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EFFECT OF SPATIAL AUTOCORRELATION STRUCTURE OF EMPLOYMENT IN CENTRAL JAVA

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Abstract

Industry, agriculture and THR sectors are some of the leading sectors in Central Java . Central Java with the capital city of Semarang City, is the third in Indonesia with the highest population in addition to West Java and East Java. Given the high population density and economic growth rate, it should also be followed by the sector's ability to absorb the available employment. Whereas in reality, the world of work or industry and professional associations often complain that the quality of staff (graduates) has not yet met the required skills demands (competencies). So the need for assessment of the absorption of employment from elementary school to upper for the planning of education system, so that education is more directed to education system oriented to the world of work appropriately and more efficiently with adequate amount and quality can be absorbed. Data used in this research is observation data to Central Statistics Agency of Central Java and Ministry of Education and Culture of Central Java for the period of 2015. Observation unit in this research is cities in Central Java , the data used among others the amount of absorption Workforce in general with basic education background to upper. In addition to employment data, data supporting factors such as workforce, industrial GDP value, agricultural GDP value, THR GDP value, and wage employment is also a research variable. The results of this study are the variables that significantly influence the model are the variables workforce, agricultural GDP value, THR GDP value, and wage employment. While significant variables have significant and significant influence in the spatial model are the variables workforce, industrial GDP value, agricultural GDP value, and THR GDP value.

Keywords: Employment, *Spatial Autocorrelation*

1. Introduction

Increasing population in Indonesia is currently increasing rapidly, especially in major cities in Java. By 2015, Central Java has a population of 33,774,141 people, consisting of 16,750,898 male and 17,023,243 female inhabitants. Compared with the population of 2014, the population of Central Java experienced growth of 0.15 percent. Central Java is the third in Indonesia with the largest population in addition to West Java and East Java.

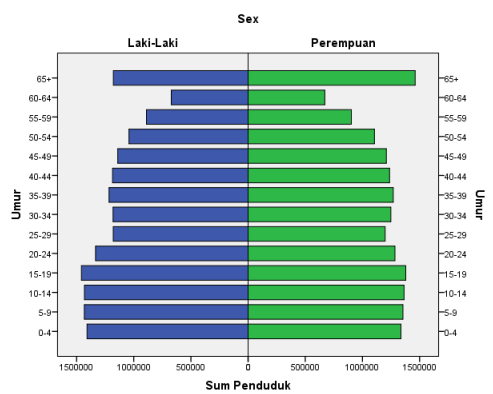


Fig. 1. The population of Central Java by sex and age (person)

Central Java , a thousand cities in Semarang City, is geographically located between East Java and West Java with a total area of 3.25 million hectares or about 25.04 percent of the total area of Java Island (1.70 percent of Indonesia). Population density in Central Java in 2014 is 1,030 people per square kilometer with the largest density in Surakarta City of 11,585 people per square kilometer. The population growth rate in East Java is 0.37 percent. Some of the leading sectors in Central Java are industrial sector, THR (trade, hotel and restaurant) and agriculture. The economic growth of Central Java in 2014 is indicated by the growth rate of Gross Domestic Product (GDP) of 2014 of 5.42 percent which increased from the previous year.



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Based on the demographic and macroeconomic aspects above, it is expected that the bonus will affect the number of skilled work force from high school graduates that support the distribution of employment. The absorption of employment of each sector should increase along with the increase of economic activity in Central Java, meaning that the rate of economic growth that increased indicates that there is also an increase in the quantity of production and economic process in Central Java. The number of products, goods and services that increase means the number of factors of production one of which is the employment also increased. This is in accordance with the nature of employment demand, where demand for employment is a description of the demand for goods and services.

Tobler (1970) proposes the first law of geography, a condition in which one of the points or areas corresponds to a condition at one point or adjacent area. This law is the foundation for the study of regional science. Spatial effects often occur between one region and another. In spatial data, observations at a site often depend on observations in other neighboring locations.

Anselin (1988) describes two spatial effects in econometrics including the effects of spatial dependence and spatial heterogeneity. Spatial dependence indicates an autocorrelation between the object of the study (cross sectional data set). Spatial heterogeneity refers to the diversity of functional forms and parameters at each location. The study sites show homogeneity in the data.

2. Methods

2.1 Participants

Data used in this research is observation data to Central Statistics Agency of Central Java and Ministry of Education and Culture of Central Java for the period of 2015. Observation unit in this research is and City in Central Java, the data used among others the amount of absorption employment in general with basic education background to upper. In addition to employment data, data on employment support factors such as, industrial GDP value, agricultural GDP value, THR GDP value, and wage employment are also research variables.

