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Socio Spatial Analysis of Manpower in East Java 2022

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ABSTRACT: There are 25 regencies and cities in East Java that are included in the priority areas for accelerating the elimination of extreme poverty. In some areas, unemployment is a complex problem and not easy to solve, so solving it is one of the priorities of macroeconomic policy. In 2022, of the 22,869 million people in the labor force in East Java, 1,255,719 of them are unemployed. This condition is exacerbated by the number of unemployed people who are dominated by high school graduates. Unemployment Rate in each region of East Java is very diverse, although Unemployment Rate East Java has decreased significantly, not all regencies and cities have also decreased. This condition is in line with Lewandowska-Gwarda's opinion, which reveals that the problem of unemployment is a heterent economic problem because it is influenced by geographical spatial effects. This study aims to identify spatial patterns and identify and analyze factors that affect unemployment in each region in East Java. Identify spatial patterns of unemployment in East Java using the spatial autocorrelation method, while to identify and analyze factors affecting Unemployment Rate in East Java using GWR. For GWR, variable X is used which consists of economic growth and Regional Minimum Wages. The results show a moran index value of 0.368 which means ≠0 with a kurtosis of 2.876 so that it shows a positive spatial autocorrelation with indications of clustered patterns. While the results of the GWR analysis obtained that Unemployment Rate in each district and city area in East Java was influenced by MSE variables, while economic growth variables did not have a significant effect.

KEYWORDS –*Unemployment Rate, Spatial Autocorrelation, Moran Index, GWR*

I. INTRODUCTION

SDGs as a global agenda to achieve human welfare through sustainable development programs, in point 8 of the SDGs reveals that to increase the added value of the economy is carried out by creating decent jobs supported by economic growth. These efforts are made to reduce the unemployment rate so that the economy remains stable in a sustainable manner (Bappenas, 2020). This is because when the economy experiences a recession, the demand for goods and services decreases so that the number of labor needs also decreases. Thus, the welfare of the population also decreases because income decreases (Sukirno, 2011).

The problem of unemployment is a problem that is interrelated with employment conditions. Unemployment is created when the number of labor force is more than job opportunities. Therefore, the role of the government is urgently needed to overcome the problem of unemployment so that it does not have a greater impact on the economy of a region (Soleh, 2017). Unemployment itself defines a person who does not have a job and is looking for a job for himself (Pigou, 2013). In practice, unemployment is closely related to the amount of salary, a person's health level, and the number of hours worked each day.

This unemployment problem further forms organizations and spatial structures that tend to produce complex patterns of interaction and dependence (Anselin, 1988). This condition is in line with the opinion of Lewandowska-Gwarda (2018), who revealed that the problem of unemployment is a heerogenic economic problem because it is influenced by geographical spatial effects. Tobler said in the First Law of Geography that all things are related to each other, but that things that are close are more likely to have a much closer relationship than things that are far away (Anselin, 1988).

Identification of spatial effects on the problem of unemployment requires spatial regression analysis. Spatial regression is the result of the development of a linear regression method by considering the spatial aspects of the data analyzed (Wang in Lutfiani et al, 2019). This is done in order to meet the assumption of free mutual error so that the conclusions obtained are more precise supported by accurate results. In spatial modeling, there are two approaches, namely area and point. Point data is determined using the coordinate points of an area, while area data is determined from the area (Azkiyah, 2016). One of the spatial regression methods that is often used in a study is Geographically Weighted Regression (GWR). This method is a spatial regression method that uses a point approach that allows for local parameter estimation(Lutfiani et al., 2019).

In some areas, unemployment is a complex problem and not easy to solve, so its solution is one of the priorities of macroeconomic policy (Lewandowska-Gwarda, 2018). If the right efforts are not made, unemployment will cause a multiplier effect ranging from crime, slum areas, to poverty (Franita et al., 2019). Unemployment occurs due to various factors ranging from structural factors to non-structural factors. The general factors that are considered the most influential on unemployment are the quality of the workforce, the Regency and City Minimum Wage, and also the number of the labor force (Adriyanto et al., 2020). The determination of high Regional Minimum Wages will result in a decrease in labor demand (Kaufman & Hotchkiss in Prawira, 2018).

Another factor that affects the unemployment rate in a region is economic growth. Economic growth can be interpreted as the development of economic activities that affect the amount of production of services and goods (Sadono in Zulfa, 2016). If the production of goods increases, the number of labor needs is greater. On the other hand, if the production of goods decreases, then the number of labor needs will decrease. That way, the unemployment rate will increase (Sukirno, 2011). Economic growth can be measured using the value of GDP and/or capita income.

In addition to regional factors, the unemployment rate is also influenced by individual factors as mentioned in the HDI component, namely the level of education and the quality of health (Dewi & Sutrisna, 2014). A person with a high level of education has a greater tendency to get a much better job (Prawira, 2018). Meanwhile, a high GHE shows the government's success in improving the quality of population health (Shantika, 2022). Thus, the ability of the population to work is greater compared to low GHE.

The Unemployment Rate is a measure of unemployment calculated from the percentage of unemployment divided by the number of labor force. Open unemployment itself can be defined as someone who does not have a job and is looking for a job or preparing for a business, someone who has not started working, and someone who does not have a job and is not looking for a job because they feel they are incapable (BPS, 2023).

