THE EFFECT OF REGIONAL SPILLOVERS ON ECONOMIC GROWTH IN PEKANBARU CITY, RIAU PROVINCE, INDONESIA

M. Irfan Rosyadi[1], Sinta Yulyanti[2]

Abstract:

The economic activities of one region can provide abundant economic growth for other areas. This research discusses the reciprocal relationship between economic growth in Pekanbaru City and economic growth in Siak Regency, Pelalawan Regency, and Kampar Regency. Using quantitative methods and secondary data from the Central Bureau of Statistics was analyzed using the Two-Stage Least Square method then regressed using the Eviews 10 application. The results showed a positive and significant reciprocal relationship at α 0.05 between Pekanbaru city GRDP and Siak Regency GRDP. Coefficients 0.9626 and 1.0890. The expected effect of GRDP of Pekanbaru City and GRDP of Pelalawan Regency with a coefficient of 3.4663 and 0.2864 at α 0.05. Whereas Kampar Regency only has a unidirectional relationship, namely, the GRDP of Pekanbaru City has a positive and significant effect on Kampar's GRDP with a coefficient of 0.9527 at α 0.10. Apart from being caused by geographic conditions, this reciprocal influence is caused by leading sectors, including the pulp and paper processing industry, the oil and gas mining sector, and the oil palm plantation sector, which delegate economic activities between Siak Regency and Pelalawan Regency with Pekanbaru City. Meanwhile, GRDP Pekanbaru City and GRDP Kampar Regency only provide unidirectional spillover due to the dominance of the trade and construction sector in Pekanbaru City.

Keywords: Regional spollover effect, Gross Regional Domestic Product, Two-Stage Least Square, Eviews
.

[1]Faculty of Economics, Riau Islamic University, Indonesia, m.irfanrosyadi@eco.uir.ac.id
[2]Faculty of Economics, Riau Islamic University, Indonesia, syulyanti@eco.uir.ac.id

1. Introduction

In essence, development is a planned and programmed effort carried out continuously to create a better society. Regional development as an integral part of national development has a significant meaning in realizing national goals. Regional economic growth is a process in which local governments and communities manage existing resources and form a partnership pattern to create new jobs and stimulate economic activities (Arsyad, 2004).

According to Hirschman (1984) in the Linkage Effect and Industrial Effect theory, a region's economic growth will have both beneficial and detrimental effects for other areas. One of the beneficial effects for different areas is the Industrial Effect, which can increase aggregate economic growth because the industrial activities can help absorb labor and increase per capita income.

Regional spillovers can increase the economic growth of a region and provide spillover growth to the other areas. The study of regional spillovers is a topic of discussion within the local economy's scope, which refers to each region's economic activities that affect the surrounding area—cooperation between regions in carrying out economic activities interrelated with each other to boost economic growth. The regional spillover includes Knowledge spillover, industrial spillover, and growth spillover (Capello, 2009).

Various studies on the regional spillover effect have been conducted by previous researchers such as (Suparta, 2009; Carlino, 2001; Wibisono & Kuncoro, 2015; Harahap et al., 2015; Luo, 2005; Jaffe et al., 2000; Aghion & Jaravel, 2015; Li & Li, 2018; Ahmed, 2012; Salam & Prishardoyo, 2018; Seif et al., 2017; Aiyubbi & Wijayanti, 2014; Laksono et al., 2018). The study was carried out on regional spillovers with different methods and objects. They agree that an effect can be exerted on the education, industry, and growth of one region on another.

Pekanbaru City is the capital city of Riau province, which borders Kampar Regency, Siak Regency, and Pelalawan Regency. These Regency have different regional economic potentials. Through the potential resources possessed by each region, relationships are made with other areas on an ongoing basis to achieve sustainable economic growth.

Based on Table 1, fluctuations in economic growth in Pekanbaru City are caused by various things, one of which is the impact of economic growth changes in other regions. Such as the increase or decrease in economic activity in the Regency, which is directly adjacent to the city of Pekanbaru, can reflect the economic conditions of Pekanbaru City because of the distribution of goods and services and the center of trade in Riau Province are in Pekanbaru City.

