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Determinants of Regency/City Typology Based on HDI Indicators: Case from West Java, Indonesia

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ABSTRACT

West Java is the most populated province in Indonesia, housing 18% of the total population, and its Gini Ratio shows the prevalence of income inequality. Previous studies have shown a relationship between education and income inequality, partly derived from inequality in education. This study explores the condition of education in regencies/cities in West Java by mapping based on agriculture/non-agriculture classifications, length of the school and life expectancy in 4 quadrants. Significant factors that determine a region in a particular quadrant are explored. Quadrant I is a region of non-agricultural basis, and the average education has graduated junior high. Quadrant III is also a non-agricultural base characterized by elementary school graduates. Quadrant IV is an agricultural base with graduates from elementary school. There is no region in quadrant II, a rural base with junior high graduates. With secondary data from 2017, multinomial logit regression was used for analysis. The result showed life expectancy in quadrants I and III was greater than in IV. Population and gender empowerment index characterize an area in quadrants I and III rather than IV. This is clearer when one looks at the marginal effect where the variable population growth and the development of the gender empowerment index significantly reduce the area's chances of being in quadrant IV. Based on the typology results, we suggest that the government pay more attention to areas in quadrant IV so that educational inequality in West Java can be reduced.

Keywords: Average Length of School, Education Inequality, Gender Empowerment Index, Income Inequality, HDI, Marginal Effect.

INTRODUCTION

West Java has the third-highest GRDP after DKI and East Java for GRDP across Java (BPS, 2021c). The population of West Java is the largest in Indonesia, which is 18.6% (BPS, 2021b). In general, West Java has a reasonably high inequality. West Java is one of the eight significant provinces contributing to the Gini Ratio (BPS, 2021a). Inequalities of income occur in many districts of the city that have income from the trade, hotel and restaurant sector and the manufacturing industry. Because that sector increases the number of workers. The percentage of workers in the industrial sector increases income inequality (Saifuddin, 2014).

Kaasa (2011) states that one of the causes of income inequality is the existence of educational inequality. Some researchers have examined the relationship between income inequality and educational inequality. Woodhall & Psacharopoulus (1985) researched developed countries, and it was proven that there was a relationship between education and income inequality. Educational inequality is positively correlated with income inequality (Földvári & van Leeuwen, 2013).

Reducing educational inequality is needed to access to education by the community becomes easier. Infrastructure as a support for the implementation of education in an area largely determines how people can easily access education. Duflo (2001) study on the development of the Presidential Instruction Elementary School which affects the increase in average education and increase in the value of return on education in Indonesia. The number of primary schools in Indonesia has been fulfilled since the establishment of the presidential Instruction during the New Order. President Soeharto at that time, instructed for the construction of elementary schools in each village.

The Human Development Index (HDI) illustrates how the population can access development outcomes regarding income, health, education and so on. This index was introduced by Pakistani economist Mahbub ul Haq and has proliferated in use due to its simplicity of calculation, although it has been criticized for its simplicity (Klugman et al., 2011). There are three basic dimensions of HDI: longevity and healthy living, knowledge, and a decent standard of living. The HDI value can determine an area's rank or level of development. Even in Indonesia, it can assess the allocator for the General Allocation Fund (GAF).

In addition to HDI, there are also indices to measure equity in an area, namely the Gender Empowerment Index (GEI) (Klasen & Schüler, 2009). GEI is an indicator that shows that women can play an active role in political and economic life. This value emphasizes participation by measuring gender inequality in the economic field, political participation, and decision making. The growth of GEI shows increasing the role of women in both areas, namely economics and politics (Klasen & Schüler, 2009).

The literature deals with the effects of educational inequality on income inequality (Coady & Dizioli, 2018; Digdowiseiso, 2009; Munir & Kanwal, 2020; Rodríguez-Pose & Tselios, 2009). But not many have explored how educational inequality can occur and the best solution to overcome them. The existence of educational inequality received by the community illustrates the condition of educational inequality. Educational disparities can measure the education system's effectiveness and evaluate the educational process (Saifuddin, 2014).

Educational inequality can be measured using the Gini Ratio. It is usually used to measure income inequality. Saifuddin (2014) measures education inequality through the Gini Ratio approach. Oshima (1970) grouped the Gini Index value into three criteria: 1) Inequality is low when the Gini Index is smaller than 0.3; 2) Moderate inequality when the Gini Index is between 0.3 and 0.4; 3) Inequality is high when the Gini Index is greater than 0.4.