Figure 1. Unemployment RateDistribution Map in East Java 2022
Source: CAS, 2023

Astronomically, East Java Province is located between 111°00' E – 114°04' E and 70°12' S - 80°48' E. The areas with the highest Unemployment Rate in East Java as shown in Fig. 1 include Sidoarjo Regency (8.80%), Batu City (8.43%), and Bangkalan Regency (8.05%). Meanwhile, the areas in East Java that have the lowest Unemployment Rate are Sumenep Regency (1.36%), Pamekasan Regency (1.40%), and Ngawi Regency (2.48%). The average Unemployment Rate in East Java is 5.27%.

In 2017-2022 Unemployment Rate in East Java showed a significant decrease, although 2020 showed an increase due to the Covid-19 pandemic. However, this condition is not in line with the Tulungagung Regency and Madiun Regency areas which continue to experience an increase in Unemployment Rate (BPS, 2023). Unemployment Rate in each region of East Java is very diverse, the decrease and increase in Unemployment Rate cannot be ascertained in one region every year.

According to Presidential Instruction (INPRES) No. 4 of 2022 concerning the Acceleration of the Elimination of Extreme Poverty, there are as many as 25 districts and cities in East Java that are included in the policy priority areas. The World Bank revealed that one of the strategies in poverty alleviation is to create jobs and increase income to reduce the unemployment rate. In 2022, East Java's Unemployment Rate is at a moderate level reaching 5.49%, which shows that out of 100 working-age residents, there are 5 unemployed residents. In that year, East Java occupied the 12th position with the highest Unemployment Rate out of 34 provinces in Indonesia (BPS, 2023).

In 2022, of the 22,869 million people in the labor force in East Java, 1,255,719 of them are unemployed (BPS, 2023). The problem of Unemployment Rate in East Java is exacerbated by Unemployment Rate which is dominated by the population of vocational and high school graduates at 8.70% and 7.93%, respectively. Meanwhile, by gender, Unemployment Rate is dominated by men, which is 4.94&, while women's Unemployment Rate is 4.80%. The Unemployment Rate is most widely spread in urban areas as the center of economic activities so that many become the destination of a migrant. On the other hand, the working population of East Java is dominated by unpaid family workers, which is 14.09% of the total working population (Bappeda, 2023). In general, the high unemployment rate in East Java occurs due to the large number of labor force, but limited job opportunities. In addition, in 2022, which is still in the post-pandemic recovery stage, worker motivation is still low and the quality of workers is still poor (Kadisnakertrans, 2021).

In the Lewandowska-Gwarda (2018) study, local unemployment that occurs in Poland is predicted using the Geographically Weighted Regression (GWR) method. The study used socioeconomic aspects to predict unemployment in each region of Poland. The results show that unemployment in each region is affected by different predictor variables. Meanwhile, Mahmud & Pasaribu (2021) in their research conducted spatial modeling of Unemployment Rate in Bangka Belitung Province in 2018 using the Moran Index and OLS methods. The results show that it is predicted that Unemployment Rate is spatially related to the number of poor people and GDP with a moran index value of 0.509. This is that the pattern of Unemployment Rate spread in the study grouped and showed positive spatial autocorrelation symptoms.

Pratama & Setyowati (2022), in their research analyzed the factors that affect educated unemployment in graduates of every university in Indonesia in 2005-2021. The study uses time series data with predictor variables consisting of inflation, economic growth, investment, and population growth. Meanwhile, the method used is in the form of Ordinary Least Square (OLS) multiple linear regression analysis. The results obtained state that inflation and population growth have an effect on educated unemployment.Arizal & Marwan (2019), in their research, analyzed the influence of GDP and HDI on Unemployment Rate in West Sumatra in 2010-2017. In the study, the analysis was carried out using panel regression and using the Fixed Effect Model method. The results stated that GDP and HDI have a joint effect on Unemployment Rate. Meanwhile, individually, GDP has a negative effect and HDI also has a positive influence on Unemployment Rate.

Unlike previous research, the purpose of this research is to identify spatial patterns and analyze factors that affect Unemployment Rate in each district and city in East Java in 2022. In this study, the spatial pattern that occurs to the unemployed in East Java is identified using the spatial autocorrelation method. Meanwhile, to identify and analyze the factors that affect Unemployment Rate in East Java, the GWR method is used. Thus, it is hoped that policy formulation will be more efficient in accordance with the factors of unemployment in each region.

II. METODH

This research is a type of quantitative research with a spatial regression approach. This research is based on Tobler's theory (1971), which states that all matters are related to each other, but that something that is close to each other tends to have a much closer relationship than one that is far away. The locations used consist of districts and cities in East Java which have a total of 38. Meanwhile, the time used is in 2022 with consideration of data availability.

The data used is secondary data obtained from the official BPS website and Inageoportal. The data includes Unemployment Rate data, Economic Growth and Regional Minimum Wages, and shape files of district and city boundaries in East Java. This research is divided into 2 stages, namely the analysis of the spatial pattern of unemployment in East Java and the analysis of the relationship between variable X and variable Y locally. Before the data analysis, a classical assumption test was first carried out on testing normality, homogeneity, multicollinearity, spatial heteroscedasticity, and also spatial autocorrelation to ensure that the data was well used, unbiased, and consistent. However, because the data contained autocorrelation and homoscedasticity, GWR analysis was used.

2.1 Spatial Weighting

The first stage in the analysis of the spatial pattern of unemployment in East Java begins with spatial weighting to determine the neighborhood of districts and cities in East Java. The identification of the spatial weighting matrix in this study uses a method with queen contiguity criteria. The queen contiguity criterion is a spatial weighting matrix method by taking into account the sides and angles that intersect each other in the area concerned. The weighting matrix obtained is 38x38 according to the number of districts and cities in East Java.

