



SPILOVER EDUCATED OF INDONESIAN MIGRANT WORKERS (IMW)

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Caroline¹, Pujiono²

¹Fakultas Ekonomi dan Ilmu Sosial, Universitas Sultan Fatah, Demak, Central Java Province, Indonesia

²BP2MI Semarang City, Central Java Province, Indonesia

✉ caroline@unisfat.ac.id

Abstract

Indonesian Migrant Workers (TKI) or now known as Indonesian Migrant Workers (IMW) contribute to the economic growth of Central Java Province through foreign exchange earnings, and increasing work productivity. The purpose of this study is to analyze the spatial interaction patterns of IMW locally and globally. This research method uses a euclidean distance weight matrix approach to calculate the Local Moran Index and the Global Moran Index. The novelty of this research is to consider Indonesian workers or IMW with higher education. The conclusion of this study is that the results of the Local Moran Index empirical research identify that there are similar or dissimilar patterns of spatial interaction (within in group) in Cilacap Regency, Brebes Regency, Kendal Regency. However, in 2021 Indonesian Migrant Workers (IMW) from Central Java identified a pattern of spatial interaction (within in group), both similar and dissimilar, in the positions of Cilacap Regency and Kendal Regency. Changes in the Local Moran's Index of Indonesian Migrant Workers (IMW) in 2010 and 2021 were allegedly due to the placement of the number of Indonesian Migrant Workers (IMW) to the destination country which was limited in 2021. Initially, Indonesian Migrant Workers (IMW) in 2010 were Indonesian Migrant Workers (IMW) its placements are in 27 countries, decreasing to 17 countries in 2021. The results of empirical research on the negative Global Moran's I coefficient on Indonesian workers (IMW) with higher education from 2010 to 2021 identify that the spatial interaction pattern of Indonesian workers (IMW) with higher education in Central Java Province is divergent or spreads from districts/cities to district/city.

Keywords: Indonesian Manpower; Indonesian Migrant Workers; Economic Growth

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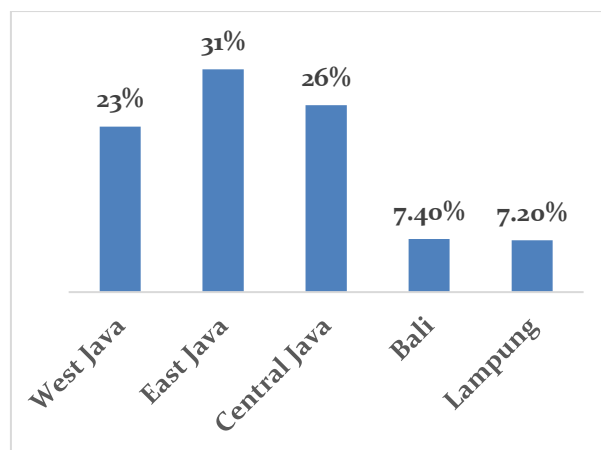
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INTRODUCTION

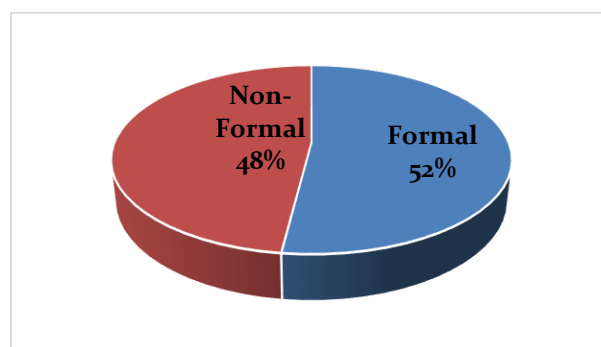
Indonesian Migrant Workers (TKI) or now known as Indonesian Migrant Workers (IMW) contribute to Central Java's economic growth through increasing labor productivity. Indonesian Migrant Workers (IMW) from Central Java not only have low education who go to work abroad, but Indonesian Migrant Workers (IMW) from Central Java with higher education also work abroad. One of the intentions of Indonesian Migrant Workers (IMW) from Central Java to work abroad is to earn a higher income than the income from working in Indonesia. In June 2022 the total number of Indonesian Migrant Workers (IMW) was 62,187 workers mostly from East Java Province, there were 19,370 or 31 percent of the total number of Indonesian Migrant Workers (IMW), followed by Indonesian Migrant Workers (IMW) from Central Java Province with 16,200 workers. or 26 percent of the total number of Indonesian Migrant Workers; There are 14,459 Indonesian Migrant Workers (IMW) from West Java Province or 23 percent of the total number of Indonesian Migrant Workers; There are 4,622 Indonesian Migrant Workers (IMW) from Bali Province or 7.4 percent of the total number of Indonesian Migrant Workers; and Indonesian Migrant Workers (IMW) from Lampung Province have 4,517 workers or 7.2 percent of the total number of Indonesian Migrant Workers.



Source: BP2MI 2022 (processed)

Figure 1 Indonesian Migrant Workers (IMW) by Province of Origin

Figure 2 shows that Indonesian Migrant Workers (IMW) in June 2022 by sector mostly worked in the formal sector, namely 52 percent or 32,104 workers, and the remaining Indonesian Migrant Workers (IMW) in June 2022 worked in the non-formal sector, 48 percent or 30,083 workers.

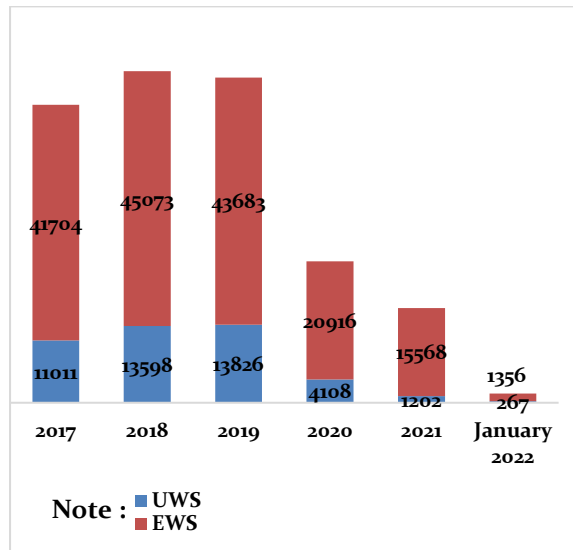


Source: BP2MI 2022 (processed)

Figure 2 Indonesian Migrant Workers by Sector

Figure 3 shows that Indonesian Migrant Workers (IMW) mostly work in the formal sector. Indonesian Migrant Workers (IMW) who work in the formal sector at the most in 2018 there are 45,073 workers, and

Indonesian Migrant Workers (IMW) who work in the formal sector at least in January 2022 there are 1,356 workers. The number of Indonesian Migrant Workers (IMW) in January 2022 who work in the formal sector is thought to be the least because the calculation period is still too premature.



Source: BP2MI 2022 (processed)

Note :

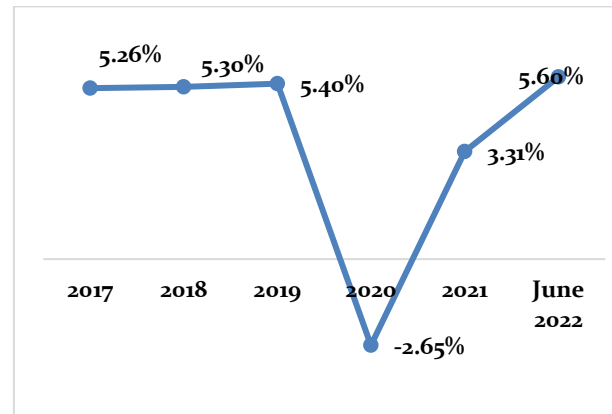
UWS = Uneducated Worker Share

EWS = Educated Worker Share

Figure 3 Indonesian Migrant Workers (IMW) By Education 2017 s.d. January 2022

Figure 4 shows that the economic growth of Central Java Province from 2017 to June 2022 was fluctuating. The economic growth of Central Java Province from 2017 to 2019 continued to increase, namely continuously in 2017 Central Java's economic growth was 5.26 percent, continued in 2018 Central Java's economic growth was 5.3 percent, and continued in 2019 Central Java's economic growth was 5.4 percent. At the beginning of 2019, the economic growth of

Central Java Province was disrupted by the Covid-19 pandemic so that Central Java's economic growth in 2020 decreased by minus 2.65 percent, then Central Java's economic growth in 2021 increased to 3.31 percent, and Central Java's economic growth June 2022 is 5.6 percent.

