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THE EFFECT OF PUBLIC HOUSING CONSTRUCTION ON ECONOMIC GROWTH IN INDONESIA

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ABSTRACT

The development of public housing infrastructure can encourage the opening of isolated areas, reduce production costs, create new centers of economic activity, expand employment opportunities, increase consumer purchasing power, and trigger economic growth at regional and national levels. This study investigates the effect of public housing on economic growth in Indonesia. The control variables included telecommunications, electricity, and education. The research method used was multiple linear regression with a panel data approach in 34 provinces of Indonesia from 2011 to 2019. The results show that telecommunications and education have a positive and significant impact on economic growth in Indonesia. Meanwhile, housing and electricity have no significant effect on economic growth in Indonesia. These results imply a need to evaluate the benefits of public housing development. Telecommunication infrastructure development must be evenly distributed so people can access the internet to support economic activities. In addition, the government must formulate effective policies so that the people of Indonesia can access education equally.

JEL : H41, H44, H53, H54.

Keywords: *economic growth, public infrastructure, education*.

ABSTRAK

Pembangunan infrastruktur perumahan rakyat akan membuka daerah terisolir, menekan biaya produksi, mendorong munculnya pusat-pusat kegiatan ekonomi baru seperti industri dan pasar, memperluas kesempatan kerja, dan meningkatkan daya beli konsumen serta dapat mendorong pertumbuhan ekonomi pada level regional maupun nasional. Studi ini mengindentifikasi pengaruh perumahan rakyat terhadap pertumbuhan ekonomi di Indonesia. Penelitian ini menggunakan variabel kontrol telekomunikasi, listrik, dan pendidikan. Metode penelitian yang digunakan adalah regresi linier berganda dengan pendekatan data panel pada 34 provinsi di Indonesia periode 2011-2019. Hasil penelitian menunjukkan bahwa telekomunikasi dan pendidikan berpengaruh positif dan signifikan terhadap pertumbuhan ekonomi di Indonesia. Sementara itu, perumahan rakyat dan listrik tidak mempengaruhi pertumbuhan ekonomi di Indonesia. Implikasi dari hasil tersebut adalah perlunya evaluasi penerima pembangunan perumahan rakyat, serta pembangunan infrastruktur telekomunikasi harus merata agar masyarakat dapat mengakses internet untuk mendukung kegiatan ekonominya. Selain itu, pemerintah harus membuat formulasi kebijakan yang tepat agar pendidikan dapat di akses merata oleh penduduk Indonesia.

Kata Kunci : *pertumbuhan ekonomi, infrastruktur publik,pendidikan.*

1. INTRODUCTION

Development is one of the main functions that governments must perform as policymakers. The concept of development contains the meaning of resource allocation, regulation, and community empowerment. Development is allocating resources owned by the public, such as natural, energy, financial, and human resources (Stiglitz, 2000). From this perspective, development must expand people's access to the necessary resources to achieve

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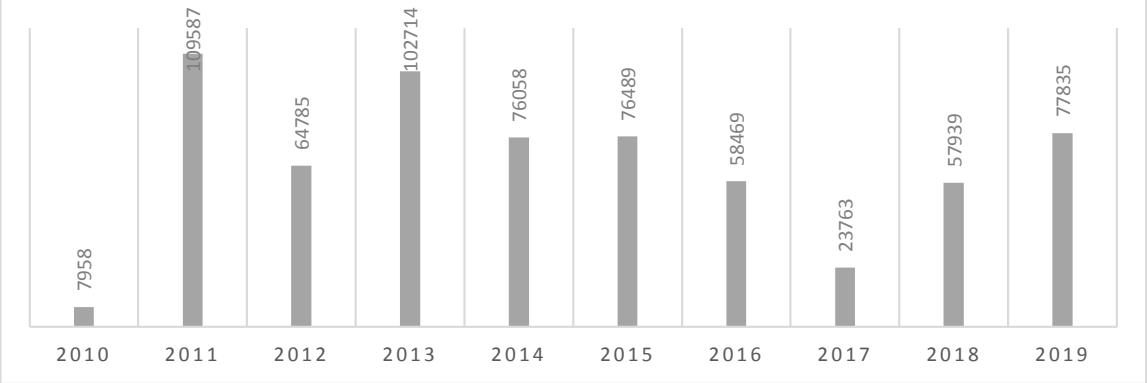
welfare. Development must also facilitate access to and enjoyment of various basic service facilities such as education, health, clean water, electricity, and security and ensure the availability of infrastructure and resources for community survival.

