

Economic agglomeration, economic growth and income inequality in regional economies

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Abstract

This study analyses the relationship between economic agglomeration, economic growth, and income inequality in East Java Province, Indonesia, in 2011-2015, after implementing a regional autonomy policy of regional development. It uses panel data with a random effect model. The model estimation's result suggests that economic agglomeration significantly and positively affects income inequality. However, economic growth does not have any significant effects on income inequality.

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Introduction

Regional autonomy and fiscal decentralization in regional development policies have been implemented in Indonesia since 2000 by transferring various authorities from the central government to local ones. The development affairs are mainly related to planning of regional development, budget allocation and implementation of development in the region. The authority delegation is expected to increase community participation in the implementation of regional development to achieve a welfare state and to reduce income inequality. These are the primary indicators of the achievement of national development in Indonesia.

Economic developments in various regions in Indonesia show some income inequalities among societies. The income inequalities are due to an uneven allocation of economic resources and inability of the communities to access available economic resources. The era of regional autonomy is mainly expected to encourage community's involvement in the development process. Additionally, it is also expected to increase equity in the availability of economic resource allocation in development.

Along with some dynamics in the global economy, the orientation of national development is for the country to be directly involved in global competitiveness. One of the strategies adopted is to implement industrial agglomeration policy of the 1990s. This policy aims to facilitate development of leading economic sectors in distinct clusters, to enable the sectors to have competitiveness in the global economy.

The applied agglomeration has generated some centres of economic activities in various regions in Indonesia. In aggregate, this policy could push the performance of the national economy in the 1990s. By the result, Indonesia reached economic growth rate, about 8-9% per year. Nevertheless, the pertinence of agglomeration created problems of income inequality among communities in various regions. The presence of economic agglomeration does not generate a multiplier effect on the area around the industry.

The critical theory of economic growth is aggregate production's rules which related to the amount of input used in the form of capital and labor to produce output in a given period (Badel & Hugget, 2016). One of the most famous economic growth models is the Harrod-Domar model that links to the Keynesian ideas. This model is often used in developing countries to explain the linkage between economic output and total capital (Tranh & Hoang, 2016). The Harrod Domar model assumes that the capital-output ratio has a rigid relationship with the coefficient of production. Besides, the Solow model explains that technology has transformed capital and labor into output productively (Ozdemir,

2017). In an empirical study, Jagadeesh (2015) explains that in Bostawa, there is a significant relationship between economic growth and saving, which is supported by the Harrod-Domar economic growth model.

The economic growth shows the role of the regional economy in national development. The leading economic region can be transformed into an industrial agglomeration area. This industrial agglomeration can lift up the economic outputs. In this case, Marshall connects economic and social conditions, often called the "Marshallian Industrial District" which means the concentration of companies or industries that are affected by geographical conditions has a relationship with regional growth and labor (Tappi, 2001). The industrial district has an industrial atmosphere and can produce output efficiently. The industrial districts may influence the dissemination of information, innovation, and technology. It also can affect the workforce and provide specific training for the community and encourage more efficient production costs due to joint production (Trullen, 2015). There are three main reasons for the industrial district establishment, which are the need for the industry to get closer to the resources; the excellence of market demand; and the existence of urban (Belussi & Caldari, 2008). The Marshallian Industrial district can be used to compare significant similarities and differences between industries in a country (Boix & Galletto, 2008).

Economic gap or disparities also remains a concern for policy researchers in Europe. Geppert and Stephan (2008) explain that the increase in economic agglomeration has triggered the increase of disparity in the UK. Agglomeration also promotes economic growth (Brulhart and Sbergami, 2009; Gardiner et al. 2010). Economic gap and agglomeration have the potential to increase economic growth (Castells, 2011).