Table 1 Gross Regional Domestic Product (GDRP) Based on Constant Prices and Economic Growth Rate of Pekanbaru City in 2010-2019

Year	Gross Regional Domestic Product at Constant Prices (Billion Rp)	Economic growth rate (Percent)
2010	41.702,83	-
2011	44.845,77	7,54
2012	48.351,74	7,82
2013	51.053,17	5,59
2014	54.575,48	6,90
2015	57.616,75	5,57
2016	60.891,07	5,68
2017	64.619,26	6,12
2018	68.108,76	4,40
2019	72.200,41	5,61

Source: Riau Province Central Bureau of Statistics (2020)

The increase in Gross Regional Domestic Product (GDRP) in Pekanbaru City from 2010-2019 was due to the encouragement of economic activity from the trade and processing industry side. The increase in the Gross Regional Domestic Product is not necessarily in line with the rise in the economic growth rate, which fluctuates every year. However, an increase in Gross Regional Domestic Product has a positive impact on the development of Pekanbaru City. Besides being the capital of Riau province, it is also a city that has potential economic activities.

The positive or negative effects of economic growth in one area affect other regions, so it is necessary to analyze the reciprocal impact of GDRP Pekanbaru City with GDRP Siak Regency, GDRP Pelalawan Regency, and GDRP Kampar Regency. It can also become a consideration for the government to determine the right policies in response to economic growth because regional economic growth is the primary reference for local governments' performance in managing their regions to achieve sustainable economic growth.

2. Theoretical Background

2.1 Regional Economic Development

Regional economic development is a process in which local governments and their communities manage existing resources and form a partnership pattern between local governments and the private sector to create new jobs and stimulate the development of economic activity (economic growth) in the region (Kuncoro, 2006).

The benchmarks for the success of development can be seen from the economic growth, economic structure, and the smaller income gap between the population, between regions and between sectors. The main objective of economic development efforts is not only to create the highest growth possible but also to eliminate or reduce poverty, income inequality and unemployment rates (Todaro & Smith, 2013).

2.2 Regional spillover effect

The regional spillover effect is a theory regarding the spillover from one region's economic growth to the other areas; the regional spillover effect can promote sustainable economic growth. For example, a place that operates in the industrial and plantation sectors will absorb labour from other regions, so that the welfare level of other local communities will increase, measured by the increase in per capita income. According to Hirschman (1984) in the Linkage Effect and Industrial Effect theory, the economic growth of a region will have both beneficial and detrimental effects for other areas.

The study of the regional spillover effect is a topic of discussion within the scope of the local economy, which refers to the economic activities of each region that affect the surrounding area—cooperation between regions in carrying out economic activities that are interrelated with each other to boost economic growth. Regional spillovers for regional development are significant. The regional spillover includes Knowledge Spillover, Industry Spillover and Growth Spillover (Capello, 2009).

The following is an explanation of several studies regarding the spillover effect of economic activities in various regions:

Seif et al. (2017) conducted a study on regional economic growth and the effects of spatial abundance in the MENA region (the Middle East and North Africa) with quantitative methods from 1970-2010. The research results show that the economic growth rate of a region does not only depend on the production of that area but is influenced by the growth rate of other regions. A positive influence on the per capita income of a region will lead to an increase in the per capita income from other areas.

Wibisono & Kuncoro (2015) examined the effects of spillover growth between regency/cities in the Province of East Java in 2001-2013. They are using secondary data obtained from the central statistical agencies of regency/cities in East Java province. The results in his study indicate that the effect of the highest spillover from economic activity occurs in Sidoarjo and Gresik regency because these two regency are surrounded by other areas that become growth poles, namely Surabaya City.

Aiyubbi & Wijayanti (2014) conducted a study on the effect of regional spillover on the GRDP of the Special Region of Yogyakarta (DIY) in 1996-2010. The data used are quantitative data obtained from the Central Statistics Agency of the DIY Province and several regency in Central Java Province, which are directly adjacent to DIY. The

results showed that the GDRP of Klaten Regency affected the GRDP of DIY Province. At the same time, the GRDP of Wonogiri Regency, Purworejo Regency and Magelang Regency did not affect the GRDP of DIY Province.