Measurement of educational inequality can be measured based on macro or micro data. Digdowiseiso (2010) mentions analyses with macro data, including four indicators, namely: 1) School Participation Rates (SPR); 2) Pure Participation Rates (PPR); 3) Educational attainment; and 4) Literacy rate. According to BPS (2018) the term School Participation Rate is the proportion of school children at a certain age of education in an age group that matches their level of education. The Pure Participation Rate, by definition, is the proportion of school children in a particular age group who attend school at a level appropriate to their age group. Educational attainment refers to the term used by BPS as the highest level of education that a person has completed. The literacy rate is the percentage of people ages 15 and upper who can read and write with understanding a short, simple statement about their everyday lives.

While Tesfeye (2002) revealed the measurement of educational inequality with microdata, four factors influence educational inequality, namely: 1) Family characteristics; 2) Child characteristics; 3) Quality of education; 4) The rate of return of education. In his research, Tesfeye (2002) revealed that including family characteristics consisted of income, family size, welfare level, and parent's education level. Children's characteristics are student/child ability, nutrition, child health, gender, and cognitive skills. Educational quality is measured by indicators of teaching quality, student-to-teacher ratio, class size, teacher qualifications, curriculum, quality of classrooms and teaching equipment, school infrastructure, electricity, drinking water and bathroom facilities. The rate of return from education is an additional return for every other year of education.

In Iran, there is an economic burden on poor families (especially the costs for spending on children in schools) are some of the common factors inhibiting the sustainability of education that affect educational inequality (Rahbari et al., 2014).

A Study in the province of Indonesia (Suryadarma & Suryahadi, 2011), shows the significant influence of poverty in completing education both primary and secondary. Primary and junior high completion indicates that the gap in educational attainment between poor and nonpoor children widens. The gap further widens at senior high completion. Only 37% of poor children finish senior high, while about 58% of nonpoor children graduate from the level. Finally, only 2% of poor children enrolled in college, compared with 24% among nonpoor children. The percentage of poor people is negatively correlated with educational inequality. It means that increases in those variables will decrease educational inequality (Wibowo, 2013).

The results of research in West Java show that poverty affects participation in junior high schools, in addition to per capita GRDP factors and the education of household heads (Khairunnisa et al., 2015).

After researching in 50 districts, the word bank is recommended to strengthen the capacity of local governments to deliver quality education to improve the quality of education in Indonesia (Al-Samarrai., 2013).

Regional typology analysis to measure inequality is more focused on measuring income inequality. The term to measure this typology is known as Klassen’s typology. Kuncoro (2004) mentions indicators to measure this typology are economic growth and per capita income. Lumbantoruan & Hidayat (2015) uses indicators of economic growth and HDI. Klassen's typology divides regions into four quadrants, namely fast-growing and fast-growing regions, developed but depressed areas, fast-developing but not developed regions, and relatively disadvantaged areas. Researchers look at educational inequality from the analysis of regional typologies by adopting the Klassen typology using indicators of the average length of schooling and the division of agricultural and non-agricultural base regions. The classification of agricultural and non-agricultural base areas is based on the Location Quotation (LQ) value (Hendajany & Rizal, 2019; Jijiao Jiang & Junheng Cheng, 2012; Pradana et al., 2019; Sukmawani et al., 2014).

LQ of the agricultural sector less than 1, indicating that this sector is not included in the base sector and is categorized as a relatively lagging sector. This sector has not been able to increase regional income. The agricultural area is somewhat poorer than non-agriculture, which certainly affects the ability of the community to access education.

Education between women and men in West Java is still different in terms of the average length of schooling, especially in regions with agriculture or district-based categories. The education gap of men and women in West Java has generally declined. This can be seen from the difference in the average length of schooling between women and men each year has decreased, for example, the difference of about 0.97 years in 2014 to 0.94 years in 2015 (BPS, 2018). However, the education gap between men and women is seen when comparing agriculture and non-agriculture-based areas. The largest gap occurs in Bogor Regency and the smallest in Cianjur Regency (BPS, 2018).

West Java is a province in Indonesia with the largest population. Indonesia’s population of around 18.12% lives in West Java (BPS, 2018). Large population of course the population growth rate is also large. Population growth in West Java is also uneven for districts/cities. A significant increase (above 2%) occurred in the capital buffer zones such as Bogor, Depok, Bekasi Regency, and Bekasi City. The most considerable growth of around 3.81 was experienced by Bekasi Regency, followed by Depok by 3.43%. The lowest growth experienced by Cianjur Regency was approximately 0.25%.