The spatial weighting matrix method is obtained through a row standardize weight matrix with the code W, which is a standardized row weighting matrix (sum of all links to n). This method is used because the number of neighbors in each region is not the same. The row standardize weight matrix W is obtained by giving equal weight to each of the nearest neighbors, then the other locations are given a weight of 0. Next, the result is obtained by dividing each weight by the number of rows. A row itself is a horizontal dimension of a table consisting of a set of columns that contain one data item.

2.2 Spatial Autocorrelation Analysis

The data obtained from spatial weighting is then used for spatial pattern analysis using spatial autocorrelation method. This method was first expressed by Moran (1948) and Geary (1954) who were guided by Tobler's First Law of Geography. Spatial autokorea emphasizes the influence of distance on a relative space (Anselin, 1988). This spatial autocorrelation is used to identify the level of homogeneity that occurs between observation regions (Pfeiffer in Yuliana et al., 2022).

The spatial autocorrelation analysis of this study was in the form of the Moran I Index and Local Indicators of Spatial Association (LISA) using Rstudio software. The Moran I Index is a method of determining spatial autocorrelation globally to identify whether or not there is a spatial relationship in a phenomenon (Moran in Lutfi, 2019). After conducting a global spatial analysis, it was followed by a local spatial analysis using LISA. The value generated from LISA is a more specific value than the value of the Moran I Index, because the value comes from the association locally (Fatati et al., 2017). In this study, the analysis of the LISA value uses a significance of 0,05.

2.3. Geographically Weighted Regression (GWR)

The analysis of factors affecting Unemployment Rate (Y) in East Java was using the Geographically Weighted Regression (GWR) method with GWR4 software. The use of the GWR method uses considerations to produce different regression models in each region according to the variables that influence it. In addition, the GWR method is also more suitable for data that contains heterogeneity and spatial autocorrelation. In this case, variable X is in the form of Economic Growth (X_1), and the City Regency Minimum Wage (X_2). The consideration of the selection of the two variables is based on the fact that both variables are regional and not individual. In this GWR analysis, the weighting was determined using the Gaussian model from the distance between the observed data point and the local regression center point. Furthermore, for the determination of the optimal bandwidth, the Cross Validation method is used. The final result in this study is in the form of a good test of the regression model and the regression model in each district and city of East Java. The following is a flow chart of this study

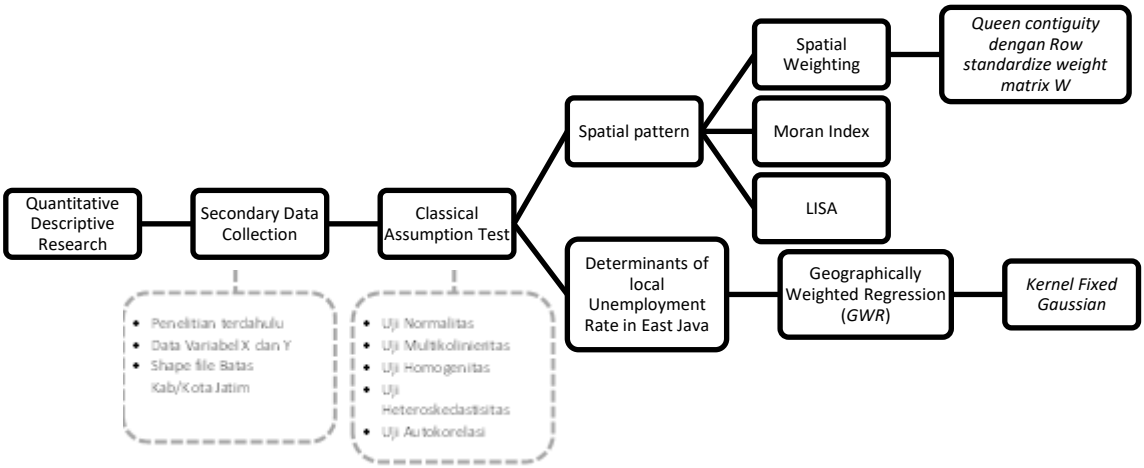


Figure 2. Data Processing Stage Flow Diagram

III. RESULTS AND DISCUSSION

Before conducting spatial analysis on Unemployment Rate in East Java, a classical assumption test was carried out with the following results

Table 1. Results of the Classic Assumption Test

No	Statistik Uji	Metode	Koefisien		Keterangan
1.	Uji Normalitas	Kolmogorov-Smirnov	0,200		The coefficient > 0.05 so that the data is normally distributed
2.	Homogenitas	Oneway	0,000		The coefficient < 0.05 so that the data is heterogeneous
4.	Multikolinieritas	*Tolerance*and VIF	***Tolerance***		
			• Economic Growth	0,887	The tolerance value > 0.10 and the VIF value < 10.00 did not cause multicollinearity
			• Regional Minimum Wages	0,887	
			VIF	1.127	
			• Economic Growth	1.127	
			• Regional Minimum Wages		
3.	Heteroskedastisitas spasial	Breusch Pagan Godfrey	• Economic Growth	0,458	The coefficient of the two variables X > 0.05 so that the data does not contain heteroscedasticity
			• Regional Minimum Wages	0,891	
5.	Autokorelasi spasial	Index Moran I	0,3684225 which means ≠0 with a curtosis of2,876295		Positive spatial autocorrelation occurs

