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NOTIFICATION OF ACCEPTANCE

Dear Prof Muhammad Zilal Hamzah,

On behalf of the ICSED 2021 Secretariat, we are pleased to inform you that your abstract (ICSED 2021: 050-044) titled "Geographic and Infrastructure Approach for Poverty Reduction at Village Level in West Java Province" has been reviewed and accepted for presentation at the conference.

An invoice for your conference fee will be sent to you shortly. Please make payment according to information provided in the invoice in order to confirm your presentation slot.

In order to be part of the proceedings you are now requested to submit your full paper for a formal review process. Please log in to our system and submit your document before Sunday, October 31st, 2021 in MS Word format. You are strictly advised to adhere to the style guideline provided on our website.

Please note that invitation letters will only be issued upon receiving the conference fee payment.

We look forward to your submission and look forward to seeing you on the conference day.

Yours sincerely,

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**3rd INTERNATIONAL CONFERENCE ON
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(ICSED 2021)**



BEST PAPER (ECONOMICS)

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Geographic and Infrastructure Approach for

Poverty Reduction at Village Level in West Java Province

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Geographic and Infrastructure Approach for Poverty Reduction at Village Level in West Java Province

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Abstract

Introduction: This study examines the factors affecting poverty with geographic and institutional approach in West Java Province. Importantly, the study uses raw data from the Village Potential Data Collection (PODES) released by the Central Bureau of Statistics of Indonesia in 2011, 2014, and 2018.

Methodology: The quantitative panel data regression method was used, where fixed effect was the best model.

Result: The results show that poverty is influenced by several variables representing geography and infrastructure. As a geographic factor, the village distance to the nearest hospital increases poverty significantly. Other infrastructure variables, such as the number of SD and SMP, *posyandu*, street illumination, and market, positively affect poverty. Furthermore, the results also showed that asphalt or concrete road infrastructure and healthy sanitation, as well as the community's economic condition represented by the primary income source in agriculture, significantly increases poverty. The number of SMEs and the GDRP rate control have a significant and positive impact, while HDI has a negatively affect poverty.

Conclusion: As an institutional product, infrastructure is the basis of human development process, which helps overcome geographical constraints and encourages economic and social activities.

Keywords: Geography, Infrastructure, Poverty, Village potential, PODES, Panel Analysis.

1. Introduction

Poverty is a big problem worldwide, especially in developing countries. Various strategies have been developed in response to poverty, including geographic and institutional approaches. The geographic approach asserts that poverty relates to the region's geographical conditions, which are essential in distributing income and economic growth of countries (Sachs et al., 2001). The essential factor in this regard includes the area's location, which reflects the distance and travel time, as well as natural resources (Démurger et al., 2002; Okwi et al., 2007; Liu and Xu, 2016; and Rahayu et al., 2019). Poverty is associated with unfavorable geographical conditions. Mountain topography that is difficult to reach, the location of the remote area far from the city center, and the distance, as well as extended travel time, are some of the factors leading to poverty.

According to the institutional approach, institutional factors are the most crucial element for a country's economic progress. Prosperity and poverty are related to institutional factors, such as governance, regulations, or social institutions in the society. A number of studies concluded that institutions positively contribute to a country's economy (Acemoglu et al., 2002; Glaeser et al., 2004; and Helliwell et al., 2014). According to this view, the right geographic conditions, good

technology, or a better quality population may cause economic growth. However, all these cannot trigger welfare in the absence of an excellent institutional system.

Studies have been conducted on the influence of geographic and institutional factors on poverty in Indonesia, though few used village-level panel data. Administratively, Indonesia is divided into 34 provinces, with 83,813 villages having very diverse regional characteristics (BPS, 2020). This study analyzes geographic and institutional factors represented by infrastructure with village potential data from 2011, 2014, and 2018.

West Java Province is vulnerable to poverty, probably due to its large population. According to BPS data, the projected population of West Java in 2018 was 48,475 (BPS, 2020), which is the largest of all provinces in Indonesia. The number of poor people in West Java Province is the third-largest after East and Central Java, which is 3,615.79 (BPS, 2019). The West Java Province location varies geographically, as the western part borders and becomes a buffer area for DKI Jakarta Province as the nation's capital. Other areas are located far from the center of the national or provincial capitals. As a province with a large population and diverse geographical conditions, its administration requires a sound institutional system. Adequate infrastructure is needed to support the population's economic and social activities to achieve better welfare. The infrastructure includes educational facilities, health, electricity, roads, street lighting, sanitation, and clean water, markets and financial institutions, as well as credit assistance. Furthermore, this study includes various community economic conditions proxied by the primary source of income for the majority of the population, as well as the number of small and medium enterprises (SMEs). The control variables for the rate of Gross Domestic Regional Product (GDRP) and Human Development Index (HDI) were added. They served as explanatory variables to capture the macroeconomic and social effects on poverty in West Java Province.

