

Land Transportation effects on Manufacture and Regional Economy of Sumatra of Indonesia

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Abstract

The study aimed to determine the effect simultaneously between land transportation and manufacturing industry on economic improvement. An explanation research was conducted to obtain the causal relationship between land transportation and manufacture. The data used in this study were off secondary sources and time series data forms from 2006-2015 data from the Central Statistics Agency (BPS) of Labuhan Batu Regency. Regression analysis was applied the mathematical relationship between the output variable or dependent (Y) with one or several input / independent variables (X). The mathematical relationship is used as a regression model that is used to predict or predict the output value (Y) based on a particular input value (X). The results of this study indicated that simultaneously the land transportation variable and manufacturing industry have a positive and significant effect on the economic improvement variable. The results obtained a t_{count} value of 3.599. Thus t_{count} is greater than t table ($3.241 > 1.894$); then H_0 is rejected H_A is accepted, meaning that partially there is a positive and significant influence between land transportation and economic improvement. The results obtained a t_{count} of 0.112. Thus t_{count} is greater than t table ($0.112 < 1.894$) then H_0 is accepted H_A is rejected, meaning that partially there is no positive and significant influence between the manufacturing industry on economic improvement.

Keywords: Transportation, industry, economic growth

Introduction

Transportation is one of the important elements in supporting the activities and rotation of the wheels of national development, especially activities in the economic field such as trade activities and industrial activities. Facilities and infrastructure needed to support city activities. Hengkeng (2015) argued the increasing regional income and rapid economic growth will certainly encourage all sectors to carry out development. Likewise the land transportation sector with an increase in the transportation sector retribution will affect the level of regional income. Retribution of the land transportation sector is one of the factors in the ability of the regions to carry out regional autonomy in terms of the regional finances themselves.

The success of economic development in the regions is a manifestation of national economic improvement in several periods known as Gross Regional Domestic Product (GRDP). GRDP is an indicator of economic growth where a higher number signals a greater potential in increasing standard of living of the people. This is measured by income per capita (Syamsuri, Amril, and Triana, 2018). As a stimulus, transportation infrastructure can be actively used to drive the regional economy which is preceded by the construction of transportation infrastructure. Transportation facilities and infrastructure can open accessibility so as to increase community production which leads to an increase in people's purchasing power in remote areas, where economic and trade activities have not gone well.

Transportation in the economic scope of transportation is very important to meet transportation needs which are constantly increasing in line with population growth, economic growth is needed to develop roads, terminals, ports, regulations and facilities to support an efficient, safe and smooth transportation system with an environmental perspective.

This study was conducted in Labuhan Batu Regency of Indonesia with its capital, Rantauprapat; it has an area of 256,138 hectares or 2,561.38 Km², equivalent to 12.87% of the total area of North Sumatra Province. As the second largest regency after South Tapanuli Regency, Labuhan Batu Regency is an eastern crossing path of Sumatra Island with a distance of 285 km from Medan, the Capital of North Sumatra Province, 329 km from Riau Province and 760 km from West Sumatra Province. The location of the Labuhan Batu Regency is in the East Coast of Sumatra Island. Besides that, it also has a very strategic position because it is crossed by the inter-

provincial route and is located between Labuhan Batu Utara and Labuhan Batu Selatan District of North Sumatra, Indonesia.

After being divided into 3 regencies, Labuhan Batu Regency has an area of 2,561.38 Km² from 9,223.18 Km² of the previous area or 27.7% of the previous area of Labuhan Batu Regency which used to have 22 sub-districts, with 9 sub-districts being divided. Labuhan Batu Regency has a strategic position, which is in the eastern Sumatra crossing lane and is at the crossroads towards West Sumatra and Riau Provinces, which connect the regional development centers in Sumatra and Java and have adequate access to foreign countries because they are directly adjacent to the Strait Malacca.

The condition of a country's infrastructure can affect the implementation of its development, especially road transport infrastructure. In Indonesia the condition of transportation infrastructure is still in a bad condition, in 2013 the number of motorized vehicles in Indonesia was 102,275,084 units while the total length of roads in Indonesia was only 501,969 Km. Increasing the length of roads that are not comparable with the increase in the number of motorized vehicles can disrupt distribution activities and cause mobility to not be smooth, whereas from a macroeconomic perspective, transportation plays a strategic role in increasing national GDP, because it is a derived demand, which means that transportation supply increases will trigger an increase in GDP figures.

