ECONOMIC GROWTH ANALYSIS WITH SPATIAL LINKAGES BETWEEN REGIONS IN INDONESIA

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Abstract: This research uses quantitative research with a descriptive approach, to analyse spatial linkages between provinces in Indonesia. With the help of R Studio software, the results of panel data spatial regression testing show that the best model is SAR fixed effect and spatial autocorrelation locally using the Local Indicator of Spatial Autocorrelation (LISA) to see which provinces have spatial autocorrelation is: Inflation 2017-2021 It is found that there is spatial autocorrelation in the provinces of Maluku, Papua, Greater Jakarta, Central Java, North Sumatra, Bangka balitung, East Kalimantan and West Papua with a significant level of 5% while other provinces are not significant. Exports in 2017-2021 There is spatial autocorrelation in the provinces of West Kalimantan, Southeast Sulawesi, and East Nusa Tenggara with a significant level of 5% while other provinces are not significant. Open Unemployment Rate in 2017-2021 It is found that there is spatial autocorrelation in the provinces of Bali, East Nusa Tenggara, North Maluku, West Nusa Tengga, South Sulawesi, Lampung, Central Java, Yogyakarta and East Kalimantan with a significant level of 5% while other provinces are not significant.

Keywords: spatial. Economy, Growth, Linkages, Region

CHAPTER I. INTRODUCTION

Spatial dependence is one of the important factors that need to be considered in analysing the economic growth of a region. Kasikoen et al. (2019) said that spatial dependence will have a stronger influence on the economic growth of neighbouring regions, because socio-economic interactions between neighbouring regions are relatively unimpeded.

Spatially, provinces on the island of Java are still the largest economic contributor contributing to Gross Domestic Product (GDP) by 58.61 per cent, followed by Sumatra Island by 21.54 per cent. In the 2015-2019 period, if detailed by regional contribution, the Papua and Maluku Provinces contributed the least growth to national economic growth, namely an average of 0.09 per cent (BPS 2021)..

Aggregate demand itself is influenced by prices in accordance with the law of demand, namely; if prices rise, demand falls. According to Keynesian theory, in the short run, national output and employment opportunities are mainly determined by aggregate demand (Murni, 2013;177). Keynes believed that both monetary policy and fiscal policy should be used to reduce the inflation rate.

On the other hand, the structure of the Indonesian economy based on the Gross Domestic Product (GDP) in 2020 shows that the household consumption expenditure component covers more than half of Indonesia's GDP, namely 57.66 per cent, this shows that restoring public consumption is an important step for the success of national economic recovery. Given this, it is important to maintain and increase the level of public consumption in order to prevent a deeper economic contraction. (BPS, 2021).

The progress of a country's economic development is one of the most important issues in the economic debate. A country can accelerate its economic growth rate by increasing and promoting exports of goods and services. Exports are one of the sources of foreign exchange that is needed by countries whose economies are open, because exports can work widely in various countries will allow an increase in the amount of production that encourages economic growth (Kalaitzi, 2013).

Exports are the total goods and services sold by a country to other countries, including goods, insurance, and services in a certain year legally because exports are able to generate foreign exchange for Indonesia. (Purwanggono, 2015).

Based on the definition of exports, the export activities carried out by each country aim to increase the income of a country, this is because export activities are one component of aggregate expenditure because exports greatly affect the level of national income which will increase economic growth.

In the end, monetary policy in regulating the money supply turns out to be able to have a complex and broad influence on other macro variables and have a major impact on the economic conditions of a country. So that monetary policy must be really precise in order to be able to overcome the problems that arise in the economy and can stabilise the economic conditions of a country.

Based on BPS data, Indonesia's economic growth in May quarter I-2021 experienced a growth contraction of 0.95 percentage points.

In terms of production, the deepest growth contraction occurred in the education services business sector by 13.04 per cent. In the second quarter of 2021, the Central Statistics Agency (BPS) reported that Indonesia's economic growth grew by 7.07 per cent. Economic growth is slowly improving compared to the condition of economic growth in the second quarter of 2020 experiencing a recession which resulted in a slowdown and contraction to -5.32 per cent. The impact of the economic downturn in Indonesia, including an increase in unemployment and poverty caused by layoffs during the Covid-19 pandemic. This happened because of the slowdown in almost all sectors of the economy.

Unemployment is a condition in which a person who is classified in the labour force category does not have a job and is not actively looking for work (Rianda, 2020).

Unemployment is one of the economic diseases that greatly affects the level of economic growth. Unemployment leaves people without income and pushes them into poverty.

When the National Health Insurance (JKN) was launched in 2014, the government extended subsidised contributions to poor families identified by consumption. For this reason, health policy makers have made various interventions to help families with low economic status to receive appropriate health services, one of which is by providing health insurance (Tangcharoensathien et al, 2015). The economic well-being of a community refers to the economic status of the community, this is characterised by the quality of economic life enjoyed by the community. The quality of people's economic life is generally expressed in their standard of living which is reflected in the economic growth of a country (Amaefule, 2020). Health improvement has become a significant social priority because the condition of human resources will improve the ability, efficiency, and quality of life of the workforce. Therefore, health is an important bridge that connects human capital accumulation and economic growth. Based on the above description, research on the analysis of economic growth with spatial linkages between regions in Indonesia is important to do.

Problem Formulation

1. How do factors affect Economic Growth in Indonesia using panel data regression?
2. What is the model of economic growth with the linkage of spatial effects between provincial regions in Indonesia using panel data spatial regression?
3. What are the characteristics of spatial effects between provincial regions that affect economic growth using the Moran Index and LISA

CHAPTER II. OVERVIEW

The Concept of Economic Growth

Economic growth serves as an indicator of the success of economic development in a country's population (Rumate, 2020).

This is indicated by an increase in living standards (Fitriyanto, 2023) Economic growth is said to experience growth if the production of goods and services increases from the previous year (Sukirno, 2015).

Various theories of economic growth have been put forward by economists. Economic growth theories see the relationship between economic growth and the determinants of economic growth.

Classical Economic Growth Theory

In classical economic growth theory, analyses are based on the trust and effectiveness of free market mechanisms. This theory was coined by classical economists including Adam Smith, David Ricardo and Thomas Robert Malthus.

Theory of Economic Growth according to Adam Smith. According to Adam Smith, an economy will grow if there is an increase in population which expands the market and encourages specialisation, because the process of specialisation in the field of work is believed to increase worker productivity. Then encourage technological progress and economic growth.

Theory of Economic Growth according to David Ricardo.

According to David Ricardo's theory of economic growth in terms of economic growth, the best known is the law of diminishing returns. His thinking is about how population or labour growth can affect the decline in marginal products due to the limited amount of land and increased labour productivity requires technological advances and sufficient capital accumulation. Thus, economic growth can be achieved.

CHAPTER III. RESEARCH METHODS

This research uses quantitative research with a descriptive approach

Population and Research Sample The overall data used in this study is secondary data in the form of panel data. The entire data is obtained from printed and online publications sourced from the Central Statistics Agency (BPS), Bank Indonesia (BI), Regional Development Planning Agency (Bappeda) in each province and various other related agencies or institutions. Data collection techniques and information collection techniques regarding data through literature studies to obtain information, descriptions and as a theoretical basis with some literature in the form of journals and reports related to the research.

The data processing procedure used in this research is to use Eviews Software as follows: Perform descriptive statistical analysis, perform cross-sectional dependence test, perform model specification test to determine the best panel data regression model estimation method, Estimate panel data regression model parameters. Perform Classical Assumption Test. Then continue using R Studio Software as follows: Forming a spatial weight matrix. LM test, test the panel data spatial autoregressive regression model, estimate panel data spatial autoregressive regression parameters, conduct parameter significance tests, determine the Moran Index and LISA. Then interpret the model.