Researchers have widely researched inequality in West Java. The study uses Klassen typology which divides four classifications, namely areas growing fast and fast forward, advanced but depressed, relatively behind, and developing quickly. Based on 1998-2012 data, which includes fast and developed regions are Purwakarta, Karawang, Bekasi and Bandung. The developed but depressed regional categories include Cirebon Regency, West Bandung, Bogor City, Bekasi City, Sukabumi City, Depok City and Tasikmalaya City. Relatively disadvantaged areas include Bogor, Sukabumi, Cianjur, Bandung, Garut, Tasikmalaya, Ciamis, Kuningan, Majalengka, Sumedang, Subang, and Banjar City Regencies. Fast growing areas include Indramayu Regency, Cirebon City and Cimahi City (Saputra, 2016).

Measurement of educational inequality can also be measured through education. The education Gini measured in 2012 shows that educational disparity in West Java is relatively small; only a few regions have moderate education, namely Bogor, Karawang, and Sukabumi City. Education Gini is calculated through micro data in each district of the city by looking at the average education of the head of the family (Saifudin, 2014). This result, of course, contrasts with research which states that income inequality in an area can be due to educational disparities.

There is still a lack of research on educational inequality, so it is necessary to review this more deeply. Different results from previous researchers, the low level of education from Saifuddin (2014) and the high-income inequality from Akita et al. (2011), are interesting to study more in-depth. The author aims to review educational inequality in West Java by using macro data and regional typology approaches as measured by the average length of schooling and the division of agricultural and non-agricultural regions.

METHODOLOGY

This study uses secondary data in 2017 taken from BPS. Data was collected from 27 districts/cities in West Java and measured the population growth, HDI, schools and the Gender Empowerment Index. The outcome measure in this analysis is the placement of regional types obtained from the study of regional typologies based on the quality of education. Indicators used to analysis regional typologies are the average length of schooling and the grouping of regions on an agricultural and non-agricultural basis. This outcome is related to the value of population growth, growth of HDI, school growth, and the growth of the Gender Empowerment Index.

The reference used from the indicator of the average length of school is a 9-year school a primary compulsory education that students must take. As for the classification of agricultural and non-agricultural base areas based on the Location Quotation (LQ) value. LQ calculation is based on the writings of Miller et al. (1991) modified with concentration in agriculture, with the formula

$$\frac{q_i/q}{Q_i/Q}$$

q_i	:	GRDP of agriculture sector/sub-sector in regency/city i
q	:	GRDP of agriculture sector/sub sector in the province
Q_j	:	Total GRDP in district/city j
Q	:	Total GRDP in the province

According to the mentioned literature, the LQ value of more than one obtained by the district/city indicates that the area is categorized as an agriculture-based region, if it is less than one then it is classified as a non-agriculture-based region. The typological analysis will form four quadrants: non-agricultural regions with education above basic education, agricultural areas with education above basic education, non-agricultural regions with education still below basic education, and agricultural areas with still below basic education. The results of this regional division become an outcome variable for regencies/cities in West Java in the following analysis.

The outcome variable or division of the type of region produced is qualitative. This variable is treated as a category assuming that the level of the type of region does not have a natural sequence, and Stata will use the reference group in its analysis. In general, the Stata software determines the reference area is the region with the highest number of regencies/cities.

The division of regencies/cities in West Java exceeds two categories. Predicting the effect of predictor variables on the dependent variable uses multinomial logistic regression. Assuming a logit multinomial model is a regency/city occupying a particular area based on latent variables or predictor variables. The logistic regression method is part of the Generalized Linear Model (GLM) statistics, producing a predictive equation on the test results.