Suparta (2009) conducted a study on the influence of the economy of DKI Jakarta and South Sumatra Provinces on the economy of Lampung Province. The results of the study indicate that economic growth in Lampung Province is not only influenced by economic activity, investment and government spending in the Province, but there is an influence from economic activities in DKI Jakarta and South Sumatra Provinces.

3. Methodology

The data used in this study is secondary data collected from data providers or a second party as a data source; in this case, the Central Bureau of Statistics. The data used is Gross Regional Domestic Product (GRDP) at 2010 Constant Prices in Time series data from 2010 to 2019. The determination of research objects follows the concept of regional spillover effect, which states that an area can have a positive impact or negative for other regions. For example, Pekanbaru City, Siak Regency, Kampar Regency, and Pelalawan Regency are geographically directly adjacent.

The method used in this study is the Two-Stage Least Square (TSLS) method. The TSLS method is a simultaneous equation model to estimate a two-way relationship interrelated between variables; in this case, the GDRP variable for each region. A variable in the TSLS method equation can be an independent variable, and in other equations, it becomes a dependent variable (Widarjono, 2018).

The first step to estimate using the TSLS method is whether the simultaneous equation can be estimated or not through the order conditions. The main rules for measuring a simultaneous equation through order conditions are (Ghozali & Ratmono, 2017):

$$K - k \geq m - 1$$

Explanation;

M: The quantity of endogenous variables in a simultaneous model
m: The quantity of endogenous variable in a given equation
K: The quantity of exogenous variables in the model, including the intercept
k: The quantity of an exogenous variable in a given equation

If K-k < m-1 then the equation is not identified; If K-k = m-1 then the equation is identified; If K-k > m-1 then the equation is overidentified. If the simultaneous equation model is not identified, the equation cannot be estimated using the Indirect Least Square (ILS) or Two-Stage Least Square (TSLS) method. If the simultaneous equation model is precisely identified, the method used is Indirect Least Square. If the simultaneous equation is too identifiable, the TSLS method is used. Here are some simultaneous equation models:

The first equation

In the first equation, the simultaneous relationship model between GRDP Pekanbaru City and GRDP Siak Regency. The following is the first simultaneous equation model:

$$PK_t = \beta_0 + \beta_1 SK_{1t} + \beta_2 PL_{2t} + \beta_3 KM_{3t} + e_t$$
$$SK_t = \beta_0 + \beta_1 PK_{1t} + \beta_2 KM_{2t} + \beta_3 PL_{3t} + \beta_4 BKS_{4t} + e_t$$

The second equation

In the second equation, the simultaneous relationship model between GRDP Pekanbaru City and GRDP Pelalawan Regency. The following is the second simultaneous equation model:

$$PK_t = \beta_0 + \beta_1 PL_{1t} + \beta_2 SK_{2t} + \beta_3 KM_{3t} + e_t$$
$$PL_t = \beta_0 + \beta_1 PK_{1t} + \beta_2 KM_{2t} + \beta_3 SK_{3t} + \beta_4 KS_{4t} + e_t$$

The third equation

In the second equation, the simultaneous relationship model between GDRP Pekanbaru City and GDRP Kampar Regency. The following is the third simultaneous equation model:

$$PK_t = \beta_0 + \beta_1 KM_{1t} + \beta_2 PL_{2t} + \beta_3 SK_{3t} + e_t$$
$$KM_t = \beta_0 + \beta_1 PK_{1t} + \beta_2 PL_{2t} + \beta_3 KS_{3t} + +\beta_4 SK_{4t} + e_t$$

Explanation;
PK : GDRP Pekanbaru
PL : GDRP Pelalawan
SK : GDRP Siak
KM : GDRP Kampar
BKS: GDRP Bengkalis
KS : GDRP Kuantan Singingi
e : Standar error
t : Time
β_0 : Intersep
$\beta_1, \beta_2, \beta_3, \beta_4$: Coefisien regression partial

4. Result

The use of the TSLS method is determined based on the Overidentified simultaneous model identification rule. Based on table 2, the simultaneous models in the first, second, and third equations are all overidentified. The simultaneous model is feasible to use the TSLS method.

