The Effect of Economic Sectors of Regency And City Area of Airports in Java Island and Outside Java Island

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ABSTRACT

This research tries to describe the economic role of regency and City area to the existence of Airport in Indonesia. An archipelagic country like Indonesia needs an adequate long-distance transport system to support overall economic growth. However, this has not been achieved by describing the uneven economic situation in Indonesia. Researches on the economic and air transport links in the world are still developing and still in debate. Therefore, this research is interesting to do. This research tries to build a model to see there is no relation between air transport service activity and regional economic condition in the model. This study was conducted on 95 airports spread in the territory of Indonesia. In addition, this study also tries to understand the differences of regional economic influence in Java and outside Java by using regression model analysis. The hope of this research is to provide an understanding of the role of airports in economic growth and can be a consideration of stakeholders to produce policies on air transportation and regional economic growth equally on the geographical conditions of the archipelago such as Indonesia.

Keywords: Regional Economics, Regression Model, Air Transportation

INTRODUCTION

Debates over the impacts and effects of infrastructure development and investment on regional economic growth have occurred since the 1980s, Where experts debate the positive and negative impacts of infrastructure development and investment. Infrastructure development and investment have a positive effect and impact on economic growth (Gillen, 1996). According to Fedderke & Bogetic (2006), the relationship between economic growth and infrastructure investment can not be separated from the controversy. In his research, positive impacts and influences were found only in long-run economic growth in South Africa. The effect also includes the role of the infrastructure itself. These impacts are also subdivided into direct and indirect impacts. According to Pollin, 2009, the direct impact of investment and infrastructure development was the creation of direct employment due to construction activities, and indirect impacts were other employment caused by the development. In contrast to (Gillen & Stang, 1996), Gillen divided the direct and indirect impacts of cost factors into direct impact and labor, capital, and intermediate goods factors into indirect impacts.

Linked to the state of Indonesia, the transportation infrastructure development in the next few years is the flagship program of the Indonesian government. The Government of Indonesia aims to provide a positive impact, which is shown by the improvement of regional economic conditions are evenly distributed. The transport infrastructure is divided into land, sea, and air transportation. One of the strategic transportation to see the form of Indonesia, which consists of the islands, is air transport. Indonesia has almost 6000 islands with population, and in general, Indonesia has five big islands. It shows the potential demand for air and sea transportation. According to data from the Ministry of Transportation of the Indonesian republic to date Indonesia has 298 airports spread across the nation. In addition, the air transportation sector in Indonesia continues to grow. One of which was shown by the increase in the number of air transport passengers that is 62.4 - 82.4 (in a million) from 2011 to 2015. But unlike Indonesia's economic growth declined from 2011 to 2015 from 6.5% to 4.8%. This research aims to understand the relationship between Air Services at Airport and the economic growth of the region in Indonesia, especially the sector which give influence to existence of Airport.

AIR TRANSPORTATION AND ECONOMY

Initially, air transportation emerged due to the needs of industrial activity in the second world war. It also directly encourages the development of the

aviation industry in the world. The global development of air transport also promoted liberal and international economic growth owned by individual companies (Graham & others, 1995). The same thing was found in the United States, where found flight mail system as a form of information systems in the American continent. The air transport system continues to grow from individual to commercial to serve large industries in Europe and America. It also states that air transportation is growing with the development of the need for economic activity.

Transportation is an essential part of the economic component, including its impact on the welfare of the population. When transport is in an efficient condition, it will derive in social opportunities and benefits in the economy. According to Pacheco et al. (2006), when transport reaches an efficient point, it will create economic costs within the activity and reduce opportunities in market failure. Besides, transport is inseparable from environmental aspects. According to Pacheco et al., 2006, distinguishes the direct and indirect economic impact of transportation, he described direct impact was related to changes in accessibility where transport creates markets and saves costs and time. Indirect impacts were directly related to the economic impact after the operational stages of transportation.