CHAPTER IV. RESULTS AND DISCUSSION

Model Interpretation

After obtaining that the best model for panel data SAR analysis is the fixed effect SAR model. The last stage of

SAR regression analysis is to interpret the best model obtained. With the Queen Continguity distance function, a table of fixed effect SAR analysis results and a table of spatial effects are obtained.:

Table 4.15 Best Panel Data SAR Model

Variables	*Fixed Effect Model*	
	Coefficient	p-value
X1 (Inflation)	0.375482	0.001569
X3 (Export)	0.106777	5.466e-14
X5 (Unemployment Rate Open)	-0.792032	1.078e-05
□	0.573166	2.2e-16
R^2	0.8042715	

Based on Table 4.15, the fixed effect SAR model obtained, the SAR model is interpreted as follows:

1. In year t, an increase in Inflation (X1) in a province in Indonesia by 1%, will result in an increase in Economic Growth by 0.37%.
2. In year t, an increase in Exports (X3) in a province in Indonesia by 1%, will result in an increase in Economic Growth by 0.10%.
3. In year t, an increase in the Open Unemployment Rate (X5) in a province in Indonesia by 1%, will result in a decrease in Economic Growth by 0.79%.

Table 4.16 Spatial Fixed Effect Value of SAR Model

Parameters	SAR *Fixed Effect* Coefficient	p-value
Constant	-0.52569	0.7064
μ1	1.884709	0.2650299
μ2	-3.202020	0.0069548
μ3	0.719251	0.7533613
μ4	0.401833	0.7374361
μ5	-1.292290	0.3614871
μ6	1.543706	0.4363818
μ7	2.218020	0.0541843
μ8	-3.203200	0.0490097
μ9	3.035703	0.1386284
μ10	0.481895	0.7402353
μ11	-0.518135	0.7224305
μ12	3.744818	0.0024949
μ13	-3.255122	0.0533450

μ14	-0.018072	0.9897579
μ15	-6.557226	0.0052205
μ16	-4.405049	0.0255380
μ17	-0.367786	0.7896709
μ18	-8.798506	0.0035403
μ19	-0.151343	0.9117764
μ20	5.776925	0.0003342
μ21	1.400063	0.4476557
μ22	-3.029386	0.0089687
μ23	2.840014	0.0032247
μ24	-0.950405	0.4404160
μ25	-2.000692	0.2641737
μ26	-0.417360	0.7852466
μ27	-1.438683	0.2557680
μ28	5.441899	0.0000330
μ29	-0.028524	0.9858882
μ30	1.569680	0.1817168
μ31	4.619463	0.0033143
μ32	-0.447750	0.7885149
μ33	2.640111	0.0393321
μ34	1.763457	0.2413058

In Table 4.15 and Table 4.16 the model that can represent the Province in Indonesia. is to use one of the Provinces in Indonesia, namely West Kalimantan Province. The model of West Kalimantan Province is as follows:

$$\hat{Y}_{kalbar)}\ ke-t = 0{,}57 \sum_{j=20}^{34} \text{Wij}(PDRB)jt + 0.375\text{X1}(\text{Inflation}) + 0.106\text{X3}(Export) - 0.792\text{X5}(TPT) + 5.776 + Vit$$

where Wij is a weight matrix which is the value of the neighbourhood distance between West Kalimantan and the provinces in Indonesia.

4.2 Moran's Index Spatial Autocorrelation

4.2.1 Moran Index

Spatial Autocorrelation can be known by looking at the Moran Index value of the observed variables. The results of the Moran Index calculation of provincial inflation data in Indonesia using queen contiguity spatial weighting are presented in Table 4. 17.

1. X1 (Inflation)

Table 4.17 Calculation Results of Moran Index of Provincial Inflation in Indonesia in 2017-2021

Years	I	E(I)	Var(I)	p-value
2017	0.03325	-0.0303	0.01107	0.061
2018	0.2645	-0.0303	0.01043	0.001
2019	-0.06533	-0.0303	0.010744	0.632

2020	-0.13585	-0.0303	0.010884	0.8442
2021	0.057667	-0.0303	0.010612	0.1966

From the results of the calculation of the Moran Index, Inflation using Queen Contiguity weights in Table 4.18, it can be concluded that there is spatial autocorrelation between provinces in Indonesia which can be seen from the Moran Index significance test which is significant at p-value < α = 0.05, and the value of I < 0. This indicates that in 2017 and 2018 Inflation of a province in Indonesia, is interrelated with Inflation from other provinces. Whereas in 2019, 2020 and 2021 Inflation of a province in Indonesia, is not interrelated because the p-value > α = 0.05 and the value of 0 < I□ 1. The Moran Index value states that there is weak autocorrelation in the data. This means that there is a slight tendency to form a clustering pattern but by chance.

Morans's Scatterplot in Figure 4.51 shows that with queen contiguity weights there are 4 quadrants, Quadrant I located at the top right is called High-High (HH) showing provinces with high inflation surrounded by other provinces with high inflation. The location of this quadrant indicates a positive spatial concentration. Quadrant II, located at the top left or called Low-High (LH) shows provinces with low inflation but surrounded by provinces with high inflation. Quadrant III, located at the bottom left is called Low-Low (LL) which is a province with low inflation and surrounded by provinces with low inflation as well. Quadrant IV located at the bottom right is called High-Low (HL) which is a province with high Inflation, surrounded by provinces with low Inflation.

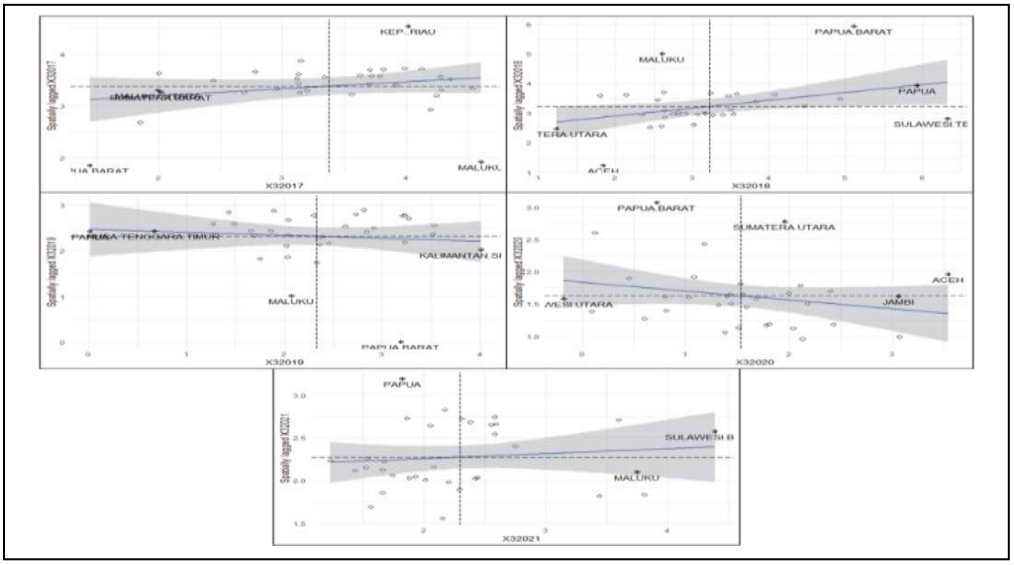

Figure 4.51 Moran's Scatterplot of Provincial Inflation in Indonesia in 2017-2021 with Queen Contiguity Weighting

2. X3 (Export)

Table 4.19 Calculation Results of Moran Index of Provincial Exports in Indonesia in 2017-2021 with Queen Contiguity Weighting

Years	I	E(I)	Var(I)	p-value
2017	-0.17555	-0.0303	0.009517	0.9317
2018	-0.14209	-0.0303	0.009686	0.872
2019	-0.14169	-0.0303	0.010168	0.8653
2020	-0.14223	-0.0303	0.01013	0.8669
2021	-0.21747	-0.0303	0.0105	0.9661

From the results of the calculation of the Moran index of Exports using Queen Contiguity weights in table 4.19, it can be concluded that there is no spatial autocorrelation or there is negative autocorrelation between provinces in Indonesia which can be seen from the Moran index significance test which is significant at p-value> α = 0.05, and also seen from the value of I < 0. This indicates that in 2017 to 2021 the exports of a province in Indonesia are not interrelated with the exports of other provinces. The Moran Index value states that there is weak autocorrelation in the data. This means that there is a slight tendency to form a clustering pattern but by chance.