Table 2 Results of simultaneous model identification through order conditions

Equation	K-k	m-1	Explanation
First	5-2	2-1	Overidentified
	5-3	2-1	Overidentified
Second	5-2	2-1	Overidentified
	5-3	2-1	Overidentified
Third	5-2	2-1	Overidentified
	5-3	2-1	Overidentified

Source: Processed Data, 2020

After all, equations are declared Overidentified, and the equation can be used to analyze and then analyze at the next stage, namely estimating using the TSLS method. The following are the regression results using the TSLS method.

Table 3 The estimation results of the Two-Stage Least square model

Equation results	Dependent Variable	Independent Variable	Coefisien	Explanation
First	GDRP Pekanbaru	GDRP Siak	0.9626	Significant *
	GDRP Siak	GDRP Pekanbaru	1.0890	Significant*
Second	GDRP Pekanbaru	GDRP Pelalawan	3.4663	Significant*
	GDRP Pelalawan	GDRP Pekanbaru	0.2864	Significant*
Third	GDRP Pekanbaru	GDRP Kampar	-0.1314	Not significant
	GDRP Kampar	GDRP Pekanbaru	0.9527	Significant**

Source: Processed data from Eviews 10, 2020
Note: *Sig on α 0.05; **Sig on α 0.10

The TSLS estimation results above show that:

Results of the first model

The first model estimates the simultaneous relationship between GRDP Pekanbaru city and GRDP Siak Regency. The estimation results show that the GRDP of Pekanbaru City has a significant effect at α 0.05 on the GRDP of Siak Regency with a coefficient of 0.9626, and vice versa, the GRDP of Siak Regency has a significant effect on the GRDP of Pekanbaru City with a coefficient of 1.0890. A reciprocal relationship between the GDRP of Pekanbaru City and the GRDP of Siak Regency from 2010 to 2019.

Results of the second model

The second model estimates the simultaneous relationship between GRDP Pekanbaru City and GRDP Pelalawan Regency. The estimation results show that the GRDP of Pekanbaru City has a significant effect at α 0.05 on the GRDP of Pelalawan Regency

with a coefficient of 3.4663. Simultaneously, the GRDP of Pelalawan Regency also has a significant effect at α 0.05 on the GRDP of Pekanbaru City with a coefficient of 0.2864. There is a reciprocal relationship between the city of Pekanbaru and the GRDP of Pelalawan Regency.

Results of the Third model

The third model estimates the simultaneous relationship between GRDP of Pekanbaru City and GRDP of the Kampar Regency. The estimation results show that the GRDP of Pekanbaru City has no significant effect on the GRDP of the Kampar Regency. In contrast, the GRDP of Kampar Regency has a significant effect at α 0.10 (10%) on the GRDP of Pekanbaru City with a coefficient of 0.9527. There is no reciprocal relationship between GRDP Pekanbaru City and GDRP Kampar Regency.

5. Discussion

5.1 Regional Spillover Effect on Economic Growth

Apart from being the capital city of Riau Province, Pekanbaru City is located in a strategic location flanked by several regencies with potential natural resources. The leading sectors of Pekanbaru City are the trade and processing industry sectors. The following are the leading sectors contributing to GRDP Pekanbaru City.

Table 4. Distribution of Pekanbaru City GRDP by sector in 2010-2019 (Percent)

Year	Construction	Wholesale and retail trade	Processing industry	Other sectors
2010	28,45	28,45	20,86	22,24
2011	29,02	28,51	20,92	21,55
2012	28,80	28,85	20,60	21,75
2013	29,58	28,32	20,29	21,81
2014	29,98	30,01	18,98	21,03
2015	29,60	29,31	19,97	21,12
2016	29,51	29,68	19,99	20,82
2017	29,66	30,47	19,88	19,99
2018	30,21	30,40	19,63	19,76
2019	30,16	31,41	19,24	19,19

Source: Pekanbaru City Statistics Agency (2020).

Regional economic growth fluctuations around the city of Pekanbaru provide a positive or negative abundance of economic growth in Pekanbaru City, one of the causes of economic growth fluctuations in each region, namely decreased production from leading sectors such as oil and gas and other sectors that support GRDP. The following is the rate of GRDP in the regencies/cities bordering the city of Pekanbaru.

