

The Effect of Infrastructure on Economic Growth in Regencies and Cities in Special Region of Yogyakarta Province

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Abstrak

Penelitian ini menggunakan regresi data panel untuk mengestimasi variabel. Estimasi dilakukan menggunakan tiga hasil. Pertama, rata-rata pertumbuhan ekonomi Provinsi Daerah istimewa Yogyakarta tahun 2009-2019 sebesar 5,30 persen. Kedua, sekolah negeri terbanyak berada di Kabupaten Gunungkidul, dan sekolah swasta paling sedikit berada di Kota Yogyakarta. Kemudian, rumah sakit umum terbanyak terdapat di Kabupaten Sleman dan paling sedikit berada di Kabupaten Gunungkidul. Puskesmas terbanyak terdapat di Gunungkidul dan paling sedikit berada di Kota Yogyakarta. Ketiga, hasil uji secara persial menunjukkan bahwa jumlah sekolah negeri, jumlah sekolah swasta dan jumlah puskesmas berpengaruh signifikan terhadap pertumbuhan ekonomi. Variabel jumlah sekolah negeri berpengaruh negatif dan signifikan terhadap pertumbuhan. Variabel jumlah sekolah swasta berpengaruh negatif dan signifikan terhadap pertumbuhan. Artinya semakin banyak pembangunan sekolah negeri dan sekolah swasta justru akan menurunkan tingkat pertumbuhan ekonomi Kabupaten/Kota di Provinsi DIY. Pertumbuhan ekonomi berkurang 0,14 persen jika jumlah sekolah negeri di bertambah satu dan jika sekolah swasta bertambah satu maka pertumbuhan ekonomi akan berkurang sebesar 22,36 persen. Semakin banyak jumlah puskesmas umum akan meningkatkan pertumbuhan ekonomi Kabupaten/Kota di Provinsi DIY, jika jumlah puskesmas bertambah satu maka akan menaikkan pertumbuhan ekonomi sebesar 5,05 persen.

Kata kunci: pertumbuhan ekonomi, infrastruktur pendidikan, infrastruktur kesehatan

Abstract

This study employed panel data regression to estimate the variables. The estimation revealed three results. First, the average economic growth in the Special Region of Yogyakarta Province in 2009-2019 is 5.30 percent. Second, most public schools are in Gunungkidul Regency, and the least number of private schools are in Yogyakarta City. Then, the highest numbers of public hospitals are in Sleman Regency, and the least is in Gunungkidul Regency. The highest numbers of public health services are in Gunungkidul Regency, and the least is in Yogyakarta City. Third, the partial test results show that the number of public schools, the number of private schools and the number of public health services have a significant effect on economic growth. The variable number of public schools has a negative and significant effect on growth. The variable number of private schools has a negative and significant effect on growth. This means that the more construction of public schools and

private schools will actually reduce the economic growth rate of districts/cities in the province of DIY. The economic growth is reduced by 0.14 percent as the number of public schools increases by one school and if the number of private schools increases by one school, it will reduce economic growth by 22.36 percent. The more the number of public health services will increase the economic growth of districts/cities in the province of DIY, if the number of hospitals increases by 1, it will increase economic growth by 5.05 percent

Keywords: economic growth, education infrastructure, health infrastructure

1. Introduction

Infrastructure is one of the essential aspects in the development process, primarily to support the regional economy. The government has an essential role in infrastructure development to support economic growth. Economic growth is one indicator of the achievement of a region's development. Positive economic growth indicates development. Therefore, infrastructure is a government asset to provide services to the community. According to this principle, there are two types of infrastructure that are central infrastructure and regional infrastructure. In terms of function, infrastructure can also be divided into income-generating infrastructure and non-income-generating infrastructure. A particular group of people usually utilizes the first type of infrastructure, and when the facilities are available, a fee will be charged to the user, such as clean water, electricity, telephone, tourism planting, etc. The second type of infrastructure is provided for the benefit of the general public, such as roads, bridges, irrigation canals, and others. In that way, users are not charged (Marsuki, 2007).

In 2011, a survey conducted by the International Institute for Management Development placed Indonesia in fourth place (infrastructure) and 37th out of 59 countries with the weakest competitiveness. There are four types of infrastructure with negative growth from the five types of infrastructure: technology infrastructure, scientific infrastructure, health, environmental infrastructure, and education infrastructure. There were two infrastructures related to basic human needs among the four infrastructures that grew negatively: health and education infrastructure. The allocation of education and health funds in the Indonesian National Budget is a top priority increasing every year. The

allocation of education and health funds increased from IDR 408.5 trillion in the 2015 APBN to IDR 428.8 trillion in the 2016 APBN, while health spending in the 2015 APBN increased from IDR 74.3 trillion to IDR 166.1 trillion in the 2016 APBN.