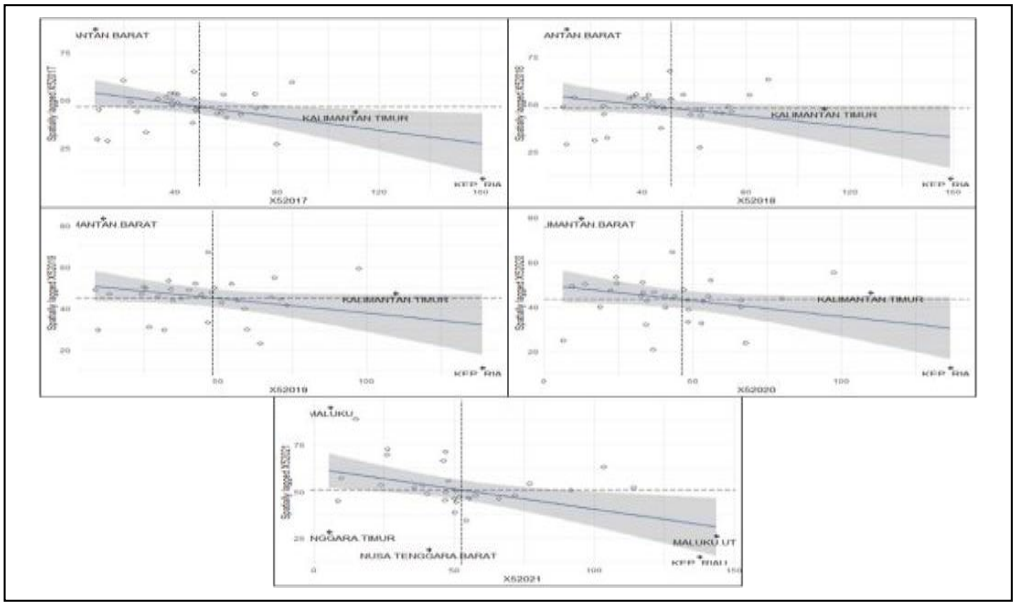

Figure 4.52 Moran's Scatterplot of Provincial Exports in Indonesia in 2017-2021 with Queen Contiguity Weighting

Morans's Scatterplot in Figure 4.52 shows that with queen contiguity weights there are 4 quadrants, Quadrant I which is located at the top right is called High-High (HH) showing provinces with high exports surrounded by provinces with other high exports. The location of this quadrant indicates a positive spatial concentration. Quadrant II, located at the top left or called Low-High (LH) shows provinces with low exports but surrounded by provinces with high exports. Quadrant III, located at the bottom left, is called Low-Low (LL), which is a province with low exports and is surrounded by provinces with low exports. Quadrant IV located at the bottom right is called High-Low (HL), which is a province with high exports, surrounded by provinces with low exports.

3. X5 (Open Unemployment Rate)

Table 4.17 Results of Moran Index Calculation of Open Unemployment Rate in Indonesian Provinces in 2017-2021 with Queen Contiguity Weighting

Years	I	E(I)	Var(I)	p-value
2017	0.036975	-0.0303	0.01094	0.26
2018	0.004987	-0.0303	0.01105	0.38
2019	0.635046	-0.0303	0.02202	0.18
2020	0.02631	-0.0303	0.01063	0.29
2021	0.051159	-0.0303	0.01077	0.21

From the results of the calculation of the Moran index of the Open Unemployment Rate using the Queen Contiguity weighting in table 4.17, it can be concluded that there is no spatial autocorrelation between provinces in Indonesia which can be seen from the Moran index significance test which is not significant with a p-value > α = 0.05 and a value of I < 0. This indicates that from 2017 to 2021 the Open Unemployment Rate of a province in Indonesia is not interrelated with the Open Unemployment Rate of other provinces. Moran's Index value states that there is weak autocorrelation in the data. This means that there is a slight tendency to form a clustering pattern but by chance.

Morans's Scatterplot in Figure 4.50 shows that with queen contiguity weights, there are 4 quadrants. Quadrant I, located at the top right, is called High-High (HH), indicating provinces with high Open Unemployment Rate are surrounded by other provinces with high Open Unemployment Rate. The location of this quadrant indicates a positive spatial concentration. Quadrant II, located in the upper left or called Low-High (LH) shows provinces with low Open Unemployment Rate but surrounded by provinces with high Open Unemployment Rate. Quadrant III, located at the bottom left, is called Low-Low (LL), which shows provinces with a low Open Unemployment Rate and surrounded by provinces with a low Open Unemployment Rate as well. Quadrant IV located at the bottom right is called High-Low (HL), which is a province with a high Open Unemployment Rate, surrounded by provinces with a low Open Unemployment Rate.

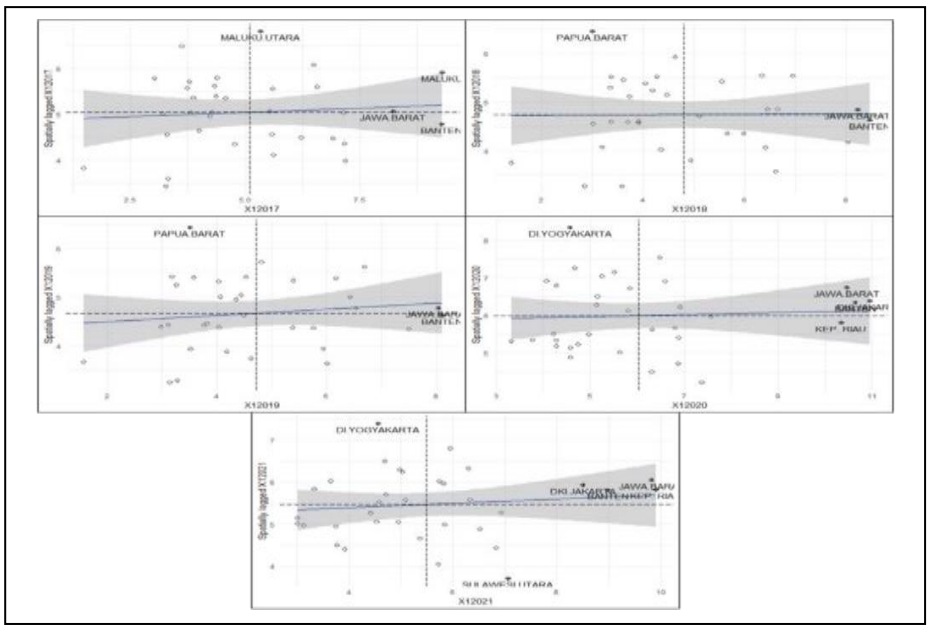

Figure 4.50 Moran's Scatterplot of Open Unemployment Rate in Indonesian Provinces in 2017-2021 with Queen Contiguity Weighting

4.2.2 Local Moran

Based on the Local Indicator of Spatial association (LISA) or Local Moran test results obtained are as follows:

1. X1 (Inflation)

a. Inflation in 2017

The results of the LISA test on the Inflation variable in 2017 provide information that, Maluku and Papua provinces have a p-value <α so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The value of li shows the value of the Moran index at the i-th location. Papua Province has a value of li> 0 so it can be concluded that neighbouring locations have the same value, while for Maluku Province has a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite values.

Figure 4.51 Quadrant Distribution Map of Inflation in 2017

Based on Figure 4.51, it shows that Maluku and Papua provinces are significant at $\alpha = 0.05$. The figure above also shows that Maluku Province is in the High-Low (HL) quadrant, which is a province with high inflation but surrounded by provinces with low inflation. Meanwhile, Papua Province is in the Low-High (LH) quadrant, which is a province with low inflation but surrounded by provinces with high inflation.

b. Inflation in 2018

The LISA test results on the Inflation variable in 2018 provide information that, Maluku and Papua provinces have a p-value < 0.05 so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. Papua Province has a value of li > 0 so it can be concluded that neighbouring locations have the same value, while for Maluku Province has a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite values.