Infrastructure development is an important aspect of accelerating national and regional development. Infrastructure is a driving force of economic growth (Fadilla, Zumaeroh, Kencana, Retnowati, Purnomo, Winarto, & Adhitya, 2022). The rate of economic growth and investment in a country or region is inseparable from the availability of infrastructures, such as transportation, electricity, telecommunications, sanitation, energy, and housing. Positive economic growth indicates an increase in economic activity. By contrast, negative economic growth indicates a decline (Maqin, 2011), which causes infrastructure development to become the foundation for sustainable economic development. Improvements in government infrastructure are expected to spur economic growth.

According to Friawan (2008), there are three main reasons infrastructure is vital in economic integration. First, the availability of new infrastructure is the main engine of economic development. Second, to get the full benefits of integration, the availability of an infrastructure network is crucial in facilitating trade and investment activities. Third, attention to improving infrastructure is also important in overcoming disparities in economic development between countries. The infrastructure consists of several sub-sectors in which infrastructure in the form of housing and electricity are essential to support people's lives.

The Indonesian government carries out some developments to help people have decent housing, one of which is through public housing loans. For the loan payment, the Indonesian people get support from housing financing liquidity facilities for low-medium-income communities. The Ministry of Public Works and Housing in Indonesia is developing housing infrastructure. Figure 1 shows the number of housing developments completed by the ministry.



Source: Ministry of Public Works and Housing, 2020

Figure 1. Number of housing developments completed by the Ministry of Public Works and Housing Indonesia in 2010-2019

Based on the data, public housing development in Indonesia has significantly fluctuated from 2010-2019. During that period, the largest number of housing developments was in 2011. It was 109,587 units, and at least in 2010, as many as 7,958 units. The average number of the construction of houses that had been realized by the Ministry of Public Works and Housing was 65,560 units. According to Sahi, Arham, & Santoso (2020), proper housing will give the

community better quality of life because a decent house will also support health and increase human resources' productivity. On a large scale, human resource productivity will drive economic growth. The following Figure 2 shows the economic growth in Indonesia from 2010-2019.

Source: BPS-Statistics Indonesia, 2020

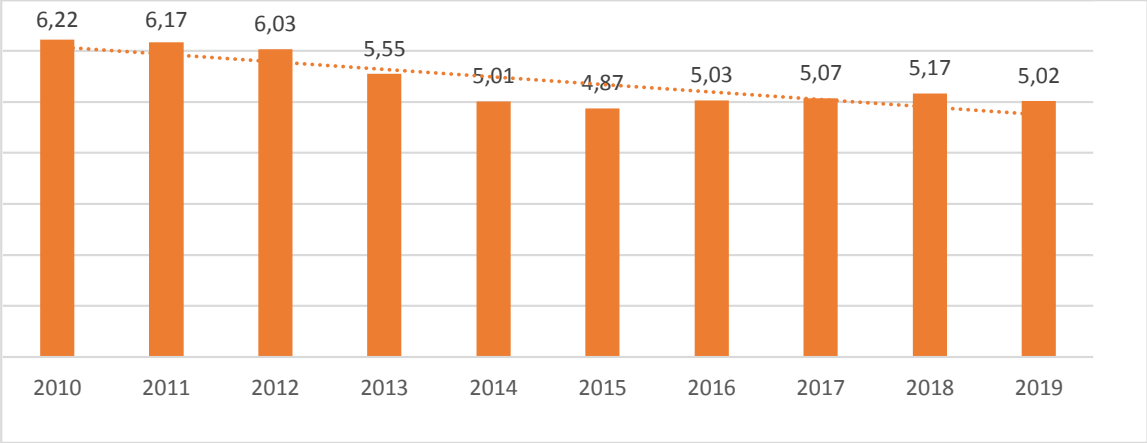


Figure 2. Indonesia's Economic Growth in 2010-2019

After reviewing the data roughly, the economic growth in Indonesia tended to decline from 2010-2019. It does not seem in line with public housing development during that period. It is important to conduct a deep analysis to prove the empirical relationship between housing and economic growth. The provision of infrastructure is the main requirement for the development process. Government spending on infrastructure provision is expected to increase production capacity and have a multiplier effect on the economy. The development of public housing infrastructure will open up isolated areas, reduce production costs, encourage the emergence of new centers of economic activity (such as industry and markets), expand employment opportunities, and increase consumer purchasing power.