The relationship between air transport and the economy has been shown in previous studies. There was a relationship between infrastructure and socio-economic impact (Quinet & Vickerman, 2004). This is further redefined to the air transport infrastructure sector. The relationship between air transport and the economy is indicated by the presence of influences. Many studies defined and categorized these influences. Van De Vijver, 2014 shown a classification of the relationship between air transport service and regional economy. The classification was the unidirectional causality, the economic growth was the driver of air traffic, the bi-directional causal relationship, and the absence of a causal relationship. York Aviation, 2004 divided the impact of the Airport, (1) direct impacts relating to the operation of the Airport itself; (2) Indirect impacts relating to the operations of suppliers in the area; (3) Induced impacts relating to the activity generated by the direct and indirect operations; (4) Catalytic impacts relating to the wider role of the Airport on regional development. Button & Taylor, 2000, divided the impact into several groups. These groups were Primary effects, secondary effects (impacts related to the local economy), Tertiary effects (the third impact is the impact of the result of a second impact such as industries Major industrial suppliers associated with

airports), and Perpetuity effects (recent impacts are broader impacts such as regional economies). These influences were also being authenticated by the official aviation agencies that handle direct air transport. According to The International Air Transport Association (IATA) incorporated in the oxford economics study in 80 countries around the world, the study concluded that the overall airport presence contributes to GDP / GRDP, employment aspect, and income taxes driven by sectors and the Supplay chain. Reinforced with a study from the Air Transport Action Group (ATAG), air transport had an important role in economic growth especially for developing countries (in this case international air transport) whose main influence is to encourage foreign direct investment (FDI), Business cluster development / business development, specialization, and other spillover effects.

These effects are also seen in aggregate or disaggregated and one-way or two-way directions. Blonigen & Cristea, 2012, identified the relationship between air movement in transportation and local economic growth (air traffic and local economic growth). This research was also conducted on 263 metropolitan areas in time series (263 Metropolitan Statistical Areas) by looking at the relationship between air movement and population, income, and employment. In general, this study showed a 50 percent increase in air movement affecting 7.4 percent of GRDP (GDP) over 20 years. In his research Blonigen & Cristea, 2012, found similar to Brueckner, 2003, that air movement affected the economic sector in terms of employment. He also used a service scale or geographic element to be considered in assessing the relationship between the movement of air transport and regional economies. In addition, the characteristics of the region determined how the influence of the Airport on the regional economy (Mukkala & Tervo, 2013). According to Percoco (2010), in his research that the commemoration of the movement of air transport services affected the service sector labor in cities in Italy. Besides that, air transport services, especially passenger movement, contributed to PDRB / GDP (Yao & Yang, 2008). A similar study was conducted in Nigeria. According to Saheed & Iluno, 2015, in his research stated that there are three conclusions, the influence of air transport service activities on economic growth, long-term relationship of both, and the indirect relationship between air transport and economic growth.

Weisbrod et al., (1993) in his research, tried to Identified how increasing quantity and capacity of Airport affected the region's economy. In producing his research model, Weisbrod divided the variables into four groups. The group is the Economic Characteristics of the Airport Area and the Metropolitan

Region (variables in this group such as GDP / GRDP, population, and labor growth), Air Service Functional Characteristics (variables in this group that relate directly to airport operations such as class, Passengers, and cargo quantities), Other Airport Functions (variables in this group are like military activities, etc.), and Airport Area Land Characteristics (the last variable is all related to airport land activities such as entertainment and business).

The classification or grouping of air transport service activities is also done to understand the relationship with the economy. According to Baker et al (2015), he was found that the relationship between Airport and regional economy is bi-directional at the same time. In addition to grouping, the classification of major and small airports is also done by Redondi, 2013. In his research tries to evaluated the role of small airports (small aiport) seen from the main components of travel time Redondi conducted analysis on 19 objects (19 Western European countries and regions).In addition, he also classified the class the Airport is based on the number of passengers (less than 1 million (1M) and between 1 million (1M) and 2m (2M) passengers) .In Redondi's research results stated that there is still a small airport contribution to the region's economy but the influence is in accordance with the scale of service And the travel time of air movement service from the Airport The classification or other grouping was according to the characteristics of the Airport. Halpern in his research, tried to describe the influence of the Airport on the accessibility of the region and the social impact on two different airports. The first Airport is a small airport with no access to the capital (Oslo), and the second Airport is the airport premises N medium size with access to the capital (Oslo). In this study, the main respondent was a resident. This is because the resident is a major impact on the social of the Airport (Halpern & Bråthen, 2011).