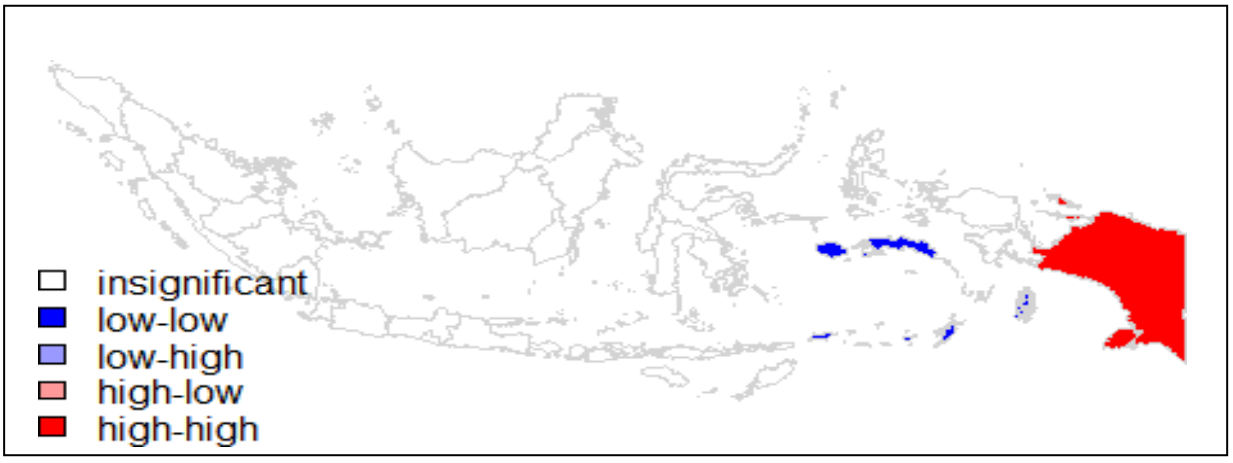

Figure 4.52 Map of Inflation Quadrant Distribution in 2018

Based on Figure 4.52, it shows that Maluku and Papua provinces are significant at $\alpha = 0.05$. The figure above also shows that Maluku Province is in the High-High (HH) quadrant which is a province with high inflation and surrounded by provinces with high inflation. While Papua Province is in the Low-Low (LL) quadrant which is a province with low inflation and surrounded by provinces with low inflation.

c. Inflation in 2019

The results of the LISA test on the 2019 Inflation variable provide information that the provinces of Greater Jakarta, Central Java, Maluku and Papua have a p-value $<\alpha = 0.05$ so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The value of li indicates the value of the Moran index at the i-th location. The provinces of Greater Jakarta, Central Java and Maluku have a value of li > 0 so it can be concluded that neighbouring locations have the same value, while for Papua Province has a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite values.

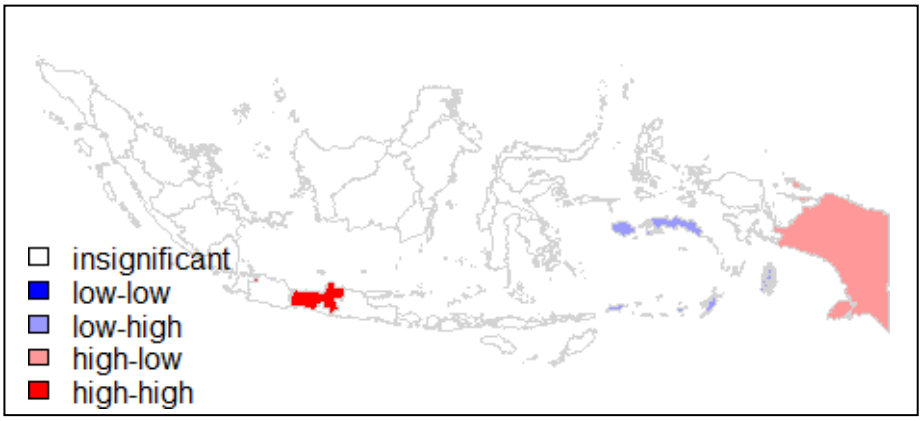

Figure 4.53 Quadrant Distribution Map of Inflation in 2019

Based on Figure 4.53, it shows that Greater Jakarta, Central Java, Maluku and Papua provinces are significant at $\alpha = 0.05$. The figure above also shows that the provinces of Central Java and Greater Jakarta are in the High-High (HH) quadrant which is a province with high inflation and surrounded by provinces with high inflation, Papua Province is in the High-Low (HL) quadrant which is a province with high inflation but surrounded by provinces with low inflation. Maluku Province is in the Low- Low (LL) quadrant which is a province with low inflation and surrounded by provinces with low inflation.

d. Inflation in 2020

The LISA test results on the 2020 Inflation variable provide information that only North Sumatra Province has a p-value < 0.05 so that H0 is rejected, which means it is significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. North Sumatra Province has a value of li > 0 so it can be concluded that neighbouring locations have the same value.

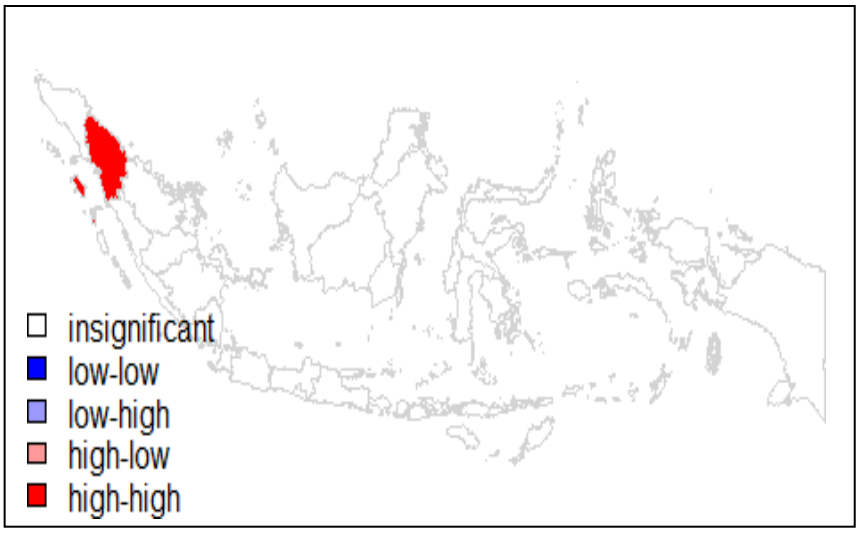

Figure 4.54 Quadrant Distribution Map of Inflation in 2020

Based on Figure 4.54, it shows that North Sumatera Province is significant at α = 0.05. The figure above also shows that North Sumatra Province is in the High-High (HH) quadrant which is a province with high inflation and surrounded by provinces with high inflation.

e. Inflation in 2021

The results of the LISA test on the 2021 Inflation variable provide information that the provinces of Bangka Belitung, East Kalimantan, and West Papua have a p-value <α = 0.05 so that H0 is rejected, which means significant or there is spatial autocorrelation in the province. The value of li shows the value of the Moran index at the i-th location. The provinces of Bangka Belitung, East Kalimantan, and West Papua have a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite, values.

