

The Effect of Population Development and Gross Domestic Product on Covid-19 Prevalence in East Java Province

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ABSTRACT

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus, a family of coronaviridae. The government has taken various countermeasures to reduce the impact of the Covid-19 pandemic in various sectors. Covid-19 pandemic affected not only health sector, but almost all the sector. The economic sector has also been seriously affected by the coronavirus pandemic. The economic slowdown will certainly have an impact on Indonesia's economic growth performance in 2020. The pandemic has caused a ripple effect from health to social and economic problems, including business actors. The increasing number of residents due to economic activity that continues to grow encourages the increase in residential areas and causes an increase in the level of population density. Population density has a role in the spread of COVID-19 in Indonesia, this refers to the fact that urban areas that have a high population density compared to suburban areas will cause faster disease transmission with a more compact and complex chain of distribution.

Keywords: coronavirus disease, PDRB, East Java

1. INTRODUCTION

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by SARS-CoV-2, a family of coronaviridae. This disease resulted in the 2019–2020 coronavirus pandemic. People with COVID-19 may experience fever, dry cough, and difficulty breathing. Sore throat, runny nose, or sneezing are less common. In the most susceptible patients, the disease can lead to pneumonia and multiorgan failure [1]

Since then, the government has taken various countermeasures to reduce the impact of the Covid-19 pandemic in various sectors. Covid-19 pandemic affected not only health sector, but almost all the sector. The economic sector has also been seriously affected by the coronavirus pandemic. Restrictions on community activities affected business activities which have an impact on the economy. The economic slowdown will certainly have an impact on Indonesia's economic growth performance in 2020. The pandemic has caused a ripple effect from health to social and economic problems, including business actors. The Central Statistics Agency

has recorded that the economic growth rate in the first quarter (January-March) 2020 only grew 2.97%. This figure slowed from 4.97% in the fourth quarter of 2019. Growth was far below the achievement of the first quarter of 2019 which reached 5.07%. In the second quarter of 2020, Indonesia's economic growth rate was minus 5.32%. This figure is inversely proportional to the second quarter of 2019 of 5.05%. [2] Indonesia's economy based on GDP (Gross Domestic Product) in Quarter II 2020 at current prices was IDR 3,687.7 trillion. But based on constant prices with the base year 2010 amounting to Rp2,589.6 trillion. When compared to the basis of constant prices or YoY (year on year), economic growth in the second quarter of 2020 experienced a contraction of -5.32%. When compared to the first quarter of 2020, the contraction is -4.19%. While cumulatively in Semester I 2019, growth contracted -1.26%, the contraction of Indonesia's economic growth in Quarter II on a YoY basis was quite deep. Based on these data, Indonesia's economic growth experienced negative growth in the second quarter of 2020.

The population growth due to economic activity that continues to grow encourages the increase in residential areas and causes an increase in population density [3]. Population density has a role in the spread of COVID-19 in Indonesia, this refers to the fact that urban areas that have a high population density compared to suburban areas will cause faster disease transmission with a more compact and complex chain of distribution. [4]. This parameter has been shown to influence the spread of COVID-19 in the State of South India based on a study conducted by [5], There are three states with high density and high prevalence of cases, namely Tamil Nadu, Karnataka, and Telangana. In addition, there are other findings that state that there is a correlation between population density and disease outbreaks in the study of Li et al (2018) in [4]. However, research conducted in America by [6], after controlling for socioeconomic conditions and health care infrastructure in metropolitan cities in the United States, found that there was no correlation between population density and the spread of COVID-19 and low mortality in high-density areas while in low-density areas high mortality rates. Therefore, it is necessary to analyse the effect of population density and gross domestic product on the prevalence of COVID-19.

2. METHOD

This study is a descriptive type of research. The data analysis used descriptive quantitative. The location of this research is East Java Province which is chosen based on the importance of population density and gross domestic product. The population is the overall value of the results of calculations or quantitative measurements as well as quality associated with certain characteristics of all members of a complete and clear group to study its nature. The population of this research is the total population, the occurred of covid and gross domestic income each district in East Java Province.