Theoretical Reviews

Regional Trade of Asian Countries

Shepherd and Wilson's study (2008) of trade facilities in ASEAN countries stated that trade flows in Southeast Asia are sensitive in the infrastructure sector, namely transportation and information communication technology. In this study, infrastructure was approached with the quality of port infrastructure, the quality of airport infrastructure and also the quality of the provision of internet services. Another approach is through several factors related to the implementation of exports and imports, such as the time of export / import, export / import costs per container, and so forth.

Albarran et al (2009) stated that the investment in transportation infrastructure can reduce transportation costs, especially for companies that export in Spain. In the end, the reduction in transportation costs helped small and medium enterprises to enter the export market. Prapti, Suryawardana and Triyani (2015) the study explained that there are positive and significant effects of the road infrastructure variable on economic benefits. This illustrates that road infrastructure is able to provide benefits to the economic growth of a region. Hapsari (2011) studied the effect of infrastructure on economic growth in Indonesia. By using panel data with a period of time from 2004-2009 and *the chow test* and *hausman test* to get a fixed effect data panel model. The results of the four independent variables (roads, electricity, water, telephone) there are two variables that have a significant influence on economic growth, namely roads and electricity and two other variables that have no significant influence, namely telephone and water. Freunda and Weinhold (2004) with a gravity model examining the influence of the internet on international trade. The scope of the study consisted of 56 countries, from 1995 to 1999. The model shows an increase in trade because the fixed costs of entering international trade are getting cheaper. Additionally Wahyuni (2009) reported the influence of economic and social infrastructure on economic productivity in Indonesia. This study aims to look at the influence and magnitude of the contribution of social and economic infrastructure to economic productivity in Indonesia. Economic productivity is obtained by the coefficient of output per labor which is adopted from the form of the *Solow growth model*, which connects output to input of production factors. The capital under study is investment that is used to develop economic and social infrastructure. Panel data regression analysis is used to see the magnitude of the influence of infrastructure on economic productivity in Indonesia. The infrastructure studied included: road length, electricity sold, clean water distributed and health facilities represented by data on the number of hospitals and health centers. The analysis was carried out using data from 26 provinces in Indonesia and over a period of 13 years (1995-2007).

Transportation Concept

Transportation is a means of connecting or connecting between production areas and markets, or it can be said to bring production areas and markets closer, or it is often said to bridge producers and consumers. The role of transportation is very important, namely as a means of connecting, getting closer, and bridging between parties who need each other (Adisasmita, 2011). In the history of human development towards the development of the city we can see that humans are always eager to travel from one place to another in order to get the needs

needed. In this case humans really need a means of transportation called mode or transportation. The transportation process is created due to differences in needs between humans with one another, between one place to another, which are qualitative and have different characteristics as a function of time, destination, type of transport, and so on. The function of transportation is to move or move people and / or goods from one place to another using a particular system for certain purposes. Transportation is carried out because the value of the person or goods transported will be higher in another place (destination) than in the place of origin (Morlok, 1995).

Regional economic development is a process when local governments and communities manage existing resources and subsequently form a partnership pattern between local governments and the private sector to create new jobs and stimulate the development of economic activities (*economic growth*) in the region (Arsyad, 1999). Increasing economic development should not only be seen from the increase in per capita income but the quality of good economic development should be reflected through investment in the manufacturing industry. Eklund (2013) suggest that investments are made until the present value of expected future revenues, at the margin, is equal to the opportunity cost of capital. This means that investments are made until the net present value is equal to zero. An investment is expected to generate a stream of future cash flows (Eklund, 2013).

The main problem in regional development is the emphasis on development policies that are based on the specificity of the region concerned (*endogenous development*) by using the potential of human resources, institutions, and physical resources locally (*regional*). We need to take initiatives from those regions in the development process to create new employment opportunities and stimulate economic activity. The value of economic growth can be used as an indicator to determine the economic performance of a region. Positive growth shows an increase in the economy, whereas negative growth shows a decline. Low economic growth illustrates the low economic performance of a region this condition can hamper development in various sectors which ultimately hinders the development process.