On the other hand, Mukhlis and Simanjuntak (2016) explain that economic growth does not have any significant effect on poverty. The raise of the minimum wage will reduce poverty in East Java Province. Associated with Kuznet's hypothesis according to Frazer (2006) in low-income countries, economic growth significantly affects economic inequality. Meanwhile, Dietz, Rosa, & York (2012) explains that the relationship of per capita income to the environmental quality has an opposite shape to the U-curve.

Obradovic, Lojanica, & Janković (2016) explain that economic growth and long-term gaps are significantly positive. To reduce the gap rate, it requires an increase in output in disadvantaged areas. Riso, Punzo, Javier, & Carrera (2013) find that there is a negative relationship between income disparity and economic growth. In addition, Vu & Mukhopadhaya (2011) find that the economic disparity negatively affect the economic growth, especially in developing countries, which has a more considerable influence than the developed countries. In the long-term, the economic gap has negatively affected economic growth in developed and developing countries, democracy, and non-democratic countries (Herzer & Vollmer, 2012).

Hsing (2005) explains that economic disparities are detrimental to economic growth in the United States, means that the economic disparity negatively affects economic growth. Case studies in Pakistan show that the gap has a significant relationship with economic growth. Hence, it supports Kuznet's inverted U hypothesis (Shahbaz, 2010; Tian, 2012; Wahiba & Wariemmi, 2014), which also explain that economic gap has a negative relationship with economic growth. On the other hand, Riso, Javier, and Carrera (2012) state that economic disparities and economic growth are positively influential in China.

Up to now, various studies about the linkages of agglomeration, economic growth and income inequality in various countries. The results of these studies can justify the linkage between agglomeration and income inequality that occurs in various countries (Frazer, 2006; Geppert & Stephan, 2008). Based on the relationship between economic growth and income inequality research conducted by Mukhlis and Simanjuntak (2016) found a link between economic growth and poverty levels.

The discernment of research result about the relationship between economic growth and agglomeration happen because many countries implement different policies to increase economic performance. The countries that have limited economic resources would try to optimise economic activities with industrialisation and international economic activities (i.e., international trade, capital inflow, and labor mobility). Besides that, countries that have abundant economic resources adopt technology to boost the productivity to enter the global market. In this case, agglomeration and income inequality still happen in many countries and need the right policy to facilitate economic activities to grow well and spread over the area.

East Java Province of Indonesia has an economic growth rate above the average of national economic growth in several periods. The advantages of East Java province compared to other provinces are the existence of land, sea, and air transportation infrastructure that can be connected internationally. Natural resources availability is abundance, mainly in the agricultural sector; such as terrestrial and marine fisheries, plantations, forestry, and food crops. Supported by a large population, the economic capacity of eastern Java province can grow faster than the national average.

The economic agglomeration strategy in economic development also experienced by East Java Province. The economic agglomeration applied in the form of industrial estate, an industrial centre and a cluster of sectoral economic activities which spread in Pasuruan, Surabaya, Gresik, Mojokerto, and Lamongan. As a result of the massive rate of economic activities in these districts, economic activities have a significant rate of economic growth. As an illustration, in 2016, economic growth in East Java province reaches 5.6% (BPS East Java, 2017), per capita income level (GRDP per capita) has reached the amount of IDR 35.962.000 - per year (more and less 2600 USD/year).

The performance of economic agglomeration and regional economic growth in various regencies/cities in East Java also causes poverty and income inequality among the population. Not all residents can access the available economic resources. Also, the need for competence employment not fulfilled by the labor force in the region. As a result, there are mobilities of economic resources from peripheral areas to hinterland. In 2016, the number of poor people in various regencies/cities in Eastern Java reached 4,639 thousand people. The level of income inequality (measured by the Gini ratio) in 2015 is 0.42 (BPS East Java, 2017).

This research aims to analyse the correlation of economic agglomeration, economic growth and income inequality in East Java province, Indonesia for 2011-2015.