The data collection has used the documentation technique. Documentation techniques are used to obtain secondary data from the Central Statistics Agency of East Java, namely population density and gross domestic income. Meanwhile, the data on the prevalence of COVID-19 was obtained from the East Java COVID-19 response [7]

Data analysis is an analysis that is used to simplify data in an easy-to-read form, including multiple linear regression analysis using SPSS to determine the effect of population density and gross domestic product on the prevalence of COVID-19, which can be used for prediction if it meets several classical assumptions.

3. RESULT AND DISCUSSION

A. Population Density

The highest population density is in the cities of Surabaya and Mojokerto. However, the direct relationship between population density and the prevalence of COVID-19 cases does not show a strong correlation in several statistical method-based studies. [8] comparing two variables, namely activity density, and area of a metropolitan city, with the rate of spread of COVID-19 and its mortality rate. The results show that the area of the metropolitan city is positively correlated with the rate of spread and mortality in this outbreak. Meanwhile, activity density has a negative correlation which is influenced by the good health service system in densely populated cities. The most obvious variable that correlates with the rate of spread and mortality of COVID-19 is the level of mobility of the population of an area. This supports research [9] There is a strong positive correlation between the size of the metropolitan city area and the rate of spread and mortality. Because the wider the metropolitan area, the higher the mobility carried out by the local population and the more modes of public transportation used so that transmission is easy to occur.

B. PDRB

The highest GRDP is in two cities and one district, namely Kediri City, Surabaya City, and Gresik Regency. GRDP are 457,979;190,897, respectively; and 101,266 thousand rupiah. This means that the number of goods and services produced in the two cities of Kediri City, Surabaya City and Gresik Regency in 2020 is 457,979; 190,897; and 101,266 thousand rupiahs.

According to previous research, [10] Before the Covid-19 pandemic, GRDP in East Java Province grew by 5.52%. It was said that the most influential sector since the absence of the pandemic was the manufacturing sector, followed by the trade, hotel, restaurant, and GRDP sectors in the province at that time contributed by consumption. This study shows that this pandemic caused a decrease in GDP by 0.28% percent in the second quarter of 2020 caused by the PSBB carried out by the Indonesian government. [11]. Almost all employment sectors in Indonesia contracted but there are still some jobs that are growing in a positive direction. MSMEs in East Java Province that have the most impact are the food, beverage, clothing, and handicraft product industries [12]. This pandemic has also caused credit payments to the financial industry to become stuck [13], People's ability to shop has decreased.

C. Covid-19 Prevalence

The highest Covid-19 case in August 2021 was in the city of Surabaya with 61,321 positive cases, 60 suspected

and 96 probable people. East Java province does not have the privileges that make it worthy of being categorized as a city that is resilient to pandemics. No industry can be done remotely and working remotely still feels unfamiliar. In addition, the density of East Java Province is different from the density in developed countries, so there are terms rich dense places (such as Singapore and Tokyo) and poor dense places (such as Mumbai and Bogota). For cities that are considered poor dense places, the concept of self-isolation becomes an exclusive thing that is difficult to have. Moreover, coupled with the level of community discipline in following the advice to stay at home, which is still low. Therefore, the provincial government should be sceptical when it sees the low positive rate in densely populated urban villages while starting to selectively organize the necessary resources if the worst happens. Because if an outbreak occurs, areas with high density may be more vulnerable and more difficult to contain the spread of the virus. Another important thing is related to the type of spread that occurs the most. The regencies/cities with the highest current cases are Surabaya, Gresik, and Sidoarjo. The high number of these immoral Gates can be said to be partly casuistic and partly endemic. In general, for the time being, there is no significant relationship between population density and the prevalence of COVID-19. The findings should not be taken for granted, because they need to be read by noting the extent to which rapid tests, swab tests, and contact tracing have been carried out in each densely populated district/city so that the provincial government can get a more accurate picture.

D. Relationship between Population Density and Covid-19 Prevalence

The results of the Adjusted R-Square coefficient of determination are used to obtain information about the magnitude of the influence of all X variables on Y variables because they are more adjusted and are usually the most accurate. The Summary model shows the Adjusted R-Square correlation coefficient which shows the level of relationship between variables (0.129). This means that the variable X (Population Density) affects Y (Covid Prevalence) by 12.9%, the rest is influenced by other variables.