Transportation creates a place utility and time utility, because the value of goods becomes higher at the destination than in the place of origin, apart from that the goods are transported quickly so that they arrive at their destination on time to make ends meet. Transportation is a service activities. Transportation services are needed to assist the activities of other sectors (agricultural sector, industrial sector, mining sector, trade sector, construction sector, financial sector, government sector, transmigration, defense and others) to transport goods and people in their respective activities. each of these sectors. Therefore transportation services are said to be derived demand, which means that the demand for transportation services increases because it is needed to serve various economic activities and increased development. The increasing demand for transportation services comes from the increase in the activities of other sectors. In accordance with its nature as a derived demand, the planning of the transportation sector always contains uncertainty (Siregar, 1995: 21).

Manufacturing Industry

Industry has two senses namely broad understanding and narrow understanding. In broad terms, industry includes all productive businesses and activities in the field of economics. While narrow understanding, industry or processing industry is an activity that changes a basic item mechanically, chemically, or by hand so that it becomes a semi-finished item or finished goods. In this case, it is including the activities of industrial services and assembly workers. In economic terms, industry has two senses. First, industry is a set of similar companies, the example of the paper industry means the set of paper-producing companies. Second, industry is an economic sector in which there are productive activities that process raw goods into semi-finished goods or finished goods (Arsyad, 2004).

In the second sense, the word industry is often called the manufacturing sector, which is one of the factors of production or business in the calculation of national income according to the production approach. Sukirno (2006) the notion of industry is: "A unit or unit of product that is located in a certain place that places activities to change goods mechanically or chemically, so that the goods (products that are closer to the last consumer), including here install part of an item (assembling). When one country has reached the stage where the industrial sector is the leading sector, it can be said that the country has experienced industrialization (Yustika, 2000).

It can be said that industrialization is a structural transformation in a country. Therefore, the industrialization process can be defined as a process of changing economic structures where there is an increase in the contribution of the industrial sector to consumer demand, GDP, exports and employment opportunities.

Industrialization in another sense is the process of economic modernization which includes a poor economic sector that has links with the processing industry. This means that industrialization aims to increase the added value of all economic sectors with the manufacturing sector as the leading sector, meaning that with the development of industry it will spur and lift the development of other sectors (Arsyad, 2004).

Gross Regional Domestic Product (GRDP)

One indicator that is considered important to know the condition of the regional economy is Gross Regional Domestic Product, both at current prices and at constant prices. GRDP is added value produced by all economic units in certain regions. GRDP at current prices illustrates the added value of goods and services calculated using the prevailing prices every year, while GDP at constant prices shows the value added of goods and services calculated at prices that apply at a certain time as the base year (Central Agency Labuhan Batu District Statistics, 2018).

Development of GDP at current prices from year to year illustrates the development caused by changes in the volume of production of goods and services produced and changes in the price level and shows the income that can be enjoyed by residents of a region and describes the value added of goods and services calculated using price every year. One factor that encourages investors to invest in an area is due to economic factors in the area of interest, such as market potential, natural resources and competitiveness. Market potential is illustrated by the size of the regional income reflected by the value of Gross Domestic Product (GDP).

The role of regional income (GRDP) on investment is very important, because high income will increase the income of the community and then the high income of the community will increase the demand for goods and services. High demand will also increase the company's profits and encourage more investment. In other words, if the GDP increases, investment will increase too. Thus investment gets the influence of regional income (GRDP).

Based on the literature review above, the mindset in the research can be seen through the picture below:

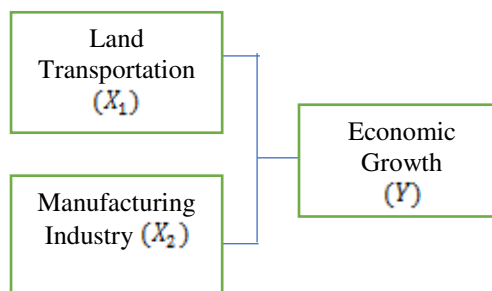


Figure 1. Thinking Framework

Hypothesis

Based on the problem formula and the framework outlined above, the following hypotheses can be formulated:

- H₁: Simultaneously there is an influence between land transportation and manufacturing industries on improving the economy.
- H₂: Partially there is an influence between land transportation and economic improvement.
- H₃: Partially there is an influence between the manufacturing industry on improving the economy.