Source: Autor, 2023

3.1 Spatial Pattern of Unemployment Rate in East Java

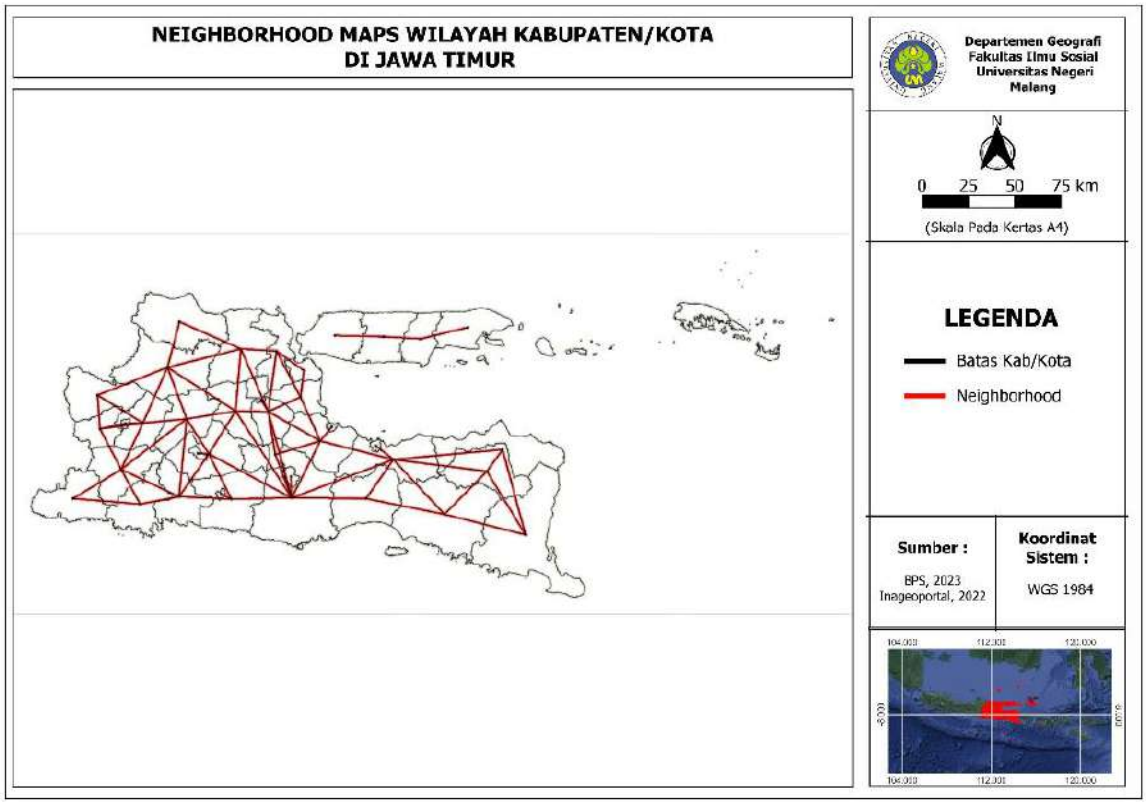


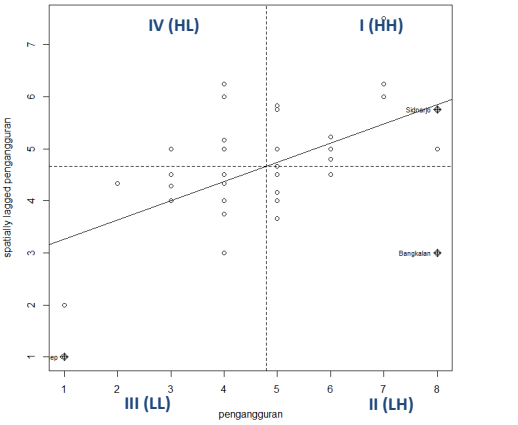
Figure 3. Map of Neighborhood Regencies and Cities in East Java
Source: Autor, 2023

Based on the results of the spatial weighting analysis, the average neighbors in each district and city in East Java are 6 neighbors. In this case, the neighbor in question is the relationship or relationship of one area with another nearby area seen from the nearest area. The following is a list of neighbors of each district and city in East Java