2. Literature Review

2.1 Empirical Studies

According to Démurger et al. (2002), the geographic location of provinces far from the city center is economically underdeveloped than China's metropolitan provinces. The distance and travel time to public resources, as well as the region's elevated location, partially explain poverty in Kenya (Okwi et al., 2007). Using the per capita consumption as a measure of welfare, Gounder (2013) found that differences in rural and urban areas' status significantly determine Fiji's people's welfare. Rural households have a lower per capita consumption than in urban areas. Furthermore, Liu and Xu (2016) reported that greater multidimensional poverty identifies and distributes in disadvantaged areas in rural China. The difference in the location of the regions between rural and urban areas significantly determines the level of poverty. This is reflected in the lower per capita consumption of rural communities than people living in urban areas. Also, geographical factors in the form of the distance between the village and the hospital significantly affect poverty in Riau Province, Indonesia (Rahayu et al., 2019).

Acemoglu's research during 2001-2005 showed that good institutions' quality significantly influences the determination of long-term economic growth. Furthermore, Heliwell et al. (2014) conducted a study on 157 countries from 2005 to 2012. The study stated that countries with good quality governance and government services could provide a better life quality for their citizens. Institutions contribute to increased development and economic growth as facilitators and regulators. In this case, efforts to improve welfare and alleviate poverty is by providing various facilities or infrastructure and regulations that enable people to carry out economic and social activities. Some of the infrastructure needed by the community include education, health services, roads and street lighting, electricity, markets, and banking institutions. Others include access to clean water and sanitation, as well as policies to provide assistance or credit facilities to people's businesses.

The following empirical studies examine poverty and its determining factors. Gounder (2013) stated that regional location and electricity significantly and negatively affect per capita consumption in Fiji. According to Balisacan et al. (2002), the State Electricity Company (PLN) positively and significantly increased income, reducing poverty in Indonesia. Hakim and Zuber's (2008) established that the electricity technology facility of PLN increased poverty cases in the former Surakarta residency. However, Nashwari et al. (2016) reported that the number of villages with asphalt roads significantly reduced poverty among food crop farmers in the city districts in Jambi Province. From Sari and Kawashima's (2016), clean water and sanitation significantly affect poverty reduction in Indonesia, while Rahayu et al. (2019) established that river transportation facilities increase poverty in Riau Province.

2.2. Poverty Theory

Poverty is defined as the gap from a prosperous life, specifically a person's inability to maintain a minimum living standard (World Bank in Haughton and Khandker, 2012). The term poverty has a series of meanings connected by many similarities. Many aspects are related to poverty, such as material. In this case, people are deemed inferior when they lack goods or services, such as food, clothing, fuel, or shelter (Spicker, 2007). Absolute poverty is a condition characterized by a severe shortage of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education, and information. This condition depends on income, as well as access to services (UN, 2005).

The debate on how to view poverty began in the 1970s, with two initial approaches emerging, including the basic needs and capabilities. The basic needs approach has main materialist ideas, such as food, shelter, sanitation, and clean water. Individuals are considered inferior when they cannot meet minimum needs or access these goods and services. This approach has inspired the government to provide various public services to alleviate poverty.

The capability approach emerged in the 1980s to measure poverty using the basic needs approach. As Sen (1999) presented, the capability approach's main idea is based on function and freedom elements. A person carries out functions in a better life and has the same freedom to get value for something valuable. Hence, the capability approach defines poverty as a condition in which an individual or society lacks opportunities to hinder freedom (Wong, 2012). Furthermore, Alkire

(2012) mentioned critical dimensions of capability, including empowerment, knowledge, social relations, religion, health, security, and employment. This means that the poverty reduction policy is empowerment. The Human Development (HD) approach emphasizes improvements in life quality as the primary goal of development (Stewart, 2019).

Thinking about poverty underwent renewal in the 1990s with the emergence of debates between geographic and institutional views. These two approaches do not individually define and measure poverty. This is because they look at poverty from different dimensions. The geographic approach looks at poverty from a region's geographical conditions. In this view, an area is geographically less favorable when it has a tropical climate, is isolated, lacks natural resources, and has a mountainous topography with difficult access. These are the factors that lead to an increase in poverty. Institutional views, which were developed in response to geographic views, hold that institutions are an essential factor in determining a country's economic progress or failure. Institutions derive various forms of rules, regulations, and facilities to ensure true economic sustainability.