$P(Y = j|x) = \mu_j(x) \qquad j = 0,1,2$

$Y = 0$, the reference category

The probability of an area with a specific category based on the characteristics of the area or referred to as conditional probability is described as follows:

$$P(Y = 0|x) = \frac{1}{(1 + \exp(\beta_{10} + \beta_{11}x_1 + \cdots + \beta_{1n}x_n) + \exp(\beta_{20} + \beta_{21}x_1 + \cdots + \beta_{2n}x_n) + \exp(\beta_{30} + \beta_{31}x_1 + \cdots + \beta_{3n}x_n)}$$

$$P(Y = 1|x) = \frac{\exp(\beta_{10} + \beta_{11}x_1 + \cdots + \beta_{1n}x_n)}{(1 + \exp(\beta_{10} + \beta_{11}x_1 + \cdots + \beta_{1n}x_n) + \exp(\beta_{20} + \beta_{21}x_1 + \cdots + \beta_{2n}x_n) + \exp(\beta_{30} + \beta_{31}x_1 + \cdots + \beta_{3n}x_n)}$$

$$P(Y = 2|x) = \frac{\exp(\beta_{20} + \beta_{21}x_1 + \cdots + \beta_{2n}x_n)}{(1 + \exp(\beta_{10} + \beta_{11}x_1 + \cdots + \beta_{1n}x_n) + \exp(\beta_{20} + \beta_{21}x_1 + \cdots + \beta_{2n}x_n) + \exp(\beta_{30} + \beta_{31}x_1 + \cdots + \beta_{3n}x_n)}$$

Two binary logit equation models will be obtained from the three conditional probability models. This model compares the conditional probability equation of each category to the reference category probability equation. The two logit equation models are explained as follows:

$$G_i(x) = \frac{lnP(Y = i|x)}{P(Y = 0|x)} \qquad i = 1.2$$

Or

$$G_1(x) = \beta_{10} + \beta_{11}x_1 + \cdots + \beta_{1n}x_n$$
$$G_2(x) = \beta_{20} + \beta_{21}x_1 + \cdots + \beta_{2n}x_n$$

Multinomial logistic regression uses maximum likelihood estimation, which is a recurring procedure. The first iteration called iteration 0, is the log-likelihood of a "zero" model without predictors. Next iteration, predictors are included in the model. In each iteration the log probability increases, when the difference between consecutive iterations is minimal, the model is said to have converged, and the results will be displayed. However, if the value of each iteration continues to grow or shrink, it is said to be not convergent. This causes no results will be displayed in the analysis.

RESULTS AND DISCUSSION

The grouping of regions based on two indicators, namely the average length of schooling and life expectancy can be seen in Figure 1. A reference line for the two indicators is the national average value. West Java has 27 regions consisting of 18 districts and nine cities. The results of the regional typology in Figure 1 are explained further in Table 1.

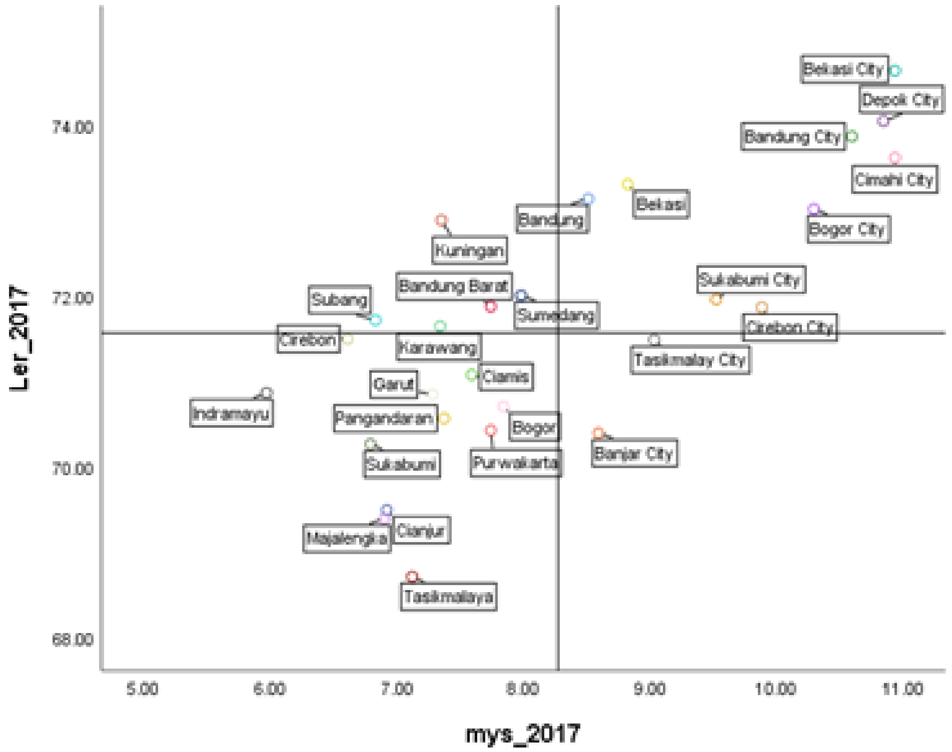

Figure 1. Typology of the West Java region based on indicators of average school duration and life expectancy in 2017

Source: BPS (2018).