Table 2. List of Neighbors of Regencies and Cities in East Java

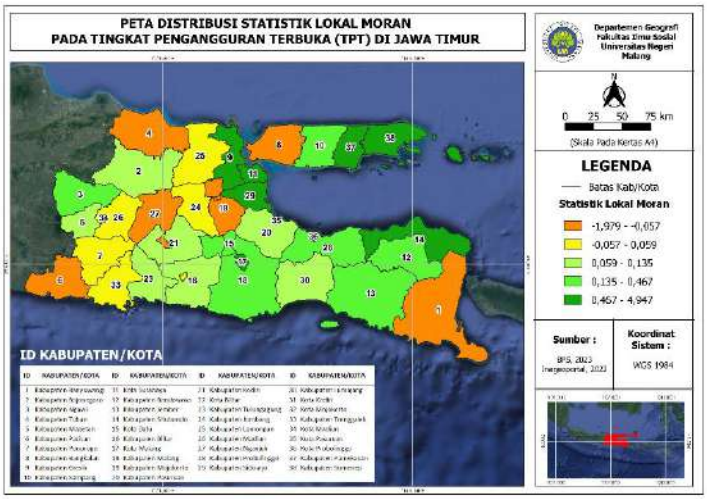
ID	Regencies and Cities	Number of Neighbors	Neighbors List
1	Kabupaten Banyuwangi	3	Kab. Bondowoso, Kab. Jember, Kab. Situbondo
2	Kabupaten Bojonegoro	6	Kab. Ngawi, Kab. Tuban, Kab. Jombang, Kab. Lamongan, Kab. Madiun, Kab. Nganjuk
3	Kabupaten Ngawi	3	Kab. Bojonegoro, Kab. Magetan, Kab. Madiun
4	Kabupaten Tuban	2	Kab. Bojonegoro, Kab. Lamongan
5	Kabupaten Magetan	4	Kab. Ngawi, Kab. Ponorogo, Kab. Madiun, Kota Madiun
6	Kabupaten Pacitan	2	Kab. Ponorogo, Kab. Trenggalek
7	Kabupaten Ponorogo	6	Kab. Magetan, Kab. Pacitan, Kab. Tulungagung, Kab. Madiun, Kab. Nganjuk, Kab. Trenggalek
8	Kabupaten Bangkalan	1	Kab. Sampang
9	Kabupaten Gresik	4	Kota Surabaya, Kab. Mojokerto, Kab. Lamongan, Kab. Sidoarjo
10	Kabupaten Sampang	2	Kab. Bangkalan, Kab. Pamekasan
11	Kota Surabaya	2	Kab. Bojonegoro, Kab. Sidoarjo
12	Kabupaten Bondowoso	4	Kab. Banyuwangi, Kab. Jember, Kab. Situbondo, Kab. Probolinggo
13	Kabupaten Jember	4	Kab. Banyuwangi, Kab. Bondowoso, Kab. Probolinggo, Kab. Lumajang
14	Kabupaten Situbondo	3	Kab. Banyuwangi, Kab. Bondowoso, Kab. Probolinggo
15	Kota Batu	3	Kab. Malang, Kab. Mojokerto, Kab. Pasuruan
16	Kabupaten Blitar	4	Kab. Malang, Kab. Kediri, Kota Blitar, Kab. Tulungagung
17	Kota Malang	1	Kab. Malang
18	Kabupaten Malang	9	Kota Batu, Kab. Blitar, Kota Malang, Kab. Mojokerto, Kab. Pasuruan, Kab. Kediri, Kab. Jombang, Kab. Probolinggo, Kab. Lumajang
19	Kabupaten Mojokerto	8	Kab. Gresik, Kota Batu, Kab. Malang, Kab. Pasuruan, Kab. Jombang, Kab. Lamongan, Kab. Sidoarjo, Kota Mojokerto
20	Kabupaten Pasuruan	6	Kota Batu, Kab. Malang, Kab. Mojokerto, Kab. Probolinggo, Kab. Sidoarjo, Kota Pasuruan
21	Kabupaten Kediri	6	Kab. Blitar, Kab. Malang, Kab. Tulungagung, Kab. Jombang, Kab. Nganjuk, Kota Kediri
22	Kota Blitar	1	Kab. Blitar
23	Kabupaten Tulungagung	5	Kab. Ponorogo, Kab. Blitar, Kab. Kediri, Kab. Nganjuk, Kab. Trenggalek
24	Kabupaten Jombang	6	Kab. Bojonegoro, Kab. Malang, Kab. Mojokerto, Kab. Kediri, Kab. Lamongan, Kab. Nganjuk
25	Kabupaten Lamongan	5	Kab. Bojonegoro, Kab Tuban, Kab. Gresik, Kab. Mojokerto, Kab. Jombang
26	Kabupaten Madiun	6	Kab. Bojonegoro, Kab. Ngawi, Kab. Magetan, Kab. Ponorogo, Kab. Nganjuk, Kota Madiun
27	Kabupaten Nganjuk	6	Kab. Bojonegoro, Kab. Ponorogo, Kab. Kediri, Kab. Tulungagung, Kab. Jombang, Kab. Madiun
28	Kabupaten Probolinggo	7	Kab. Bondowoso, Kab. Jember, Kab. Situbondo, Kab. Malang, Kab. Pasuruan, Kab. Lumajang, Kota Probolinggo
29	Kabupaten Sidoarjo	4	Kab. Gresik, Kota Surabaya, Kab. Mojokerto, Kab. Pasuruan
30	Kabupaten Lumajang	3	Kab. Jember, Kab. Malang, Kab. Probolinggo
31	Kota Kediri	1	Kab. Kediri
32	Kota Mojokerto	1	Kab. Mojokerto
33	Kabupaten Trenggalek	3	Kab. Pacitan, Kab. Ponorogo, Kab. Tulungagung
34	Kota Madiun	2	Kab. Magetan, Kab. Madiun
35	Kota Pasuruan	1	Kab. Pasuruan
36	Kota Probolinggo	1	Kab. Probolinggo
37	Kabupaten Pamekasan	2	Kab. Sampang, Kab. Sumenep
38	Kabupaten Sumenep	1	Kab. Pamekasan

Based on the results of the analysis of the global moran index, the value of the moran index is 0.368 which means ≠0 with a kurtosis of 2.876 which means that there is a positive spatial autocorrelation. In addition, the results of spatial autocorrelation also show that the E value is -0.027 and is smaller than the value of the moran index. These results indicate the occurrence of a strong spatial pattern and is supported by clustering. In this grouping pattern, the districts and adjacent cities generally have the same or similar characteristics of the number of Unemployment Rate.



