0.034	75	Road Transport	0.020

Source: Output estimation, processed with IO-F software

Table 13. Impact of Primary Input Changes on Other Sectors: Total Transaction

Code	Sector	74	Code	Sector	75
74	Railway Transport	1.002	75	Road Transport	1.024
71	Trade	0.123	71	Trade	1.114
83	General Government and Defence	0.091	70	Other Construction	0.049
70	Other Construction	0.035	83	General Government and Defence	0.043
69	Residential and Non-Residential Construction	0.020	43	Manufacture of Cigarettes	0.043

Source: Output estimation, processed with IO-F software

Table 14. Impact of Primary Input Changes on Other Sectors: Domestic transaction

Code	Sector	74	Code	Sector	75
74	Railway Transport	1.001	75	Road Transport	1.020
71	Trade	0.078	71	Trade	0.107
83	General Government and Defence	0.056	70	Other Construction	0.041
70	Other Construction	0.018	83	General Government and Defence	0.036
69	Residential and Non-Residential Construction	0.011	43	Manufacture of Cigarettes	0.036

Source: Output estimation, processed with IO-F software

Conclusion

Land transportation sectors, such as Railway Transportation and Road Transportation have an important role for the economy of Central Java; the activities of the production sectors in Central Java are closely related to the activities of these sectors. The main sectors in Central Java such as Trade, General Government and Defense, Manufacture of Cigarettes, Manufacture of Textile are the main users of these two sectors.

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