2.2 Instrument

The variable that will be used in this research consists of two parts, namely endogenous variable (Y) and exogenous variable (X). Endogenous variable (Y) in this research is Employment. While exogenous variable (X) in this research consist of: Workforce, industrial GDP value, agricultural GDP value, THR GDP value, and wage employment. With the operational definition of variables are as follows :

No	Variable	Indicators	Unit of Analysis	Data Source
Variabel endogenous (Y)				
1	Employment	Number of manpower in general with primary (up to secondary) or vocational education	People	Ministry and culture of education
Variabel exogenous (X)				
1	Workforce (X1)	Number of residents over 15 years of age with elementary to senior secondary or vocational education	People	The central statistics in central java
2	GDP of Industry (X2)	The total value of industrial production is one area in one unit of time	Million dollars	The central statistics in central java
3	GDP of agriculture (X3)	The total value of industrial production of agriculture is one area in one unit of time	Million dollars	The central statistics in central java
4	GDP of THR (X4)	The total value of industrial production of THR is one area in one unit of time	Million dollars	The central statistics in central java
5	Wage Employment (X5)	Wages of employment	Million dollars	The central statistics in central java

2.3 Research Design

The SUR model for the proposed sectoral employment data of Central Java is the development of a model defined by Sitanggang and Nachrowi (2004), the modification of the model is the use of the Spatial

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autocorrelation with the limitation of work characteristic (population) with basic education background to upper secondary. The analysis used in this research consists of mapping based on the distribution of employment absorption and mapping for the analysis of factors affecting the absorption of employment, then stage is spatial autocorrelation analysis to determine the relationship between districts and cities based on employment absorption, this providing different stages. Here are the analysis steps for each method.

1. Map the cities from the distribution of employment absorption.
2. Spatial autocorrelation analysis for determination of employment absorption of cities in Central Java

3. Results and Discussion

3.1 Description of the Employment Absorption Pattern in Central Java

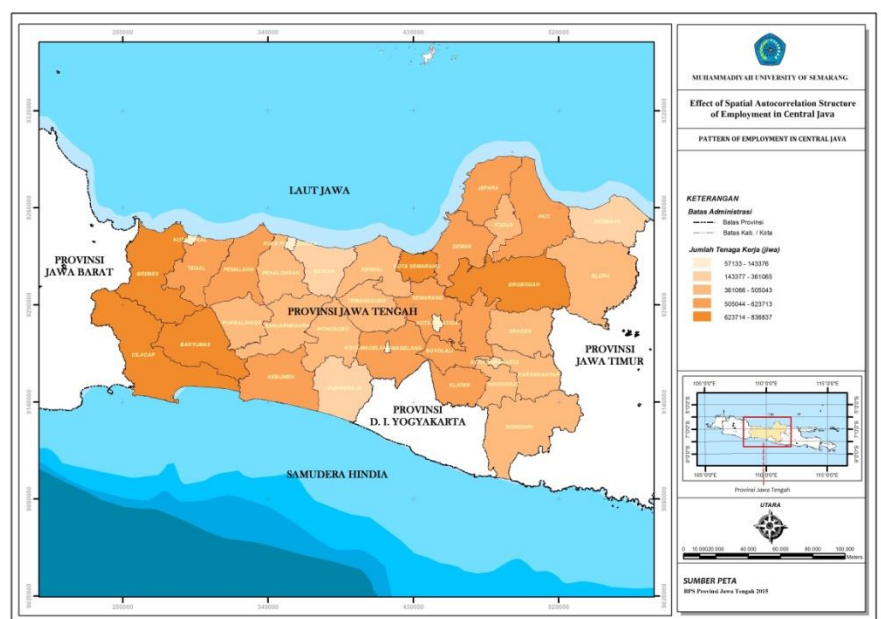


Fig. 2. Employment in Central Java

Figure 2 shows the dispersion of employment cities in of Central Java 2015. Based on Figure 2 it can be seen that the color of the location is getting dark, the higher the employment. It can be seen that cities that have a number of employments ranged from 623714 to 836837 people are Grobogan (685333 people), Semarang (836837 people), Brebes (767841 people), Banyumas (693340 people), and Cilacap (715819 soul). The cities that have a number of employments ranging from 505044 to 623713 people are Pati, Jepara, Demak, Semarang, Boyolali, Klaten, Magelang, Kebumen, Pemalang and Tegal. The cities that have a number of employments ranging from 361066 to 505043 are Blora, Sragen, Karanganyar, Wonogiri, Sukoharjo, Kudus, Kendal, Temanggung, Wonosobo, Banjarnegara, Purbalingga and Pekalongan. The cities that have a number of employment ranges from 143377 to 361065 people are Rembang, Surakarta, Purworejo, and Batang. While the cities that have a number of employment ranges from 57133 to 143376 people are Salatiga City, Magelang City, Pekalongan City, and Tegal City.