Research Methodology

The explanation research was applied to seek the causal relationship between variables and testing hypotheses. The data used in this study were secondary data and time series data form from 2006-2015 data from the Central Statistics Agency (BPS) of Labuhan Batu Regency. Regression analysis is an approach used to define mathematical relationships between output or dependent variables (Y) with one or several input / independent variables (X) The mathematical relationship is used as a regression model used to predict or predict the output value (Y) based on a certain input value (X). The method of this study is:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \varepsilon$$

Analysis and Discussion

Descriptive Analysis

The economic growth or improvement of Labuhan Batu Regency in the last 10 years can be seen as follows:

Table 1. Data on Economic Growth in Labuhan Batu Regency (in%)

Year	Transportation	Manufacturing Industry	GRDP
2006	3,43	9,35	4,41
2007	3,33	4,95	4,29
2008	3,24	9,2	4,18
2009	3,28	2,22	4,24
2010	3,3	8,04	4,29
2011	5,3	4,85	5,71
2012	5,51	5,94	6,09
2013	5,63	5,56	5,99
2014	6,71	4,7	5,22
2015	6,21	4,99	5,04

Source: Labuhan Batu Statistics Center

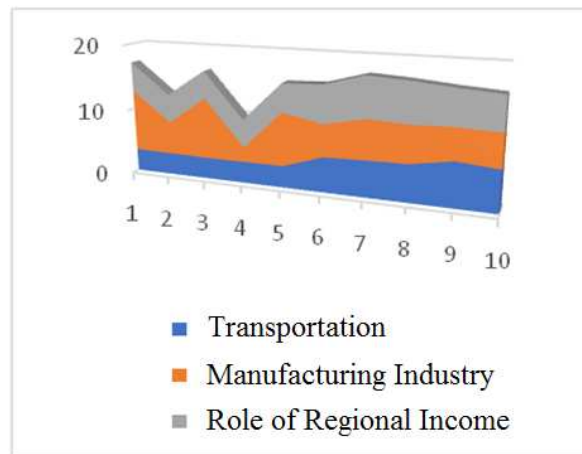


Figure 2. Economic Growth of Labuhan Batu Regency

From the data in Table 1 and Figure 1, it shows that the economic improvement of Labuhan Batu Regency in the past 10 years was influenced by the development of land transportation and manufacturing infrastructure.

Hypothesis testing

1. Multiple Linear Regression Analysis

Multiple linear regression analysis is used to determine the effect or relationship of independent variables on the dependent variable. Regression analysis in this study used the least squares method. The results of the test can be seen below:

Table 2. Multiple Linear Regression

Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients
	B	Std. Error	Beta
(Constant)	2,872	,949	
1 Transportation	,439	,135	,802
Infrastructure	,009	,085	,028

a. Dependent Variable: Economic Improvement
 Source: SPSS processed data in 2018.

From the results of the above calculations can be made a multiple linear regression equation model, namely as follows:

$$Y = 2.872 + 0.439X_1 + 0.009X_2$$

2. Simultaneous Test (F Test)

The results of this test aim to know simultaneously between the land transportation variables and manufacturing industries on the economic improvement variables as follows:

Table 3. Simultaneous Test Results

ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3,327	2	1,664	5,906	,031 ^b
1 Residual	1,972	7	,282		
Total	5,299	9			

a. Dependent Variable: Economic Improvement
 b. Predictors: (Constant), Infrastructure, Transportation
 Source: SPSS processed data in 2018.

Based on the data obtained F_{count} of 5.906 with a probability of F_{count} of 0.031. While the value of F_{table} is 4.46 at a significant level of 5%. Therefore, if the value of $F_{count} > F_{table}$ (5.906) > (4.46) while the significant value is 0.031 < 0.05 then H_0 is rejected H_A is accepted. This means that simultaneously the land transportation variable and manufacturing industry have a positive and significant effect on the economic improvement variable.

3. Partial Test (t test)

The results of this test aim to know partially between the land transportation variables and the manufacturing industry towards the economic improvement variables as follows:

Table 4. Partial Test Results

Coefficients ^a		
Model	T	Sig.
(Constant)	3,025	,019
1 Transportation	3,241	,014
Infrastructure	,112	,914

a. Dependent Variable: Economic Improvement

Source: SPSS processed data in 2018.