Based on these views, many studies link the factors causing prosperity or poverty in a region or country. These factors could be in macro/aggregate or micro/individual/household size. Several determinant factors of poverty include economic growth (Fosu, 2017; Barros and Gupta, 2017; Nandori, 2012; Hatta and Azis, 2017), and the Human Development Index or HDI (Megawati and Sebayang, 2018; Zuhdiyaty and Kaluge, 2018; Sayifullah and Gandasari, 2016). Furthermore, other factors include the area's location, which is measured from a distance (Okwi et al., 2007; Gounder, 2013), topography (Wahyuni and Damayanti, 2014), road infrastructure, education, health, and electricity facilities (Gounder, 2013; Wahyuni and Damayanti, 2014). The fulfillment of basic needs, such as drinking water, sanitation, clean water (Sari and Kawashima, 2016), and entrepreneurship (Naminse and Zhuang, 2018) are other determinant factors. Additionally, rural regions are more prone to poverty than urban areas (Djamaluddin, 2014). The poverty and inequality in West Java Province are influenced by various factors, such as the quality of human resources, education infrastructure, health, and electricity. Other factors are the fulfillment of basic needs, including clean water, sanitation, the internet, and employment status.

2.3. Geography Factor

Physically, geographic aspects play an essential role in determining economic growth. Geographical conditions are seen from several aspects, such as location (area, shape, and position of map coordinates), as well as relief, which includes surface shape and altitude. Other aspects include weather and climate, as well as the resources available. Based on the map, an area occupies different positions on the earth's surface because some regions are located around the equator with low latitudes and tropical climates. In contrast, others are far from the equator with temperate climates. Some areas are fertile plains, while others are barren mountains or hills. Differences in geographic positions lead to disparities in resource ownership.

Using a Geographic Information System (GIS), areas near the equator have a scorching climate and are pockets of massive poverty. Moreover, tropical regions are vulnerable to various diseases, and the population has an inadequate health level. Production technology in agriculture and health

in tropical countries is lagging in comparison to temperate countries. There is the exploitation of natural resources in tropical regions, leading to poverty (Sachs et al., 2001; Sachs 2003)

2.4. Institutional And Infrastructure Factors

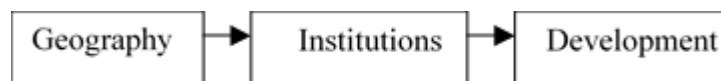
Another essential factor that determines long-term economic performance is an institutional factor. According to North, the institutional definition is a set of rules, compliance procedures, as well as moral and ethical behavior norms. These aspects are designed to limit individual behavior in the interest of maximizing the wealth or utility of economic actors (Glaeser et al., 2004). Institutions differ from factors of education, natural resources, population, or technology. Institutions are often referred to as rules of the game that live and operate on society's social realities (Yustika, 2012). In this case, countries with good institutions have good economic performance. According to (Acemoglu and Robinson, 2017), one of the right institution characteristics is the wide availability of public services.

The availability of various infrastructures is needed to improve people's living standards. Infrastructure refers to the construction of public physical facilities, such as roads, airports, ports, electricity, telecommunications, clean water, sewage treatment, hospitals, and schools. In economics, infrastructure is a form of public capital comprising public roads, bridges, sewer systems, and others, as a government investment (Mankiw, 2003). According to Grigg (1998), infrastructure is a physical system that provides a means of drainage, irrigation, transportation, buildings, and other public facilities. Hence, institutions and infrastructure need to meet various basic human social, and economic needs, making the society more prosperous. However, institutions are not the first-factor causing economic growth. There is human and social capital, whose role cannot be overlooked in shaping society's institutional capacity and productivity to enhance economic growth (Glaeser, 2004).