Kuadran	Sebaran Data	Kuadran	Sebaran Data
I	13	III	13
II	7	IV	5

(a)



(b)

Figure 4: (a) Moran Scatterplot Unemployment Rate in East Java,
(b) Local Statistical Distribution Moran ofUnemployment Rate in East Java Map

Based on Fig. 4(a), it shows that the local statistical value of Unemployment Rate moran in East Java is most widely distributed in quadrants I and III. The districts and cities included in quadrant I show that areas with high Unemployment Rate are surrounded by areas with high Unemployment Rate, while quadrant III shows that areas with low Unemployment Rate are surrounded by areas with low Unemployment Rate. Meanwhile, the districts and cities included in quadrant II show that areas with low Unemployment Rate are surrounded by areas with high Unemployment Rate, but on the other hand, quadrant IV shows areas with high Unemployment Rate surrounded by areas with low Unemployment Rate. A more specific value of the moran index is shown by the local statistical value of moran in each district and city in Fig. 4(b).

The next stage of global spatial autocorrelation analysis with the Moran I Index, namely local spatial autocorrelation analysis using Local Indicators of Spatial Association (LISA). The results of LISA are as follows

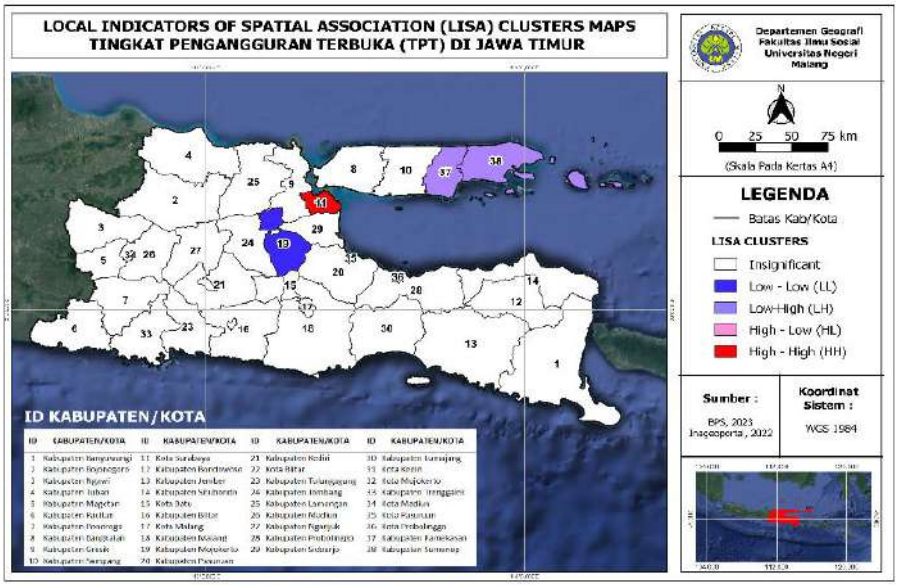


Figure 5. LISA Distribution ofUnemployment Rate in East Java Map

Based on Fig. 5, Mojokerto Regency is included in Cold Spots or Low-Low (LL). This condition indicates that Mojokerto Regency has low Unemployment Rate with neighbors who have low Unemployment Rate as well. The low Unemployment Rate in Mojokerto Regency and its surroundings is supported by the government's efforts to improve the quality of human resources through competency-based job training and job fairs. In addition, the high investment in the region also encourages the creation of new jobs (Prihatini, 2023). This condition is also supported by several areas adjacent to Mojokerto Regency which is an industrial city such as Gresik Regency, Malang Regency, Jombang Regency, Pasuruan Regency, and Mojokerto City so that it can absorb a large number of workers (JIIPE, 2023). The regions included in the cold spots contribute greatly to the negative global autocorrelation value.

Sumenep is included in the Outliers or Low-High (LH). This condition shows that Pamekasan Regency and Sumenep Regency have low Unemployment Rate with neighbors who have high Unemployment Rate. Pamekasan Regency and Sumenep Regency must be more vigilant about the increase in Unemployment Rate because it is feared that it will be affected by adjacent areas related to population migration to obtain jobs. The high Unemployment Rate in the nearest neighboring areas of Pamekasan Regency and Sumenep Regency is influenced by the imbalance in the number of labor force and employment (Wibowo in Umam, 2023).

The city of Surabaya is included in the Hot Spots or High-High (HH). This condition shows that the city of Surabaya has a high Unemployment Rate with neighbors who have a high Unemployment Rate as well. The areas included in the hot spots contribute greatly to the positive global autocorrelation value. Although the city of Surabaya and its surroundings is a big city with rapid industrial development, it has not been able to absorb local workers because many of the available job opportunities are occupied by immigrants (Yani in Saputri, 2022). If they do not get special treatment, this condition is feared to cause a larger surge in Unemployment Rate in the coming year. Therefore, Unemployment Rate in the city of Surabaya requires special handling from the authorities.

In general, the results of LISA show that it is closely related to the phenomenon of labor migration. The high number of job opportunities in an area will encourage a person to migrate to that area because of the possibility of getting a job faster (Todaro, 2006). This condition is also supported by the tendency of a migrant to choose the place of migration closest to the place of origin (Ravenstein in Budiono & Wahyudi, 2020). A person's migration behavior is inseparable from the pull and push factors according to the heterogeneity of a region (Everett S. Lee in Pratama, 2012).