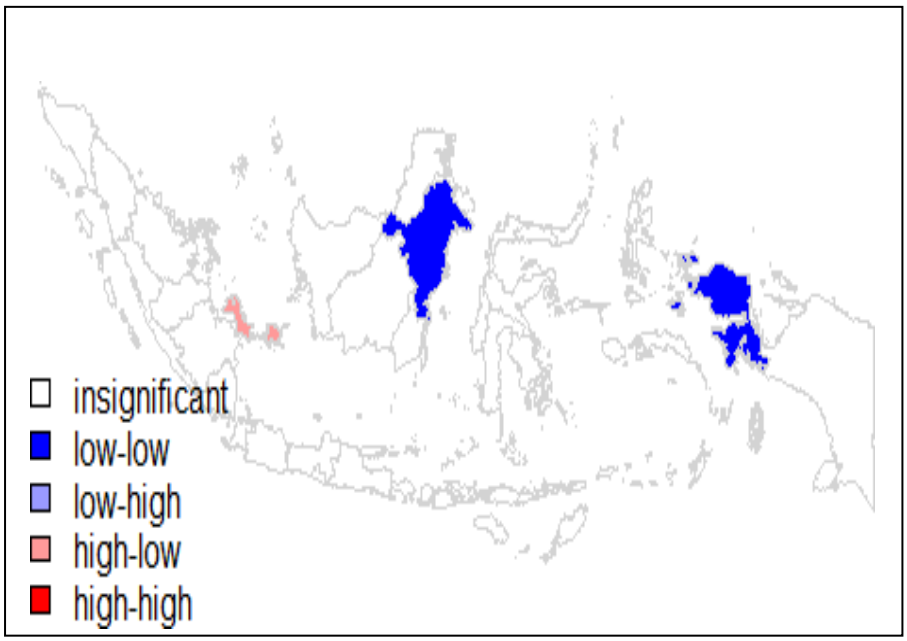

Figure 4.55 Quadrant Distribution Map of Inflation in 2021

Based on Figure 4.55, it shows that the provinces of Bangka Belitung, East Kalimantan, and West Papua are significant atα = 0.05. The figure above also shows that Bangka Belitung Province is in the High-Low (HL) quadrant which is a province with high inflation but surrounded by provinces with low inflation. The provinces of East Kalimantan and West Papua are in the Low-Low (LL) quadrant, which are provinces with low inflation and surrounded by provinces with low inflation.

2. X3 (Export)

a. Exports in 2017

The results of the LISA test on the 2017 Export variable provide information that West Kalimantan and Southeast Sulawesi Provinces have a p-value < 0.05 so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. Southeast Sulawesi Province has a value of li > 0 so it can be concluded that neighbouring locations have the same value, while for West Kalimantan Province has a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite values.

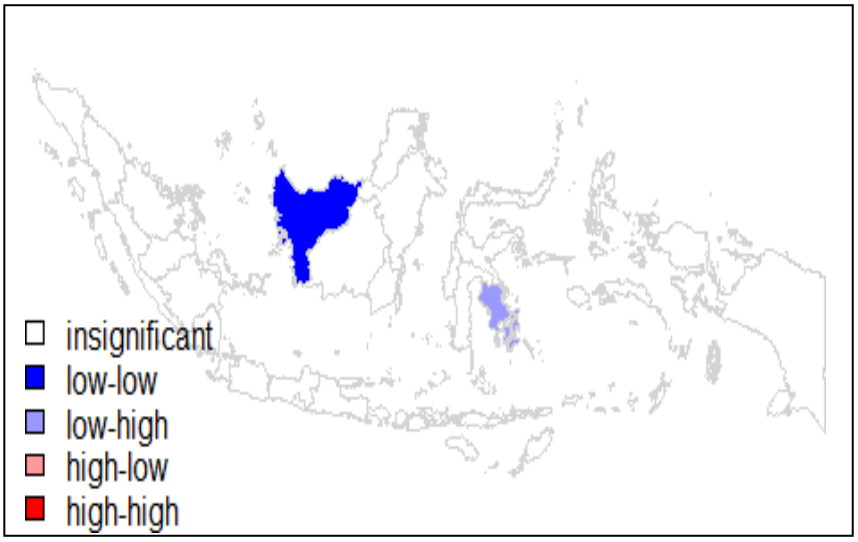

Figure 4.56 Map of Export Quadrant Distribution in 2017

Based on Figure 4.56, it shows that West Kalimantan and Southeast Sulawesi Provinces are significant at $\alpha = 0.05$. The figure above also shows that Southeast Sulawesi Province is in the Low-High (LH) quadrant, which is a province with low exports but is surrounded by provinces with high exports. West Kalimantan Province is in the Low-Low (LL) quadrant, which is a province with low exports and is surrounded by provinces with low exports.

b. Exports in 2018

The results of the LISA test on the 2018 Export variable provide information that only West Kalimantan Province has a p-value < 0.05 so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. West Kalimantan Province has a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite, values.

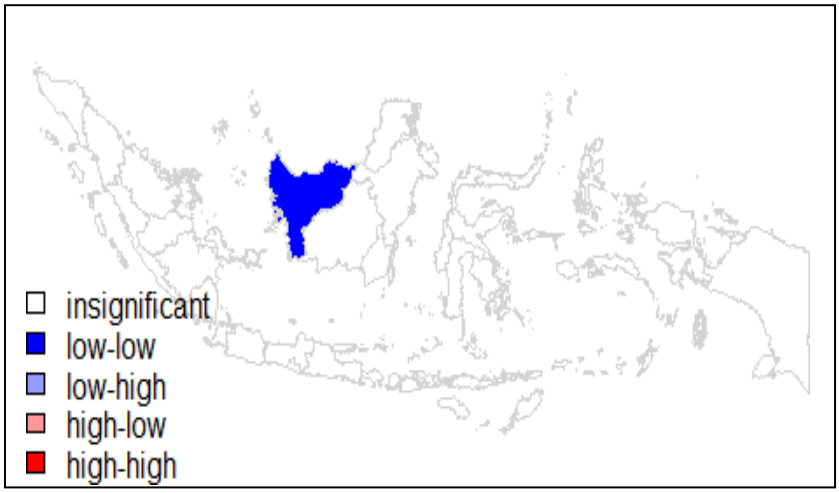

Figure 4.57 Map of Export Quadrant Distribution in 2018

Based on Figure 4.57, it shows that only West Kalimantan Province is significant at $\alpha = 0.05$. The figure above also shows that West Kalimantan Province is in the Low-Low (LL) quadrant which is a province with low exports and is surrounded by provinces with low exports.

c. Exports in 2019

The results of the LISA test on the 2019 Export variable provide information that only West Kalimantan Province has a p-value < 0.05 so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. West Kalimantan Province has a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite, values.

Figure 4.58 Map of Export Quadrant Distribution in 2019

Based on Figure 4.58, it shows that only West Kalimantan Province is significant at α = 0.05. The figure above also shows that West Kalimantan Province is in the Low-Low (LL) quadrant which is a province with low exports and is surrounded by provinces with low exports.

d. Export in 2020

Table 4.26 Results of Local Moran Calculation of Provincial Exports in Indonesia in 2020

Provinsi	Li	P-value	Keterangan
Aceh	-0.03489	0.64033	Tidak Signifikan
North Sumatra	-0.07977	0.750666	Tidak Signifikan
West Sumatra	-0.02238	0.427315	Tidak Signifikan
Riau	0.048767	0.515873	Tidak Signifikan
Jambi	-0.16718	0.502396	Tidak Signifikan
South Sumatra	-0.0358	0.958864	Tidak Signifikan
Bengkulu	-0.00366	0.983655	Tidak Signifikan
Lampung	0.009948	0.853975	Tidak Signifikan
Bangka Belitung	0.055487	0.600706	Tidak Signifikan
Riau Islands	-3.99636	0.178134	Tidak Signifikan
Greater Jakarta	-0.03769	0.639793	Tidak Signifikan
West Java	0.005378	0.841898	Tidak Signifikan
Central Java	-0.00362	0.99958	Tidak Signifikan
Yogyakarta	-0.02027	0.887882	Tidak Signifikan
East Java	-0.00871	0.731673	Tidak Signifikan
Banten	-0.08799	0.726215	Tidak Signifikan
Bali	0.230552	0.484393	Tidak Signifikan