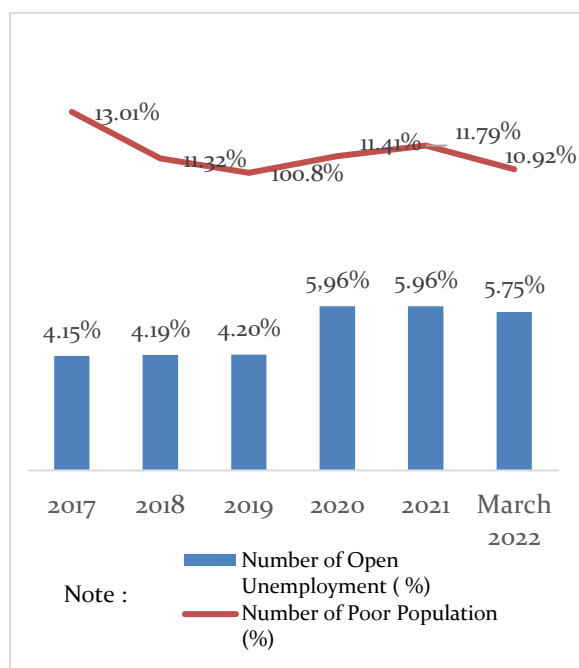


Source: Central Java Macro Indicator 2022 plus formal information, processed (2022)

Figure 4 Economic Growth Central Java (%)

One of the impetuses for Indonesian Migrant Workers (IMW) from Central Java Province to work abroad is the limited number of jobs in Central Java Province which has resulted in a large number of open unemployment in Central Java Province, and an increase in the number of poor people in Central Java Province. Figure 5 shows that the highest population of Central Java Province in 2021 is 11.79 percent of the total population of Central Java Province. The number of open unemployment in 2020 and the number of open unemployment in 2020 is high, namely 5.96 percent of the total workforce of Central Java Province. The economic growth of Central Java Province in 2020 was negative

2.65 percent, which resulted in an increase in the number of unemployed, and an increase in the number of poor people in Central Java Province in 2020. There was an increase in the number of poor people, from 11.41 percent in 2020 to 11.79 percent in 2020. year 2021.



Source: Some Macro Indicators of Central Java August 2022 (processed, 2022)

Figure 5 Total Open Unemployment (%) and Number of Poor Population (%) in 2017 to d. March 2022

This study adopts the Caroline economic growth model (2018) which considers an educated workforce as human capital in the form of workers with a certain level of education. This research is very important to do because no one has done this research. The purpose of this study was to analyze the spatial interaction pattern of Educated Worker Share Indonesian Migrant Workers from Central Java Province.

THEORETICAL BASIS

Several research results on human capital spillover and human capital externalities in relation to economic growth have been studied by several researchers, including Lucas (1988) and Romer (1990) who include human capital in the form of physical capital and uneducated labor in endogenous growth model. Lucas (1988) sparked the idea of the role of human capital externalities where the accumulation of technology in formal education or others will have an impact on productivity levels, personally, colleagues, or others. The Lucas model (1988) shows that human capital has a productivity effect internally, and a productivity effect externally. Thus the increase in human capital in individuals does not only come from their own productivity but is part of the productivity of other workers at a certain skill level.

Lucas's (1988) research is strengthened by the research of Acemoglu and Autor (2011) where human capital is defined as something related to the knowledge or characteristics of workers possessed (either innate or acquired) by workers. Knowledge or worker characteristics contribute to "productivity". This study is in line with the research of Mathur (1999) which sees the impact of externalities from high growth in an area that invests capital in the accumulation of human capital. Thus, a large investment in human capital accumulation will increase economic growth.

Another researcher who analyzed the impact of human capital externalities was Rauch (1991) using cross-sectional data, United States in 1980. The results of his empirical study Rauch (1991) stated that the level of human capital externalities ranged from 3 to 5 percent. This means that a one-year increase in the average length of schooling of workers will increase wages by 3 to 5 percent.

A similar study on human capital externalities has been carried out by Moretti (2004) by building a model that examines the external impact of education on land prices, and wages. Empirical study of Moretti (2004) states that companies located in cities with growth of college graduates will increase productivity faster, compared to similar companies located in cities with slower college graduates. The estimation of the difference in productivity between cities with high human capital and cities with low human capital occurs because of the difference in wages in the two cities. In this case, manufacturing companies will gain more profits if the presence of human capital is closer both geographically and economically.

The novelty of this study is that this study adopts the economic growth model of Mankiw et al., (1992) who developed the economic growth model of Solow (1956). The economic growth model of Mankiw et al., (1992) considers the level of education. In this study, the variables used are Indonesian

Migrant Workers (IMW) with a higher education level as human capital in the economic growth model. The education variable is proxied by the school average. The human capital variable is proxied by the educated worker share of Indonesian Migrant Workers (IMW) from Central Java Province. This study adopted the Local Moran Index and Global Moran Index research methods from Anselin (1995) using the Euclidean Distance spatial weight matrix from Dattaro (2010).

RESEARCH METHODS

This type of research is quantitative research using the Explanatory Spatial Data Analysis (ESDA) method with the Spatial Autocorrelation method (Global Moran's I and Local Moran's I). This study uses a spatial autocorrelation approach locally and global spatial autocorrelation to answer research questions on the analysis of the spatial interaction pattern of Human Capital in 29 Regencies and 6 Cities in Central Java Province through the Global Moran's Index and Local Moran's Index.

This research was conducted with a time span of 2010 to 2021 or 11 years. The sample of this study includes 29 districts (Cilacap Regency, Banyumas Regency, Purbalingga Regency, Banjarnegara Regency, Kebumen Regency, Purworejo Regency, Wonosobo Regency, Magelang Regency, Boyolali Regency, Klaten Regency, Sukoharjo Regency, Wonogiri Regency, Karanganyar Regency, Sragen Regency, Grobogan Regency,

Bloro Regency, Rembang Regency, Pati Regency, Kudus Regency, Jepara Regency, Demak Regency, Semarang Regency, Temanggung Regency, Kendal Regency, Batang Regency, Pekalongan Regency, Pemalang Regency, Tegal Regency, Brebes Regency), and 6 cities (Magelang City, Surakarta City, Salatiga City, Semarang City, Pekalongan City, and Tegal City) in Central Java Province.

Data, Instruments and Data Collection Techniques

The variables used in this study are: GDP, Capital Stock, Average length of school (ALS), Educated Worker Share (EWS), Indonesian Migrant Workers (IMW).

Table 1. Variable Description

No	Variable	Indicators	Item	sources
1.	Regency/City Economic Growth	GDP	Millions of rupiah	Central Java BPS
2.	Capital stock	Domestic Fixed Capital Formation	Millions of rupiah	Central Java BPS
3.	<i>Human capital</i>			Central Java BPS
	a. <i>Average length of school (ALS)</i>	Average length of school	years	Central Java BPS
	b. <i>Educated Worker Share (EWS)</i>	Population aged 15 years and over who worked during the past week according to the highest education completed (college/university) in Central Java Province	person	Central Java BPS
4.	Indonesian Migrant Workers (IMW)	Population aged 15 years and over who worked during the past week according to the highest education completed in Central Java Province	person	Central Java BPS

Data analysis technique

taken for the spatial autocorrelation method (Global Moran's I and Local Moran's I):

Stages of Research Analysis

The analysis steps to answer the spatial interaction pattern of human capital in 29 regencies and 6 cities in Central Java Province used the Global Moran's Index and the Local Moran's Index. Several steps must be

1. Determine the data to be used in the research;
2. Input the time period (T) that is T = 12, and the number of countries n = 10 GeoDa

- subversion 1.20.0.20 release July 8, 2022 via map files (map_Jawa_Tengah.shp) ;
3. Calculating the spatial weight matrix with the Euclidean Distance approach using GeoDa version 1.8.16.4;
 4. Input data into Stata 17
 5. Calculating the Local Moran's Index and Global Moran's I with Stata 17;