DIY is well-known as 'a city of education' and one of the provinces with special region status. The economic growth in DIY from 2004 to 2013 fluctuates between 4.70% in 2004 and 5.40% in 2013. Even though the growth is positive, DIY's economy experienced a slowdown and only grew 3.70% in 2006. The increase in fuel prices in 2005 and the earthquake's impact that hit DIY in May 2006 declined the economic growth from 5.03% to 4.43% in 2009. However, the DIY economy slowly recovered over time, which shows that economic growth reached 5.17% to 5.40% from 2010 to 2013. The figure in 2013 is the highest growth rate that can be achieved by DIY during the period 2004-2013.

Improving the provision of infrastructure is seen as creating competitiveness, efficiency, and productivity. Thus, a country needs to increase investment in infrastructure to compete in a globalized world. In addition, according to research conducted by Khan *et al* (2020). The distribution of sectors and geographic infrastructure is essential to know the overall impact of growth. This shows that infrastructure development can significantly affect economic growth (Valila, 2020). Social infrastructure spending such as education and health services provides the economy with skilled and productive human resources, leading to increased productivity. Thus, economic growth must be achieved optimally (Agrawal, 2019). This is because physical infrastructure and human resources have long-term benefits in terms of GDP growth. Physical capital and human capital play is important. The availability of

physical capital is related to the availability of investment funds (Maryaningsih, 2014).

Maqin (2011) investigate the impact relies on is the theory of economic growth and the theoretical basis. The data used is panel data. The type of data used is "Panel Data on Infrastructure and Economic Growth (GRDP)". The analytical tool used is panel data regression. This situation shows that improving infrastructure will support economic growth.

Research on Ogun (2010) utilize the theory of economic growth, the theory of infrastructure, and the general theory of 1936 on employment and currency criticality as the theoretical basis. The research used panel data. The study employed panel regression to estimate quarterly GDP, Nigerian per capita income, per capita expenditure, and overall infrastructure data. The estimation result revealed that there is a negative correlation between infrastructure investment and poverty in Nigeria. In addition, overall, infrastructure investment can also reduce poverty in Nigeria.

Ayuso *et al* (2011) researched the impact of infrastructure on total factor productivity and its determinants in Mexico. The study relies on basic structure theory as a theoretical basis. The study examined panel data that consist of Mexico's GDP, investment, number of workers, and infrastructure during 1970-2003. This study indicates that infrastructure (roads, ports, and airports), telecommunications, and household appliances (water and electricity) are positively correlated with the growth of private production factors. Imran & Niazi, (2015) conducted research about infrastructure and growth. The study used the theory of infrastructure and the theory of economic growth as the theoretical basis. The data panel is utilized in this study includes Pakistan's GDP data from 1976 to 2011 and Pakistan's infrastructure (roads and telecommunications) data from 1975 to 2011. The results showed that infrastructure development (electricity, telecommunications, transportation, and clean water) positively affects economic growth

Infrastructure is an important factor

influencing economic growth. Indonesia has the lowest score for infrastructure competitiveness, and the score is declining compared to other industries' competitiveness. Indonesia put the education and health sector in the APBN as a priority. DIY is one of the provinces in Indonesia and well-known as a city of education. DIY obtains special funds from the Indonesian State Budget, which can fund development to support economic growth. The priority of infrastructure development is education and health, which is in line with the priorities of the Indonesia State Budget. The background explained that this study is conducted to determine whether the budget allocated to DIY and allocated for the development of health and education infrastructure and Cities in Special Region of Yogyakarta Province.

2. Methods

This research model refers to Maqin (2011). The dependent variable is the economic growth of districts/cities in DIY. The independent variables are education infrastructure and health infrastructure. The econometric model is as follow:

$$G = \alpha + \beta_1 JSN + \beta_2 SS + \beta_3 JRSU + \beta_4 JPUSU + e$$

Variable specification:

G : Growth

α : Constanta

β : Coefficient Variable

JSN : The number of public schools

JSS : The number of private schools

JPUSU : The number of public health service

JRSU : The number of public hospitals

E : *error term*

This study utilized secondary data generated from Statistics of the Special Region of Yogyakarta. This study employed panel regression to estimate panel data which consists of time series data from 2009 to 2014 and cross-section data of districts and cities in DIY Province. According to Gujarati (2006), three models usually employed to estimate panel data are *Pooled Least Square* (PLS), *Fixed Effect* (FE), and

Random Effect (RE). Panel data regression has several approaches that can be chosen to estimate panel data in research are as follow:

1. Pooled Least Square (Common Effect)

Pooled Least Square is the most straightforward approach to estimate panel data. This approach only combines time series and cross-section data using the OLS method known as Common Effect estimation. This approach does not pay attention to individual dimensions and time.