We will look at the previous empirical study of the relationship between housing-related government spending and economic growth. The findings of Sahi et al. (2020) explain that long-term government spending for housing development has a positive and significant effect on economic growth. Srinivasu & Rao (2013) found that the existence of public housing infrastructure will encourage regional and national economic growth. In addition, Wang, Kim, & Kim (2021) show a relationship between housing affordability and economic development. On the other hand, the findings of Gunter & Manuel (2016) show that subsidized housing in South Africa does not fully contribute to local economic development. Meanwhile, Chen, Guo, & Zhu (2011) found that the relationship between housing investment and economic growth differs across three regions in China. Based on some of these studies, there is still a gap in opinion regarding the relationship between government spending on housing development and economic growth.

Referring to research recommendations by Kumari & Sharma (2017) which analyze the effect of physical infrastructure and social infrastructure on economic growth, they propose the need for research that investigates the effect of public housing development on economic growth. In addition, previous studies were limited in analyzing this matter, so it is necessary to conduct similar research to empirically prove the effect of public housing development on economic growth. Previous inconclusive studies with different results support it, so this research is feasible. This study will use other independent variables to analyze economic growth in Indonesia, such as

telecommunications, electricity, and education, as control variables to obtain valid results. Thus, the purpose of this study is to analyze the amount of public housing, telecommunications, distributed electricity, and length of education on economic growth in Indonesia

2. THEORETICAL FRAMEWORK AND EMPIRICAL STUDIES

Todaro & Smith (2011) stated that economic growth is one of the goals that need to be achieved by a country. Economic growth is a quantitative measure that reflects the yearly economic developments of a country in comparison to the previous year. According to Mankiw (2007), economic growth reflects a country's national output that determines the rate of their living standard. In practice, high economic growth could be one of the main goals for national development in developing countries. Economic growth is closely related to the increased production of goods and services in society.

Glasson (1997) explains that long-run economic growth theory needs to consider short-term factors such as technology, wages, population prices, and income distribution. The use of macroeconomic models can be used to explain the endogenous factors of regional economic growth. This model is supply oriented and presents regional output according to certain regional aspects, each of which can be analyzed independently. Capital is the main factor used in the production process. The reason is that natural resources are meaningless if there is no capital to manage them, which will drive output growth.

Labor is a factor that drives economic growth. A larger number of workers will increase the level of production. A region's land and natural resources describe the ability of the potential revenue of the area. Natural resources are used as input for production activities. Transport resource as infrastructure has an essential role in increasing economic growth. Improved transportation infrastructure will impact accessibility, so regional economic activities will also develop. The increasingly high use of technology greatly encourages economic growth by accelerating the production process of goods and services. The weak political and social structure of society is an obstacle to economic development and growth. An efficient, strong, efficient and non-corrupt political system is thus very important in building the economy and economic growth (Glasson, 1997).

According to the Keynesian, theory of economic growth holds, the view that the role of government influences economic growth. Keynesian theory has the equation $Y = C + I + G + (X-M)$, where G is the aggregate of government spending. The equation suggests that increasing or decreasing government spending will increase or decrease national income. Many considerations underlie government decision-making in regulating its expenditure. Government spending is needed to improve physical capital, such as basic infrastructure and public facilities, as well as for the improvement of public services such as health, education, social protection, order and peace, and the environment, which in turn can improve the economy and people's welfare (Rosen, 2014). Government spending on infrastructure in the long term can increase economic growth and provide a multiplier effect on improving people's welfare (Srinivasan, 2013; Gemmell, Kneller, & Sanz, 2016). For example, government spending on agriculture, industrial development, trading activities, cooperatives, and micro, small and medium enterprises.

The government needs to provide adequate basic infrastructure to develop potential economic sectors. Infrastructure development can improve welfare and economic growth by

increasing the efficiency of economic activity. Infrastructure recovery contributes to increasing productivity and supporting long-term economic growth. Higher economic growth can be seen in places where adequate infrastructure is available. The unavailability of infrastructure is one of the obstacles to achieving rapid economic growth. Maqin (2011) states that infrastructure has a statistically significant and strong impact on economic growth.

Infrastructure is a physical facility used by the community, for example, public housing, roads, bridges, hospitals, telephones, and others. Mankiw (2007) explains that, theoretically, infrastructure is an embodiment of public capital, which is realized from the existence of government capital. The infrastructure supports the interrelation of systems in life. The availability of adequate infrastructure affects various systems in human life. Therefore, a clear understanding of this is necessary when determining a policy. In addition, the availability of infrastructure also affects the country's economic development, especially regarding how fast it accelerates and how broad the economic growth is (Todaro & Smith, 2011).

Todaro & Smith (2011) stated that improving human quality can be achieved through several policies. One of them is the development of education which can determine the direction of economic growth in the future. Community welfare is directly proportional to the community's need for quality education. The higher a person's educational level, the more productive they are, increasing their individual and national income. Increasing personal income will also increase the ability to consume and therefore increase economic growth. Life expectancy can be an indicator of successful development in the health sector. An increase in life expectancy can reflect the socioeconomic conditions of society, health, and the environment. Conversely, a decrease in the socioeconomic conditions of a period in a society can reduce life expectancy.

