ANALYSIS OF INDUSTRIAL AGGLOMERATION AND ECONOMICS GROWTH IN 2013-2019 (CASE STUDY OF SIX PROVINCES ON JAVA ISLAND)

By
Fitri Bahari[1*)], Zulfatun Nisa[2)]
Faculty of Economics and Business, Diponegoro University
[*)]Corresponding Author: fitribahari@students.undip.ac.id

Submission: April 7, 2020; Accepted: July 16, 2020

ABSTRACT

This study aims to analyze the degree of agglomeration industry in manufacturing product between DKI Jakarta, West Java, Central Java, Yogyakarta, East Java, and Banten in 2013-2019. The degree of agglomeration industry was calculated by using the Balassa Index and using panel data with fixed effect model analysis to explain determinants of economic growth in provinces Java Island. The results of this study show that the degree of Agglomeration Industry West Java has mild agglomeration. Central Java, East Java, and Banten have weak agglomeration. DKI Jakarta and Yogyakarta have no agglomeration industry in manufacturing products. Moreover, the empirical results of the determinants of economic growth indicate that agglomeration has a positive influence, While Labor has a negative effect on Economic Growth. The results also suggest that investment has an un-significant influence on Economics growth. Therefore, the government is expected to encourage increased domestic investment so that it can have an impact on economic growth. One way that the government can increase domestic investment is to develop investment in e-commerce and tourism.

Keywords: Economic Growth, Agglomeration, Labor, Investment

ABSTRAK

Penelitian ini bertujuan untuk menganalisis tingkat aglomerasi industri manufaktur di provinsi DKI Jakarta, Jawa Barat, Jawa Tengah, Yogyakarta, Jawa Timur, dan Banten periode tahun 2013-2019. Tingkat aglomerasi dihitung dengan menggunakan Indeks Balassa dan menggunakan data panel dengan model fixed effect model guna menjelaskan faktor-faktor yang mempengaruhi pertumbuhan ekonomi di provinsi-provinsi pulau Jawa. Hasil penelitian ini menunjukkan bahwa tingkat aglomerasi industri di Jawa Barat memiliki aglomerasi sedang. Jawa Tengah, Jawa Timur dan Banten memiliki tingkat aglomerasi lemah. DKI Jakarta dan Yogyakarta tidak memiliki tingkat aglomerasi di produk manufaktur. Dan hasil empiris dari faktor-faktor yang mempengaruhi pertumbuhan ekonomi, menunjukkan bahwa Aglomerasi memiliki pengaruh positif dan signifikan terhadap Pertumbuhan ekonomi. Variabel Tenaga Kerja memiliki pengaruh negatif dan signifikan. Sementara variabel Investasi (PMDN) berpengaruh positif dan tidak signifikan terhadap pertumbuhan ekonomi..

Kata Kunci: *Pertumbuhan Ekonomi, Aglomerasi, Tenaga Kerja, Investasi*

INTRODUCTION

Economic development involved the community's efforts as a whole to develop economic activities and enhance the public welfare. The concept of development is often to linkages with the process of industrialization. For Accelerate the development economy, these strategies are to carried out by the Government. Along with the increasing of progress industrialization and supported by government policy, the manufacturing sector has an essential role in the growth of a region's GRDP. According to the rates of distribution GRDP per island in Indonesia since 2013-2017, Java Island has become the most significant distribution island in Indonesia.

Table 1. Percentage Distribution of Gross Regional Domestic Product by Island 2013-2017

Island	2013	2014	2015	2016	2017	2018
Sumatra	23.05	23.02	22.18	22.02	21.73	21.58
Java	57.06	57.39	58.33	58.52	58.37	58.49
Kalimantan	9.25	8.77	8.16	7.86	8.24	8.20
Sulawesi	5.50	5.64	5.91	6.04	6.12	6.22
Maluku & Papua	2.34	2.31	2.35	2.44	2.42	2.47
Bali & Nusa Tenggara	2.80	2.87	3.07	3.12	3.12	3.05

Sources: Statistics of Indonesia, 2020, processed.

We based the table 1. Statistic of Indonesia data in 2008, java island has the most significant contributor to rates distribution of GRDP in Indonesia. According to the data of The distribution of GRDP on Java has increased every year. In 2013, it amounted to 57.06 percent, increasing to 58.33 percent in 2015, and increasing again in 2017 to 58.49 percent.