Unlike before, Button & Taylor (2000) did research on an international airport. Button analyzed 41 airports. In conclusion, Button stated that the international air movement service has a positive influence on the economic structure around the airport area. But the note is the limitations of these influences. Debbage & Delk (2001) in his study, also showed a relationship between "number of passengers and air service connectivity" with employment. In addition, Button & Taylor (2000) also showed in his research that air transport services are closely related to the science-based economic sector (information technology, biotechnology, electronics, and management services). Jiang & Zhang (2014) in his research, concluded the relationship between airport activity with the local business sector focusing on professional,

science, and other technological activities. Several studies have shown that close linkages between the economy, especially the high-tech industry sector and air transportation activities. If in some studies show the positive effects provided by air transport activities on the economy, different in the results of Kayode's (2013) research. His research concluded that over the long run, negative influences arise from the northern transport service to the economy in aggregate. It showed the relationship between the two variables are still in debate.

METHODOLOGY

Size of Datasets

This study was conducted on 95 airports spread across 95 regencies and cities in Indonesia. 95 The Airport is divided into several classifications based on service scale and airport class. The 95th aerodrome data in this study is supported by data of service movement of aircraft arriving and departing (TOTPW) in the period 2011 to 2015. Data movement of the aircraft service has included the international and Domestic traffic of each Airport. The data which becomes the representation of the existence of the Airport in relation to the regional economy. It is also explained by Grubesic et al. (2016) that air transport services contributed to several sectors of the economy. In addition, this study also tried to understand the condition of economic structure in the region and city of Indonesia through the condition of 95 regencies and cities in Indonesia. The 95 districts and cities are supported by data of 15 economic sectors on the economic structure of their respective regions. The data of 15 economic sectors/GRDP[2] are also in the period of 2011 to 2015. The 15 sectors are GRDP Agriculture, GRDP Mining, GRDP Industry, GRDP Electricity and gas, GRDP Water and Rubbish, GRDP Construction, GRDP Trading, GRDP Transportation, GRDP Accommodation Providers, GRDP Information and Communication, GRDP Financial Services and Insurance, GRDP Real Estate, GRDP Services Company, GRDP Government Group, and GRDP Health and Social Services. The sectors are also described in a study conducted by Saheed & Iluno (2015), that each sector in the economic structure had its respective influence on air transport depending on the characteristics of the economic sector.

In this study, the method of analysis used is the regression modeling analysis approach. Regression modeling in this study is intended to look at the

2 GRDP – GRDP on a constant basis/PDRB atas dasar harga konstan

overall sector of the economy and partially or individually from the economic sector in giving influence to the existence of the Airport described by the data of the air transport service traffic. Besides, the fixed-effect approach in the process of interpretation of the model results is also used to understand the economic influence of the region based on location in Java Island and outside Java Island in giving influence on the existence of the Airport. The fixed effect in this model is not to produce an estimation of modeling parameters but as a sketch to understand the difference of regional economic effect.