GRDP only contributes 8% of the influence on the prevalence of covid-19, the rest is influenced by other variables. According to previous researchers, [14] Before the Covid-19 pandemic, GRDP in East Java Province grew by 5.52%. It was said that the most influential sector since the absence of the pandemic was the manufacturing sector, followed by the trade, hotel, restaurant, and GRDP sectors in the province at that time contributed by consumption. This study shows that this pandemic caused a decrease in GDP by 0.28% percent in the second quarter of 2020 caused by the PSBB carried out by the Indonesian government. [15]. Almost all employment

sectors in Indonesia contracted but there are still some jobs that are growing in a positive direction. MSMEs in East Java Province that have the most impact are the food, beverage, clothing, and handicraft product industries [16]. This pandemic has also caused credit payments to the financial industry to become stuck [17] People's ability to shop has decreased.

When viewed from data obtained from the Central Statistics Agency (BPS), economic development in East Java Province continues to increase every year, but since the Covid-19 pandemic, economic growth has decreased to an extreme 0.28% percent from 2019-2020. which was predicted that economic growth would reach 5.9 percent. Before the Covid-19 pandemic, East Java's economic growth had increased by 7.05 percent from 2018-2019. There are several mainstay sectors in East Java such as agriculture, trade, processing, business, tourism, and construction. [18]. The agricultural sector is the sector that has the most positive impact [19] and there has been no visible impact since the Covid-19 pandemic and it has been predicted that if the agricultural sector is affected by the Covid-19 pandemic, the impact will not be significant. In addition to the agricultural sector, several minority sectors are also said to have a positive impact. Minority sectors that ultimately have a positive impact and become conspicuous during the emergence of the Covid-19 pandemic are the health services sector and the information and communication sector. In addition to the health services sector and the minority information and communication sector, this minority transportation and warehousing sector have a significant negative impact after the manufacturing sector. When viewed from the value of GDP and GRDP, sectors affected by Covid-19 and those not affected by Covid-19 still show a higher economy than the national economy. The results of research from previous researchers show that GRDP in East Java Province always increases from year to year before the Covid-19 pandemic

E. Relationship between GRDP and Covid-19 Prevalence

The results of the Adjusted R-Square coefficient of determination are used to obtain information about the magnitude of the influence of all X variables on Y variables because they are more adjusted and are usually the most accurate. The Summary model shows the Adjusted R-Square correlation coefficient which shows the level of relationship between variables (0.08). This means that the X variable (GRDP) affects Y (Covid-19 Prevalence) by 8%, the rest is influenced by other variables.

This shows that there is an influence of population density and GRDP on the prevalence of covid 19 which has been proven by the SPSS test. Population density only contributes 12.9%, the rest is influenced by other variables. The results of this study are in line with several

findings which state that population density alone is not the main factor in the spread of the virus. In an interesting article on [15], Richard Florida, an urban expert from the University of Toronto, stated that high-density cities in the United States have varying resilience in the face of COVID-19. New York City, the most populous city in America, did experience a significant number of cases (the number was 139,385 as of April 22, 2020, while in New York state as a whole there were 251,690 cases). However, most of the cases reported did not come from the urban Manhattan area, but donations from areas such as the Bronx, Queen, and Staten Island. On the other hand, San Francisco, America's second-most populous city, reported a very small number of cases (the number of confirmed cases is currently 'only' 1,231, while the total in the state of California as a whole is 33,261, and nationally in the United States 826,240). According to Florida, the stark difference between these two big cities, apart from the faster lockdown policies implemented in San Francisco, may be since many of the workers and types of work in San Francisco can be done remotely. For example, if we look at the data on types of jobs in San Francisco, the highest number is software developers and some jobs are still related to the high-tech industry. In addition, the character of the people of San Francisco is considered not as diverse and mobile as the residents of New York City. So, even though it's crowded, San Francisco has more advantageous characteristics than other big cities in America that make it more resilient in the face of a pandemic.

4. CONCLUSION

There is an influence of population density and GRDP on the prevalence of covid 19. Population density alone is not the main factor in the spread. The most influential sector since the absence of the pandemic is the manufacturing sector, followed by the trade, hotel, restaurant, and GRDP sectors in this province at that time contributed by consumption. This study shows that this pandemic caused a decrease in GDP by 0.28% percent in the second quarter of 2020 caused by the PSBB carried out by the Indonesian government.

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