Table 5. Economic Growth Rate of four Regencies/Cities in Riau Province 2011-2019 (Percent)

Year	Pekanbaru	Kampar	Siak	Pelalawan
2011	7,5	4,1	-0,5	5,7
2012	7,8	5,8	2,1	3,0
2013	5,6	6,3	-2,3	5,6
2014	6,9	3,4	-1,0	6,2
2015	5,6	1,1	-0,2	2,5
2016	5,7	2,8	0,4	3,0
2017	6,1	3,0	0,9	4,1
2018	4,4	1,9	1,1	3,8
2019	5,6	3,9	1,5	3,9

Source: Riau Province Central Bureau of Statistics (2020)

5.2 Regional spillover effect Economic growth of Pekanbaru City and Siak Regency

GDRP Siak Regency has a positive and significant effect on GDRP Pekanbaru City, and vice versa GDRP Pekanbaru City has the same effect. The increase in GDRP in Siak Regency and Pekanbaru City will be mutually beneficial for each region. Siak Regency is an area with considerable resource potential, one of the pulp and paper processing industry areas, and large oil and gas reserves in the Riau Province. Also, Siak Regency has a sector of agriculture, forestry, and fisheries, especially the palm oil sub-sector, which makes a considerable contribution to the GDRP of the Siak Regency. The following are the leading sectors in Siak Regency.

Table 6 Distribution of GDRP in Siak Regency by sector in 2010-2019 (Percent)

Year	Agriculture, Forestry, and Fisheries	Mining and excavation	Processing industry	Other sectors
2010	18,65	41,47	33,62	6,26
2011	15,42	47,15	30,72	6,71
2012	14,05	53,18	26,42	6,35
2013	14,15	53,18	26,42	6,25
2014	15,04	48,01	29,40	7,55
2015	17,27	38,89	34,82	9,02
2016	18,46	36,50	35,38	9,66
2017	19,67	34,45	35,74	10,14
2018	18,87	36,44	34,56	10,13
2019	20,10	31,83	36,78	11,29

Source: Central Bureau of Statistics of Siak Regency (2020)

Geographically, Siak Regency is directly adjacent to Pekanbaru City, so it is possible for workers who work in the industry to have assets such as housing, buildings, and shophouses that increase income from the Pekanbaru city construction sector. Apart from that, adequate transportation facilities, shopping centers for goods and services also encourage Siak Regency residents to consume goods and services in the trade sector in Pekanbaru City. According to Adisasmita (2008), exploitation or processing of natural resources can be an economic basis for developing regions with a socio-economic structure supporting trade between regions.

Based on the above analysis, the positive influence of the GDRP between Pekanbaru City and Siak Regency shows that the government's role in setting economic policies to achieve the goal of sustainable Economic Growth between regions is realized.

5.3 Regional spillover effect Economic growth of Pekanbaru City and Pelalawan Regency

GDRP Pelalawan Regency and GDRP Pekanbaru City are statistically positive and significant. The effect of the GRDP between these regions is due to the geographical proximity and the linkages between the GRDP sectors. The leading sectors in Pelalawan Regency are the agriculture, forestry, fisheries sectors, and the manufacturing industry sector. The pulp and paper processing industry significantly affects regional progress by absorbing labor, which encourages regional economic activity. Meanwhile, Pekanbaru City is superior in the trade sector, construction sector, and processing industry sector.

Table 7 Distribution of GRDP of Pelalawan Regency by sector in 2010-2019 (Percent)

Year	Agriculture, Forestry, and Fisheries	Processing industry	Other sectors
2010	38,50	51,68	9,82
2011	38,04	51,50	10,46
2012	38,24	50,12	11,64
2013	38,75	48,56	12,69
2014	38,49	48,67	12,84
2015	39,00	48,78	12,22
2016	39,08	48,92	12,00
2017	39,18	48,91	11,91
2018	28,69	49,00	22,31
2019	38,80	49,01	12,19

Source: Central Bureau of Statistics of Pelalawan Regency (2020)

The agglomeration effect of the pulp and paper processing industry and other leading sectors in the Pelalawan Regency has a positive impact on Pekanbaru's economic activities, which is favored by the trade sectors and construction sectors. According to Adisasmita (2008) agglomeration occurs if the supporting industry succeeds in attracting complimentary activities from other regions to obtain cumulative opportunities at lower costs, concentrated in big cities. As the provincial capital, the city of Pekanbaru can become an area that supports the industrial sector in other regions.