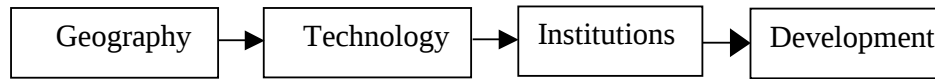
2.5. The Relationship Between Geography And Institutions With Development

The development process reflects a complex interaction between institutions, policies, and geographies. According to McArthur and Sachs (2001), geographic and institutional factors significantly influence per capita income. Geographical factors influence per capita income and economic development through institutional channels in several schemes, as shown below:

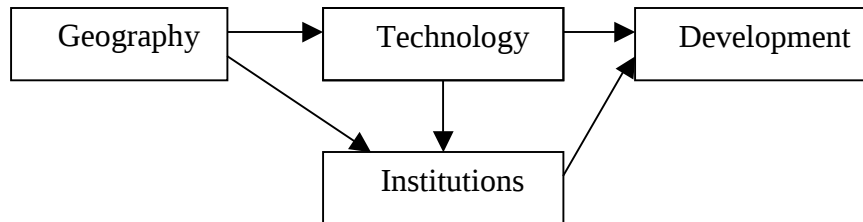
1. Geography affects per capita income primarily through institutional channels, with the following pattern:



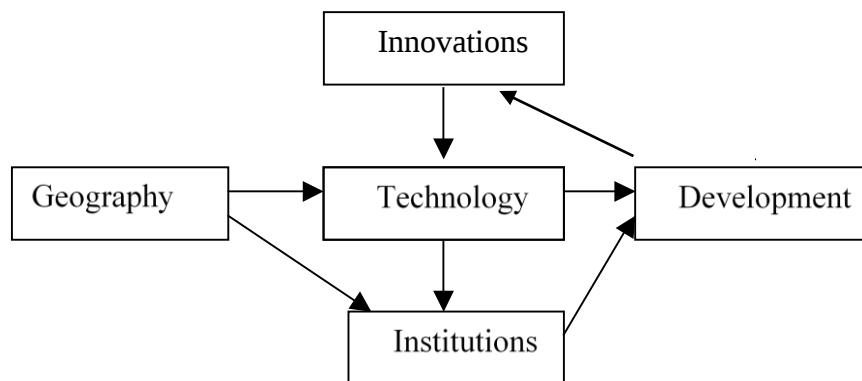
2. Geography affects per capita income primarily through technology and institutional channels with the following pattern:



3. Geography affects economic development through institutions (technology) and directly through effects on productivity, with the following pattern:



4. Poor geographic position directly affects production and indirectly affects institutions, both leading to low development levels. Underdevelopment results in low innovation and slow technological change, with the following pattern:



3. Research Method

This study uses raw data from the Village Potential Data Collection (PODES) of West Java Province released by the Badan Pusat Statistik (BPS) in 2011, 2014, and 2018. The scope of analysis is at the village level with the household level analysis unit. The study used a sample of 26 regions from 27 population districts or cities in West Java Province. The number of research observations was 5,793 villages or wards.

3.1. Research Variables

This study used poverty as the dependent variable, while the independent variables were broadly divided into 4 groups, including:

1. Geographical variable represented by:
 - a. Topography
 - b. Distance from the village office to:
 - i. the regent or mayor's office
 - ii. the nearest hospital
 - iii. the nearest market
2. Institutional variables represented by infrastructure and facilities for carrying out economic, social, and other activities, consisting of:
 - a. Educational infrastructure, which is the number of primary schools (SD) and junior high schools (SMP)
 - b. Health infrastructure
 - c. Road infrastructure
 - d. Street illumination infrastructure
 - e. Market infrastructure
 - f. Economic infrastructure
 - g. Facilities for drinking water sources
 - h. Sanitation facilities
 - i. Electricity infrastructure
 - j. Credit facilities
3. Economic condition variables, including the primary source of income and the number of small and medium enterprises (SMEs)
4. Control variables, comprising the rate of Gross Regional Domestic Product (GRDP) and Human Development Index (HDI)

Research Model Specifications

This study uses a panel data econometric model using the specifications referring to Balisacan et al. (2002), Nandori (2012), Barros and Gupta (2017), and Fosu (2017). The research model used to analyze the factors influencing poverty in West Java Province is as follows:

$$Y_{it} = f(X1_{it}, X2_{it}, X3_{it}, \dots, Xn_{it})$$

$$Y_{it} = \alpha + \beta_1 X1_{it} + \beta_2 X2_{it} + \beta_3 X3_{it} + \beta_4 X4_{it} + \beta_5 X5_{it} + \beta_6 X6_{it} + \beta_7 X7_{it} + \beta_8 X8_{it} \\ + \beta_9 X9_{it} + \beta_{10} X10_{it} + \beta_{11} X11_{it} + \beta_{12} X12_{it} + \beta_{13} X13_{it} + \beta_{14} X14_{it} \\ + \beta_{15} X15_{it} + \beta_{16} X16_{it} + \beta_{17} X17_{it} + \beta_{18} X18_{it} + \beta_{19} X19_{it} + \beta_{20} X20_{it} \\ + \beta_{21} X21_{it} + \varepsilon_{it}$$