RESULTS AND DISCUSSION

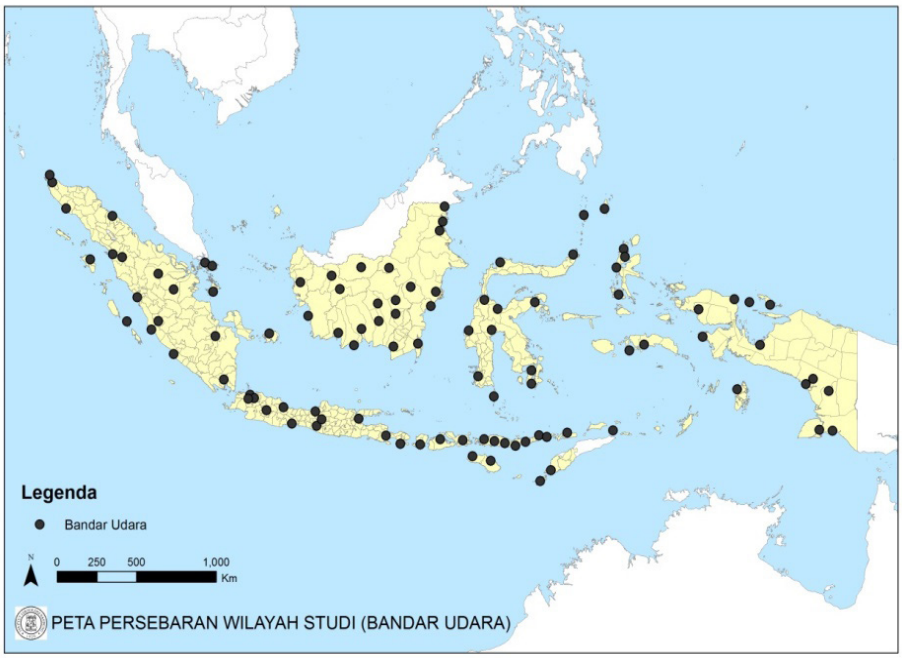

Figure 1. Distribution of 95 Airports

If grouped by west and east are west of Java-Bali Island, Sumatera Island, and Kalimantan Island, the number of airports is evenly distributed in two parts, namely 53 airports in the west and 42 airports in the east. But different when viewed based on the location on the island of Java or outside the island of Java. There are 11 airports on Java Island, and the rest are outside Java Island.

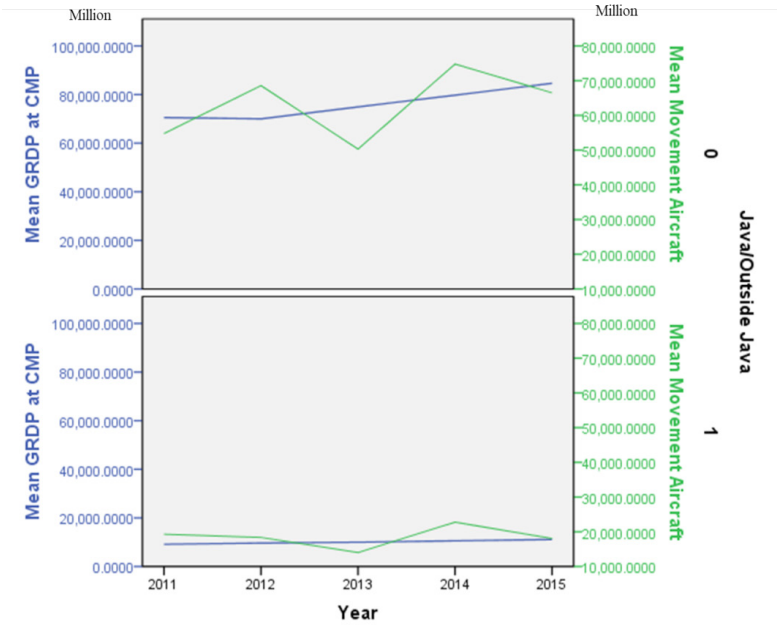

Figure 2. The growth of total GRDP and Airplane Movement in 2011-2015

The graph above is a graph of the total GRDP growth of 95 districts and municipalities (blue line) and growth in aircraft movements at 95 airports (green line). The graph shows that the value and growth of the economy in the islands of Java is higher than in the Outer Islands. The same thing is also seen in the movement of aircraft services. The value and growth of air transport movement in Java Island is higher when compared with the traffics of air transport outside Java. It can be seen that the average number of air transport traffics outside of Java only reached 20,000 while on the island of Java more than 60,000. It shows that the movement of air transport is dominated by the island of Java. Next will be explained about the process of analysis and discussion of this research.

This section describes the process of analyzing and analyzing the results of this study. First, the results of the modeling analysis try to understand how the sector economy affects overall and parallel airport activity. From table 1 it can be seen that the overall economic model of the sector affects the movement of air transport. It is charged by the significance value of ANOVA, which is below the number 0.05. And 51% of the independent variables in the model are able to explain the dependent variable. When viewed partially or in each sector, found nine sectors that have a significant influence on the movement

of air transport. In addition to the constants in the model, these sectors are all secondary sectors except construction and all tertiary sectors except the services sector of accommodation, service and health. It is tested with a significance value in each sector that is below 0.05. But when viewed based on the magnitude of the sector's influence, four sectors with a strong influence on the air transport movement of the sector are industrial sector, transportation, financial services and real estate.