Notes: X-axis: Mean Years School; Y-axis: Life Expectancy Rate.

Table 1. Average length of schooling and life expectancy for a regional typology with two indicators

Quadrant	Region	Average	
		MYS	LER
I	Bekasi City, Depok City, Bandung City, Cimahi City, Bogor City, Cirebon City, Sukabumi City, Bekasi, dan Bandung	10.03	73.26
II	Sumedang, Bandung Barat, Kuningan, Karawang, dan Subang	7.45	72.02
III	Banjar City, dan Tasikmalaya City	8.81	70.94
IV	Bogor, Purwakarta, Pangandaran, Garut, Tasikmalaya, Majalengka, Sukabumi, Cianjur, Indramayu, Cirebon, dan Ciamis	6.9	70.34

Source: BPS (2018).

Notes: MYS: Mean Years School; LER: Life Expectancy Rate.

There are seven cities, and two districts that are in Quadrant I. Members of this quadrant have an average length of the school of 10.03 years or have exceeded primary education (9 years). Quadrant I have an average life expectancy of 73.26 years. Quadrant II consists of five districts where an average length of school is 7.45 years, still below primary education. However, Quadrant II has an average life expectancy that is relatively high at around 72.02 years. The other two cities in West Java are classified as Quadrant III. The cities of Banjar and Tasikmalaya, which have an average length of schooling, are still below elementary education, around 8.81 years, and have an average life expectancy of about 70.94 years. The remaining eleven districts are in Quadrant IV, with an average length of the school of 6.9 years and an average life expectancy of 70.34 years. This condition shows that regions with higher education tend to have an increased life expectancy.

This situation is supported by research from Wardhana & Kharisma (2020), which examines that life expectancy depends on GRDP, access to clean water, average years of schooling and poverty levels. The longer the school, the higher the education. Although this condition is different from the research result by Nurhayati & Suparman (2014) in East Java, which states that life expectancy is only influenced by health, not education or economic development. In addition, according to Anggraini & Lisyaningsih (2013), the life expectancy of an area depends on area's characteristics and dramatically influences the environmental conditions of the area.

The grouping of regions based on the average length of schooling, LQ, and LER are obtained, as shown in Figure 2, with the average of each group presented in Table 2. References to the division of this area are the length of compulsory schooling (9 years) and the LQ value indicating the boundary an area is said to be agriculture-based (LQ> 1). The value of life expectancy is reflected in the circle of each district/city. The 9-year-old school reference divides the two regions into an average of above nine years and under nine years. Only eight regions have an average length of school for over nine years, while 19 other regions still have an average of under nine years. The LQ = 1 reference divides the two regions based on agriculture and non-agriculture. There are 14 regions classified as agricultural bases, while 13 others are classified as non-agricultural bases.

Dividing the region produces four quadrants, but only three quadrants have members. Quadrant I is a non-agricultural area with education above basic education. Of the 27 city districts in West Java, 30% are in Quadrant I. Almost all cities are included in Quadrant I except Banjar City. The average length of schooling for this quadrant is 10.25 years, and the average life expectancy is 73.06 years. Quadrant II in agricultural areas with education above basic education does not fall into this category. There are five districts in Quadrant III non-agricultural regions with education still below basic education, namely Bekasi, Bandung, Bogor, Purwakarta, and Karawang. The average length of school is 8.05 years, and the life expectancy is 71.84 years. Quadrant IV has the most members, 52%, with an average length of the school of 6.6 years and a life expectancy of 70.82 years.