Nusa Tenggara West	0.322633	0.052616	Tidak Signifikan
Nusa Tenggara East	1.122016	0.078759	Tidak Signifikan
West Kalimantan	-1.46998	0.001738	Signifikan
Kalimantan Middle East	-0.07727	0.122901	Tidak Signifikan
Kalimantan South	0.069392	0.473356	Tidak Signifikan
Kalimantan East	-0.01049	0.822996	Tidak Signifikan
North Kalimantan	0.602001	0.403625	Tidak Signifikan
North Sulawesi	-0.12344	0.753207	Tidak Signifikan
Central Sulawesi	-0.12092	0.854262	Tidak Signifikan
South Sulawesi	-0.14346	0.827645	Tidak Signifikan
Southeast Sulawesi	0.227744	0.1598	Tidak Signifikan
Gorontalo	-0.20115	0.50825	Tidak Signifikan
West Sulawesi	0.001193	0.8775	Tidak Signifikan
Maluku	-0.16353	0.881376	Tidak Signifikan
North Maluku	-0.63316	0.097482	Tidak Signifikan
Papua	-0.11683	0.628783	Tidak Signifikan
West Papua	0.027791	0.900127	Tidak Signifikan

The LISA test results on the 2020 Export variable provide information that only West Kalimantan Province has a p-value < 0.05 so that H0 is rejected, which means it is significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. West Kalimantan Province has a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite, values..

Based on Figure 4.59, it shows that only West Kalimantan Province is significant at $\alpha = 0.05$. The figure above also shows that West Kalimantan Province is in the Low-Low (LL) quadrant which is a province with low exports and is surrounded by provinces with exports that are also low.

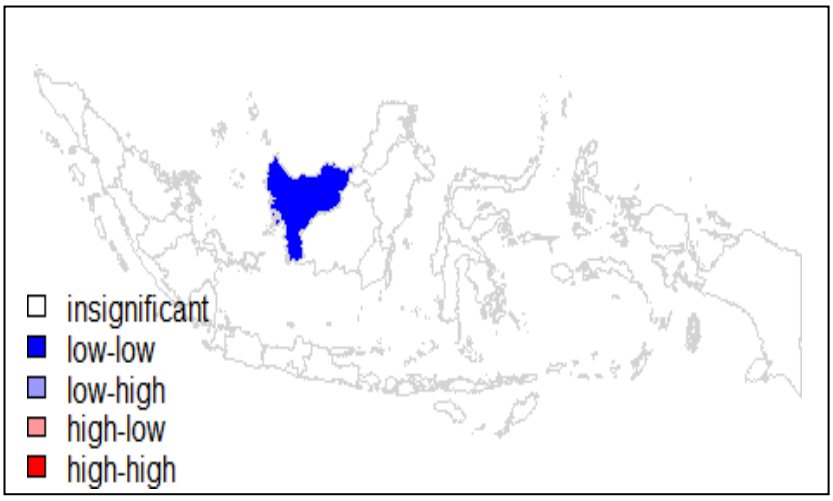

Figure 4.59 Map of Export Quadrant Distribution in 2020

Based on Figure 4.59, it shows that only West Kalimantan Province is significant at α = 0.05. The figure above also shows that West Kalimantan Province is in the Low-Low (LL) quadrant which is a province with low exports and is surrounded by provinces with low exports.

a. Export in 2021

The results of the LISA test on the 2021 Export variable provide information that West Nusa Tenggara and West Kalimantan Provinces have a p-value <α = 0.05 so that H0 is rejected, which means significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. West Nusa Tenggara Province has a value of li > 0 so it can be concluded that neighbouring locations have the same value, while for West Kalimantan Province has a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite values.

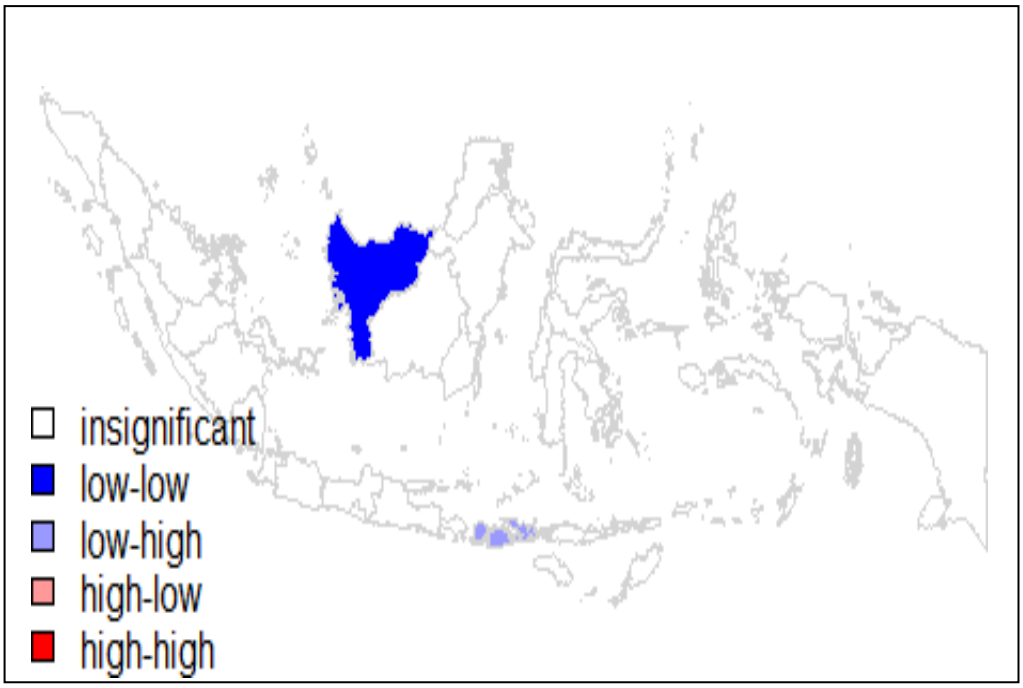

Figure 4.60 Map of Export Quadrant Distribution in 2021

Based on Figure 4.60, it shows that West Nusa Tenggara and West Kalimantan Provinces are significant at α = 0.05. The figure above also shows that West Nusa Tenggara Province is in the Low-High (LH) quadrant, which is a province with low exports but is surrounded by provinces with high exports. West Kalimantan Province is in the Low-Low (LL) quadrant, which is a province with low exports and is surrounded by provinces with low exports.

1. X5 (Open Unemployment Rate)

a. Open Unemployment Rate in 2017

The results of the LISA test on the Open Unemployment Rate variable in 2017 provide information that the provinces of Bali, East Nusa Tenggara, and North Maluku have a p-value <α so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The value of li indicates the value of the Moran index at the i-th location. The provinces of Bali, East Nusa Tenggara, and North Maluku have a value of li> 0 so it can be concluded that neighbouring locations have the same value.

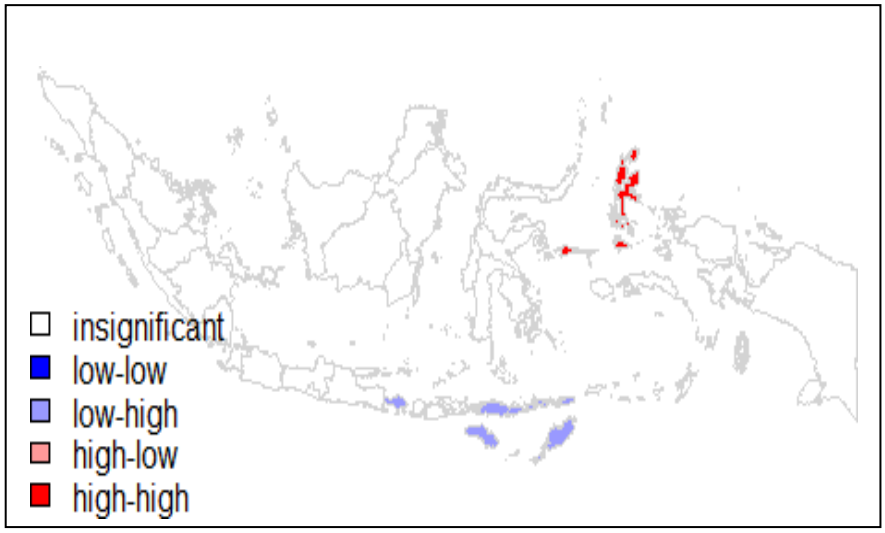

Figure 4.61 Quadrant Distribution Map of Open Unemployment Rate in 2017

Based on Figure 4.61, the provinces of Bali, East Nusa Tenggara, and North Maluku are significant at $\alpha = 0.05$. The figure above also shows that North Maluku Province is in the High-High (HH) quadrant, which is a province with a high percentage of Open Unemployment Rate and surrounded by provinces with high Open Unemployment Rate as well. Meanwhile, the provinces of Bali and East Nusa Tenggara are in the Low-High (LH) quadrant, which are provinces with a low Open Unemployment Rate but surrounded by provinces with a high Open Unemployment Rate.