Based on table 4 data it is known that:

1. With two-sided testing that uses a significant level of 0.05% and with degrees of freedom $df (n-k-1 = 10-2-1 = 7)$ obtained table = 1.894. The results of calculations in multiple linear regression obtained a t_{count} value of 3.599. Thus t_{count} is greater than t table ($3.241 > 1.894$) then H_0 is rejected H_A is accepted, meaning that partially there is a positive and significant influence between land transportation and economic improvement.

2. With two-sided testing that uses a significant level of 0.05% and with degrees of freedom $df (n-k-1 = 10-2-1 = 7)$ obtained table = 1.894. The results of calculations in multiple linear regression obtained a t_{count} of 0.112. Thus t_{count} is greater than t table ($0.112 < 1.894$) then H_0 is accepted H_A is rejected, meaning that partially there is no positive and significant influence between the manufacturing industry on economic improvement.

Discussion

Transportation towards improving the economy

Road transportation is often said to be the lifeblood of life and the economic, social, and mobility development of the population that grows follows and encourages the development that occurs in various sectors and fields of life. In this connection, transportation is especially true, carrying out two functions, namely as an important element that serves the activities that have been / are running or the servicing function and as an important driving element in the promoting function. It can be stated here that highway transportation is a basic and fundamental need for human life. Basically, the basic transportation needs can be filled by highway transportation itself, while railroad transportation, sea transportation, and air transportation cannot stand alone. These various modes of transportation depend or need to be complemented by highway transportation (Schumer, 1968).

The role of transportation in human life, the economy and development is increasingly important, reflected in the use of modern high-speed and large loading capacity transportation facilities. Transportation has an important and increasingly important role, from primitive times to modern times, therefore it can be said that transportation is as old as human civilization, as old as human existence in the world (Schumer, 1968).

Manufacturing Industry against Economic Improvement

Infrastructure is a supporting (physical) means for a country's economic development to be realized. Infrastructure consists of several sub-sectors, some of which are quite dominant in economic development are housing and transportation. Infrastructure also shows how much development equity occurs. A country with high economic growth will be able to do equitable development and then carry out infrastructure development in all parts of its territory. An integrated economy requires infrastructure development. According to scientific studies conducted by Wirawan (2008), there are at least three main reasons why infrastructure is important in an economic integration. First, the availability of good infrastructure is the main engine driving economic growth, for example, the study of The World Bank (2004) states that the low level of economic growth in the last few years after the economic crisis in 1998 was influenced by the low level of investment. in improving the investment climate in Indonesia. Second, to obtain full benefits from integration, the availability of infrastructure

networks is very important in facilitating trade and investment activities. Decreasing rates due to economic integration cannot guarantee that trade and investment activities will increase without the support of adequate infrastructure. Third, attention to infrastructure improvements is also important to address economic development gaps between Asian countries and also accelerate Asian economic integration.

The number of motorized vehicles that tends to increase is an indicator of the increasing public demand for adequate transportation facilities in line with the increasing mobility of the population. The population has a direct relationship in quantity with the need for movement. The more the movement needs of humans and goods, the more the use of motorbikes and cars will be as a mode of land transportation. The law of demand is essentially a hypothesis that states the lower the price of an item the more demand for the goods, on the contrary the higher the price of an item less demand for these items (Sukirno, 2006: 76). Demand for goods and services had been generally very dependent on consumer income and on the prices of goods and services relative to the prices of other goods. For example, the level of vehicle sales depends on people's income, the higher the income of the community, the higher the consumption of the community, including in this case the demand for vehicles will be higher. The mode of transportation chosen depends on several factors, such as travel destination, travel distance, and income of the travellers (Khisty and Lall, 2002).

Conclusions

Based on the results of the research and discussion previously described, conclusions can be drawn as follows:

1. Simultaneously the land transportation variable and manufacturing industry have a positive and significant effect on the economic improvement variable.
2. The results of calculations in multiple linear regression obtained a t_{count} value of 3.599. Thus t_{count} is greater than t_{table} ($3.241 > 1.894$) then H_0 is rejected H_A is accepted, meaning that partially there is a positive and significant influence between land transportation and economic improvement.
3. The results of calculations in multiple linear regression obtained a t_{count} of 0.112. Thus t_{count} is greater than t_{table} ($0.112 < 1.894$) then H_0 is accepted H_A is rejected, meaning that partially there is no positive and significant influence between the manufacturing industry on economic improvement.

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