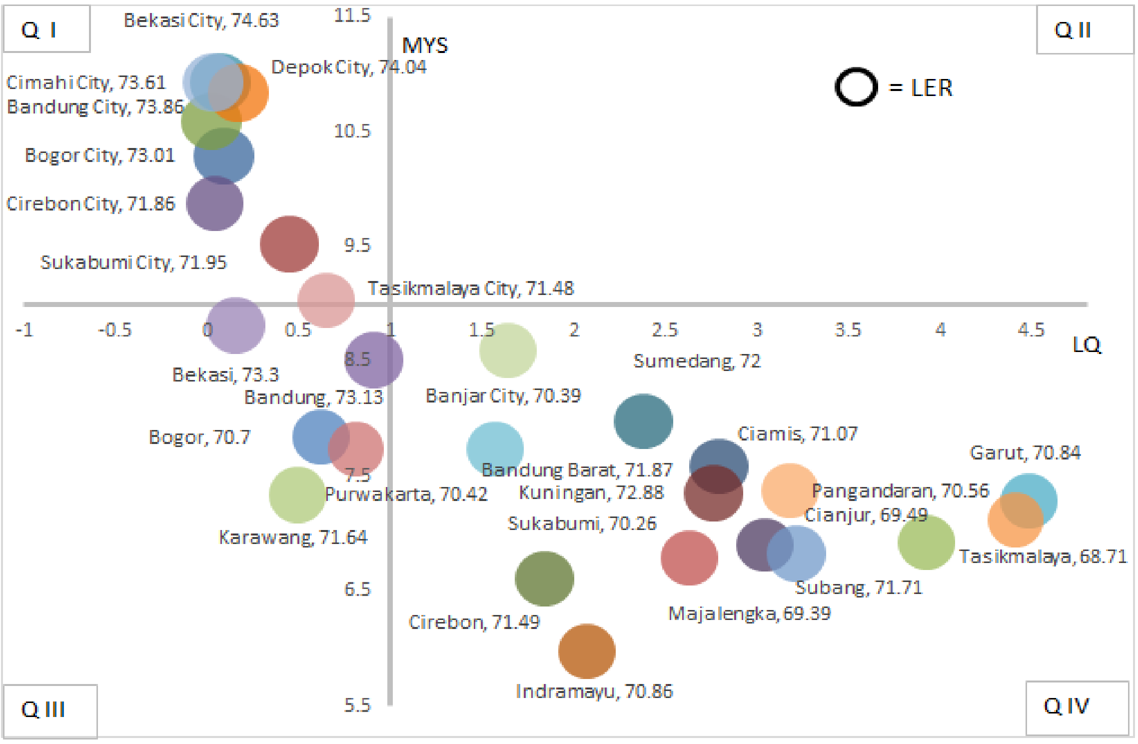

Figure 2. Typology of the West Java Region based on LQ Indicators and average school length in 2017

The choice of district/city shown in Table 2 becomes the outcome variable in a category. Category 1 is a Quadrant I, category 2 is a Quadrant III, and category 3 is a Quadrant IV. The highest number of members is in Quadrant IV, around 52%. Therefore, category three or Quadrant IV is used as a reference. The independent variables involved are population growth, growth in HDI scores, an increase in junior high schools, and growth in the gender index.

Table 2. Average school length and life expectancy for regional typologies by involving LQ

Quadrant	*Region*	*MYS*	*LER*	*Number of districts/cities*	*%*
I	Cimahi City, Bandung City, Bogor City, Depok City, Bekasi City, Cirebon City, Sukabumi City, Tasikmalaya City	10.25	73.06	8	30%
II	-	-	-	-	-
III	Bekasi, Bandung, Bogor, Purwakarta and Karawang	8.05	71.84	5	19%
IV	Banjar City, Sumedang, Bandung Barat, Ciamis, Kuningan, Pangandaran, Garut, Cianjur, Sukabumi, Subang, Tasikmalaya, Cirebon, Majalengka, and Indramayu	6.60	70.82	14	52%

Source: BPS (2018).

Estimated the multinomial regression equation with categorical variables as the dependent variable needs to be iterated until it reaches a convergent value. The Log-Likelihood value of -15,224 was obtained after iterating six times, while the log- likelihood value at the beginning of the iteration was obtained -2,358. Statistical Likelihood Ratio Chi-Square value is calculated from -2 (L (null model) -L (fitted model)) = -2 ((-27,358) - (- 15,224)) = 24,268. L (null model) is obtained from iteration 0 and L (fitted model) is taken from the last iteration. The probability obtained from the Likelihood Ratio test statistic is 0.0021. This value is smaller than the alpha level specified. So, it can be concluded that there is at least one significant dependent variable.