Since the 1980s, industrialization has been significant the driving force to rapid urbanization in the Asian region. Meanwhile Differing in the case of resource-based industries, manufacturing industries tend to be located in the city and around cities. Generally, the manufacturing industries have a significant contribution to the formation of GDP. The growth of the GDP of the manufacturing industry experienced fluctuations in 2015-2018; this can be seen in Figure 1.

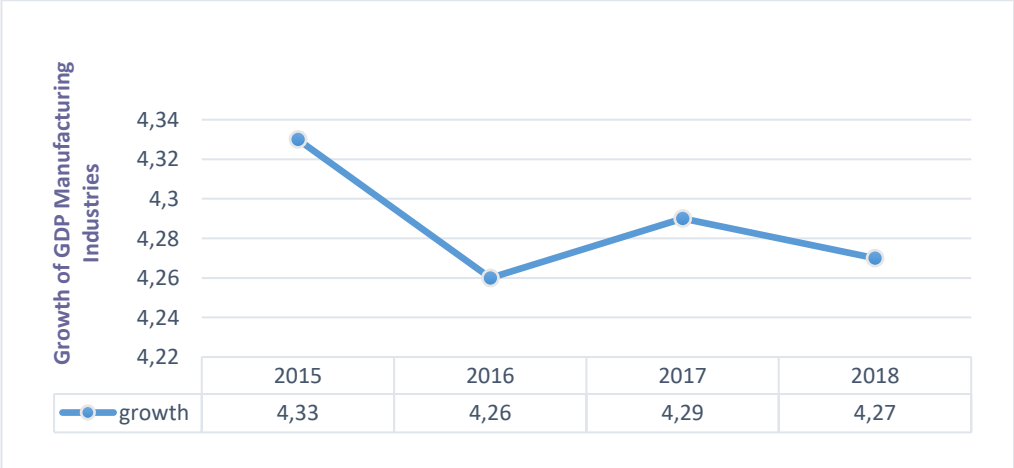
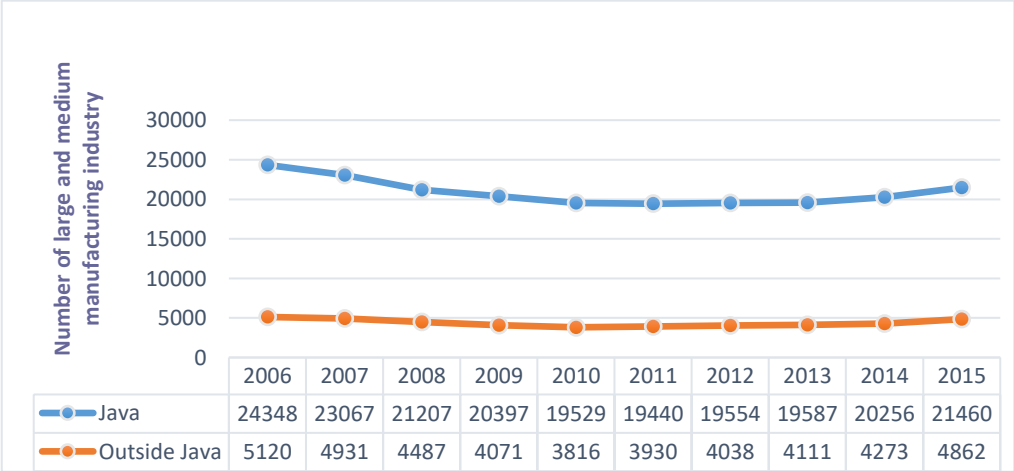


Figure 1. Growth of GDP Manufacturing Industries (%) in 2015-2018
Sources: Statistics of Indonesia, 2020, processed.

Based on the Statistic of Indonesia 2020, GDP of the manufacturing industry in 2015-2018 increased in 2015, a 4.33 percent increase to 4.26 percent in 2016. In 2017 it increased to 4.29 percent.

While the growth of the manufacturing industry in 2018 of 4.27 percent increased but slowing if compared to 2017. The manufacturing sector is still one of the drivers of the Indonesian economy.

The growth of Industries depends on geographically concentrate. This concentrate occurs where the industries located in the sector necessary, and this location can be meet with their needs. So industries can get benefit from the location of interconnected companies. Figure 2 presents data on the number of large and medium industries in java and other java in 2006-2015.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Java	24348	23067	21207	20397	19529	19440	19554	19587	20256	21460
Outside Java	5120	4931	4487	4071	3816	3930	4038	4111	4273	4862

Figure 2. Number of large and medium manufacturing industries by java and outside java 2006-2015
Sources: Statistics of Indonesia, 2020, processed.