Several researchers have analyzed the impact of government infrastructure spending on economic growth. Sahi et al. (2020) studied this topic in the province of Gorontalo. Using panel data from 5 regencies during 2013-2017, they found that government spending on housing development positively and significantly affected economic growth in the long run. In other words, the construction of public housing will increase economic growth. In addition, Srinivasu & Rao (2013) with a meta-analysis, explained that in India, an area with good public facilities such as communication housing, water, sanitation, and energy would attract more investment, especially small entrepreneurs and the community. The marginalized will start economic activities to increase income. Thus, the existence of public housing infrastructure will be able to drive regional and national economic growth. Wang et al. (2021) show that there is a relationship between housing affordability and economic development. It is because house prices are very affordable and can attract investment, especially in the property sector.

On the other hand, the findings of Gunter & Manuel (2016) show that subsidized housing in South Africa does not fully contribute to local economic development. Meanwhile, Chen et al. (2011) use Chinese provincial-level data from 1999 through 2007 to investigate the relationship between housing investment and economic growth in China. They found that relationships are different across three regions in China. In the east region, housing investment plays a big role in economic growth. Still, housing investment is unlikely to contribute to economic growth in the middle and western regions.

H1: Public housing has a significant positive effect on economic growth

Because there are previous empirical studies that show inconclusive results, we will fill this gap by carrying out follow-up studies. This study includes other independent variables in analyzing economic growth in Indonesia, such as telecommunications, electricity, and education. In the millennial era like today, telecommunication which is growing rapidly has an essential role in increasing economic growth. Myovella, Karacuka, & Haucap (2019) in their research on telecommunication development in Sub-Saharan Africa, said that telecommunication infrastructure, especially the Internet, must be developed to encourage economic growth. Policymakers must boost the spread of the Internet more widely so that all groups can access it. Dutta (2015), and Chakraborty & Nandi (2011) prove their opinion that telecommunication infrastructure causes economic growth indirectly through other infrastructure, namely production factors, and thus improves the economy. It is in line with the research results of Myovella et al. (2019) and Vu (2013) which state that telecommunications affect economic growth.

H2: Telecommunication has a significant positive effect on economic growth

The prosperity felt by the people is also determined by the facilities for electricity supply. The development of electricity infrastructure is believed to drive the real sector and trigger production activities. Sumadiasa, Tisnawati, & Wirathi (2016) show that electricity infrastructure affects economic growth in Bali. Also, Owusu-Manu, Jehuri, Edwards, Boateng, & Asumadu (2019) explain that power generation capacity is identified as an index of infrastructure stocks that has the biggest positive impact on Ghana's economic growth. In addition to the quality of infrastructure in driving economic growth, the quality of human resources also plays a role in economic growth. Previous empirical studies by Nowak & Dahal (2016), Donou-Adonsou (2018), Hanushek (2016) state that education has a positive and significant effect on economic growth. Better quality of human resources will boost individual and national productivity so that economic growth will be even higher.

H3: electricity has a significant positive effect on economic growth

Human capital is input for economic growth. Besides that, it is also the goal of economic development. Thus, education is crucial in improving the quality of people's lives to increase economic growth. Handayani, Bendesa, & Yuliarmi (2016) explained that education has a positive and significant effect on economic growth. That is, higher education can have a direct effect on economic growth. Hasiani, Maulida, & Sari (2015) and Nurwijayati (2017) stated that the average length of schooling positively affects economic growth. Any increase in the average length of schooling will result in economic growth. The average length of the school provides an overview of the community's knowledge in pursuing education which will ultimately increase productivity through the skills possessed by the workforce. The higher the population's education, the higher the knowledge and skills they have, thereby boosting productivity and indirectly affecting economic growth.

H4: length of education has a significant positive effect on economic growth.

To illustrate the relationship between the variables of public housing, telecommunications, electricity, and length of schooling to economic growth is illustrated in the following chart.