3.2 Factors Affecting Unemployment Ratein Every Region in East Java

Based on the analysis on GWR4 software, 2 results were obtained, namely global regression (OLS) and GWR. The residual sum of squares shows that the sum of the squares of the difference between the actual observed value and the value predicted by a global regression model is 87.227. A high *RSS* value of close to 100 shows that the regression model is not good at explaining the variation in the data. While the R square of 0.252 shows that as many as 25.21% of the model is influenced by factors in the model so that the model is said to be bad because it is far from 100%. The results of global regression show that the Economic Growth variable (X_1) does not have a significant influence on Unemployment Rate because the t_{count} (0.205) < t_{table} (1.688). Meanwhile, the District and City Minimum Wage (X1) has a significant influence on Unemployment Rate because the t_{count}(3.160) > t_{table} (1.688).

Meanwhile, in the GWR method, the optimal bandwidth size is obtained of 84,611 with a minimum value of CV kernel of 3,720. This means that there are 65 neighbors (districts and cities) nearby that significantly affect the Unemployment Rate of East Java. The CV value shows that if the distance between cities and districts is more than 3,720, the influence given will be reduced. The iterations carried out until the best model is obtained are carried out up to 13 iterations. The residual sum of squares in GWR shows that the sum of the squares of the difference between the actual observed value and the value predicted by a regression model is 64.350. A high RSS value of close to 100 shows that the regression model is not good at explaining the variation in the data. In this method, an R square of 0.448 shows that as many as 32.84% of the model is influenced by factors in the model so that the model is said to be less good because it is far from 100%.

Table 3. Statistical Results of F_{caunt} Test on Each Research Variable

No	Variabel	Koefisien	Keterangan
1.	Economic Growth (X_1)	2,779	**F_{count}< F_{table} (4,11)** so that economic growth has no effect on Unemployment Rate
2.	Regional Minimum Wages (X_2)	7,834	**F_{count}> F_{table} (4,11)** so that Regional Minimum Wages have an effect on Unemployment Rate

Table 3. shows that the results of the GWR method test are in line with the results of the global regression test which shows that the economic growth variable (X_1) is not significant, while the Regional Minimum Wagesvariable (X_2) is significant for Unemployment Rate in East Java. The results are also supported by the partial t-test value of the economic growth variable (X_1) in the GWR method which ranges from 0.099 to 1.673 which shows a ttable < (1.688). Thus, it can be concluded that the economic growth variable (X_1) has no effect on Unemployment Rate in every district and city in East Java. Meanwhile, the results of the global regression method (OLS) and GWR are compared as follows

Table 4. Comparison of Global Regression (OLS) with GWR

	Global Regression	GWR
R Square (Max)	0,252	0,448
Classic AIC (Min)	147,415	140,378

Table 4 shows that the maximum Rsquare value is found in the GWR model, while the minimum Classic AIC value is also found in the GWR model. This means that the GWR model is better than the Global Regression (OLS) model. On the other hand, F_{caunt} (3.098) < F_{table} (4.11) show that the GWR model is not better or the same as the global regression model so that both can be used. The model formed from the two regression methods is as follows

Table 5. Comparison of the Global Regression Model (OLS) with GWR

Regression Metodh	Model
Regresi Global	$\hat{Y}(long_i, lat_i) = 2{,}957822 + X_{UMK} . 0{,}205206(long_i, lat_i) + e$
GWR	$\hat{Y}(long_i, lat_i) = 5{,}318314 + X_{UMK} . 7{,}834290(long_i, lat_i) + e$

In the global regression model, it means that every change in 1 unit of Regional Minimum Wagesvalue and other variables are considered fixed, it will affect the Unemployment Rate value by 0.205 units. Meanwhile, if all variables are considered constant, a Unemployment Rate value of 2.958 will be obtained. In the GWR model, it means that every change of 1 unit of Regional Minimum Wagesvalue and other variables are considered fixed, it will affect the Unemployment Rate value of 7.834 units. Meanwhile, if all variables are considered constant, a Unemployment Rate value of 5.318 will be obtained. In general, the DIFF of Criterion value in the positive GWR method shows that the variables of Economic Growth and Regional Minimum Wages have spatial variations in each district and city.The variation formed in each parameter of the GWR model indicates that all variables have spatial nonstationarity properties. So the model formed in this study is a mixed GWR with an F_{count} showing that Regional Minimum Wages are significant (> F_{count} 4.11), while the F_{count} of Economic Growth is not significant (> F_{Count} 4.11).

Meanwhile, in the results of local GWR, overall the Economic Growth variable does not have a significant effect on Unemployment Rate, while the Regional Minimum Wagesvariable has a significant influence on Unemployment Rate in every district and city in East Java. Thus, the Unemployment Rate model was obtained in each district and city in East Java as follows

Table 6. Research Summary

Region	UNEMPLOYMENT RATE (%)	∑Neighbor	Ii	LISA	Model	Lokal R^2 (%)
Kab. Mojokerto	7,62	8	-0,397	LL	$\hat{Y}_{Kab.\ Mojokerto} = 3{,}551126 + X_{UMK.} 0{,}763837 + e$	37,21
Kab. Pamekasan	1,40	2	3,641	LH	$\hat{Y}_{Kab.\ Pamekasan} = 1{,}294449 + X_{UMK.} 1{,}881947 + e$	58,12
Kab. Sumenep	1,36	1	4,947	LH	$\hat{Y}_{Kab.\ Sumenep} = -1{,}083211 + X_{UMK.} 2{,}588509 + e$	48,56
Kota Surabaya	4,83	2	2,064	HH	$\hat{Y}_{Kota\ Surabaya} = 3{,}221204 + X_{UMK.} 0{,}975692 + e$	44,10

The results of the study show that economic growth variables do not have a significant effect on Unemployment Rate in every district and city in East Java because economic growth is only taken into account from macroeconomic factors such as inflation, exchange rate, and GDP increase. Meanwhile, real factors in the field such as the development of Micro, Small, and Medium Enterprises (MSMEs) are not paid attention to (Zulfa, 2016). MSMEs are able to contribute greatly to the availability of jobs and economic growth that can

reduce Unemployment Rate in a region (Setiyawati in Zulfa, 2016). In addition, economic growth has no effect on Unemployment Rate can also be caused because economic growth is not followed by an increase in production capacity so that Unemployment Rate can increase along with economic growth (Laksamana, 2016).