Variable description can be explained as follows:

- | | |
|----|--|
| Y | = poverty, proxied by the number of people receiving the <i>Jamkesmas/Jamkesda/ BPJS kesehatan</i> receiving contribution assistance (PBI) |
| X1 | = topographic, dummy variable (1 = plain, 0 = not plain) |
| X2 | = distance from the village office to the regent/mayor's office (km) |
| X3 | = distance from the village office to the nearest hospital (km) |
| X4 | = distance from the village office to the nearest market (km) |

- X5 = number of public and private primary schools (SD)/madrasah ibtidaiyah (MI)
- X6 = number of public and private junior high schools (SMP)/madrasah tsanawiyah (MTS)
- X7 = number of health facilities within the scope of the village, including puskesmas with and without inpatient care, auxiliary puskesmas, polyclinic or medical center, doctor's practice place, midwife's practice, poskesdes and polindes
- X8 = number of posyandu (Integrated Health Post), one of the places for community participation managed and organized by, for, and with the community. This aims to obtain essential health services and the growth of children under 5 to improve the quality of human resources.
- X9 = number of general practitioners or specialists, dentists and midwives living in the village
- X10 = type of road Surface, dummy variable (1 = asphalt, 0 = gravel/soil/other)
- X11 = village street illumination, dummy variable (1 = there is street illumination, 0 = no street illumination)
- X12 = market, dummy variable (1 = there is a market, 0 = no market)
- X13 = dummy variable for the existence of a bank (1 = there are banks, 0 = no banks)
- X14 = dummy variable of drinking water facilities (1 = clean water, 0 = not clean water)
- X15 = family or household sanitation facility dummy variable (1 = healthy sanitation, 0 = unhealthy sanitation)
- X16 = the percentage of the number of households using electricity PLN to the total household
- X17 = dummy variable of the main source of income for the majority of the population (1 = agriculture, 0 = non-agriculture)
- X18 = number of micro and small enterprises (having a workforce of fewer than 20 people)
- X19 = dummy variable for the existence of credit facilities received by villagers or sub-districts (1 = there is a credit facility, 0 = no credit facility)
- X20 = GRDP growth (percent)
- X21 = human development index (percent)
- ε = error factor

The data analysis techniques used in this research are descriptive statistics and regression. The descriptive statistics method quantitatively describes the distribution characteristics of one data against another. This method involves calculating the average value (mean), standard deviation, highest (maximum), and lowest (minimum) values from a data set. Panel data regression techniques were used to analyze the independent variable's effect on the dependent variable. There are 3 techniques (models) to estimate the panel data regression model's parameters, including the standard effect model, fixed effect, and random effect. The best estimation model is determined through statistical testing with the Chow and Hausman test.

4. Result

Table 1 summarizes the research variables, whose statistical values are the number of observations, the mean, the standard deviation, the minimum, and maximum values. The number of observations used is different for each variable, ranging from 16,413-16,478 throughout 2011, 2014, and 2018, indicating unbalanced panel data.

Table 1. Statistics Summary

	Variable	Observations	Mean	Std.Dev	Min	Max
Dependent Variable						
Poverty	Y	16,478	1,560.21	1,717.08	1	19,914
Independent Variable						
A. Geography						
Regional Topography	X ₁	16,478	0.74	0.44	0	1
Village Distance to the Office of Regency	X ₂	16,477	27.44	26.85	0	280
Village Distance to the Hospital	X ₃	16,456	13.84	18.72	0	99.9
Village Distance to the Market	X ₄	16,413	4.72	8.18	0	99.9
B. Institutions (Infrastructure and policies)						
Number of SD	X ₅	16,478	3.55	2.89	0	41
Number of SMP	X ₆	16,478	1.04	1.35	0	22
Number of Health Facilities	X ₇	16,478	4.45	6.15	0	177
Number of Posyandu	X ₈	16,476	7.52	5.23	0	96
Number of Health Workers	X ₉	16,478	5.27	10.72	0	495
Road Infrastructure	X ₁₀	16,474	0.92	0.27	0	1
Street illumination	X ₁₁	16,478	0.71	0.45	0	1
Market	X ₁₂	16,478	0.18	0.38	0	1
Bank	X ₁₃	16,477	0.16	0.36	0	1
Clean Water	X ₁₄	16,478	0.42	0.49	0	1
Sanitation	X ₁₅	16,478	0.64	0.48	0	1
Electricity	X ₁₆	16,478	94.27	12.21	0	100
Credit Facility	X ₁₇	16,478	0.67	0.47	0	1
C. Economic Condition						
Source of Income	X ₁₈	16,478	0.91	0.39	0	1
Number of Small and Micro Enterprises	X ₁₉	16,478	36.13	86.80	0	1,297
D. Control Variables						
GRDP Growth Rate	X ₂₀	16,478	5.42	0.96	1.34	7.91
Human Development Index	X ₂₁	16,478	66.57	4.21	59.3	81.06