Locally of Spatial Autocorrelation Model

This study uses a statistical measure of Moran's Index to detect spatial autocorrelation in the data. Moran's Index statistic is the most widely used measure to detect and explain spatial groupings not only because of its interpretative simplicity, but also because it can be decomposed into local statistical forms by providing graphic evidence of the existence of spatial groupings. Positive/negative spatial autocorrelation occurs when geography tends to be surrounded by neighbors with the same or different values of the variables studied. Local spatial autocorrelation is the value observed that i is positive (has similarity) or negative (different) with neighboring observations, j . Moran index value is between $-1 \leq |I| \leq 1$. This study adopted the Local Moran Index statistic from Anselin (1995). The Moran's-Index - statistical model of spatial autocorrelation is locally written,

$$I_i = \frac{x_i - \bar{X}}{S_i^2} \sum_{j=1, j \neq i}^n w_{ij} (x_j - \bar{X}) \quad (1.)$$

where:

$$S_i^2 = \frac{\sum_{j=1, j \neq i}^n w_{ij} (x_j - \bar{x})^2}{n - 1}$$

$$Z_{I_i} = \frac{I_i - E[I_i]}{\sqrt{V[I_i]}}$$

$$E[I_i] = - \frac{\sum_{j=1, j \neq i}^n w_{ij}}{n - 1}$$

$$E[I^2] = A - B$$

$$A = \frac{n - b_{2i} \sum_{j=1, j \neq i}^n w_{i,j}^2}{n - 1} b_{2i}$$

$$B = \frac{(b_{2i} - n) \sum_{k=1, k \neq i}^n \sum_{h=1, h \neq i}^n w_{i,k} w_{i,h}}{(n-1)(n-1)}$$

$$b_{2i} = \frac{\sum_{i=1, i \neq j}^n (x_i - \bar{X})^4}{(\sum_{i=1, i \neq j}^n (x_i - \bar{X})^2)^2}$$

$$V_{I_i} = E[I_i^2 - E[I_i]^2]$$

note :

I_i is Local Moran's- Index -statistic ;

N = 29 districts (Cilacap Regency, Banyumas Regency, Purbalingga Regency, Banjarnegara Regency, Kebumen Regency, Purworejo Regency, Wonosobo Regency, Magelang Regency, Boyolali Regency, Klaten Regency, Sukoharjo Regency, Wonogiri Regency, Karanganyar Regency, Sragen Regency, Grobogan Regency, Blora Regency, Rembang Regency, Pati Regency, Kudus Regency, Jepara Regency, Demak Regency, Semarang Regency, Temanggung Regency, Kendal Regency, Batang Regency, Pekalongan Regency, Pemalang Regency, Tegal Regency, Brebes Regency), and 6 cities (Magelang City, Surakarta City, Salatiga City, Semarang City, Pekalongan City, and Tegal City) in Central Java Province;

\bar{x} is the average value of x ; x is the observed variable;

w_{ij} is an element of the spatial weight matrix that connects the observations of district/city i (observed districts/cities) with neighboring districts/cities, j by using an inclusive distance approach based on the x -coordinate point and the y -coordinate point of a district/city.

Globally of Spatial Autocorrelation Model

Spatial autocorrelation occurs when the spatial distribution of the studied variables shows a systematic pattern (Cliff and Ord, 1981). Positive/negative spatial autocorrelation occurs when geography tends to be surrounded by neighbors with the same or different values of the variables studied. In this study, Moran's I statistic was used to detect spatial autocorrelation in the data. Moran's I statistic is the most widely used measure to detect and explain spatial groupings not only because of its interpretive simplicity, but also because it can be decomposed into local statistical forms by providing graphic evidence of the existence of spatial groupings. Globally spatial autocorrelation is also used to measure covariance or correlation between the neighbors of the observed variables so that information will be obtained about the similarity of observations and similarities between locations (Griffith and Chun, 2014). This study adopted the Global Moran I statistics from Dube and Legros (2014), Anselin (1995).

The Global Moran's Index equation is written:

$$I = \frac{N}{S_0} \frac{\sum_{i=1}^N w(i,j)(x_i - \bar{x})(x_j - \bar{x})}{\sum_{i=1}^N (x_i - \bar{x})^2} \quad (2.)$$

Note :

N is amount of time observed (11 years)

S_0 = data standardization

x = observed variable

i = observed variable

j = neighboring area

\bar{x} = average from x_i

$$\bar{x} = \sum_{i=1}^N \frac{x_i}{N}$$

$$S_0 = \sum_{i=1}^N \sum_{j=1}^N w(i,j)$$

$w(i,j)$ = spatial weight connectivity i and j

$w(i,j)$ = nilai matriks $N \times N$

$w(i,j) = A/d(i,j)^m$ where $d(i,j)$ is distance from point i to point j ; m adalah 2 (the x -coordinate and the y -coordinate point); A adalah 1.

Expected Value (I) = $-1/(N - 1)$

A positive Global Moran's Index value indicates that the observed area has similarities with its neighboring regions, whereas a negative Global Moran's Index value indicates that the observed area has nothing in common with its neighboring regions. Moran index value is between $-1 \leq |I| \leq 1$. Significant decision making if H_0 is rejected, it means that there is an autocorrelation between 29 regencies and 6 cities in Central Java Province.

RESEARCH RESULTS AND DISCUSSION

This study uses the Euclidean Distance spatial weight matrix. With the aim of simplifying the calculation of the weight matrix. The Euclidean Distance value is obtained from the Central Java Province MAP which has been processed through GeoDa, then from the Central Java Province MAP, the x coordinates and y coordinates will be obtained. Euclidean Distance unit in mills. One Euclidean Distance = 15.91 km. The

calculation of the spatial weight matrix using the Euclidean Distance approach uses the help of GeoDa subversion version 1.20.0.20 which is released on July 8, 2022. Table 2 identifies the x-coordinates and y-coordinates of 29 districts, and 6 cities in Central Java Province. Rembang Regency has a coordinate of x 111.46 and a coordinate of y -6.77. Cilacap Regency has a coordinate of x 108.88 and a coordinate of y : -7.48. The use of x-coordinate points and y-coordinate points in the Euclidean Distance weight matrix is to solve problems related to commuting distance, travel time, labor mobility, information mobility, and technology mobility.

Table 2. Spatial Weight Matrix with Euclidean Distance Approach

No	Region	Coordinate point x	Coordinate point y
1.	Cilacap Regency	108,88	-7,48
2.	Demak Regency	110,63	-6,91
3.	Grobogan Regency	110,92	-7,11
4.	Banjarnegara Regency	109,65	-7,35
5.	Banyumas Regency	109,17	-7,45
6.	Batang Regency	109,86	-7,02
	Blora Regency	111,38	-7,02
8.	Boyolali Regency	110,65	-7,07
9.	Brebes Regency	108,92	-7,41
10.	Magelang City	110,22	-7,06
11.	Jepara Regency	110,76	-7,47
12.	Karanganyar Regency	111,01	-6,55
13.	Kebumen Regency	109,61	-7,61
14.	Kendal Regency	110,15	-7,65
15.	Klaten Regency	110,62	-7,03
16.	Magelang Regency	110,24	-7,68
17.	Pati Regency	111,04	-7,50
18.	Salatiga City	110,49	-6,74
19.	Pekalongan City	109,67	-7,33

No	Region	Coordinate point x	Coordinate point y
20.	Semarang City	110,38	-6,89
21.	Surakarta City	110,82	-7,02
22.	Tegal City	109,11	-7,55
23.	Kudus Regency	110,86	-6,86
24.	Pekalongan Regency	109,62	-7,05
25.	Pemalang Regency	109,39	-7,03
26.	Tegal Regency	109,15	-7,02
27.	Temanggung Regency	110,13	-7,25
28.	Wonogiri Regency	110,99	-7,91
29.	Wonosobo Regency	109,90	-7,41
30.	Purbalingga Regency	109,40	-7,32
31.	Purworejo Regency	109,96	-7,70
32.	Rembang Regency	111,46	-6,77
33.	Semarang Regency	110,47	-7,27
34.	Sragen Regency	110,97	-7,38
35.	Sukoharjo Regency	110,83	-7,68

Local Moran's Index is to prove that there is or not a spatial autocorrelation in the overall data. Local Moran's I is used to identify the existence of spatial interactions for the observed partial entities. The range of values for the global Moran index with a standardized spatial weight matrix is $-1 \leq I \leq 1$. The value of $-1 \leq I \leq 0$ indicates a negative spatial autocorrelation, while $0 \leq I \leq 1$ indicates a positive spatial autocorrelation. A global Moran index of zero indicates not clustering.