b. Open Unemployment Rate in 2018

The results of the LISA test on the Open Unemployment Rate variable in 2018 provide information that, East Nusa Tenggara Province has a p-value < 0.05 so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The value of li shows the value of the Moran index at the i-th location. East Nusa Tenggara Province has a value of li> 0 so it can be concluded that neighbouring locations have the same value.

Based on Figure 4.62, it shows that East Nusa Tenggara Province is significant at $\alpha = 0.05$. The figure above also shows that East Nusa Tenggara Province is in the Low-High (LH) quadrant, which is a province with a low open unemployment rate but surrounded by provinces with a high open unemployment rate.

c. Open Unemployment Rate in 2019

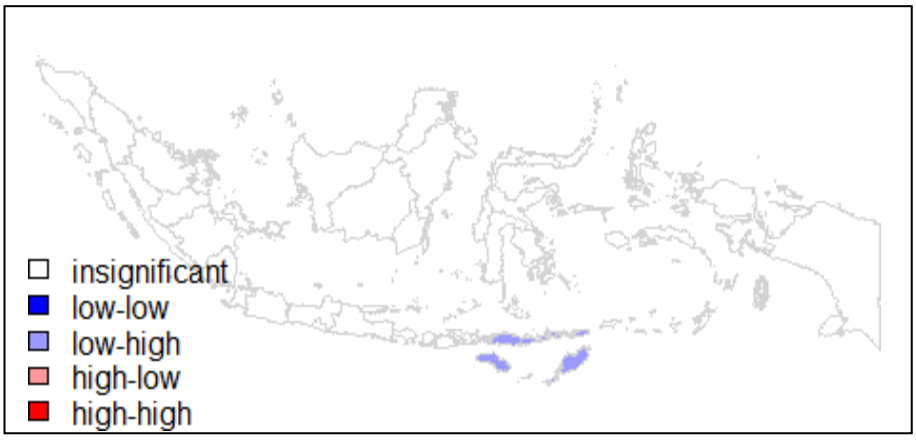

Figure 4.62 Quadrant Distribution Map of Open Unemployment Rate in 2018

The results of the LISA test on the Open Unemployment Rate variable in 2019 provide information that the provinces of Bali, East Nusa Tenggara, West Nusa Tenggara, and South Sulawesi have a p-value < 0.05 so that H0 is rejected which means significant or there is spatial autocorrelation in the province. The value of li shows the value of the Moran index at the i-th location. The provinces of Bali, East Nusa Tenggara, West Nusa Tenggara, and South Sulawesi have a value of li > 0 so it can be concluded that neighbouring locations have the same value.

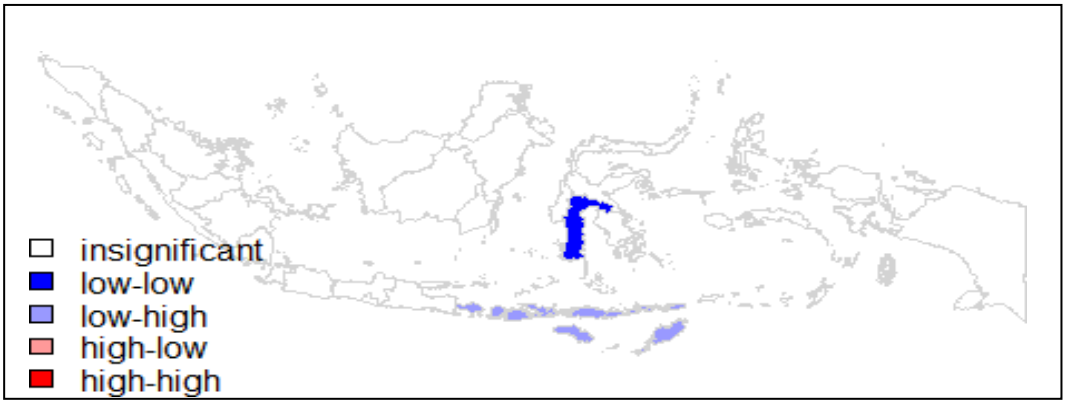

Figure 4.63 Quadrant Distribution Map of Open Unemployment Rate in 2019

Based on Figure 4.63, it shows that the Provinces of Bali, East Nusa Tenggara, West Nusa Tenggara, and South Sulawesi are significant at $\alpha = 0.05$. The figure above also shows that the provinces of Bali, East Nusa Tenggara, West Nusa Tenggara are in the Low-High (LH) quadrant, which is a province with a low open unemployment rate but surrounded by provinces with a high open unemployment rate, and the province of South Sulawesi is in the Low-Low (LL) quadrant, which is a province with a low open unemployment rate and surrounded by provinces with a low open unemployment rate.

d. Open Unemployment Rate in 2020

The results of the LISA test on the Open Unemployment Rate variable in 2020 provide information that Lampung, Central Java, Yogyakarta, East Kalimantan, North Sulawesi, and South Sulawesi provinces have a p-value < 0.05 so that H0 is rejected, which means that it is significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. Central Java Province has a value of li > 0 so it can be concluded that neighbouring locations have the same value, while for Lampung Province, Yogyakarta, East Kalimantan, North Sulawesi, and South Sulawesi have a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite values.

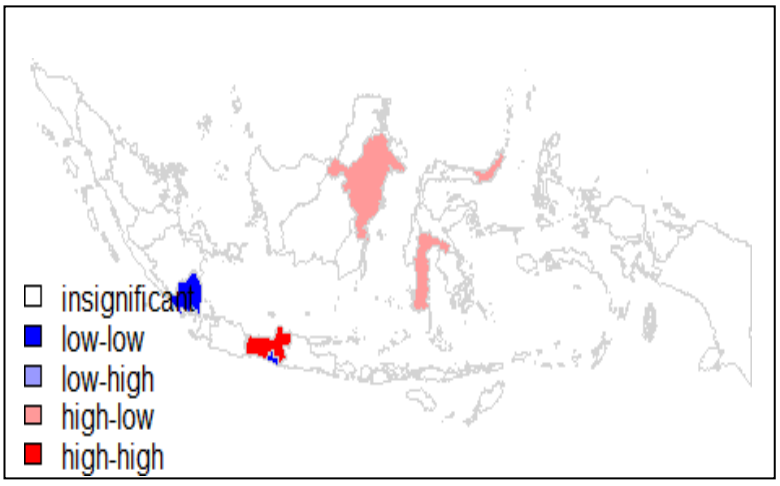

Figure 4.64 Quadrant Distribution Map of Unemployment RateOpen in 2020

Based on Figure 4.64, it shows that the Provinces of Lampung, Central Java, Yogyakarta, East Kalimantan, North Sulawesi, and South Sulawesi are significant at $\alpha = 0.05$. The figure above also shows that the provinces of East Kalimantan, North Sulawesi, and South Sulawesi are in the High-Low (HL) quadrant, which is a province with a high open unemployment rate but surrounded by provinces with a low open unemployment rate, Central Java Province is in the High-High (HH) quadrant which is a province with a high Open Unemployment Rate and is surrounded by provinces with a high Open Unemployment Rate, and Lampung and Yogyakarta Provinces are in the Low-Low (LL) quadrant which is a province with a low Open Unemployment Rate and is surrounded by provinces with a low Open Unemployment Rate.

e. Open Unemployment Rate in 2021

The results of the LISA test on the Open Unemployment Rate variable in 2021 provide information that the provinces of Central Java, Yogyakarta, North Sulawesi, and South Sulawesi have a p-value $<\alpha = 0.05$ so that H0 is rejected, which means it is significant or there is spatial autocorrelation in the province. The li value shows the value of the Moran index at the i-th location. Central Java Province has a value of li > 0 so it can be concluded that neighbouring locations have the same value, while for Yogyakarta, North Sulawesi, and South Sulawesi Provinces have a value of li < 0 so it can be concluded that neighbouring locations have unequal, or opposite values.