Table 3. Estimation of multinomial logit models of West Java regional typology in 2017

	Quadrant I	*Quadrant III*
Gpop	3.111*	4.464**
	(1.754)	(2.010)
Ghdi	-3.927*	2.537
	(2.255)	(3.438)
Gsch	11.08	-6.624
	(23.49)	(28.61)
Ggei	24.73*	4.711
	(14.62)	(16.49)
Constant	-0.466	-7.688*
	(1.985)	(4.294)
Observations	27	
Log Likelihood	-15.224	
Log likelihood (null)	-27.358	
LR chi2(8)	24.27	
Prob>Chi2	0.0021	
Pseudo R2	0.4435	

Note: Categories that become the base outcome are Quadrant IV, * significant 10%, and ** significant 5%.
gpop: the growth in population, ghdi: the growth in the human development index, gsch: the growth in the number of junior high schools, ggei: the growth of the gender empowerment index
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Table 4. Multinomial Regression Output

	Exp(B)	
	Quadrant I	Quadrant III
Gpop	22.4410*	86.877**
	(39.372)	(174.588)
Ghdi	.0197*	12.6414
	(.0444)	(43.457)
Gsch	65090.05	.0013
	(1529235)	(.0379)
Ggei	5.52e+10*	111.1618
	(8.07e+11)	(1833.364)
Observations	27	
Log Likelihood	-15.224	
Log likelihood (null)	-27.358	
LR chi2(8)	24.27	
Prob>Chi2	0.0021	
Pseudo R2	0.4435	

Note: Categories that become the base outcome are Quadrant IV, * significant 10%, and ** significant 5%

Based on Table 4, the estimation results of the population growth variable in Quadrant I show that the higher the population growth in the district/city, the tendency of the district/city to be in Quadrant I is 22,441 times compared to Quadrant IV. Or it can also be interpreted that the higher population growth in districts/cities, the tendency for districts/cities to be in Quadrant IV is 0.0446 times compared to Quadrant I. The population growth variable in Quadrant III shows that the higher the population growth in districts/cities, the tendency is in Quadrant III 86.877 times compared to in Quadrant IV. In other words, high population growth tends not to be in Quadrant IV.

The HDI growth variable in Quadrant I shows that the higher the HDI growth in districts/cities, the tendency for districts/cities to be in Quadrant I is 0.0197 times compared to in Quadrant IV, or the higher the HDI growth, the tendency for districts/cities to be in Quadrant IV is 50.7614 times compared to Quadrant I. High HDI growth occurs when the initial value is still small, while low growth generally occurs at the initial high. This is in line with economic growth theory (Barro & Sala-I-Martin, 1992).

The GEI growth variable in Quadrant I show that the higher the GEI growth in districts/cities, the tendency for districts/cities to be in Quadrant I is 5.52x1010 times compared to Quadrant IV, or that the height of GEI growth then the trend for districts/cities is in Quadrant IV of 1.81x10-11 times compared to Quadrant I. This shows that districts/cities with a high gender concern tend to be in Quadrant I compared to Quadrant IV. Infrastructure variables provided by the growth of junior high schools do not show their significance. Further studies need to be done on the impact of infrastructure on educational disparities in West Java.

Based on the multinomial login equation, then the marginal effect can be determined and also can learn the average chance of districts/cities in certain quadrants. The average probability of regencies/cities is in Quadrant I of 0.3995, Quadrant III of 0.1736 and Quadrant IV of 0.4268. The determining factor in Quadrant I is the growth of HDI and GEI, in Quadrant IV is population and GEI growth, while there is nothing significant for Quadrant III.

Table 5. Marginal effect of the determinant of Quadrant type Region

	Quadrant I	*Quadrant III*	*Quadrant IV*
Gpop	0.4366	0.4248	-0.8614**
Ghdi	-1.1182**	0.6365	0.4817
Gsch	3.1186	-1.7195	-1.3991
Ggei	5.6070*	-1.0400	-4.5670*
Y=Pr(Quadrant$_i$)	0.3995	0.1736	0.4268

Note: * significant 10%, and ** significant 5%

The marginal effect on Quadrant I for negative HDI growth means that the opportunity for Quadrant I is reduced by 1.12% for each HDI growth rate. The average marginal impact on the chance of a city district in Quadrant I related to HDI growth of one unit will reduce 112 percentage points. While related to the growth of GEI by one unit will increase 561 percentage points.

The marginal effect in Quadrant IV for population growth has increased by one percent, reducing the chance of the region being in Quadrant IV by 0.86%. The marginal effect of increasing GEI growth by one percent will reduce the opportunity for regions to be in Quadrant IV by 4.57%.