Table 3. Feature Patterns Formed from Local Moran's Index

Global/Local Moran's Index	Note
$I > 0$	The spatial interaction pattern is clustered because there are many similarities between 29 districts and 6 cities in Central Java Province

$I < 0$	Random spatial interaction patterns because there are no obscure feature patterns
$I = 0$	The spatial interaction pattern spreads because high feature values and low feature values spread in the data set
I positif	Clustered or convergent spatial interaction patterns
I negatif	The spatial interaction pattern is spreading or divergent

Source: several articles, and literature (Caroline, 2019)

The form of spatial autocorrelation using the Local Moran's Index method is only read by the sign of the positive coefficient value or the sign of the negative coefficient value. A positive coefficient sign value implies that there are similar values that are clustered (spatial clustering of similar values), while a negative coefficient value indicates a checkerboard pattern of values. The value of the Local Moran's Index is significant depending on the distribution of the statistical test. There are 2 approaches to determine the observation test scores from the global Moran's Index, namely the random permutation test approach and the distribution approach from the Local Moran's Index. A Local Moran's Index coefficient value that is more than expected from $-1/(n-1)$ indicates a positive spatial autocorrelation, and a Local Moran's Index coefficient value that is less than expected indicates a negative spatial autocorrelation (Fischer and Wang, 2011; Bailey and Gatrell, 1995). The approach to the distribution of the observed area x_i assumes that the observed data values are normal (Fortin and Dale, 2009, Bailey and

Gatrell, 1995). This study identifies Local Moran's I by reading the positive or negative "sign" of the Local Moran's Index through the distribution approach of the Local Moran's Index.

Table 4 identifies the interaction pattern of economic growth in 2010 from 29 districts (Cilacap Regency, Banyumas Regency, Purbalingga Regency, Banjarnegara Regency, Kebumen Regency, Purworejo Regency, Wonosobo Regency, Magelang Regency, Boyolali Regency, Klaten Regency, Sukoharjo Regency, Wonogiri Regency, Karanganyar Regency, Sragen Regency, Grobogan Regency, Blora Regency, Rembang Regency, Pati Regency, Kudus Regency, Jepara Regency, Demak Regency, Semarang Regency, Temanggung Regency, Kendal Regency, Batang Regency, Pekalongan Regency, Pemalang Regency, Tegal Regency, Brebes Regency), and 6 cities (Magelang City, Surakarta City, Salatiga City, Semarang City, Pekalongan City, and Tegal City) in Central Java Province that spread or diverge. The spatial interaction pattern of economic growth in 2010 was random from 29 regencies and 6 cities because there were no unclear feature patterns. Table 4 identifies the spatial interaction pattern of capital in 2010 from 29 districts and 6 cities (Magelang City, Surakarta City, Salatiga City, Semarang City, Pekalongan City, and Tegal City) in Central Java Province that are spread or divergent. The spatial interaction pattern of capital in 2010 was

randomly assigned from 29 regencies and 6 cities because there were no unclear feature patterns. The significant Local Moran's Index value =5% economic and capital growth in 2010 identified a pattern of spatial interaction (within in group) both similar and dissimilar to the position in Semarang City.

Table 4 identifies that the 2010 average length of schooling (ALS) interaction pattern from 29 districts and 6 cities is spread or divergent. Spatial interaction pattern

Average length of schooling (ALS) in 2010 was randomly assigned from 29 districts and 6 cities because there was no unclear feature pattern. The Local Moran's Index value is significant =5% The average length of schooling (ALS) in 2010 identified a pattern of spatial interaction (within in group) both similar and dissimilar in positions in Magelang City, Salatiga City, Semarang City, Kota Surakarta, and the City of Tegal.

Table 4. Local Moran's Index 2010

Region	GDP	Cap	ALS	IMW	EWS
Cilacap Regency	-0,000	-0,000	-0,019	-0,479 ^{*)}	-0,693 ^{*)}
Demak Regency	-0,001	-0,001	-0,001	-0,001	-0,003
Grobogan Regency	-0,001	-0,001	-0,018	-0,003	-0,001
Banjarnegara Regency	-0,001	-0,001	-0,033	-0,002	-0,007
Banyumas Regency	-0,001	-0,001	-0,004	-0,026	-0,014
Batang Regency	-0,001	-0,001	-0,028	-0,000	-0,007
Blora Regency	-0,002	-0,002	-0,023	-0,014	-0,016
Boyolali Regency	-0,000	-0,001	-0,001	-0,011	-0,003
Brebes Regency	-0,000	-0,001	-0,068	-0,0142 ^{*)}	-0,133
Magelang City	-0,000	-0,002	-0,0133 ^{*)}	-0,019	-0,011
Jepara Regency	-0,000	-0,001	-0,001	-0,004	-0,011
Karanganyar Regency	-0,001	-0,001	-0,005	-0,004	-0,000
Kebumen Regency	-0,001	-0,001	-0,005	-0,000	-0,003
Kendal Regency	-0,001	-0,001	-0,007	-0,149 ^{*)}	-0,014
Klaten Regency	-0,001	-0,001	-0,011	-0,004	-0,003
Magelang Regency	-0,001	-0,001	-0,001	-0,002	-0,003
Pati Regency	-0,001	-0,001	-0,007	-0,016	-0,000
Salatiga City	-0,000	-0,000	-0,037 ^{*)}	-0,015	-0,007
Pekalongan City	-0,002	-0,002	-0,026	-0,018	-0,011
Semarang City	-0,994 ^{*)}	-0,994 ^{*)}	-0,150 ^{*)}	-0,017	-0,004
Surakarta City	-0,001	-0,001	-0,165 ^{*)}	-0,008	-0,000

Region	GDP	Cap	ALS	IMW	EWS
Tegal City	-0,002	-0,002	-0,009 ^{*)}	-0,008	-0,016
Kudus Regency	-0,002	-0,009	-0,010	-0,009	-0,011
Pekalongan Regency	-0,002	-0,002	-0,047	-0,006	-0,009
Pemalang Regency	-0,000	-0,002	-0,085	-0,008	-0,012
Tegal Regency	-0,001	-0,001	-0,009	-0,008	-0,004
Temanggung Regency	-0,001	-0,001	-0,013	-0,008	-0,004
Wonogiri Regency	-0,001	-0,001	-0,010	-0,015	-0,011
Wonosobo Regency	-0,002	-0,002	-0,001	-0,000	-0,011
Purbalingga Regency	-0,001	-0,001	-0,013	-0,012	-0,004
Purworejo Regency	-0,001	-0,001	-0,000	-0,005	-0,011
Rembang Regency	-0,002	-0,002	-0,011	-0,015	-0,011
Semarang Regency	-0,001	-0,001	-0,000	-0,000	-0,003
Sragen Regency	-0,001	-0,001	-0,003	-0,000	-0,001
Sukoharjo Regency	-0,001	-0,001	-0,004	-0,008	-0,001

Source: Central Java data in Figures 2011 to 2022 (processed, 2022)

Information:

- a) This study uses a level of confidence with a significance level of =5%, *)
- b) The Local Moran's Index value is significant to identify the spatial interaction pattern (within in group) both similar and dissimilar;
- c) Pattern + indicates a convergence or cluster, Pattern - indicates a distribution or divergence;
- d) The value of the Global Moran's Index was not significant, indicating the absence of similar or dissimilar patterns of spatial interaction (within in group); (b), (c), and (d) adopt Anselin (1995)

Table 4 identifies that the interaction patterns of Indonesian Migrant Workers (IMW) from Central Java in 2010 were spread or divergent. The spatial interaction pattern of

Indonesian Migrant Workers (IMW) from Central Java in 2010 was randomly assigned from 29 districts and 6 cities because there were no unclear feature patterns. The significant Local Moran's Index value =5% Indonesian Migrant Workers (IMW) from Central Java in 2010 identified a pattern of spatial interaction (within in group) both similar and dissimilar in positions in Cilacap Regency and Kendal Regency.

Table 4 identifies that the interaction patterns of Indonesian Migrant Workers (IMW) from Central Java in 2010 with higher education levels (educated worker share "EWS) are spread or divergent. The spatial interaction pattern of Indonesian Migrant

Workers (IMW) from Central Java in 2010 with a higher education level (educated worker share "EWS) was randomly assigned from 29 regencies and 6 cities in 2010 because there were no unclear feature patterns. The significant Local Moran's Index value =5%

Indonesian Migrant Workers (IMW) from Central Java in 2010 with a higher education level (educated worker share "EWS) identified a pattern of spatial interaction (within in group) both similar and dissimilar in positions in Cilacap Regency, and Kendal Regency.