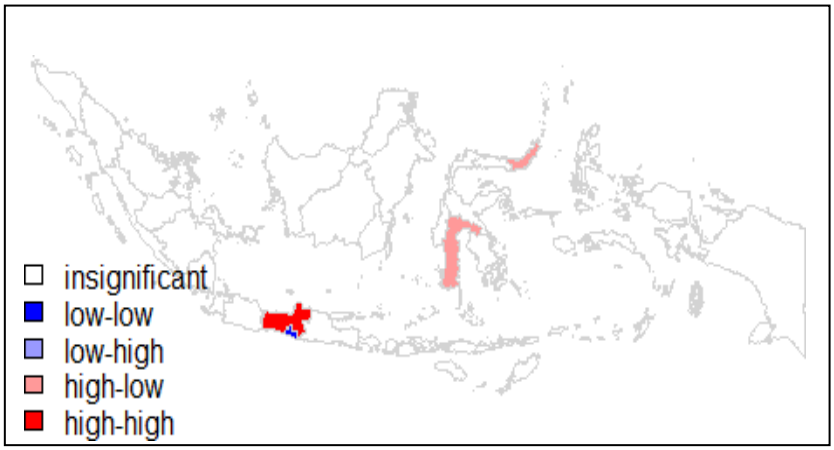

Figure 4.65 Quadrant Distribution Map of Open Unemployment Rate in 2021

Based on Figure 4.65, it shows that the Provinces of Central Java, Yogyakarta, North Sulawesi, and South Sulawesi are significant at $\alpha = 0.05$. The figure above also shows that North Sulawesi and South Sulawesi are in the High-Low (HL) quadrant, which is a province with a high open unemployment rate but surrounded by provinces with a low open unemployment rate, Central Java is in the High-High (HH) quadrant, which is a province with a high open unemployment rate and surrounded by provinces with a high open unemployment rate, and Yogyakarta is in the Low-Low (LL) quadrant, which is a province with a low open unemployment rate and surrounded by provinces with a low open unemployment rate..

CONCLUSIONS AND SUGGESTIONS

5.1 Conclusion

Based on the results of the analysis that has been carried out, the conclusions in this study are as follows:

1. Factors that have a significant effect on economic growth in Indonesia using panel data regression with the help of Eviews are inflation (X1), Exports (X3) and Open Unemployment Rate (X5).
2. The results of the panel data spatial regression analysis obtained the appropriate model is the fixed effect SAR model using Software R which shows the spatial influence on provincial economic growth in Indonesia using one of the provinces in Indonesia, namely West Kalimantan Province. The model of West Kalimantan

Province is as follows:

$$\hat{Y}(kalbar)ke-t = 0{,}57 \sum_{j=20}^{34} \text{Wij}(PDRB)it + 0.375\text{X1}(Inflation) + 0.106\text{X3}(Export) - 0.792\text{X5}(TPT) + 5.776 + Vit$$

The fixed effect SAR model obtained can be interpreted as follows:

a. In year t, an increase in Inflation (X1) in a province in Indonesia by 1%, will result in an increase in Economic Growth by 0.37%.
b. In year t, an increase in Exports (X3) in a province in Indonesia by 1%, will result in an increase in Economic Growth by 0.10%.
c. In year t, an increase in the Open Unemployment Rate (X5) in a province in Indonesia of 1%, will result in a decrease in Economic Growth of 0.79%..

3. Based on global testing using the Moran Index with a significance level of 5% using Queen Contiguity weights, it can be concluded that:

a. There is spatial autocorrelation in the 2017 and 2018 inflation variables between provinces in Indonesia that are located close together, so that inflation in one province in Indonesia is interrelated with inflation from other provinces. While in 2019-2021 there is no autocorrelation in the inflation variable so that the inflation of a province in Indonesia is not interrelated.
b. There is no spatial autocorrelation in the export variable in 2017-2021 between provinces in Indonesia that are located close together. In other words, it does not have similarities and is not interrelated with exports from other provinces.
c. There is no spatial autocorrelation in the variable open unemployment rate in 2017-2021 between provinces in Indonesia which are located nearby and are not related to the open unemployment rate of other provinces.

4. Based on Moran's scatterplot or scatter map for 2017-2021, it is found that:

a. Inflation variable
In quadrant I: High-High (HH) is the province of Maluku, Greater Jakarta, Central Java, North Sumatra which indicates that the province has high inflation surrounded by provinces that have high inflation.
In quadrant II: Low-Higt (LH) is Papua Province, which indicates that the province has low inflation and is surrounded by provinces that have high inflation.
In Quadrant III: Low-Low (LL) is the province of Papua, Maluku East Kalimantan and West Papua which indicates that the province has low inflation and is surrounded by provinces that have low inflation.
In quadrant IV: High-Low (HL) is the province of Maluku, Papua, and Bangka Balitung which indicates that the province has high inflation and is surrounded by provinces that have low inflation.

b. Export Variables
In quadrant I: High-High (HH) there are no provinces with high exports surrounded by provinces that have high exports as well.
In quadrant II: Low-Higt (LH), namely the provinces of Southeast Sulawesi and East Nusa Tenggara, which indicate that the province has low exports and is surrounded by provinces that have high exports.
In Quadrant III: Low-Low (LL), namely West Kalimantan Province which shows that the province has low exports and is surrounded by provinces that have low exports.
In Quadrant IV: High-Low (HL) there are no provinces with high exports and are surrounded by provinces that have low exports.

c. Open Unemployment Rate Variable (TPT)
In quadrant I: High-High (HH), namely North Maluku Province, Central Java which shows that the province has a high TPT surrounded by provinces that have high TPT.
In quadrant II: Low-High (LH) are the provinces of Bali and East Nusa Tenggara which indicate that the

province has a low TPT and is surrounded by provinces that have a high TPT.
In Quadrant III: Low-Low (LL), namely the provinces of South Sulawesi, Lampung, Yogyakarta, which shows that the province has a low TPT and is surrounded by provinces that have low TPT.
In quadrant IV: High-Low (HL), namely the provinces of South Sulawesi, North Sulawesi, East Kalimantan, which indicates that the province has a high TPT and is surrounded by provinces that have low TPT.

5. The results of testing spatial autocorrelation locally using the Local Indicator of Spatial Autocorrelation (LISA) to see which provinces have spatial autocorrelation, with the help of R Studio software as follows:

a. Infaltion Year 2017-2021
There is spatial autocorrelation in Maluku, Papua, Greater Jakarta, Central Java, North Sumatra, Bangka Balitung, East Kalimantan and West Papua provinces with a significant level of 5% while the other provinces are not significant.

b. Exports 2017-2021
There is spatial autocorrelation in West Kalimantan, Southeast Sulawesi, and East Nusa Tenggara provinces with a significant level of 5%, while the other provinces are not significant.

c. Open Unemployment Rate 2017-2021
There is spatial autocorrelation in the provinces of Bali, East Nusa Tenggara, North Maluku, West Nusa Tengga, South Sulawesi, Lampung, Central Java, Yogyakarta and East Kalimantan with a significant level of 5% while other provinces are not significant.

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