2. Fixed Effect

One way to deal with the PLS problem is to assume that differences between individuals can be accommodated through differences in intercepts. Therefore, each α_i will be treated as an unknown parameter and will be estimated. Although the intercepts between individuals are different, each individual does not vary over time (time-invariant). Therefore, this model is called a fixed effect (FEM)

3. Random Effect

The random effect model is explained with the assumption that each variable has different incepts. The intercept is assumed to be a random or stochastic variable. This model is instrumental represents the population

4. Findings and Discussion

Figure 1 shows the average economic growth in DIY Province from 2009 to 2019 was 5.30%. The highest value of economic growth is 13.49%, and the lowest value is 3.06%. The highest value of economic growth is in Kulonprogo Regency in 2019, and the lowest value of economic growth is in Kulonprogo Regency in 2010.

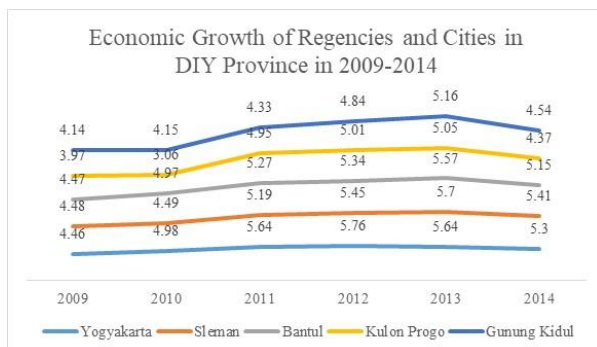


Figure 1: Economic Growth of Regencies and Cities

in DIY Province in 2009-2019

Figure 2 shows that the average number of public hospitals from 2009 to 2019 is 12 units. The highest value in public hospitals is 28 units, and the lowest value is three units. The highest value in the number of public hospitals is in Sleman Regency from 2016 to 2017. Then for the lowest value, the number of public hospitals is in 2009 to 2012 in Gunung Kidul Regency.

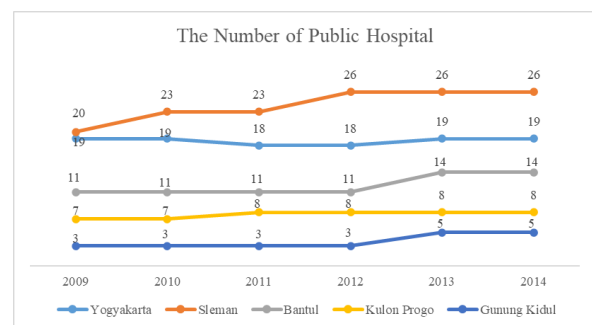


Figure 2: The number of public hospitals in Regencies and Cities in DIY Province 2009-2019

The average number of public health from 2009 to 2019 was 24 units. The highest value in the number of public health centers is 33 units, and the lowest value is 16 units. The highest value in the number of public health was in Gunungkidul Regency in 2018. Then for the lowest value, the number of public health centers was in 2017 to 2019 in Yogyakarta City.

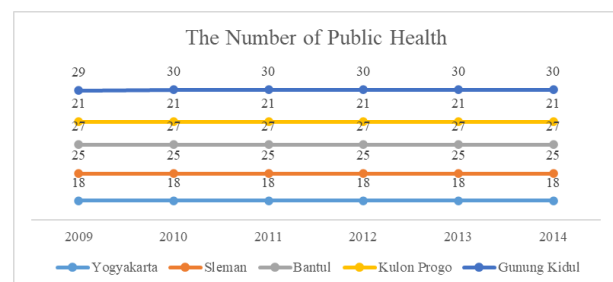


Figure 3: The number of public health centers in Regencies and Cities in DIY Province 2009-2019

According to Chow test, Hausman test, and Lagrange multiplier Pool Least Square model is preferred. The econometric model is as follow:

$$G = \alpha - 0.001450 \text{ JSN} - 2.236440 \text{ JSS} + 0.018456 \text{ JRSU} + 0.050570 \text{ JPUSU} + e$$

The number of public schools has a negative and significant effect on economic growth. It means that more development of public schools will reduce economic growth in the Regency/City in the DIY Province. It explained that the economic growth is reduced by 0.14 percent as the number of public schools increases by one school.