Research Methods

The type of this research is quantitative analysis while the data analysis method is descriptive. The object of this research is ten regencies/cities in East Java Province, covering Malang City, Batu City, Blitar City, Malang Regency, Pasuruan Regency, Lumajang Regency, Sidoarjo Regency, Mojokerto Regency, Jombang Regency, and Kediri Regency. The data in this research is from East Java BPS using publication services in the form of physical documents and through the website. These data that analysed are labor absorbed at work, Gini ratio, and economic growth during 2011-2015. The data analysis used in this research is Location Quotient (LQ) and Data Panel Regression method (OLS).

Location Quotient

Location Quotient (LQ) analysis measures the level of the task at the district level and the provincial level in sectoral production activities. The concept used is $LQ > 1$, then the sectors that are the basis of the sector, $LQ = 1$ matters required by the sector that is sufficient for local needs, $LQ < 1$ is not the base sector and is unable to meet local needs.

Here is the LQ equation (Tian, 2012):

$$LQ = \frac{x_{ij}}{x_{sj}} = \frac{x_{ij}/x_{is}}{x_{sj}/x_{ss}}$$

Based on the equation: X_{ij} is the workforce of sector i in regencies/cities j , X is the total sector i workforce in East Java Province. Then, X_{sj} total labor of all sectors in regencies/cities i , and X_{ss} is the total of the workforce. This coefficient is used to measure economic agglomeration in the region.

Panel data regression

This case study uses disparity that is represented by the Gini ratio as the dependent variable, while economic agglomeration represented by LQ coefficient and economic growth become the independent variable. Here is the equation of the panel data regression model:

$$Gin_{it} = a_i + \beta_1 LQ_{it} + \beta_2 Gr_{it} + \varepsilon_{it}$$

The error terms are ε , and i denotes the observed unit distribution, t years of observation, the magnitude of the constant, indicating the coefficient of the independent variable. Gini ratio is the value of gap or Gini coefficient, LQ is the value of agglomeration or Location Quotient, while Gr is the value of economic growth.

Results and Discussion

Location Quotient (LQ)

This study measured the Location Quotient (LQ) on ten (10) regencies/cities from 2011-2015. The following LQ values are in Tables 1 and 2:

Table 1. Average LQ District-City East Java Province

Sector	Malang City	Blitar City	Batu City	Malang Regency	Pasuruan Regency
1	0.04	0.27	0.76	1.05	0.80
2	0.31	0.29	0.15	0.67	0.30
3	1.41	0.96	0.57	0.97	1.71
4	3.52	2.39	1.22	1.36	1.19
5	1.13	1.01	1.35	1.44	1.21
6	1.66	1.52	1.45	0.95	0.99
7	1.64	1.14	0.97	0.93	1.09
8	2.51	2.60	1.22	0.59	0.56
9	1.86	2.07	1.33	0.82	0.83

Table 2. Average LQ District-City East Java Province

Sector	Mojokerto	Jombang	Lumajang	Kediri	Sidoarjo
1	0.55	0.72	1.27	0.92	0.16
2	0.54	0.50	1.77	0.55	0.49
3	2.04	1.26	0.80	1.04	2.53
4	0.29	1.06	0.25	0.31	0.70
5	0.93	1.44	1.01	1.28	1.00
6	1.05	1.23	0.76	1.21	1.13
7	1.31	1.01	1.01	0.65	1.53
8	1.20	0.78	0.39	0.78	2.34
9	1.06	1.04	0.84	0.91	1.29

Notes:

- Sectors
- 1: Agriculture, forestry, hunting, and fisheries
 - 2: Mining and quarrying
 - 3: Processing Industry
 - 4: Electricity, Gas, and Water
 - 5: Building
 - 6: Great Trade, Retail, Restaurants, and Hotels
 - 7: Transportation, Warehousing, and communication
 - 8: Finance, Insurance, Leasehold business, land, and services company
 - 9: Community, social, and individual services

The above results indicate that the value of LQ Malang in the sector of electricity, gas and clean water with a value of 3.52. Blitar City excels in transport, trade, and communications with a value of 2.60. Batu City excels in the sector of large trade, retail, restaurants, and hotels with a value of 1.45. Malang Regency transcends in building sector with value 1.44. Pasuruan Regency outdoes in the processing industry sector with a value of 1.71. Mojokerto Regency outrivals in the manufacturing sector with a value of 2.04. Jombang Regency excels in the building sector with a value of 1.44. The building sector is also the leading sector in Kediri Regency with the value of 1.28, and the last of Sidoarjo regency better in the manufacturing industry sector with a value of 2.53.

