

BACKGROUND

- Four out of the five most affected provinces in Indonesia are located on Java island, and it has around 57% of the nation's total confirmed cases (Satuan Tugas Penanganan COVID-19, 2020).
- The difficulty of managing the pandemic underlines the need for more research to understand its nature.
- The purpose of this study is to identify socioeconomic factors associated with COVID-19 cases in Java at city/regency level.

DATA AND METHOD

- This research was conducted using the data from 6 provinces in Java, covering 118 cities/regencies. The cut-off date for accumulated confirmed cases is July 18th 2020 while all of the socioeconomic variable that we used are 2019 data.
- Spatial Econometrics was applied to examine the relationships between variables.

Table 1. The Name, Description, and Source of The Variable

Variable Name	Description	Source
Incidence Rate	Number of confirmed cases per 100,000 persons	Official COVID-19 websites of each provinces
Population density	Population size per sq km	
Population 65+	Percentage of population aged 65 and over	
Unemployment	Percentage of unemployed persons in the labor force	Statistics Indonesia
Per capita expenditure	Per capita expenditure in a month	
Household size	Average household size	
Medical personnel	The number of medical personnel (doctors and nurses) per 100,000 persons	Health department of each province

SELECTED BIBLIOGRAPHY

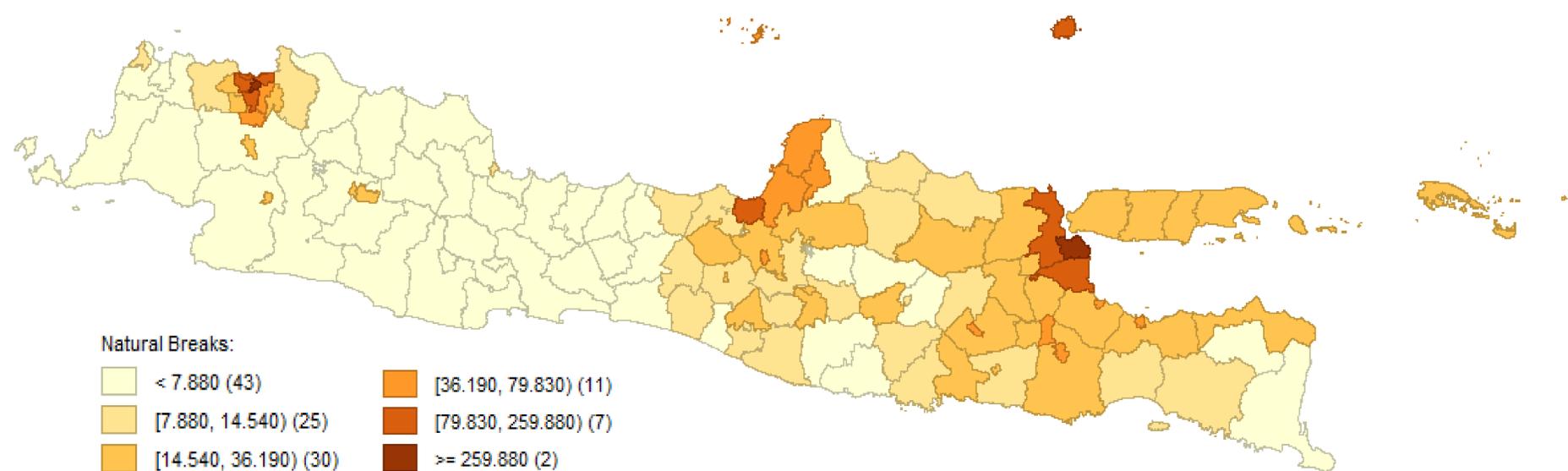
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FINDINGS

Figure 1. Covid-19 Incidence Rate in Java Island on June 18, 2020



- There are several clusters with high incidence rates. The first cluster is Jabodetabek (Jakarta, Bogor, Depok, Tangerang, and Bekasi) area. The next cluster is Semarang, which is the capital of Central Java Province, and its surrounding cities/regencies such as Demak, Jepara, Salatiga, and Kudus. Further east, there is another cluster that consists of Surabaya and its surrounding cities/regencies.
- The Moran-I index for COVID-19 incidence rate is 0.651 (p -value = $2.2 \times 10^{-16} < \alpha = 0.05$) which means that the COVID-19 incidence rate has a positive spatial correlation between regions.
- Lagrange Multiplier(LM) test and Robust LM-lag statistics indicate that the appropriate model is Spatial Autoregressive Model (SAR)

Table 2. The Result of Spatial Autoregressive Model

Variable	Coefficient	P-value
Intercept	-2.20560	0.103352
Population Density	-0.00002	0.476019
Population 65+	-0.05395	0.183887
Household size	0.91808	0.001350
Medical personel density	0.00085	0.010685
Unemployment	-0.20872	0.000000
Percapita expenditure	0.00118	0.000394
Rho	0.55741	0.000000

- The average household size, per capita expenditure and medical personnel density were found to be significant and positively correlated with COVID-19 incidence rate. This could mean that the suppressing effect of having more medical personals was found to be minimal at this stage of the pandemic, it may have the opposite effect as they are more exposed to the virus and thus have a higher risk of contracting and spreading it.
- Unemployment rate has a significant negative influence on COVID-19 incidence rate.
- Population density and percentage of older residents were not found to be significant. Although older people are at a higher risk of contracting the disease, a characteristic may have the opposite effect when examined at a population level.
- The SAR model shows a rho value of 0.557 and significant at 5% level. This result denotes the high spatial influence of COVID-19 incidence rate in an area to the other areas around it.

SUGGESTION

- This study found that there is a spatial correlation in COVID-19 incidence rate in Java, so the future research should take spatial correlation into account.
- Some factors could have more effects at the beginning of the pandemic then waned in both significance and strength over time, while others might be more influential at the highest point or the end. One of the limitations of our study is that we did not measure this kind of variance over time.