Table 5. Local Moran's Index 2021

Region	GDP	Capital	ALS	IMW	EWS
Cilacap Regency	-0,180 [*])	-0,009	-0,010	-0,392 [*])	-0,345 [*])
Demak Regency	-0,004	-0,009	-0,000	-0,000	-0,000
Grobogan Regency	-0,003	-0,009	-0,009	-0,010	-0,011
Banjarnegara Regency	-0,007	-0,009	-0,031	-0,000	-0,000
Banyumas Regency	-0,007	-0,009	-0,002	-0,005	-0,001
Batang Regency	-0,007	-0,009	-0,024	-0,001	-0,002
Blora Regency	-0,005	-0,009	-0,029	-0,009	-0,008
Boyolali Regency	-0,001	-0,009	-0,000	-0,007	-0,007
Brebes Regency	-0,001	-0,009	-0,069	-0,032	-0,011
Magelang City	-0,021	-0,009	-0,000	-0,011	-0,010
Jepara Regency	-0,002	-0,009	-0,000	-0,006	-0,005
Karanganyar Regency	-0,000	-0,009	-0,001	-0,004	-0,003
Kebumen Regency	-0,000	-0,009	-0,007	-0,000	-0,495
Kendal Regency	-0,000	-0,009	-0,005	-0,410 [*])	-0,005 [*])
Klaten Regency	-0,001	-0,009	-0,006	-0,005	-0,003
Magelang Regency	-0,001	-0,009	-0,160	-0,004	-0,003
Pati Regency	-0,000	-0,009	-0,004	-0,008	-0,009
Salatiga City	-0,015	-0,009	-0,121	-0,010	-0,010
Pekalongan City	-0,019	-0,009	-0,035	-0,011	-0,010
Semarang City	-0,603 [*])	-0,009	-0,146 [*])	-0,009	-0,010
Surakarta City	-0,013	-0,009	-0,187 [*])	-0,011	-0,009
Tegal City	-0,013	-0,009	-0,016	-0,004	-0,005
Kudus Regency	-0,075	-0,009	-0,011	-0,013	-0,003
Pekalongan Regency	-0,012	-0,009	-0,027	-0,014	-0,007
Pemalang Regency	-0,009	-0,009	-0,033	-0,015	-0,012
Tegal Regency	-0,000	-0,009	-0,021	-0,004	-0,006
Temanggung Regency	-0,008	-0,009	-0,006	-0,004	-0,005
Wonogiri Regency	-0,002	-0,009	-0,027	-0,008	-0,003

Region	GDP	Capital	ALS	IMW	EWS
Wonosobo Regency	-0,009	-0,009	-0,028	-0,009	-0,007
Purbalingga Regency	-0,005	-0,009	-0,007	-0,003	-0,012
Purworejo Regency	-0,010	-0,009	-0,002	-0,010	-0,006
Rembang Regency	-0,009	-0,009	-0,006	-0,003	-0,009
Semarang Regency	-0,003	-0,009	-0,000	-0,000	-0,001
Sragen Regency	-0,000	-0,009	-0,006	-0,001	-0,000
Sukoharjo Regency	-0,000	-0,009	-0,020	-0,008	-0,007

Source: Central Java data in Figures 2011 to 2022 (processed, 2022)

Table 5 identifies that the interaction pattern of economic growth in 2021 from 29 districts and 6 cities in Central Java Province is spread or divergent. The spatial interaction pattern of economic growth in 2021 is random from 29 districts and 6 cities because there are no unclear feature patterns. Table 4 identifies that the spatial interaction pattern of capital in 2021 from 29 districts and 6 cities in Central Java Province is spread or divergent. The spatial interaction pattern of capital in 2021 is random from 29 districts and 6 cities because there are no unclear feature patterns. The significant Local Moran's Index value =5% economic growth in 2021 identifies a pattern of spatial interaction (within in group) both similar and dissimilar to the position in Cilacap Regency

Table 5 identifies that the interaction pattern of the 2021 average length of schooling (ALS) from 29 districts and 6 cities is spread or divergent. Spatial interaction pattern Average length of schooling (ALS) in 2021 randomly

from 29 districts and 6 cities because there are no unclear feature patterns. The Local Moran's Index value is significant =5% The average length of schooling (ALS) in 2021 identifies a pattern of spatial interaction (within in group) both similar and dissimilar in positions in Magelang City, Salatiga City, Semarang City, Kota Surakarta, and the City of Tegal.

Table 5 identifies that the interaction patterns of Indonesian Migrant Workers (IMW) from Central Java in 2021 are spreading or divergent. The pattern of spatial interaction of Indonesian Migrant Workers (IMW) from Central Java randomly in 2021 from 29 districts and 6 cities because there are no unclear feature patterns. The significant Local Moran's Index value =5% Indonesian Migrant Workers (IMW) from Central Java in 2021 identified a pattern of spatial interaction (within in group) both similar and dissimilar in positions in Cilacap Regency and Kendal Regency.

Table 5 identifies that the interaction pattern of Indonesian Migrant Workers

(IMW) from Central Java in 2010 with a higher education level (educated worker share "EWS) is spread or divergent. The pattern of spatial interaction of Indonesian Migrant Workers (IMW) from Central Java with a higher education level (educated worker share "EWS) randomly from 29 districts and 6 cities in 2010 because there is no unclear feature pattern. Significant Local Moran's Index value =5% Indonesian Migrant Workers (IMW) from Central Java in 2010 with a higher education level (educated worker share "EWS) identified a pattern of spatial interaction (within in group) both similar and dissimilar in positions in Cilacap Regency, and Kendal Regency.

Table 6. Local Moran's Index Economic Growth Capital, ALS, IMW, EWS Year 2010 and Year 2021

Variable	2010	2021
GDP	Semarang City	Cilacap Regency; Semarang City
Capital	Semarang City	-
ALS	Magelang City; Salatiga City; Semarang City; Surakarta City; Tegal City; Cilacap Regency; Brebes Regency; Kendal Reegency	Semarang City; Surakarta City
IMW		Cilacap Regency; Kendal Regency
EWS	Cilacap regency	Cilacap regency, Kendal regency

Source: processed data (2022)

Table 6 first identifies the 2010 Local Moran's Index of economic growth in Semarang City, then in 2021 the Local Moran's Index of economic growth in Cilacap Regency and Semarang City. Table 6 identifies the

Local Moran's Index of economic growth which was originally only Semarang City in 2010 allegedly due to the existence of Semarang City's economic growth of 5.69% with the potential sector or leading sector being the Construction sector with Location Quotiens (LQ) = 2.68; Corporate Services sector Location Quotiens (LQ) = 1.83; Real Estate sector Company Location Quotiens (LQ) = 1.74; Financial Services and Insurance sector with Location Quotiens (LQ) = 1.61; Water Supply, Waste Management, Waste and Recycling sector with Location Quotiens (LQ) = 1.41; Information and Communication sector with Location Quotiens (LQ) = 2.43; Electricity and Gas Procurement sector with Location Quotiens (LQ) = 1.17; Government Administration, Defense and Mandatory Social Security Sector with Location Quotiens (LQ) = 1.17; Transportation and Warehousing Sector with Location Quotiens (LQ) = 1.13; Wholesale and Retail Trade Sector; Car and Motorcycle Repair with Location Quotiens (LQ) = 1.1; Accommodation and Food and Drink Provision Sector with Location Quotiens (LQ) = 1.01.

Another assumption that the identification of the Local Moran's Index of Semarang City's economic growth in 2010 is that there are sectors that are included in the advanced and fast-growing sector, only the Information and Communications Sector. Semarang City in 2010 was included in the classification of developed but relatively

depressed sectors, namely the Procurement, Electricity and Gas Sector, Water Supply Sector, Waste Management, Waste and Recycling; Construction Sector, Wholesale and Retail Trade Sector; Car and Motorcycle Repair; Transportation and Warehousing Sector, Accommodation and Food and Drink Provision Sector; Financial Services and Insurance Sector; Real Estate Sector; Corporate Services Sector, Government Administration Sector, Defense and Mandatory Social Security.

The Local Moran's Index of economic growth in 2021 is Cilacap Regency and Semarang City, allegedly because there are several sectors that support the economic growth of Cilacap Regency and Semarang City in 2021, namely the Manufacturing Industry sector, Construction sector, Wholesale and Retail Trade sector; Car and Motorcycle Repair, Information and Communication sector and Accommodation and Food and Drink Provision sector.

Table 7 identifies the Local Moran's Index of economic growth in the city of Semarang in 2021 allegedly supported by the Manufacturing sector, which is 28.65%; the construction sector there are 27, 65%; Wholesale and Retail Trade sector; the car and motorcycle repair sector is 13.46%, the information and communication sector is 9.27%; the sector of providing accommodation and food and drink is 2.77%. Table 7 identifies the Local Moran's Index of

economic growth in 2021 in Cilacap Regency allegedly supported by the Manufacturing sector, which is 58.35%; the construction sector is 7.04%; Wholesale and Retail Trade sector; the Car and Motorcycle Repair sector is 6.84%, the Information and Communication sector is 6.84%; the sector for the provision of accommodation and food and drink is 2.43%.