Source: processed data, 2020

This research model assumes differences in characteristics between villages, though they do not change between times. The assumption arises because each village in the research observation has different characteristics in culture, leadership styles, and social systems. Based on these assumptions, this research is estimated using a fixed-effect model, which captures the differences in these characteristics by adding a dummy variable to the model (LSDV). The estimation model is selected through the Chow and Hausman test to support this assumption.

Table 2. Chow and Hausman Test

No	Test	<i>P-Value</i>	<i>Alpha (α)</i>	Decision
1	Chow	Prob.F = 0.00	0.05	<i>fixed effect</i>
2	Hausman	Prob. <i>Chi-Square</i> = 0.00	0.05	<i>fixed effect</i>

Source: processed data, 2020

Multicollinearity testing aims to determine whether the regression model found a correlation between independent variables or independent variables. The multicollinearity test results between variables showed the highest correlation score of 0.63 in the X2 and X3 variables. This correlation is still allowed because the two variables are not perfectly correlated.

Tables 3 presents tests of heteroscedasticity in the estimated model obtained. Heteroscedasticity testing was carried out using the Wald test.. The model has a p-value (Prob. Chi-square) smaller than 0.05, indicating that H_0 is rejected or H_1 is accepted. Therefore, this model contains a heteroscedasticity problem.

Table 3. Heteroskedasticity Test

Model	<i>P-Value</i> (Prob. <i>Chi-Square</i>)	<i>Alpha (α)</i>	Decision
1	0.00	0.05	heteroskedasticity

Source: processed data, 2020

One method of treating heteroscedasticity in the model is the White or heteroscedasticity-robust standard error. The procedure for this method begins by estimating the panel data regression equation with OLS. The residual value obtained from the regression is then used to calculate each independent variable's variance. This method produces an estimation coefficient that is robust against violations of the homoscedasticity assumption. The resulting estimator is unbiased and consistent, meaning it is valid for the t-test and the F-test.

The regression model tests and classical assumptions have been fulfilled, meaning the estimators produced are unbiased and consistent. Hence, the regression results obtained are valid for the t-test and F-test. Table 4 presents the regression results of fixed-effect panel data with a robust standard error

Table 5. presents the regression results of fixed-effect panel data with a robust standard error. Table 5 shows the regression results obtained using the robust fixed-effect panel data method. The level of significance (α) used in this study was 0.05. This model is designed to determine the factors influencing the number of poor people in West Java Province.

Table 5. Results of Fixed Effect Panel Data Regression

Variables	Y	Standard Error
X ₁	-11.040	(40.268)
X ₂	1.108	(1.187)
X ₃	3.672***	(0.905)
X ₄	-2.606*	(1.362)
X ₅	54.648***	(17.886)
X ₆	49.268**	(21.762)
X ₇	6.489	(6.478)
X ₈	18.879**	(9.135)
X ₉	0.149	(3.483)
X ₁₀	-93.790**	(46.199)
X ₁₁	99.314***	(27.756)
X ₁₂	179.728***	(48.788)
X ₁₃	114.334	(83.997)
X ₁₄	-37.500	(35.964)
X ₁₅	-293.647***	(27.391)
X ₁₆	4.894***	(1.146)
X ₁₇	1.488	(34.088)
X ₁₈	169.387***	(50.199)
X ₁₉	0.628***	(0.199)
X ₂₀	110.391***	(16.024)
X ₂₁	-121.441***	(10.632)
Observations	16,383	
Number of vcode	5,792	
R-squared	0.072	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Source: processed data, 2020

1. Discussion

1.1. Geography variables

A geography variable significantly affecting poverty in West Java Province is the distance from the village to the nearest hospital (X3), with a positive coefficient of 3.67. This result is consistent with the theory that the distance to the hospital from distant villages increases the poverty rate. Hospitals are places of referral health services and are usually located in areas near the city center. These results align with Rahayu's (2019) study, which stated a significant relationship between the distance from health facilities to the villages. The greater the obstacles to accessing health services due to the longer distance, the more indirect it impacts the increase in poverty.