The number of private schools has a negatively significant effect on economic growth. More private school development will reduce economic growth in the Regency/City in DIY Province. If the number of private schools increases by one school, it will reduce economic growth by 22.36 percent. The development of educational infrastructure in private schools and public schools will still have a negative impact. It is because, in the long term, the benefits or positive impacts can be seen from the development of new infrastructure based on (Khan, 2020). The research results showed that there is a correlation between infrastructure and GDP growth in the long term. Therefore, in the short term, the development of educational infrastructure will not necessarily affect economic growth positively. In short, the availability of good educational infrastructure affects the quality of education provided and affects the educational output. Therefore, good output (skillful, expert, and productive) does not necessarily boost economic growth at that time. This research is also in line with Maharani (2019), which shows that the development of educational infrastructure has a negative impact on economic growth.

The number of public health centers in each district / city in Yogyakarta has a positive significant effect on economic growth. It means that more health centers will increase economic growth in the Yogyakarta district/city. If the number of hospitals increases by 1, it will increase economic growth by 5.05 percent. The development of health infrastructure can improve the health services for the community, leading to the community's health status

improvement. Healthy people will have higher productivity and create maximum work efficiency. The existence of productive economic activities will have a positive impact on economic growth. This research is also in line with the results of Pane *et al* (2020).

All dependent variables (number of public hospitals, number of public health centers, number of public schools, and number of private schools) have a significant and simultaneous effect on the economic growth of districts/cities in DIY Province. The R-squared value showed 0.842985. This means that 84.29 per cent of the dependent variable can be explained by independent variables, the remaining 15.71 percent is explained by variables outside the model.

Agrawal (2019), showed that actual investment and infrastructure play an essential role in accelerating India's GDP. Sports and educational infrastructure have a significant and beneficial effect on economic growth. A cost-benefit analysis showed that an increase in GDP from electricity and road infrastructure investments would provide about two and a half times the benefits, while education and telecommunications would be six to eight times. This showed that economic policy should pay more attention to the development of physical infrastructure, especially the improvement of educational facilities and infrastructure, to achieve and maintain India's economic growth. Empirical studies by Agrawal (2019) and Imran and Niazi (2015) showed that infrastructure positively impacts economic growth. Therefore, infrastructure development is a top priority, and development through public sector development plans is essential.

A study by Ramadhan (2019) also highlighted that the realization of the education infrastructure development budget and the community economic budget had a positively significant impact on improving community welfare. It is reflected in the increase in GDP per capita in eastern Indonesia. The result is also a high-level effort by the government to reduce inequality while increasing justice in Indonesia's central and eastern

regions. An empirical study by Palei (2015) stated investment needs to be maintained in order to increase employment. Good health and a high education workforce leading to accelerated economic growth. Thus, it can be implied that infrastructure can boost human resources. This research is also in line with Kodongo & Ojah (2016). Therefore, increasing the supply and the quality of infrastructure is very important for economic development.

5. Conclusion

This study concluded that the average economic growth in DIY Province in 2009-2019 was 5.30%. Therefore, Kulonprogo Regency has the highest economic growth in 2019 and the lowest economic growth in 2010.

The average number of public schools from 2009 to 2019 was 516 units. Gunungkidul Regency had the most public schools in 2010. The least public schools were in Yogyakarta City in 2018. The average number of private schools from 2009 to 2019 was 168 units. The highest number of private schools was in Sleman Regency in 2018. Then the least private schools occurred in 2012 in Yogyakarta City. While the least private schools in Yogyakarta City. The average number of general hospitals from 2009 to 2019 is 12 units. The highest number of public hospitals was in Sleman Regency from 2016 to 2017, and the least was in Gunungkidul Regency from 2009 to 2012. The average number of public health centers from 2009 to 2019 was 24 units. The highest number of public health centers is in Gunungkidul Regency in 2018, and the least is in the city of Yogyakarta from 2017 to 2019.

The partial test results show that the number of public schools, the number of private schools and the number of public health services have a significant effect on economic growth. The variable number of public schools has a negative and significant effect on growth. The variable number of private schools has a negative and significant effect on growth. This means that the more construction of public schools and private schools will actually reduce the economic growth

rate of districts/cities in the province of DIY. The economic growth is reduced by 0.14 percent as the number of public schools increases by one school and if the number of private schools increases by one school, it will reduce economic growth by 22.36 percent. The more the number of public health services will increase the economic growth of districts/cities in the province of DIY, if the number of hospitals increases by 1, it will increase economic growth by 5.05 percent

6. Recommendation

The local government needs to improve infrastructure development, especially education infrastructure and health infrastructure, to increase district/city economic growth in the Special Region of Yogyakarta Province. The Special Region of Yogyakarta government should increase the infrastructure quantity and the quality of existing infrastructure. Thus, the positive impact of infrastructure development on economic growth can be realized.

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