If it is connected between the results of LISA and GWR, it is found that the city of Surabaya is in hot spots because of the influence of Regional Minimum Wages. Regional Minimum Wages in Surabaya City in 2022 reached IDR 4,375,479.19 and occupied the highest position in East Java. This condition is in accordance with The General Theory of Employment expressed by Keynes (1936) that wage changes will have a significant impact on consumption because wages contribute a large percentage to national income. Thus, it is assumed that a decrease in wages will reduce consumption and will subsequently decrease the demand for goods and services which causes the demand for labor to decrease. The next reduction in open Unemployment Rate can be done only by reducing the amount of wages (Mankiw in Prawira, 2018). In addition to the influence of economic growth, Unemployment Rate in the city of Surabaya is also influenced by other factors that are not mentioned in this research.

In contrast to the city of Surabaya, Mojokerto Regency is located in cold spots but is also influenced by the MSE variable. This condition occurs because the Mojokerto Regency area is included in the industrial area. Mojokerto Regency has a number of large industries spread across the industrial areas of Ngoro District, Jetis District, Kemlagi, Dawarblandong District, and Mojoanyar District. The development of the industry is influenced by the factor of access to transportation both by land, air, and sea. The number of these industries has a tendency to absorb a larger workforce so that Unemployment Rate in Mojokerto Regency is smaller. In addition, the development of large industries also has an impact on the high number of Regional Minimum Wages. This is shown by the Regional Minimum Wages of Mojokerto Regency in 2022 which reached IDR 4,354,787.17 (CAS, 2023).

On the other hand, Pamekasan Regency and Sumenep Regency are in outliers (LH) but are also influenced by Regional Minimum Wages. This happens because the two regions are included in the 4 districts on Madura Island that are isolated from industrialization because of their areas surrounded by the ocean (Sari & Khoirudin, 2019). This condition results in slow growth and economic development which further has an impact on the low number of Regional Minimum Wages set. The East Java Provincial Parliament (2022), revealed that the wages given to workers in the field are much lower than the established Regional Minimum Wages.

Pamekasan Regency and Sumenep Regency have a lower Unemployment Rate than Bangkalan Regency and Sampang Regency which are unitary of the Madura Island area because the majority of the residents of Pamekasan Regency and Sumenep Regency take advantage of the potential of fisheries and agriculture that do not require special skills so that they are able to absorb more labor (Fajrin & Sudarsono, 2019). Meanwhile, Bangkalan Regency and Sampang Regency have higher Unemployment Rate because there is a gap in labor absorption in urban and rural areas (BPS, 2023). In addition, Bangkalan Regency and Sampang Regency have closer access to the provincial center so that many are used as migration destinations which results in an increase in Unemployment Rate.

Referring to the results of this study, it is hoped that the government can implement appropriate and efficient policies in overcoming Unemployment Rate in each region, especially in matters related to labor. Population migration patterns must also be considered so as not to aggravate Unemployment Rate in the migration destination area. This can be done by equalizing job opportunities in each region by developing every potential that a region has. In addition, migration actors must also be wiser in considering the location of the migration destination so that the benefits obtained do not harm other parties.

IV. CONCLUSION

The results of the study were obtained from the average neighbors in each regency and city in East Java, which is as many as 6 neighbors. Analysis of the global moran index, the value of the moran index is 0.368 which means ≠0 with a curtosis of 2.876 which means that there is a positive spatial autocorrelation with the indication of a clustered pattern. The Moran scatterplot shows that the local statistical values of Unemployment Rate moran in East Java are most widely distributed in quadrants I (High-High) and III (Low-Low).Quadrant I shows areas with high Unemployment Rate surrounded by areas with high Unemployment Rate. Meanwhile, quadrant III shows that areas with low Unemployment Rate are surrounded by areas with low Unemployment Rate. According to LISA's analysis, Mojokerto Regency is included in Cold Spots or Low-Low (LL), which means that the area has a low Unemployment Rate adjacent to an area with low Unemployment Rate. Pamekasan Regency and Sumenep Regency are included in Outliers or Low-High (LH) which means that the area has a low Unemployment Rate adjacent to the area with high Unemployment Rate. Meanwhile, the city of Surabaya is included in Hot Spots or High-High (HH) which means that the area has a high Unemployment Rate adjacent to areas with high Unemployment Rate.

The results of the study using GWR4 software were obtained that the GWR model was not better or the same as the global regression model. The Regional Minimum Wagesvariable has a significant influence, while the economic growth variable does not have a significant influence on Unemployment Rate in each district and city

in East Java. In general, a positive DIFF of Criterion indicates that economic growth variables and Regional Minimum Wages have spatial variations in each district and city.

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