1.2. Institutional and Infrastructure Variables

The institutional and Infrastructure variables that are statistically significant in affecting poverty in West Java Province are:

(i) Number of SD (X5) and SMP (X6)

These two variables significantly influence poverty with coefficients of 54.65 and 49.27 for the number of SD and junior high schools, respectively. Both coefficients are positive, meaning that increasing the number of SD and SMP increases poverty. The outcome of the SD and SMP schools' construction on poverty reduction is not short term. These results are in line with a study by Duflo (2004), which stated that the impact of the construction of SD Inpres in Indonesia in 1974-1978 reduced poverty. This was reflected in the increase in school enrollment rates, salaries, and labor force participation over 13 years. According to (Ren et al., 2017; Joshi and Gebremedhin, 2012), senior secondary and tertiary educations reduce poverty in a shorter period.

(ii) Number of Posyandu (X8)

The number of posyandu significantly affects poverty with a positive coefficient of 18.88. The results showed that increasing the number of posyandu increased poverty. Posyandu is a community-based health effort managed and organized from, by, for, and with the community to implement health development. However, since it does not function as a means of medical treatment, the addition of posyandu is not directly related to poverty reduction.

(iii) Road infrastructure (X10)

The road infrastructure paved with concrete is statistically significant in reducing poverty, with a coefficient of (-93.79). This is in line with many studies' findings that adequate road infrastructure increases population mobility to carry out economic and social activities. Furthermore, a more equitable increase in economic and social activities increases the population's income and welfare in all regions of West Java Province. In this case, a rural connecting road provides opportunities for the communities to increase their income (Syviengxay, 2008). Also, adequate road infrastructure accelerates equitable development between regions.

(iv) Street illumination (X11)

The primary street illumination variable is statistically significant in affecting poverty with a positive coefficient of 99.79. This means that the street lighting facilities in a village increase poverty in West Java Province. These results are in line with (Rahayu et al., 2019). Street lighting facilities are a means of community mobility at night and have no direct link with poverty reduction. However, the street lighting facilities are not well maintained or not functioning correctly. Consequently, the utilization of the central street lighting, whose tax has been paid by the community, is not optimal.

(v) Market Infrastructure (X12)

A market's existence has a statistically significant and positive effect on poverty, with a coefficient of 179.73. This means that the market is one of the means for society to carry out economic activities. The existence of a market with permanent and semi-permanent buildings in one village has encouraged villagers to spend more. In line with Nasution et al. (2014), permanent markets have a positive effect on increasing the population's per capita expenditure.

In some rural communities with agricultural livelihoods, agricultural products' exchange rate is not comparable with that for industrial products to increase poverty (Balisacan et al., 2002). The market has not created opportunities for economic activity to increase people's income.

(vi) Sanitation (X15)

The sanitation variable is statistically significant and hurts poverty with a coefficient of (-293.65). This result means that healthy sanitation reduces poverty in a village population. Since sanitation infrastructure is a significant component in measuring health, it is needed to improve public and environmental health through cleanliness. This study supports Sari and Kawashima's (2016), as well as Suryahadi and Marlina (2018). They stated that a house with healthier sanitation is more prosperous with a lower probability of being poor.

(vii) Percentage of households using PLN electricity (X16)

The variable percentage of households using electricity is statistically significant and positively affects poverty with a coefficient of 4.89. Electricity facilities are a proxy for necessary technology that is accessed by residents or households. This is because electricity is a modern energy source for improving life quality (Hussein, 2012). In modern life, almost all advanced technology is based on the use of electricity. Households must pay installation fees and tariffs every month, that increasing their expenses. However, the use of electricity facilities is not optimal for households, implying that there has not been an increase in income and welfare. These results are in line with Hakim and Zuber (2008), as well as Nasution et al. (2014). They found that households with access to electricity have a positive effect on per capita expenditure. However, these results are contrary to Balisacan et al. (2002), Usman et al. (2006), Maqin (2014), and Gounder (2013). They found that households with access to electricity have the opportunity to increase per capita income.

C. Variable of economic conditions of the community

(i) The primary source of income (X18)

The primary income source for the population significantly and positively affects poverty, with a coefficient of 1169.39. Moreover, the primary source of income for the agricultural sector population increases poverty. These results are in line with Djamaluddin (2014) and Usman et al. (2006), which established that the characteristics of households with agricultural sector income significantly increase poverty. The agricultural sector in developing countries is generally characterized by low productivity, scarce land, lower exchange rates for products, and traditional business management. These conditions cause low income among businesses in the agricultural sector.