Table 7. Sector Contribution to Economic Growth Semarang City and Cilacap City in 2021 (Percentage)

Sector	Semarang City	Cilacap Regency
Processing industry;	28,65%	58,35%
Construction;	27,65%	7,04%
Big Trade and Retail;	13,46%	6,84%
Car Repair and Motorcycle		
Information and communication	9,27%	2,43%
Provision of	2,77%	1,31%
Accommodation and Eating and drinking		

Source: processed data (2022)

Table 8 first identifies the 2010 Local Moran's Index of Indonesian Migrant Workers (IMW) from Cilacap Regency, Brebes Regency, Kendal Regency, then in 2021 the Local Moran's Index Index of Indonesian Migrant Workers (IMW) from Cilacap Regency, Kendal Regency which dominates Indonesian workers who working abroad. Table 6 identifies the Local Moran's Index of initial economic growth of Indonesian Migrant Workers (IMW) from Cilacap Regency, Brebes Regency, Kendal Regency in 2010 allegedly because of the number of Indonesian workers who went abroad

dominated from Cilacap Regency, Brebes Regency, Kendal Regency.

Table 8 identifies initially in 2010 the Local Moran's Index of Indonesian Migrant Workers (IMW) from Cilacap Regency, Brebes Regency, Kendal Regency, then in 2021 the Local Moran's Index Index of Indonesian Migrant Workers (IMW) from Cilacap Regency, Kendal Regency which dominates Indonesian workers who working abroad. Table 8 identifies the Local Moran's Index of initial economic growth of Indonesian Migrant Workers (IMW) from Cilacap Regency, Brebes Regency, Kendal Regency in 2010 allegedly because of the number of Indonesian workers who went abroad dominated from Cilacap Regency, Brebes Regency, Kendal Regency.

Table 8. Local Moran's Index of Indonesian Migrant Workers (IMW) 2010 and 2021

Regency	2010	Regency	2021
Cilacap	7981	Cilacap	3433
Kendal	6593	Kendal	3501
Brebes	3369	-	-

Source: processed data (2022)

Table 9 identifies that identifying changes in the Local Moran's Index of Indonesian Migrant Workers (IMW) in 2010 and 2021, allegedly due to the placement of the number of Indonesian Migrant Workers (IMW) to a limited number of destination countries in 2021. Initially, Indonesian Migrant Workers (IMW) in 2010 Indonesian Migrant Workers (IMW) have placements in 27 countries, decreasing to 17 countries in 2021.

Table 9. Placement of Indonesian Migrant Workers (IMW) Year 2010 and Year 2021

No	Country of destination	2010	Country of destination	2021
1	Saudi Arabia	276633	Hong kong	31.942
2	Malaysia	123886	Taiwan	27.004
3	Taiwan	59335	Saudi Arabia	19.138
4	Singapore	33077	Singapura	13350
5	United Emirate Arab (Uea)	40391	Poland	8.320
6	Hong Kong	32.417	Italy	5180
7	Kuwait	23.041	Kuwait	1251
8	Qatar	1001	Turkey	540
9	Yordania	10932	Romania	425
10	Oman	97	United Arab Emirat	344
11	Brunai Darussalam	4.785	Jordan	55
12	South Korea	2	Hungary	40
13	United States of America	47	Malaysia	35
14	Bahrain	3	Qatar	31

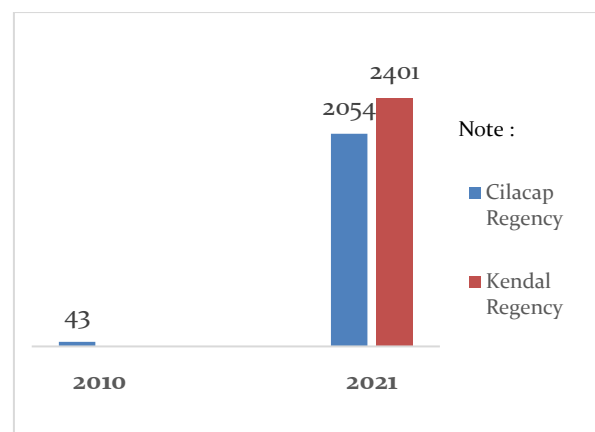
15	Syria	1155	Papua New Guinea	26
16	Jepang	362	Brunai Darussalam	20
17	Aljazair	453		
18	Macao	674		
19	Thailand	9		
20	New Zealand	269		
21	Maldives	20		
22	Nigeria	81		
23	India	2		
24	Libya	35		
25	Mesir	2		
26	Yaman	30		
27	etc	99		
Total		608838		107701

Source: BP2MI 2022, processed

The Ministry of Manpower (Kemenaker) in 2021 issued the placement of certain destination countries for Indonesian migrant workers (IMW) during the adaptation period to new habits through Kepdirjen Number 3/100/PK.02.02/I/2021 which has set only 17 destination countries for IMW placement and sectors. and the placement scheme. Not only that, the Ministry of Manpower also issued a Circular Letter of the Minister of Manpower Number M/1/PK.02.03/I/2021 concerning the Process of Placement of Indonesian Migrant Workers to Japan and Taiwan dated January 7, 2021. The Director General of Binapenta and PKK of the Ministry of Manpower Suhartono said, regarding the process of placing IMW to Japan and Taiwan are temporarily closed.

Figure 6 illustrates that initially in 2010 the Local Moran's Index of Indonesian Migrant Workers (IMW) with a higher education level (EWS) in 2010 came from Cilacap Regency, then in 2021 Local Moran's

Index Index of Indonesian Migrant Workers (IMW) from Cilacap Regency, Kendal Regency which dominates Indonesian workers who work abroad. In 2010 there were 43 Indonesian Migrant Workers (IMW) from Cilacap Regency, an increase in 2021, Cilacap Regency had 2,054 workers, and Kendal Regency had 2,041 workers.



Source: BP2MI 2022, processed

Figure 6 Indonesian Migrant Workers (IMW) with Higher Education 2010 and 2021

The form of spatial autocorrelation using the Global Moran's Index method is only read by the sign of the positive coefficient value or the sign of the negative coefficient

value. A positive coefficient sign value implies that there are similar values that are clustered (spatial clustering of similar values), while a negative coefficient value indicates a checkerboard pattern of values. The global value of the Moran's Index is significant depending on the distribution of the statistical test. There are two approaches to find out the observation test scores from the global Moran's Index, namely the random permutation test approach and the distribution approach from the global Moran's I. The global Moran's Index coefficient value is more than expected from $-1/(n-1)$ is an indication of a positive spatial autocorrelation, and a global coefficient value of Moran's Index that is less than expected indicates a negative spatial autocorrelation (Fischer and Wang, 2011; Bailey and Gatrell, 1995). The approach to the distribution of the observed area x_{ij} assumes that the observed data values are normal (Fortin and Dale, 2009, Bailey and Gatrell, 1995). This study identifies the global Moran index by reading the positive or negative "sign" of Global Moran's I through the distribution approach of the global Moran's Index.

Table 10. identifies that the results of empirical research on the negative Global Moran's Index coefficient value on educated Indonesian Migrant Workers (IMW) in 2021. This identifies that the spatial interaction pattern of educated workers (Educated Worker Share) globally in 2021 is divergent or

spread, and workers Indonesian Migrants (IMW) who were educated in 2021 with a significant Global Moran's Index value identified a pattern of spatial interaction (within in group) both similar and dissimilar.