Apart from the paper processing industry, the oil palm plantation sub-sector also provides a hefty balance to the GRDP per capita of Pelalawan Regency. By increasing the income of Pelalawan Regency residents, it can provide an abundance of economic activity to the GDRP of Pekanbaru City in the trade, processing, and construction industry sectors. Access and geographical conditions make it very possible for Pelalawan residents to shop and encourage trade in Pekanbaru City.

5.4 Regional spillover effect Economic growth of Pekanbaru City and Kampar Regency

GDRP Pekanbaru City has no significant effect on GDRP Kampar Regency. In contrast, the GDRP of the Kampar Regency has a significant effect at α 0.10 on the GRDP of Pekanbaru City. There is no reciprocal relationship between GDRP Pekanbaru City and GDRP Kampar Regency. If there is an increase in GRDP in Kampar Regency, it will positively affect the GRDP in Pekanbaru City. In contrast, the increase in GDRP in Pekanbaru City will not significantly affect GDRP in Kampar Regency.

Geographically, Kampar Regency is the largest Regency in Riau Province, directly adjacent to Pekanbaru City. Kampar Regency is also the primary access to several regencies in Riau Province and West Sumatra Province to Pekanbaru City. Kampar Regency GDRP is supported by potential sectors, namely agriculture, forestry, fishery, mining, and quarrying and processing. The existence of large enough natural resources makes Kampar Regency one of Regency's most extensive oil palm plantations in Riau Province. Through its leading sectors, Kampar Regency can provide abundant economic activities for Pekanbaru City. Below are the sectors that most influence the GDRP of the Kampar Regency.

Table 8 Distribution of GRDP of Kampar Regency by sector in 2010-2019 (Percent)

Year	Agriculture, Forestry, and Fisheries	Mining and excavation	Processing industry	Other sectors
2010	30,02	32,47	24,45	13,06
2011	25,97	40,30	21,78	11,95
2012	24,05	42,72	21,03	12,20

2013	22,17	45,56	20,36	11,91
2014	22,30	45,86	19,65	12,19
2015	24,87	39,21	21,97	13,95
2016	26,12	36,94	22,35	14,59
2017	27,37	34,48	23,02	15,13
2018	26,31	36,68	22,03	14,98
2019	27,82	32,37	23,54	16,27

Source: Central Bureau of Statistics of Kampar Regency (2020).

The leading sectors in Kampar Regency are supported by potential natural resources, the agricultural, forestry, fisheries sectors, and the mining and excavation sectors to increase the GRDP of Kampar Regency in aggregate. The increase in GRDP increases the income per capita and the rise in population consumption so that economic activity is abundant that other areas such as the city of Pekanbaru. This shows that the spillover of economic activity in the form of the mobility of goods, labor, and capital and spatial externalities, will affect economic activity in a region or region. (Suparta, 2009).

The tendency of the Kampar Regency population to shop or complete their needs in the city of Pekanbaru is due to lower price comparisons and the right accessibility encouragement so that the consumption of the Kampar population affects economic activity in the city of Pekanbaru. However, this phenomenon is not of good value to encourage economic activity in Kampar Regency because the people's income in Kampar Regency is mostly flowing to Pekanbaru City.

6. Conclusions

Geographical conditions, good accessibility, and the superior sector's role will significantly affect the overflow of economic activity from one region to another, as by the expected effect of the GDRP of Siak Regency and Pelalawan GRDP on the GDRP of Pekanbaru City. However, there is no reciprocal relationship between GDRP Kampar Regency and GDRP Pekanbaru city.

The encouragement of sectors that are a priority for economic growth plays an important role. For example, the processing industry sector and the oil palm plantation sub-sector can encourage an increase in per capita income, which causes an increase in population consumption so that the spillover of increased economic activity in the Regency of Siak, Kampar, and Pelalawan will continue to be felt by the city of Pekanbaru. However, the effect of a region's economic activity does not significantly impact other areas, such as the city of Pekanbaru, on Kampar.