Based on the table above, it shows that in the first sector (Agriculture, Forestry, Hunting, and fisheries) and the second sector (mining and excavation) are in Lumajang District. Moreover, the third sector (manufacturing industry) is in Malang City, Pasuruan Regency, Mojokerto Regency, Sidoarjo Regency, Jombang. The fourth sector (electricity, gas, and water) is the area of Malang City, Malang Regency, Batu City, Blitar City, Pasuruan District. The fifth sector (building) the superior area that is almost all districts except Mojokerto, Sidoarjo, and Lumajang. Then, the sixth sector (big trade, retail, and hotels) are Batu, Malang City, Blitar City, Kediri Regency, Jombang Regency, Sidoarjo Regency. The seventh sector (Transportation, Warehousing and Communication) is in areas of Malang City, Blitar City, Mojokerto Regency, Sidoarjo Regency. Lastly, the eighth sector (finance, insurance, building rental business, land and services company) in

Malang City, Blitar City, Batu City, Mojokerto Regency, and Sidoarjo Regency. The last ninth sector (social services, social and individual) areas that are superior are the city of Malang, Blitar, Batu, and Sidoarjo.

The geographical conditions significantly affect the form of economic agglomeration (concentration) of each region as an example of the ninth sector example (social service, social and individual) tend to superior in the urban areas of Malang, Blitar and Batu City. Related to the Marshallian Industrial District Model which stated that the concentration of firms or industries that are affected by geographical conditions, has a relationship to regional growth and labor in an area (Tappi, 2001).

Panel data regression

The first step before doing the test panel data regression is doing the Chow Test and Hausman Test.

Chow Test

Chow Test is used to test the best model between Common Effect Model and Fixed Effect model. Here's the Chow test result.

Table 3. Chow Test

Effect Test	Statistic	D, F	Probability
Cross-Section F	5.253538	(9,38)	0.0001
Cross-Section Chi-Square	40.418772	9	0.0000

Based on Chow Test Probability value $0.0001 < 0.05$. Thus, the Fixed Effect Model is better than the Common Effect Model.

Hausman Test

Hausman Test is used to test the best model between the Fixed Effect Model and Random Effect Model. The following Hausman Test results explained in table 4.

Table 4. Hausman Test

Test Summary	Chi-Sq Statistic	Chi-Sq d.f	Probability
Cross-Section random	2.488157	2	0.2882

Hausman Test shows that the probability of 0.2882, which exceeds 0.05. Thus, the suitable model used in panel data regression is the Random Effect Model.

Random Effect Model

Based on the Chow Test and Hausman Test the best model is the Random Effect Model. The test results are shown in the following table:

Table 5. Random Effect Model

Variable	Coefficient	Probability
C	0.284398	0.0000
LQ	0.088885	0.0006
Gr	-0.009633	0.1513
Adjusted R-Squared		0.23739
F-Statistic		0.000743

Based on the table, the panel data regression model is:

$$\text{Gini} = 0.284398 + 0.088885\text{LQ} - 0.009633\text{Gr}$$

Panel data regression test shows that the relationship between economic disparity and agglomeration is significant and positive with coefficient value 0.088885 (p-value equal 0.0006 below $\alpha = 1\%$). This coefficient means that any increase (1%) in the level of economic agglomeration (concentration) followed by an increase in income disparity of 0.089 or 8.9%. Geppert (2008) explains that the increase in economic concentration can increase the disparity. In this case, the concentration of economic activity in one region tends to establish other

economic activities located in the same region due to their necessary infrastructure in economic activity. As for labor and raw materials, it can provide from other regions outside the existing economic area. Nevertheless, the use of these factors of production is unable to improve the economic equality in various regions significantly. In many cases, the increase of income inequality between the regions where the economic concentration and the surrounding areas are affected.