Table 10. Global Moran's Index

Years	GDP	Capital	ALS	IMW	EWS
2010	-0.030	-0.029	-0.030	-0.030	-0.030
2011	-0.030	-0.029	-0.030	-0.030	-0.029
2012	-0.029	-0.029	-0.030	-0.030	-0.030
2013	-0.029	-0.029	-0.031	-0.030	-0.030
2014	-0.030	-0.030	-0.031	-0.030	-0.030
2015	-0.030	-0.030	-0.031	-0.030	-0.030
2016	-0.030	-0.030	-0.031	-0.030	-0.030
2017	-0.030	-0.030	-0.031	-0.030	-0.029
2018	-0.030	-0.030	-0.031	-0.030	-0.030
2019	-0.030	-0.030	-0.030	-0.030	-0.030
2020	-0.030	-0.030	-0.030	-0.030	-0.030
2021	-0.030	-0.030	-0.031	-0.030	-0.027 ^{*)}

Source: BP2MI 2022, processed

Table 10 shows that the Global Moran coefficient of economic growth index, capital, education, IMW, EWS of Central Java Province from 2010 to 2021 has a negative value, meaning that the spatial interaction pattern of economic growth, capital, education is divergent (spread). Global Moran Coefficient The index of economic growth, capital, education, IMW, EWS Central Java Province in 2010 to 2021 is worth less than 1, meaning that the spatial interaction pattern of economic growth, capital, education, IMW, EWS is random because there is no unclear feature pattern . This is presumably because the economic growth of capital, education, IMW, EWS of Central Java Province is globally influenced by the economic growth of 29 districts (Cilacap Regency, Banyumas Regency, Purbalingga Regency, Banjarnegara Regency, Kebumen Regency, Purworejo

Regency, Wonosobo Regency, Magelang Regency, Boyolali Regency, Klaten Regency, Sukoharjo Regency, Wonogiri Regency, Karanganyar Regency, Sragen Regency, Grobogan Regency, Blora Regency, Rembang Regency, Pati Regency, Kudus Regency, Jepara Regency, Demak Regency, Semarang Regency, Temanggung Regency, Kendal Regency, Batang Regency, Pekalongan Regency, Pemalang Regency, Tegal Regency, Brebes Regency), and 6 cities (Magelang City, Surakarta City, Salatiga City, Semarang City, Pekalongan City, and Tegal City) which are centralized from the Center.

This research is focused on labor research with higher education in Central Java Province and Central Java Province. Table 10 shows that the empirical results of the negative Global Moran's Index coefficient on Indonesian workers (IMW) with higher education from 2010 to 2021 identify that the spatial interaction pattern of Indonesian workers (IMW) with higher education in Central Java Province is divergent or spread from district/city to district/city. This is presumably due to the close distance between the regions and the short travel time. In addition, because of the demand for labor and the supply of labor in accordance with the criteria for Indonesian workers (IMW) with the required higher education. In 2020, there are quite a lot of workers affected by Covid-19, which will affect the economic growth of Central Java Province.

The demand for Indonesian workers (IMW) with higher education in 2021 from other countries has decreased due to Indonesia's Covid-19 handling policies and Indonesian labor restrictions (IMW) policies from destination countries. Table 11 identifies that Indonesian workers (IMW) with higher education from Cilacap Regency from 2010 to 2021 mostly went to the destination countries of Brunei Darussalam, Hong Kong, South Korea, Malaysia, Oman, Papua New Guinea, Qatar, Saudi Arabia, Singapore, Taiwan, United Arab Emirates (UAE). Indonesian workers (IMW) with higher education from Kendal Regency from 2010 to 2021 mostly go to the destination countries of Brunei Darussalam, Hong Kong, South Korea, Malaysia, Oman, Qatar, Saudi Arabia, Singapura, Taiwan, United Arab Emirates (UAE).

Table 11. Indonesian Migrant Workers (IMW) from Cilacap and Kendal Regencies By Country of Destination 2010-2021 (person)

Regency	Country of destination	2010	2021
Cilacap	Brunai Darussalam	278	0
	Hongkong	1036	2614
	South Korea	260	22
	Malaysia	1.299	1
	Oman	34	0
	Papua New Guini	0	1
	Qatar	33	4
	Saudi Arabia	368	4
	Singapore	3.051	219
	Taiwan	1.329	479
Kendal	United Emirate Arab (Uea)	134	3
	Brunai Darussalam	68	0
	Hongkong	1926	2.977

Regency	Country of destination	2010	2021
	Korea Selatan	132	8
	Malaysia	670	0
	Oman	31	0
	Qatar	51	0
	Saudi Arabia	349	2
	Singapura	2256	162
	Taiwan	851	275
	United Emirate Arab (Uea)	215	3

Source: BP2MI 2022, processed

Table 12 identifies that Indonesian workers (IMW) in Cilacap Regency with higher education from 2010 to 2021 work abroad mostly with the positions of Care Taker, Caregiver, Construction Laborers, House Maid, Operator, Operator, Plantation Worker, Worker, Construction Worker, Domestic Helper, Domestic Worker, Driver Automotive, Factory Worker, Farm Industry, Farmer, and Fisherman. Indonesian Migrant Workers (IMW) Kendal Regency with higher education from 2010 to 2021 work abroad mostly with the positions of Care Taker, House Maid, Domestic Worker, General Worker, Housekeepers, Operators, and workers.

Table 12. Indonesian Migrant Workers (IMW) from Cilacap and Kendal Regencies By position Year 2010-2021 (person)

	Position	2010	2021
Cilacap Regency	Care Taker	1088	0
	Caregiver	3	355
	Domestic Worker	0	207
	Driver Automotive	27	0
	Factory Worker	1	12
	Farmer	24	0
	Fisherman	11	4
	Fitter	2	7

	Gardener	53	0
	General Worker	97	1
	House Maid	3.640	2.622
	Labour	47	1
	Operator	990	22
	Plantation Worker	171	1
	Poultry Man Production Operator	0	0
	Operator	9	0
	Servant	0	0
	Waitress	6	1
	Welder	8	6
	Women Worker	442	0
	Worker	2	126
	Worker (Man)	444	0
Kendal Regency	Care Taker	517	0
	Caregiver	1	242
	Cleaning Service	46	0
	Domestic Worker	0	139
	Driver Automotive	44	0
	Factory Worker	0	16
	Farmer	11	0
	Fisherman	3	6
	Gardener	10	0
	General Worker	162	0
	Helper	0	0
	House Maid	3009	2991
	House Maid (Man)	4	0
	Housekeepers/Plrt	1.663	0
	Insulation Helper	0	0
	Labour	31	0
	Operator	305	16
Women Worker	453	0	
Worker	2	38	
Worker (Man)	118	2	

Source: BP2MI 2022, processed

CONCLUSIONS AND SUGGESTIONS

Conclusions

The results of the Local Moran Index empirical research identified that the interaction patterns of Indonesian Migrant

Workers (IMW) from Central Java in 2010 were spread or divergent. The spatial interaction pattern of Indonesian Migrant Workers (IMW) from Central Java in 2010 was randomly assigned from 29 districts and 6 cities because there were no unclear feature patterns. Local Moran's Index value is significant =5%. Indonesian Migrant Workers (IMW) from Central Java in 2010 identified a pattern of spatial interaction (within in group) both similar and dissimilar in positions in Cilacap Regency, Brebes Regency, Kendal Regency. However, in 2021 Indonesian Migrant Workers (IMW) from Central Java identified a pattern of spatial interaction (within in group), both similar and dissimilar, in the positions of Cilacap Regency and Kendal Regency. Changes in the Local Moran's Index of Indonesian Migrant Workers (IMW) in 2010 and 2021 were allegedly due to the placement of the number of Indonesian Migrant Workers (IMW) to the destination country which was limited in 2021. Initially, Indonesian Migrant Workers (IMW) in 2010 were Indonesian Migrant Workers (IMW) its placements are in 27 countries, decreasing to 17 countries in 2021.

The results of empirical research on the negative Global Moran's Index coefficient on Indonesian workers (IMW) with higher education from 2010 to 2021 identify that the spatial interaction pattern of Indonesian workers (IMW) with higher education in Central Java Province is divergent or spreads

from districts/cities to district/city. This is presumably due to the close distance between the regions and the short travel time. In addition, because of the demand for labor and the supply of labor in accordance with the criteria for Indonesian workers (IMW) with higher education required by the destination country.

Indonesian workers (IMW) with higher education from Cilacap Regency from 2010 to 2021 mostly go to the destination countries of Brunei Darussalam, Hong Kong, South Korea, Malaysia, Oman, Papua New Guinea, Qatar, Saudi Arabia, Singapore, Taiwan, United Arab Emirates (UAE). Indonesian workers (IMW) with higher education from Kendal Regency from 2010 to 2021 mostly go to the destination countries of Brunei Darussalam, Hong Kong, South Korea, Malaysia, Oman, Qatar, Saudi Arabia, Singapura, Taiwan, United Arab Emirates (UAE).

Indonesian workers (IMW) in Cilacap Regency with higher education from 2010 to 2021 work abroad mostly with the positions of Care Taker, Caregiver, Construction Laborers, House Maid, Operator, Operator, Plantation Worker, Worker, Construction Worker, Domestic Helper, Domestic Worker, Driver Automotive, Factory Worker, Farm Industry, Farmer, and Fisherman. Indonesian Migrant Workers (IMW) Kendal Regency with higher education from 2010 to 2021 work abroad mostly with the positions of Care Taker,

House Maid, Domestic Worker, General Worker, Housekeepers, Operators, and workers.