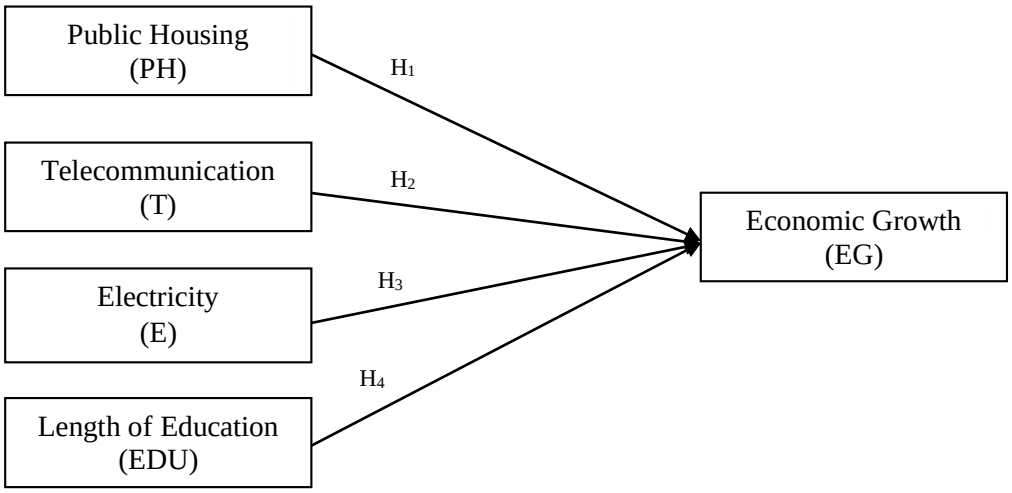


Figure 3. Research Framework

3. RESEARCH METHODS

This study uses quantitative data from 34 provinces in Indonesia from 2011-2019. The data consists of economic growth, economic infrastructure, and social infrastructure. In this study, infrastructure capital is then broken down into economic infrastructure, represented by electricity, and social infrastructure, represented by education. The data is obtained from the publication of BPS-Statistics Indonesia. The dependent variable is economic growth. Meanwhile, independent variables are public housing, telecommunications, electricity, and education. Table 1 shows the operational definitions of the variables of this study.

Table 1. Operational Definition of Variables

Variable	Operational Definition	Unit
Economic growth	Changes in the value of Gross Domestic Product (GDP) compared to a year earlier	Percent
People's housing	Subsidized public housing built by the government	Unit
Telecommunications	Number of means of communication owned by the population	Unit
Electricity	The total distributed electricity production used by consumers of electricity service users both households, social bodies, government agencies, industry, and so on recorded by the State Electricity Company	Watt
Education	The proxies of the Average Length of Schooling as the number of years passed by the residents of the formal education	Year

The research method used is multiple linear regression with a panel data model. Furthermore, the model is developed under the research carried out as follows:

$$\mathrm{EG}i\,t = \alpha + \beta\,1\mathrm{LnPH1}i\,t + \beta\,2\mathrm{LnT2}i\,t + \beta\,3\mathrm{LnE3}i\,t + \beta\,4\mathrm{EDU4}i\,t + U\,i\,t \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

where:

α : constant;

β1, β2, β3, β4 : coefficient regression

EG$i\ t$	: economic growth;
PH1$i\ t$	: number of public housing;
T2$i\ t$	: telecommunication;
E3$i\ t$	: electricity delivered;
EDU4$i\ t$	: length of education;
$U\ i\ t$	: error component;
i	: province (cross-section);
t	: period.

The panel data model equation above is then estimated using the common effect, fixed effect and random effect model approaches. The next step is determining which method is more suitable for research (Gujarati & Porter, 2009). Next is to test the classical assumptions. The classical assumption test of the regression model is used to determine whether the model is good or not. The classic assumption tests are normality, multicollinearity, heteroscedasticity, and autocorrelation.

4. DATA ANALYSIS AND DISCUSSIONS

The model fit test is used to select the best model in the research. To determine the best regression model using the Chow test, Hausman test, and Lagrange multiplier test. Table 2 shows the output of the Hausman test.

Table 2. Model fit Test Results

Chow test			
Effects Test	**Statistic**	**d.f.**	**Prob.**
Cross-section F	60.339924	(4.69)	0.0000
Cross-section Chi-square	120.196533	4	0.0000
Hausman Test			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	P-Value
Cross-section random	16.95531	4	0.9852
Lagrange Multiplier Test			
Null (no rand. Effect) Alternative	Cross-section One Sided	Period One-sided	Both
Breusch-Pagan	47.97137 (0.0000))	0.2020707 (0.6733)	44.08520 (0.0000)

Source: Processed Data, 2021

Table 2 shows that the output model fit the results. The results of the Chow test show that the Prob Cross-section value is 0.0000, which is less than alpha (α: 0.05). Thus the best model used is the Fixed Effect Model compared to the Common Effect Model. Hausman test shows that the Probability value of chi-square is 0.9852 more than alpha (α: 0.05), so the best model is a random effect model. The final test is the Lagrange-Multiplier. The Lagrange-Multiplier test selects the best model among the random effect model or common effect model. The method used for the Lagrange multiplier test is Breush-Pagan by comparing the probability value of Breush-Pagan with alpha. The Lagrange-Multiplier test shows that the chi-square value of 0.0000 is less than the alpha of 0.05, so the random effect model is the best. The regression result can be seen in Table 4.