The development of economic potential in the areas bordering the city of Pekanbaru needs to be continuously improved. The increase in GRDP through the spillover of economic growth can be felt, and there will be sustainable economic growth.

7. Acknowledgements

References:

Adisasmita, R. (2008). Regional Development (Concept and Theory). First edition. Graha Ilmu.

Aghion, P., & Jaravel, X. (2015). Knowledge spillovers, innovation and growth. *Economic Journal*, *125*(583): 533–573. https://doi.org/10.1111/ecoj.12199

Aiyubbi, D. E., & Wijayanti, D. (2014). The Influence of Regional Spillover on the GRDP of the Special Region of Yogyakarta in 1996-2010. *Business Aplications*, *15*(9): 1777–1798.

Salam, A.S., & Prishardoyo, B. (2018). The Influence of Human Capital Spillover Effects on Productivity of the Processing Industry in Kedungsepur Area. *Economics Development Analysis Journal*, *5*(2): 226–234. https://doi.org/10.15294/edaj.v5i2.22036

Arsyad, L. (2004). Introduction to Regional Economic Planning and Development]. BPFE Gajah Mada University.

Capello, R. (2009). Spatial spillovers and regional growth: A cognitive approach. *European Planning Studies*, *17*(5): 639–658. https://doi.org/10.1080/09654310902778045

Carlino, G. A. (2001). Knowledge Spillovers: Cities' Role in the New Economy. *Business Review*. https://doi.org/10.7551/mitpress/2613.003.0007

Ghozali, I., & Ratmono, D. (2017). Multivariate and econometric analysis. Publishing agency Diponegoro University.

Harahap, B. A., Bary, P., Nurliana, L., & Satyanugroho, R. (2015). The Impact of External Spillover Shock on the Indonesian Economy: A Global Var Approach. *Working Paper Bank Indonesia*, *June*.

Hirschman, A. (1984). A Dissenter´s Conffesion: "The Strategy of Economic Development" Revisited. *Pioneers in Development*, *1*(1): 85–111.

Jaffe, A. B., Trajtenberg, M., & Fogarty, M. S. (2000). Knowledge Spillovers and Patent Citations: Evidence from a Survey of Inventors. *American Economic Review*, *90*(2): 215–218. https://doi.org/10.1257/aer.90.2.215

Laksono, H., Rustiadi, E., & Siregar, H. (2018). Negative Spillover Spillover Economic Growth Between Regencies / Cities in East Java Province. *Tataloka*, *20*(3): 266-277. https://doi.org/10.14710/tataloka.20.3.266-277

Li, F., & Li, G. (2018). Agglomeration and spatial spillover effects of regional economic growth in China. *Sustainability (Switzerland)*, *10*(12): 1–13. https://doi.org/10.3390/su10124695

Luo, X. (2005). Growth Spillover Effects and Regional Development Patterns: The Case of Chinese Provinces. *World Bank Policy Research Working Paper*, 1–29.

Ahmed, M. E. (2012). Are trade spillover effects on East Asian economic growth productivity driven? *World Journal of Entrepreneurship, Management and Sustainable Development*, *8*(4): 246–259. https://doi.org/10.1108/20425961211276624

Seif, A. M., Panahi, H., & Razi, D. H. (2017). Regional Economic Growth and Spatial Spillover Effects in MENA Area. *Iran. Econ. Rev*, *21*(4): 765–787.

Suparta, I. W. (2009). Spillover Effect of the Economy of DKI Jakarta Province and South Sumatra on the economic growth of Lampung Province. *Journal of Development Economics*, *10*(1): 32–48.

Todaro, M. P., & Smith, S.C. (2013). Economic Development (Translated By adi Maulana & N. I. Sallama). 11th ed. *Erlangga Publisher*.

Wibisono, P., & Kuncoro, M. (2015). Spillover Effects of Inter-Regency / City Growth in East Java Province 2001 - 2013. *Indonesian Journal of Economics and Development*, *16*(1): 31–46. https://doi.org/http://dx.doi.org/10.21002/jepi.v16i1.584

Widarjono, A. (2018). Introductory econometrics and its application with eviews guide]. 5th ed. *Publisher UPP STIM YKPN*.