Suggestions

The policy recommendation for the Central Java Provincial government is to use digital passports to reduce the number of illegal Indonesian migrant workers. BP2MI provides training in accordance with the demand for labor from the destination country. Former Indonesian Migrant Workers who have returned to their areas of origin are given special training so that they can impart the knowledge and skills they acquired while working abroad.

Implications and Limitations

Researchers suggest that economic growth be used as a proxy for income per capita with a time span that is adjusted to the latest data. The limitations of the data studied in 2022 for economic growth, Indonesian migrant workers from Central Java Province are different at the time of the study. The limitations of this study ignore workers with low levels of education. This study only focuses on workers with higher education levels. Future research is expected to be able to examine the variables of gender, formal working status of Indonesian migrant workers/informal working status of Indonesian migrant workers, remittances.

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REFERENCES

- Anselin, L. (1995). Local indicators of spatial association—LISA. *Geographical analysis*, 27(2), 93-115.
- Caroline, C., Lestari, E. P., & Srimindarti, C. (2021). A Multidimensional Optimum Ecotope Base Algorithm Labour Central Java. *Economics Development Analysis Journal*, 10(3), 361-381.
- Caroline, C., Sugiyanto, F. X., Kurnia, A. S., & Lestari, E. P. (2021). Dampak Covid-19 Pada Tenaga Kerja Lokal Provinsi Jawa Tengah. *Indicators: Journal of Economic and Business*, 3(1), 71-81.
- Caroline, C., Lestari, E. P., Srimindarti, C., Kusumawati, D., & Safriandono, A. N. (2020). Spatial Interaction Pattern of Local Workers in Central Java Province by using the Euclidean Distance Approach. *International Journal of Business & Management Science*, 10(2).
- Caroline, C., Kusumawati, D., Nuruddin, A., Lestari, E. P., Srimindarti, C., & Rahayu, T. I. (2020). *The Pattern of Spatial Interaction of Workers in Central Java Province using the Explanatory Spatial Data Analysis (ESDA) Approach*.
- Caroline, C., & Lestari, E. P. (2020). Adakah Relasi Antara Modal Sosial, dan Pertumbuhan Ekonomi Jawa Tengah?. *Indicators: Journal of Economic and Business*, 2(2), 182-190.
- Caroline, C., Lestari, E. P., Srimindarti, C., Kusumawati, D., & Safriandono, A. N. (2019). Kebijakan Spasial Spillover Tenaga Kerja Propinsi Jawa Tengah.

- Prosiding Seminar Bisnis Magister Manajemen (SAMBIS) 2019
- Caroline, Caroline., FX. Sugiyanto, Akhmad Syakir Kurnia, *et al.*, (2017). Human Capital Category Interaction Pattern to Economic Growth of ASEAN Countries in 2015 using Geo-Information Technology Data. *International Journal of Civil Engineering and Technology*, Vol. 8, No. 11 Tahun 2017.
- Caroline, Caroline. FX. Sugiyanto, Akhmad Syakir Kurnia *et al.*, (2018). Spatial Human Capital Interaction Pattern to Indonesian Economic Growth. *International Journal of Civil Engineering and Technology*. Vol 9, No. 1 tahun 2018
- Caroline, Caroline, FX. Sugiyanto, Akhmad Syakir Kurnia *et al.*, (2019). The Impact Of Spillover Labor On The Economic Growth Of Central Java Province With Spatial Econometrics Model Approach. *International Journal of Civil Engineering and Technology (IJCIET)* Volume 10, Issue 09, September 2019, pp. 16-26.
- Caroline, Caroline, FX. Sugiyanto, Akhmad Syakir Kurnia, *et al.*, (2019). Local indicators of spatial association (LISA) of Indonesian workers *Journal of Economics, Business, and Accountancy Ventura* Vol. 22, No. 2, August - November 2019, pages 177 - 192. Vol. 22, No. 2, August - November 2019, pages 177 - 192.
- Knowles, S., & Owen, P. D. (1995). Health capital and cross-country variation in income per capita in the Mankiw-Romer-Weil model. *Economic Letter*(48), pp. 99-106.
- Lucas, R. E. (1988). On the mechanics of economic development. *Journal of monetary economics*, 22(1), 3-42.
- Lestari, E. P., & Caroline, C. (2021). How Does Human Capital Spillover Inflow of Foreign Workers Affect Economic Growth?. *Frontiers in Sociology*, 6.
- Marques, J. A. L., Gois, F. N. B., Xavier-Neto, J., & Fong, S. J. (2021). *Predictive Models for Decision Support in the COVID-19 Crisis*. Springer International Publishing.
- Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A Contribution to The Empirics of Economic Growth. *The Quarterly Journal of Economics*.
- Solow, R. M. (1956). A Contribution to the Theory of Economic Growth. *The Quarterly Journal of Economics*, Vol. 70(No. 1), pp. 65-94.
- Book**
- Anselin, L., & Bera, A. K. (1998). Spatial dependence in linear regression models with an introduction to spatial econometrics. *Statistics Textbooks and Monographs*, 155, 237-290.
- Becker, Gary S. *Human Capital a Theoretical and Empirical Analysis, with Special Reference to Education*. Third Edision ed.: University Of Chicago Press 1994.
- Boediono, 1992. *Teori Pertumbuhan Ekonomi*, Yogyakarta: BPFE UGM.
- Caroline, E. (2020). *Aplikasi Data Spasial Spillover Tenaga Kerja Provinsi Jawa Tengah Dengan Software GeoDa 1.14*. Scopindo Media Pustaka.
- Caroline (2020), *Aplikasi Ekonometrika Spasial dengan Software Stata "Kajian Tenaga Kerja Propinsi Jawa Tengah"* Scopindo Media Pustaka.
- Caroline, E. (2016). *Kajian dan Kebijakan Migrasi Tenaga Kerja Provinsi Jawa Tengah*. *Media Sahabat Cendekia*.
- Cliff, A. D., & Ord, J. K. (1981). *Spatial processes: models & applications*. Taylor & Francis.

- Dattorro, J. (2010). *Convex optimization & Euclidean distance geometry*. Lulu.com.
- Dube, J., & Legros, D. (2014). *Spatial Econometrics Using Microdata*: John Wiley and Sons, Inc.
- Fischer, M. M., & Wang, J. (2011). *Spatial data analysis: models, methods and techniques*. Springer Science & Business Media.
- Fortin, M. J., & Dale, M. R. (2009). Spatial autocorrelation. *The SAGE handbook of spatial analysis*, 89-103.
- Fotheringham, A. S., Brunsdon, C., & Charlton, M. (2000). *Quantitative geography: perspectives on spatial data analysis*. Sage.
- Griffith, D., & Chun, Y. (2014). Spatial autocorrelation and spatial filtering. In *Handbook of regional science* (pp. 1477-1507). Springer Berlin Heidelberg.
- Haining, R. P. (2003). *Spatial data analysis: theory and practice*. Cambridge University Press.
- LeSage, J. P., & Pace, R. K. (2010). Spatial econometric models. *Handbook of applied spatial analysis*, 355-376.
- Mankiw, N. G. (2009). *Principles of macroeconomics*. Cengage Learning.
- McConnell, Brue *et al.* (2015). *Contemporary Labor Economics*. McGraw-Hill Higher Education

URL

<https://www.iaeme.com/ijciyet/issues.asp?VType=8&IType=11&JType=IJCIET&PageNumber=2>

<https://www.iaeme.com/ijciyet/issues.asp?VType=9&IType=1&JType=IJCIET&PageNumber=2>

<http://www.iaeme.com/ijciyet/issues.asp?JType=IJCIET&VType=10&IType=9>

<https://journal.perbanas.ac.id/index.php/jebav/article/view/1685>

<https://jateng.bps.go.id/publication/2019/o8/16/fcb9efa7796cdbc491325688/provinsi-jawa-tengah-dalam-angka-2019.html>

<https://jateng.bps.go.id/publication/2018/o8/16/73e4da7b5902cb91ff591bc7/provinsi-jawa-tengah-dalam-angka-2018.html>

<https://jateng.bps.go.id/publication/2017/o8/11/c7ba6078dd03a08a92893eb7/provinsi-jawa-tengah-dalam-angka-2017.html>

<https://www.kompas.com/tren/read/2020/12/13/124500065/kasus-corona-indonesia-611.631-ini-5-provinsi-dengan-kasus-tertinggi?page=all>.

: <https://money.kompas.com/read/2021/01/10/191500626/pekerja-migran-indonesia-hanya-boleh-kerja-di-17-negara-apa-saja-?page=all>.