After selecting the best regression model, then the model must be tested with classical assumptions, including normality, heteroscedasticity, multicollinearity, and autocorrelation tests. The normality test is used to determine whether the residual value is normally distributed or not. Based on the normality test, the Jarque-Bera probability value is less than 5 percent alpha (p-value= 0.0000). The regression results were detected as having an abnormal data distribution. However, Tinungki (2007) states that if the research data is not normally distributed but has a large amount of data, it can be said that the data is normally according to the central limit theorem so that the normality test results can be ignored.

The heteroscedasticity test was used to determine whether the residual variance is constant for all observations in the regression model. This study uses the white method with the criteria of testing that if the probability value is less than 0.05, there is a symptom of heteroscedasticity. Based on the test results using White's method, the probability value is more than 0.05, which is 0.9127, so it can be concluded that there are no indications of a heteroscedasticity problem in the research model.

The multicollinearity test determines whether a high correlation exists between the independent variables in a multiple linear regression model. This study uses the Variance Inflation Factor test. Then, the autocorrelation test was carried out to determine whether errors are correlated over time (serial correlation) in the data of this study. Autocorrelation test using the Durbin-Watson method. Table 3 shows the summary multicollinearity test and autocorrelation test.

Table 3. Autocorrelation Test Results

Multicollinearity Test		
Independent Variable	VIF Value	
Public Housing	2.605513	
Telecommunications	9.649805	
Electricity	2.400571	
Education	7.783937	
Autocorrelation Test		
Durbin-Watson value	Value dU	Value 4 - dU
1.992	1.842	2.558

Source: Processed Data, 2021

In the multicollinearity test, each independent variable's variance inflation factor value is less than 10, so there is no correlation between independent variables. The Durbin-Watson score is 1,992. With k of 4 and n of 306, the value of du = 1,842 and 4-du = 2,558. Thus, the Durbin-Watson value lies at du < DW < 4 -du, namely 1.842 < 1.992 < 2.558. Thus, it can be concluded that the regression model does not have autocorrelation.

Table 4. Regression result of Random-Effects Model

Independent variables	**Regression coefficient**	**$t_{stat.}$**	**t_{table}**	**Prob.**
Public Housing (PH)	0.002478	0.006088	1.96889	0.9951
Telecommunication (T)	0.040463	2.572415	1.96889	0.0106*
Electricity (E)	0.861393	0.957731	1.96889	0.3391
Education (EDU)	0.340345	1.869085	1.65058	0.0627**
Constant = 1.890115				
Adj. R Square = 0.012461				
$F_{stat.}$ = 0.118713				

(*) denotes 5 percent significance level
(**) denotes 10 percent significance level.
Source: Processed Data, 2021

Based on table 6, the equation between the independent variable and the dependent variable can be stated as follows:

EG = 1.890115 + 0.002478LnPH1 + 0.040463T2 + 0.861393E3 + 0.340345EDU4…….(2)

In this study, telecommunications and education have a positive and significant impact on economic growth in Indonesia. Meanwhile, public housing and electricity have no significant effect on economic growth in Indonesia. The public housing regression coefficient results were obtained at 0.002478, assuming ceteris paribus. It explains that if public housing increases by 1%, Indonesia's economic growth will increase by 0.002478%. The value of the telecommunications regression coefficient is 0.040463, which means that if telecommunications increases by 1%, Indonesia's economic growth will increase by 0.040463%.

The value of the electric regression coefficient is 0.861393. It explains that if electricity increases by 1 %, Indonesia's economic growth will increase by 0.861393%. The value of the education regression coefficient is 0.340345, which indicates that if the average length of schooling increases by 1%, Indonesia's economic growth will increase by 0.340345%.

The Effect of Public Housing on Economic Growth

The probability of public housing is 0.9951, which indicates that public housing has no significant effect on economic growth in Indonesia. This finding is not in line with the proposed hypothesis. However, these results are in line with research from Sahi et al. (2020) that public housing does not affect economic growth. The impact of public housing development takes a long time, so the utilization and benefits cannot be felt immediately. This study adopts the Keynesian theory, which explains that the government's role in spending on infrastructure development has a direct effect on economic growth. However, this finding is different from Keynesian theory because the units of measurement for public housing variables are different. People's housing is physically measured as having an indirect effect on economic growth, meaning that the construction of public housing at this time will impact economic growth in the long term.