Table 1. Result of Model of Economic Relationship of Region and Airport in Indonesia

VARIABEL			
	B	**t**	**sig**
Dependent Variable	Total Airplane Movement		
(Constant)	21036.92	3.049	0.002
GRDP Agriculture	-3.965	-1.73	0.084
GRDP Mining	-1.367	-0.558	0.577
GRDP Industry	0.204	9.079	0
GRDP Electricity and gas	-62.192	-2.631	0.009
GRDP Water and Rubbish	-1159.89	-5.028	0
GRDP Construction	3.05	1.414	0.158
GRDP Trading	-9.07	-3.763	0
GRDP Transportation	58.371	11.835	0
GRDP accommodation provision	-11.422	-1.66	0.098
GRDP Information and Communication	-20.906	-2.803	0.005
GRDP Financial Services and Insurance	89.451	6.37	0
GRDP Real Estate	54.571	4.654	0
GRDP Company Services	10.492	0.768	0.443
GRDP Government	-76.24	-6.113	0
GRDP Health and Social Services	-19.841	-1.257	0.209
ANOVA			
f	32.491		
sig	.000a		
R square	0.515		

After knowing that not all sectors influence the air transport traffic, this second model tries to understand the difference of economic influence of region, which is in Java and outside Java Island in the air transportation traffic. A fixed-effect approach that sees intercept differences between objects is used in this analysis to understand the effect differences. From the results of modeling in table 2, it was found that the regency and cities on the island of Java give more influence than the regencies and cities outside Java. It is shown by the minus value on the coefficient of the dummy variable outside Java. It describes that the influence of the region on the island of Java is greater than 21% when compared with areas outside of Java.

Table 2. Result of Comparison of Model of Economic Relation of Region and Airport in Java Island and Outside Java Island

VARIABEL			
	B	**t**	sig
Dependent Variable	Total aircraft movement		
(Constant)	27000.94	1.228	0.22
GRDP Agriculture	-4.252	-1.697	0.09
GRDP Mining	-1.324	-0.538	0.591
GRDP Industry	0.204	9.061	0
GRDP Electricity and gas	-64.594	-2.573	0.01
GRDP Water and Rubbish	-1137.86	-4.674	0
GRDP Construction	3.138	1.438	0.151
GRDP Trading	-9.006	-3.716	0
GRDP Transportation	58.517	11.789	0
GRDP accommodation provision	-12.326	-1.626	0.105
GRDP Information and Communication	-21.684	-2.729	0.007
GRDP Financial Services and Insurance	89.37	6.357	0
GRDP Real Estate	54.648	4.654	0
GRDP Company Services	11.32	0.81	0.418
GRDP Government	-76.599	-6.104	0
GRDP Health and Social Services	-19.912	-1.26	0.208
DUMMY Outside Java	-5713.06	-0.286	0.775
ANOVA			
f	30.405		
sig	.000a		
R square	0.515		

After knowing that the districts and cities on the island of Java have more influence on the movement of air transport, the next two models try to understand which sectors influence the existence of airports with characteristic differences in Java and the Outer Islands. From the two tables below, seen from the results of ANOVA as whole independent variables i.e., economic sectors capable of giving effect to the dependent variable, that is the movement of the aircraft. In addition, 94% of the independent variables were able to explain the dependent variables on Java, and 63% of the free variables were able to explain the dependent variables on the Outer Island of Java. So that there is little possibility of other variables outside the model variables. This can be seen in tables 3 and 4.

Table 3. Results of Modeling the Economic Relations of Regions and Airports in Java

VARIABEL			
	B	**t**	**sig**
Dependent Variable	Total aircraft movement		
(Constant)	14056.73	0.484	0.631
GRDP Agriculture	13.952	1.093	0.281

VARIABEL			
	B	t	sig
GRDP Mining	-51.793	-1.192	0.241
GRDP Industry	-0.424	-0.655	0.516
GRDP Electricity and gas	136.535	2.245	0.031
GRDP Water and Rubbish	4173.328	2.706	0.01
GRDP Construction	-9.251	-1.29	0.205
GRDP Trading	-29.084	-3.41	0.002
GRDP Transportation	14.637	1.306	0.199
GRDP accommodation provision	-56.083	-3	0.005
GRDP Information and Communication	51.547	2.623	0.012
GRDP Financial Services and Insurance	-53.337	-1.121	0.269
GRDP Real Estate	26.353	0.7	0.488
GRDP Company Services	16.612	0.558	0.58
GRDP Government	24.479	0.516	0.609
GRDP Health and Social Services	-20.484	-0.713	0.48
ANOVA			
f	44.818		
sig	.000b		
R square	0.946		