Economic growth variables do not have a significant relationship with economic disparities. Based on data outcome, the coefficient equal to -0.009633. The results of study provide essential information about the strategy of optimising the economic growth, especially in developing countries. That high economic growth is a necessity to improve the welfare and livelihood. However, high economic growth will only increase the economic gap when there is no regulation of social costs arising. In other words, in every development process always creates the side-effects in the form of crime, unemployment, and poverty. Therefore, it takes a growth strategy that can improve the prosperity of the community evenly. The results of this study are by the results of research conducted by Mukhlis and Simanjuntak (2016). In his research, it concludes that in East Java province economic growth has no significant effect on poverty. The results of this study also illustrate that Kuznets hypothesis of reversed U curve about the income inequality and economic growth relationship does not occur in the context of economic development in East Java Province of Indonesia.

In contrast, some research conducted, such as: Frazer, (2006); Herzer & Vollmer, (2012); Risso et al., (2013); Vu and Mukhopadhaya, (2011). The absence of a relationship between economic growth and the income gap level in various regencies/cities in East Java province during the period of 2011-2015 provides essential information on the policy of development equity and economic growth performance. East Java province still has an economic growth rate above the national economic growth rate during 2011-2015. Hence, the rate of economic growth requires considerable economic resources supported by the contribution of qualified human resources. The performance of high economic growth requires high attention in order to prevent high-income inequality in East Java province. Theoretically, the level of economic disparities caused by the quality of human resources, uneven economic distribution, and high unemployment rate.

The results of this study still indicate the ambiguity about the relationship between the level of economic agglomeration, economic growth and income inequality in various regions in Indonesia. The causes are the differences in endowment factors and economic policies applied in each country. Endowment factors are increasingly qualified to provide a maximum contribution in achieving the economic performance of a country. Likewise, with economic policy, for a country, the application of broad economic policy is an option to overcome the problem of income inequality and economic slowdown. In developed countries, the problem of poverty and income inequality overcame by the transfer of income (welfare subsidy subsidies) from the country to the resident. The size of this income transfer depends on the financial capacity of the country. At the same time, the developed country's economy leads to achieving sustainable economic growth. Besides that, economic agglomeration causes inconsistency in economic impact. In industrial countries, this policy succeeds to push economic activity in the region. However, in developing countries, this policy still need action for economic optimisation resources in the production process.

Conclusions

Regional economic development happens through economic agglomeration activities. This policy is applied because based on various theories and studies, economic agglomeration has a positive correlation to the acceleration of economic resource utilisation and economic output. Based on the results of this study, the economic agglomeration has a positive and significant impact on income inequality in various districts of East Java Province during 2011-2015. The manifestation of economic agglomeration that occurs in various regencies/cities is the centralisation of sectoral economic activity (agriculture, industry, and services). The result of the study is in line with Marshallian Industrial District Theory, where the economic growth has no significant effect on income inequality in various cities/regencies in East Java Province. Besides, the findings are incompatible with the Kuznets Hypothesis. This study concluded that regencies/city governments could identify areas/regions that potentially form industrial estate (agglomeration). These industrial estates need to take apart to expand the affected areas to reduce the level of economic disparities. The recommendation: establishing a relevant local regulation; optimising the role of local human resources in recruiting the workforce in existing industrial areas, to create equity of income distribution.