According to economists, in Arsyad (2016), economic growth is defined as an increase in GDP regardless of whether the increase is more significant or smaller than the rate of population growth, or whether changes in economic structure occur or not. One important variable that drives economic growth is the Agglomeration industries. According to Krugman (1998), agglomeration is a central issue in improving business strategies and increasing regional competitiveness in regional economic literature. Agglomeration can provide a positive impact on the rate of economic growth. Generally, the regions with agglomeration industries have higher rates of economic growth than the regions unagglomerated. Agglomeration generates a spatial difference in income level. The regions with spatial agglomeration, the growing economy will be substantially increased.

According to Harrod-Domar, to grow, investment is needed, which is a net addition to the capital stock (Todaro and Smith, 2011). Investment affected economic growth, as well as domestic investment. The research of Nguyen and Trinh (2018) public investment and private does affect economic growth in the inverted-U shape effect as of Barro (1990 in Nguyen and Trinh, 2018), with positive effect in a short-run and negative effect in long-run. Adams (2009), Foreign Direct Investment and Domestic investment controlling macroeconomic and institutional variables, his research found that domestic investment has a positive effect and significantly correlated with economic growth, and Foreign Direct investment has a negative effect on domestic investment. Ali (2017), Domestic investment has a positive effect and significant growth. These accompanying policies were supporting enterprises. Moreover, countries have adopted a privatization strategy aimed at increasing productivity and boosting the economy.

Another critical indicator of economic growth is labor. The labor force is a factor that influences the output of a region. Hence output rises over a specified period. A portion of the output will be invested so that the capital stock will increase as large as the output invested (Boediono, 2012). For labor, it indicates the creation of employment opportunities resulting from the increase in output (Wihda, 2014). This study aims to analyze the degree of agglomeration industry in manufacturing product between DKI

Jakarta, West Java, Central Java, Yogyakarta, East Java, and Banten in 2013-2019. Then this study aims to analyze determinant economic growth with Labor, Investment, and degree agglomeration Industries.

METHODS

This research used secondary data from the Statistics of Indonesia. Our sample includes 6 Provinces, of which all the provinces of Java Island (DKI Jakarta, West Java, Central Java, DIY, East Java, Banten). The time sample spans from 2013 to 2019. The analytical tool used is Microsoft Excel 2016 to calculate economic agglomeration, and Eviews 10 software to estimate the determinants of economic growth using panel data. Hence, the total possible number of observations is 42 data. At present, the most commonly-used measurement of the level of industrial agglomeration is The Balassa Index (Sbergami, 2002), which is calculated as:

$$Balassa_{ij} = \left(\frac{E_{ij}}{\sum_j E_{ij}}\right) / \left(\frac{\sum_i E_{ij}}{\sum_i \sum_j E_{ij}}\right)$$

Where:

I : sector

J : region

According to Sbergami (2002), E is labor that works in sector i region j or can be replaced with output data from sector i region j. This index's numerator presents the region's share of the total labor in the manufacturing industry sector. The more centralized in an industry, Balassa Index more the higher. If the Balassa index number more than four its means strong agglomeration. If the value is between 2 and 4, it means average or moderate agglomeration. If the value is between 1 to 2 is weak. In contrast, a value of 0 to 1 means no agglomeration, or the region has no comparative advantage for agglomeration.

Dependent variable and panel data techniques are used to analyze the determinant of economic growth. The dependent variable of this research is the rate of Economic Growth. The independent variables are the Agglomeration of Manufacturing Industry, Labor, and Domestic Investment. We decide against using the fixed effects estimation, as some relevant variables do not vary long time. Therefore, the regression coefficient is estimated using the GLS (Generalized Least Squares) method (Gujarati, 1995: 52). At present, the model to be estimated is as follows:

$$Y_{it} = \beta_0 + \beta_1 ln(AGLO_{it}) + \beta_2 (TK_{it}) + \beta_3 ln(I_{it}) + \varepsilon_{it}$$

Where:

Y_{it} : Economic Growth of Province i on Year t

$Aglo_{it}$: Degree of Agglomeration Industry of Province i on Year t

Tk_{it} : Labor of Province i on Year t

I_{it} : Domestic Investment (DDI) Of Province i on Year t

E_{it} : *Random Error*

RESULTS AND DISCUSSIONS

This study to the estimate of degree agglomeration used the Ballasa Index. Results for the estimate of the degree of agglomeration in Six Provinces of Java in 2013- 2019 can be seen in Table 2 as below:

Table 2. Index of agglomeration industries in six province 2013-2019

Province	2013	2014	2015	2016	2017	2018	2019
DKI Jakarta	0.598	0.598	0.596	0.588	0.599	0.602	0.633
West Java	2.011	2.020	2.017	2.015	2.031	2.180	2.286

Central Java	1.613	1.640	1.636	1.630	1.628	1.714	1.816
DIY	0.614	0.608	0.595	0.599	0.607	0.643	0.672
East Java	1.334	1.362	1.372	1.367	1.380	1.419	1.607
Banten	1.781	1.723	1.700	1.677	1.658	1.637	1.798

Source: secondary data 2020, processed.

The analysis of the degree of industrial agglomeration in 2013-2019 in the Six Provinces of Java Island shows that the province of West Java has a moderate degree of agglomeration, which means the index value is 2-4 percent. The provinces of Central Java, East Java, and Banten showed a weak degree of agglomeration, which stood at 1-2 percent. In contrast, the index value of DKI Jakarta and DIY Provinces on 0 - 1 percent indicates that industrial agglomeration did not occur in the Two Provinces or did not have a comparative advantage for industrial agglomeration.

According to the empirical result of the calculation of the degree of agglomeration in the Six Provinces of Java Island, the regional government is expected to be able to increase the agglomeration of the region. Regional agglomeration can have a positive impact on improving people's welfare and increasing economic growth. Because if an area has an industrial concentration, then the rate of economic growth in the area is higher than compared of an area that does not have an industrial concentration. According to Bardley and Gans (1996), regions with agglomeration rates have high economic growth compared to regions that do not have agglomeration.

Table 3. Result of estimate Chow Test and Hausman Test

Effects test	statistic	d.f.	Prob.
Cross-section F	2.244204	-5.33	0.0730
Cross-section Chi-square	12.293094	5	0.0310

Source: secondary data 2020, processed.

From Table.3, it is evident that the result of the Chow test and Hausman test. The chow test shows the prob. Chi-square is 0,0310 smaller than 0,05, or the null hypothesis is rejected. It is a mean fixed effect chose to use better than the pool model—next to the result of Hausman Test Prob. P. value is 0,0199 smaller than 0,05, in case we rejected the null hypothesis. Therefore, the Hausman test and test chow results are most appropriate, then fixed effect models are most appropriate to use.

Additionally, fixed-effect models are used to observe the effect of economic growth in each region. In this study, the fixed-effect model is the model chosen in the use of panel data methods. The results of the regression can be seen in Table 4 below.

Table 4. Result of estimate variable growth economics with fixed effect model

Variable	**Coefficient**	**t-statistic (signif)**
konstanta	8.669584	2.984672
		(0.0053)
lnAglo	0.513875	3.661837
		(0.0009)
LnTK	-0.445562	-2.440074
		(0.0202)
lnI	0.005623	0.884543
		(0.3828)
R-square	0.792959	
F-Statistic	15.79859	

(signif)	(0.00000)
Number of significant variables	2 of variabel (66,67%)
N	42

Source: secondary data 2020, processed.

The Estimation results show that the coefficient of determination (R-square) is 79.30 percent of the variation in economic growth explained by the independent variables (agglomeration, labor, and domestic investment), while other variables outside the model explain the rest. The F-statistic probability also strengthens this result with a 5 percent significance that is equal to 0,000000. This means that H0 is rejected, and H1 is accepted, showing that the independent variables jointly influence the dependent variable.

Table 5. Result of classical assumptions test

Variable	**Coefficient**	**Signif**
Durbin Watson (Dw)	1.451742	
Jarque – Bera	2.851741	0.234600
R-square	79.2959	
R-square auxiliary regression 1 (lnAglo = lnTK + lnI)	59.8967	
R-square auxiliary regression 2 (lnTK = lnAglo + lnI)	76.1426	
R-square auxiliary regression 3 (lnI = lnAglo + lnTk)	56.7685	

Source: secondary data 2020, processed.