The main results of models 3 and 4 are sectors that significantly affect the existence of the Airport and the difference between the two. For districts and municipalities in Java Island, from model shortcuts in Table 3 it was found that partially secondary sectors that have significant influence are only water and waste sectors and gas electricity. While the industrial and construction sectors have no significant effect. Java Island is more supported by sea transportation. It cannot be separated that the presence of large ports on Java Island reduces the need for air transport to support the activities of the secondary sector. However, in contrast to the tertiary sector results, the trading sector and accommodation providers in Java Island became a sector that had a significant effect on the movement of airports. In other words, the tertiary sector in Java Island each closely related to the need for air transport movement. In addition, the results in the table above also prove the previous assumption that the primary sector in Java Island has no effect on the existence of the Airport. Seen in the agricultural and mining sectors that have no significant effect on the movement of air transport, in this case, the traffics of the aircraft.

Table 4. Results of Modeling the Economic Relations of Regions and Airports Outside Java

VARIABEL			
	B	t	sig
Dependent Variable	Total aircraft movement		
(Constant)	28247.77	3.764	0

VARIABEL			
	B	t	sig
GRDP Agriculture	2.782	0.844	0.399
GRDP Mining	-7.664	-3.309	0.001
GRDP Industry	0.148	7.27	0
GRDP Electricity and gas	-257.463	-5.803	0
GRDP Water and Rubbish	-2208.29	-5.649	0
GRDP Construction	55.09	8.594	0
GRDP Trading	-43.282	-5.975	0
GRDP Transportation	76.894	11.66	0
GRDP accommodation provision	-0.317	-0.024	0.981
GRDP Information and Communication	104.174	5.576	0
GRDP Financial Services and Insurance	63.995	2.813	0.005
GRDP Real Estate	-149.568	-4.282	0
GRDP Company Services	100.331	1.942	0.053
GRDP Government	-51.308	-2.986	0.003
GRDP Health and Social Services	-360.128	-6.707	0
ANOVA			
f	45.457		
sig	.000a		
R square	0.627		

Furthermore, from the modeling results in table 4, it can be seen that districts and cities outside Java Island all secondary sectors without exception have a significant influence on the existence of the Airport. It shows the existence of secondary sector dependence on districts and cities outside Java on air transport, especially the Airport. Whereas in the tertiary sector, all tertiary sectors can be categorized as having a significant influence on the existence of airports except in the sector of accommodation provision. This can occur due to the lack of development of the tourism sector in areas outside of Java. The most interesting of these results is the mining sector, which is the primary sector giving a significant impact on the existence of the Airport. This becomes an interesting finding to be examined more. However, it is concluded that the district and municipal, agricultural sectors in Java and outside Java have no significant influence on the existence of airports.

CONCLUSION

From these four models can be drawn some conclusions related to the results of the literature or research before. Firstly, with the conclusion of the model, it is concluded that there is a relationship between airport presence and regional economy in regencies and cities in Indonesia. But the relationship is not shown

by all economic sectors in the regional economic structure. Only the secondary and tertiary sectors have a significant influence on the existence of the Airport. In other words, the secondary and tertiary economic sectors have a need for air transport movement. It reinforces the research results of Van De Vijver, (2014) and Baker et al., (2015) that there was a positive relationship between airport presence and economic growth.

Second, the above models also answer the alleged role of the secondary and tertiary sectors in supporting the movement of air transport. Besides, the high movement air transport in Java island when compared with outside Java Island caused by the high value and growth of the secondary and tertiary sectors in Java island in comparison with outside Java. It is also shown by the results of the research by Button & Taylor, (2000), which shown that air transport was closely related to technology-based economic sectors such as the secondary and tertiary sectors.

Finally, from the models made, it can be concluded that the existence of airports is not influenced by the primary sector in the areas of Java. Especially for the agricultural sector, the sector has no effect on the existence of airports in Indonesia.

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