In general, subsidized housing programs in several countries positively impact the economy Wang et al. (2021) because house prices are very affordable and can attract investment, especially in the property sector. However, this study's results indicate that Indonesia's subsidized housing program has not had a significant impact. According to Soeroto (2018), one of the causes of the inefficiency of the subsidized housing program in Indonesia is that the Indonesian government has not committed to making the housing program a priority sector in economic development. In addition, relatively high mortgage interest rates prevent low-income people from accessing housing. It is exacerbated by the difficulty for people working in the informal sector to access formal financing, in this case, KPR. Sahi et al. (2020) show that the subsidized housing program in Gorontalo Province has no significant effect on economic growth and poverty.

South Africa's public housing program also does not have a significant impact on its economy. According to Gunter & Manuel (2016), the housing program in South Africa is not used as a potential driver of local economic development. There are several reasons for this: there is a low management capacity for administration, and housing that is built tends to be informal, or it

means that it is still below housing standards. This situation is exacerbated by the limited institutional capacity of the South African state in managing land data collection. Some of the correlations with Indonesia are represented by Parmadi (2018) which shows that the implementation of the subsidized housing program policy in Buleleng Regency has problems: (1) There are still no clear community standards and targets; (2) the absence of a representative government office for the subsidized housing program; and (3) lack of management in determining locations for the development of the subsidized housing program. Aminova & Malau (2020) also explained that the obstacles to the subsidized housing program in the city of Padang were the lack of administrative management and public awareness of the use of the subsidized housing program. Some of these explanations support the research results that there is no significant relationship between subsidized housing and economic growth in Indonesia. Since the government has yet to make the housing sector a priority for national development targets, there is still a need for one-stop management in terms of regional and national administration.

Sumadiasa et al. (2016) stated that infrastructure does not affect economic growth. It is also supported by research conducted by Iriyena, Maulida, & Sari (2019) which concluded that road length does not affect economic growth. Economic infrastructure does not directly affect economic growth because it takes time to build asphalt roads and could be the reason for not having an indirect effect. However, infrastructure must still be built and improved to improve connectivity by increasing access to potential areas such as industrial areas/special economic zones, agriculture, plantations, tourism in strategic areas, national and regional tourism, ports, airports, and opening isolated, remote, underdeveloped areas, borders, and outermost and small island areas.

For the same reason, the government is also pushing for more programs in infrastructure development. The presence of infrastructure can open up new access or make it easier to reach new areas, which can increase economic activity. Infrastructure development in Indonesia seeks to connect and provide access between regions of Indonesia to create a logistics network and connect production centers, such as from agricultural production and fishing to small industries.

The Effect of Telecommunication on Economic Growth

The regression coefficient of the telecommunications variable is 0.0404, and the probability is 0.0117. It shows that telecommunications positively and significantly affects Indonesia's economic growth. The high use of telecommunications equipment in Indonesia, especially in economic activities, can be seen from the many online shops, marketplaces, and various conveniences for buying online. Many economic activities carried out using these telecommunication tools have accelerated economic growth in Indonesia. This finding aligns with the hypothesis that telecommunications significantly positively affect economic growth. Myovella et al. (2019) and Vu (2013) explained that telecommunication infrastructure, especially the Internet, must be developed to encourage economic growth. The existence of telecommunications infrastructure will impact information related to goods and services in the community to influence demand and supply, increase goods and services production activities, and encourage economic growth.

According to Myovella et al. (2019), telecommunication infrastructure, especially the Internet, must be developed in sub-Saharan African countries to encourage economic growth. Policymakers should consider promoting more internet users in Sub-Saharan Africa as mobile users become more accessible to the broader population. In Indonesia, telecommunication

encourages all-digital economic transactions to encourage economic growth. The Bank Indonesia report shows that in 2019, online trade transactions' value reached IDR 13 trillion every month. With fair and equitable telecommunication development, Indonesia will be more advanced in various aspects of life, such as economic, social, educational, and health. Furthermore, the existence of telecommunications infrastructure impacts business actors, especially micro, small and medium enterprises (MSMEs), who can sell their products to various regions. It has been proven that in 2019, 8 million MSMEs were using the marketplace for transactions (Ministry of Communication and Informatics, 2022).