The next step is to test the detection of classical assumptions. Test for normality by looking at the value of Jarque- Bera of 2.851741 with a probability of 0.234600 .greater than the real level of 5 percent, it can be concluded with the normal distribution of data. Gujarati (2004), observations are given equal weight estimation with approach Cross Section SUR, which will estimate a feasible GLS specification correcting for both cross-section heteroskedasticity and contemporaneous correlation. In this model, we used the General Least Square (Cross Section Weights) with the approach of the Cross Section SUR (PCSE) and Standard Errors and Covariance. Therefore the assumption of heteroscedasticity and auto operation in this model can be ignored. Furthermore, the multicollinearity test is performed using auxiliary regression, and it is known that the R-square value for the entire estimate, when compared to the R-square fixed effect model (79.30 percent), has a smaller value, so that the occurrence of multicollinearity can be ignored.

The estimation results of industrial agglomeration (AGLO) with economic growth showed a positive and significant effect on the real level of 0.05 percent. This result describes that if there is an increase in agglomeration will increase economic growth in the Java provinces. This result is consistent with the researched of Kuncoro (2002) that the rapid development of the manufacturing industry in Indonesia turned out to be biased to the islands of Java and Sumatra, which was striking for large and medium-sized industries (IBM), which are often associated with modern manufacturing industries. According to Bradley and Gans (1996), the industrial agglomeration has a positive externality influence on economic growth.

The estimation results show that the coefficient of labor shows a negative and significant effect on the real level of 0.05. This result explains that if an increase in the number of employees will cause a decrease in economic growth in the Java provinces. According to Samuelson and Nordhaus (2001), the employees' quality and skills are the main factors in economic growth.

The results show that the domestic investment/ DDI (I) has a positive influence on economic growth, but it is not significant at the real level of five percent. The variable of domestic investment is not significant, so in reality, the domestic investment/ DDI is not a factor that influences changes in economic growth. The deteriorating global investment climate has a significant impact on the development of investment in the country. Therefore, the government is expected to encourage increased domestic investment so that it can have an impact on economic growth. One way that the government can increase domestic investment is to develop investment in e-commerce and tourism.

CONCLUSION

Based on the results of the above research, it can be concluded as follows: The degree of the agglomeration manufacturing industry in West Java is at a moderate level, which is at a value of 2-4 percent. Whereas in Central Java, East Java, and Banten, the industrial agglomeration in the region is weak, which is 1-2 percent. Moreover, in DKI Jakarta and Yogyakarta shows that there is no agglomeration of the manufacturing industry in the area because it is at the agglomeration degree of 0-1 percent. Industrial agglomeration has a positive and significant effect on economic growth. Labor has a negative and significant effect on economic growth. Investment has a positive and not significant effect on economic growth.

REFERENCE

Arsyad, L. .2016. *Ekonomi Pembangunan, Edisi Kelima*. Yogyakarta: UPP STIM YKPN.

Boediono. 2012. *Teori Pertumbuhan Ekonomi*. Yogyakarta, BPFE UGM.

Bradley, R., & Gans, J. S. (1996). Growth in Australian Cities, the Economic Record, the Economic Society of Australia, *74*.,226.

Gujarati, Damodar N, 1995. *Basic Econometric*, third edition, Singapore: Mc.Graw Hill.

Gujarati, D. 2004. Basic Econometric 4th Edition, Mc.Grow Hill, NewYork.

Kuncoro, M, 2002. *Analisis Spasial dan Regional, Studi Aglomerasi dan Kluster Industri Indonesia.*, UPP AMP YKPN. Yogyakarta.

Krugman. 1998. Space: the Final Frontier. *Journal of Economic Perspectives*, 12(2), 161-174.

Sbergami, Federica. 2002. *Agglomeration and Economic Growth: Some Puzzles*, Graduate Institute of International Studies, Geneva.

Samuelson, P. "A dan Nordhaus, WD 2001." *Ilmu Makroekonomi Edisis Keempat belas. Jakarta: PT Media Global Edukasi*.

Statistic of Indonesia. 2020. “Database”. www.bps.go.id. (1 April 2020).

Todaro, Michael, P. dan Stephen C. Smith. 2003 . *Pembangunan Ekonomi di Dunia Ketiga, edisi kedelapan*. Jakarta : Erlangga

Wihda, B.M. and Poerwono, D., 2014. Analisis Pengaruh Penanaman Modal dalam Negeri (Pmdn), Penanaman Modal Asing (PMA), Pengeluaran Pemerintah dan Tenaga Kerja terhadap Pertumbuhan Ekonomi di Di YOGYAKARTA (Tahun 1996–2012). *Diponegoro Journal of Economics*, *3*(1), pp.210-22