(ii) Number of small and medium enterprises (SMEs) (X19)

The number of SMEs is statistically significant and positively affects poverty with a coefficient of 0.628. Ideally, SMEs are considered economic growth engines that facilitate poverty reduction and equitable income distribution in developing countries. The positive value of the SME variable coefficient obtained shows that the community's entrepreneurial aspect is still low and has not alleviated poverty (Hakim and Zuber, 2008). The success of entrepreneurship in reducing poverty is determined by socio-cultural factors in society (Naminse and Zhuang,

2018). The SME sector still has significant challenges and problems, such as access to finance, lack of infrastructure, entrepreneurship training, and management skills that affect its role in reducing poverty (Geremewe, 2018).

4. Control variables.

(i) GDRP growth rate (X20)

The GRDP rate variable is statistically significant and positively affects poverty with a coefficient of 110.39. In theory, the effect of economic growth on poverty is expected to have a negative coefficient. The higher the rate of economic growth, the more opportunities to increase income and welfare. This is in line with several studies, such as Fosu (2017), Barros and Gupta (2017), Jajang et al. (2013), Ginting (2015), and Puspita (2015). However, this study is not in line with these findings. It indicates that the outcome of the increase in economic activity has not been enjoyed equally by all rural or urban village communities in West Java Province (Zuhdiyaty and Kaluge, 2018) and (Nurmainah, 2013).

(ii) Human Development Index (HDI) (X21)

The HDI variable is statistically significant in reducing poverty in West Java Province, with a coefficient of (-121.44). These results are in line with the expected hypothesis. The HDI figure is an enhanced measure of welfare. Poverty is measured from monetary (income) and non-monetary, which includes education and health. Therefore, an increase in the development of human resources' quality reduces the number of poor people. These results are in line with many studies, such as Megawati and Sebayang (2018), Zuhdiyaty and Kaluge (2018), Sayifullah and Gandasari (2016), and Nurmainah (2013).

2. Conclusion

The estimation results with the fixed effect model on poverty in West Java Province provide several conclusions. First, Poverty in West Java Province is a multidimensional problem. Poverty is not always seen from the economic side, either income or expenditure. Poverty can also be viewed from the geographical and institutional dimensions. This can be seen from at least one or several variables of geographical and institutional factors that significantly affect poverty.

Second, distance is a reflection of geographical factors. The distance from the village to the nearest hospital as a proxy for geographical factors is a factor that affects poverty. The distance factor is an obstacle for people to get health services at the nearest hospital. Third, the variables of infrastructure availability are used to represent institutional factors. The infrastructure variables that significantly reduce poverty are roads and sanitation. The availability of adequate road infrastructure will facilitate the mobility of the population between villages, between sub-districts and between districts and cities. Ease of population mobility will increase economic and social activities which have an impact on increasing income and welfare. Furthermore, the availability of healthy sanitation is a factor that will reduce poverty. Healthy sanitation will improve the quality of life in the health sector. Fulfillment of healthy sanitation is needed to support community welfare in the health sector. Meanwhile, several other infrastructure variables, such as the number of schools, posyandu, the percentage of households that use electricity, lighting, and the presence of a market, have a positive effect on poverty. These results indicate that certain conditions are

needed so that the existence of the infrastructure can play an optimal role in improving welfare and reducing poverty.

Fourth, the main source of income for the population is the agricultural sector, which contributes to the causes of poverty in West Java Province. Narrow agricultural land and non-agricultural land conversion have worsened the income and welfare of economic actors in the agricultural sector. The increase in the number of SMEs has also not been able to have a significant role in reducing poverty. The use of macro variables of economic growth as a control variable gives the result that economic growth has not reduced poverty in West Java Province. The increase in the West Java Province GRDP has not yet provided an even trickle down effect for the population. Finally, as an indicator of human development achievement, the HDI variable is statistically significant in reducing poverty. Therefore, increasing the HDI can be one way to reduce poverty in West Java Province.

Fifth, poverty alleviation policies need to be implemented comprehensively by considering all dimensions, including geography and institutions. Geographical constraints in the form of distances that hinder referral health services to hospitals need to be overcome. On other institutional factors such as electricity facilities, the government must re-evaluate the tariff setting policy to reduce the burden of spending on the poor.

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