The Effect of Electricity on Economic Growth

The probability of electricity is 0.8310. This value shows that electricity does not significantly affect Indonesia's economic growth. These findings are not in line with the hypothesis that electricity has a significant positive effect on economic growth. This result is in line with the research of Best & Burke (2018), Atems & Hotaling (2018), Calderón, Moral-Benito, & Servén (2015), and Calderón & Servén (2010) that electricity does not affect economic growth. Bacon & Kojima (2016) suggest that researchers can identify the positive impact of energy use, especially electricity, on economic growth by examining the negative relationship between electricity prices and economic growth. Changes in electricity prices do not only change the quantity of electricity consumed. Spending on electricity also increases when the price elasticity of energy demand is less than one absolute value. Thus, an increase in the price of electricity reduces the use of electricity by a smaller percentage than an increase in the price of electricity.

This result is inconsistent with the study by Thaker, Thaker, Amin, Pitchay, Nugroho, Pasay, & Panennungi (2019) which stated that electrical energy consumption positively affects economic growth. In order to maintain the supply of energy, there is a need for other energy sources to be developed, which means a large capital is needed as well as collaboration in developing a sustainable energy supply. The government has also instructed all ministries and government agencies to support the development of electric cars. The use of electric vehicles is increasing daily, both for two-wheeled and four-wheeled vehicles. Almost every country in Europe, America, Australia, and China has introduced electric vehicles.

The Effect of Education on Economic Growth

The Education regression coefficient is 0.340345, and the education probability is 0.0627. The coefficient and probability values indicate that education affects Indonesia's economic growth. Education is still an essential requirement in Indonesia for someone who wants to get a job. Therefore, better education in Indonesia does not only have an impact on the quality of human resources but also on the productivity of society to encourage economic growth. These findings do not align with the hypothesis that education has a significant positive effect on economic growth. However, it is in line with research by Kotásková, Procházka, Smutka, Maitah, Kuzmenko, Kopecká, & Hönig (2018), Nowak & Dahal (2016), Donou-Adonsou (2018), Hanushek (2016), Purnomo, Istiqomah, & Suharno (2019) and Purnomo (2022) which state that education has a positive and significant effect on economic growth.

Higher education can generate high income so that highly educated people have the potential to encourage economic growth further. The importance of education for the economic growth of a region follows the opinion of Todaro & Smith (2011) which explains that the education sector plays a major role in shaping the ability to develop countries to absorb modern technology

and develop production capacity to create sustainable growth and development. The average length of education is an important indicator that shows the quality of a country's population. Generally, in developed countries, the population already has a high awareness of the importance of education and mastery of science and technology. It can be seen from the high level of education participation in developed countries. Limited funds require prioritizing various options in the field of education that are effective in the long term in order to encourage economic growth.

The new growth theory also emphasizes the importance of the government's role, particularly in enhancing human capital development to boost and raise productivity to sustain economic growth. Education is a tool for adopting modern technology to increase the economy's production capacity. Education is a vital component in growth and development as an input for the aggregate production function. A productive workforce can produce good quality goods and services if these workers receive education or training. Thus it can be concluded that the higher a person's education level, his productivity will directly increase so that human resources will drive regional and national economic growth (Todaro & Smith, 2011).

One of the motivations for developing the level of education to build a country's economy is that the higher the education, the better the rationality of people's knowledge in thinking. It can cause people to take a more logical step in decision-making. Education can equip people with the technical knowledge to lead and run modern businesses and develop more modern small and micro enterprises. Good skills and knowledge acquired through education can be a driving force for innovation. The higher a person's education level and the longer his experience at school or courses, the higher his knowledge, and skills, so his productivity is also high (Hasiani et al., 2015).

5. CONCLUSION, SUGGESTION AND LIMITATION

The results show that the construction of public housing and electricity does not significantly affect Indonesia's economic growth. This is because Indonesia's electricity infrastructure and public housing were not evenly distributed. In addition, telecommunications and education had a positive and statistically significant effect on Indonesia's economic growth. Many economic activities that use these telecommunication tools have accelerated economic growth in Indonesia. In addition, better education in Indonesia will impact not only the quality of human resources, but also the productivity of society to drive economic growth.

The implication that can be formulated is the need to evaluate recipients of public housing development. Telecommunication development must be evenly distributed in rural and urban areas so that all people can access the Internet to support economic activities. Additionally, the government should make education accessible to everyone. This finding is theoretically inconsistent with the Keynesian theory, which explains that the role of the government through government spending on infrastructure development has a direct effect on economic growth. The role of the government is only in the form of a stimulus for the construction of public housing, so that house prices are below market prices in Indonesia. Meanwhile, the community still bears the burden of purchasing subsidized housing. The limitation of this study is that it only measures the public infrastructure of public housing. Public infrastructure, such as airports, stations, and ports, is still available. Thus, recommendations for further research should include other public infrastructure variables.

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