3.2 Spatial Weighted Matrix of Employment Model in Central Java

The spatial weighting matrix (W) is obtained from the inter-regional and distance-to-neighboringness or distance between one district or municipality and another county or city. In this study using customize weighting because assuming spatial weighting matrix not only emphasize the intersection and proximity between district and city location but also other factors that adjusted to the characteristics of employment and response variable. Characteristics in question is the existence of mutual relationships between regions or cities because it has a reciprocal relationship. Where $W_{ij} = 1$ for the adjacent territory or the vertex met with the area of concern, and $W_{ij} = 0$ for the other region.

3.3 Spatial Autocorrelation of Employment Absorption in Central Java

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Spatial dependency test is performed to identify whether there is relation between each location of variables with Moran's I. The hypothesis used is:
 $H_0: IM = 0$ (no dependencies between locations)
 $H_1: IM \neq 0$ (there are dependencies between locations)

Morans'I Test

Variable	Morans'I Value	P-value	Conclusion
Y	0.172756168	0.0179*	Reject H_0
X1	0.276260911	0.0007766*	Reject H_0
X2	-0.077770549	0.7525	Accept H_0
X3	-0.069981802	0.7726	Accept H_0
X4	-0.03916991	0.6189	Accept H_0
X5	0.348370662	1.305e-05*	Reject H_0

Based on the results of Morans'I test it can be seen that the variables Y, X1, and X5 there are spatial dependencies with $\alpha = 5\%$. So it can be concluded that there are spatial dependencies or have territorial relationships in the observational data in variables Y, X1, and X5. The scatterplot for local morans test as follows :

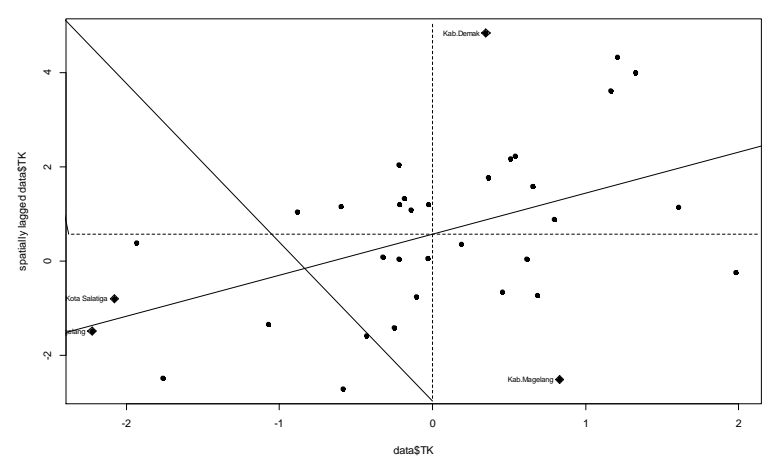


Fig. 7. *Morans Scatterplot of Employment Absorption*

Figure 7 shows the pattern of dispersal of cities employment in Central Java. The clustering pattern in quadrant I defines cities with high numbers of employers clustered cities with a high employment force as well. Demak is located in the first quadrant I, its mean Demak has a high number of employments and is located around the cities that have a high number of cities as well. The clustering pattern in quadrant III defines cities that have a low employment grouped cities with a low employment as well. Salatiga City and Magelang City are located in Quadrant III which means Salatiga City and Magelang City have low employments and are around the cities that have low employment numbers as well. The clustering pattern in the IV quadrant defines cities with high numbers of employers clustered with cities with a low employment force. Magelang is located in quadrant IV which means Magelang has high employment and is located around city which have low number of employments.

4. Conclusions

Based on the results of the analysis and discussion, this study can be concluded that the spread of employment in Central Java has a pattern that spreads between areas that are close to each other. Based on the relationship between the workforce and the variables that influence it, it can be interpreted that the similarities and differences of characteristics in each of the adjacent cities can lead to an increase or decrease in the number of workers in Central Java. The variables that significantly effect are employment, industrial GDP value, and wages labor.



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