References

- Badel, A., & Hugget, M. (2016). *Macroeconomics: A growth theory approach*. Retrieved from <http://faculty.georgetown.edu/mh5/class/econ102/macro-book.pdf>
- Belussi, F., & Caldari, K. (2008). At the origin of the industrial district: Alfred Marshall and the Cambridge School. *Cambridge Journal of Economics*, 33, 335–355.
- Boix, R., & Galletto, V. (2008). Marshallian industrial districts in Spain. *Scienze Regionali*, 7(3), 29–52.
- BPS East Java. (2017). Jawa Timur dalam angka,. Retrieved from www.bps.jatim.go.id
- Castells, D. (2011). *Agglomeration, inequality and economic growth* (Working Paper Institute de Recerca en Economia Aplicada Regional I Publica). Retrieved from <http://www.ub.edu/ubecomics/wp-content/uploads/2012/02/201114.pdf>
- Dietz, T., Rosa, E. A., & York, R. (2012). Environmentally efficient well-being: Is there a Kuznets curve? *Applied Geography*, 32(1), 21–28.
- Frazer, G. (2006). Inequality and development across and within countries. *World Development*, 34(9), 1459–1481.
- Geppert, K., & Stephan, A. (2008). Regional disparities in the European Union: Convergence and agglomeration. *Regional Science Association International*, 87(2), 193–217.
- Herzer, D., & Vollmer, S. (2012). Inequality and growth: Evidence from panel cointegration. *Journal Economic Inequal*, 10(4), 489–503.
- Hsing, Y. (2005). Economic growth and income inequality: The case of the US. *International Journal of Social Economics*, 32(7), 639–647.
- Jagadeesh, D. (2015). The impact of savings in economic growth: An empirical study based on Botswana. *International Journal of Research in Business Studies and Management*, 2(9), 10–21.
- Mukhlis, I., & Simanjuntak, T. M. (2016). The nexus of economic factors and poverty in the region's economy. *International Journal of Management Science*, 7(1), 14–20.
- Obradovic, S., Lojanica, N., & Janković, O. (2016). The influence of economic growth on regional disparities: Empirical evidence from OECD countries. *Zbornik Radova Ekonomskog Fakulteta u Rijeci*, 34(1), 161–186.
- Ozdemir, D. (2017). A post-keynesian criticism of the solow growth model. *Journal of Economics Business and Management*, 5(3), 134–137.
- Risso, A., Punzo, L. F., Javier, E., & Carrera, S. (2013). Economic growth and income distribution in Mexico. *Economic Modelling*, 35, 708–714.
- Risso, W. A., Javier, E., & Carrera, S. (2012). Inequality and economic growth in China. *Journal of Chinese Economics and Foreign Trade Studies*, 5(2), 80–90.
- Shahbaz, M. (2010). Income inequality- economic growth and non-linearity: A case of Pakistan. *International Journal of Social Economics*, 37(8), 613–636.
- Tappi, D. (2001). *The Neo-Marshallian industrial district a study on Italian contributions to theory and evidence*. Germany: Kahlaische Strasse.
- Tian, Y. (2012). The equality on economic growth in China. *Economics & Business Journal: Inquiries & Perspective*, 4(1), 150–157.
- Tranh, D., & Hoang, N. (2016). The model of economic growth and implications for economic growth Danang. In *Proceedings of the International Academic Research Conference on Small & Medium Enterprises* (pp. 1–21). Danang City-Vietnam. Retrieved from http://globalbizresearch.org/IAR16_Vietnam_Conference_2016_Aug/docs/doc/PDF/VSL622.pdf
- Trullen, J. (2015). Giacomo becatini and the Marshall's method. *Investigaciones Regionales-Journal of Regional Research*, (32), 43–60.

- Vu, H., & Mukhopadhaya, P. (2011). Reassessing the relationship between economic growth and inequality. *A Journal of Applied Economics and Policy*, 30(2), 265–272.
- Wahiba, N. F., & Wariemmi, M. E. (2014). The relationship between economic growth and income inequality. *International Journal of Economics and Financial Issues*, 4(1), 135–143.