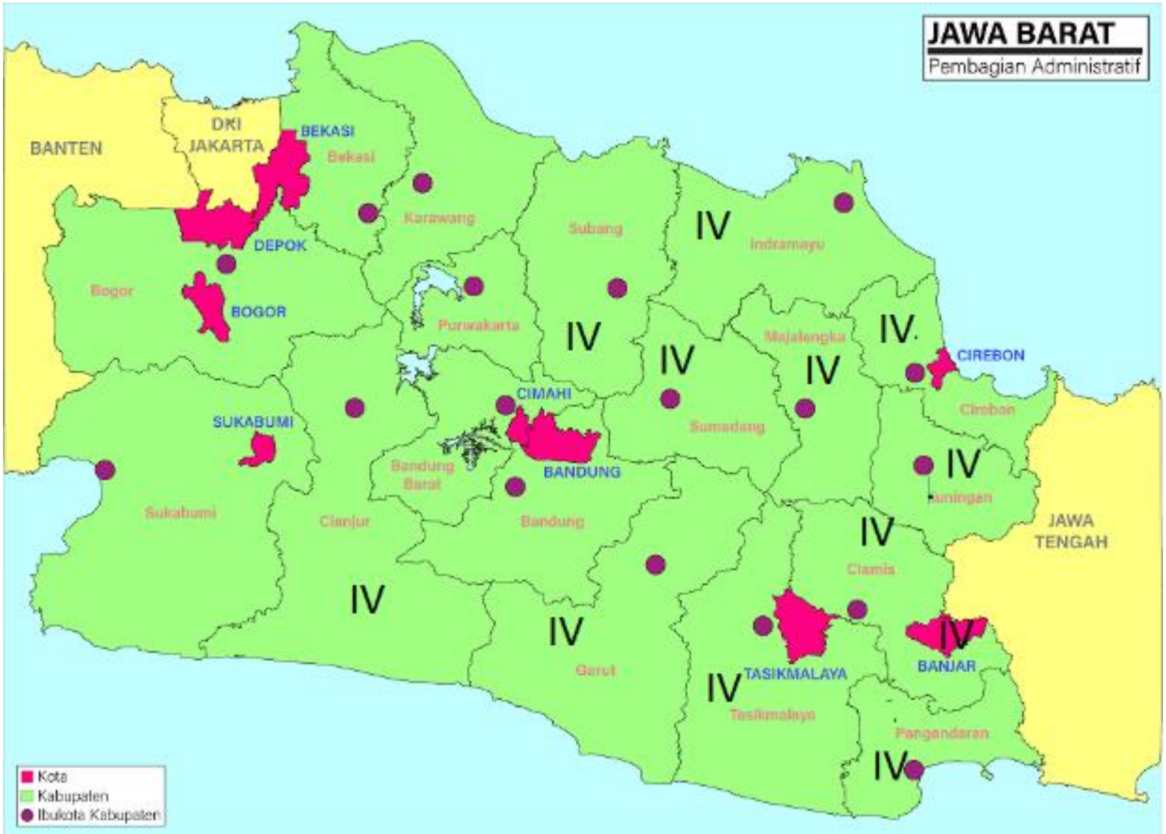

Figure 3. Geographical map of West Java

Geographically (spatially) regencies/ cities in Quadrant IV are located close. This is by several research results that spatial factors or proximity between districts/cities give similar or correlated results between certain factors, example, for education (Lutfi et al., 2019; Mustapha et al., 2016; Umar & Eam, 2014), for HDI (Septyana et al., 2021), for poverty (Bekti, 2012; Hasibuan et al., 2019). This implies the need to pay attention to spatial conditions in formulating policies, especially education to reduce inequality in access to education.

CONCLUSIONS AND RECOMMENDATIONS

Inequality in education occurs in West Java. Agriculture category regions tend to have lower education and life expectancy compared to non-agriculture. The profile shows that districts/cities with non-agricultural bases and having an average education have graduated from junior high school are in Quadrant I; districts/cities with non-agricultural bases and have an average education only graduating from elementary schools are in Quadrant III; and districts/cities with bases agriculture and have an average education only graduated from elementary school are in Quadrant III. No district/city is included in Quadrant II which is the basis of agriculture and the average education has graduated junior high. This shows the lack of attention and demands on agricultural areas for education.

Using multinomial regression shows the factor of population growth and GEI causes a city district tends to be in Quadrant I and III compared to Quadrant IV. This indicates that regions with higher economic growth (non-agriculture) tend to become urbanization goals. Hood population growth is relatively higher and opens significant opportunities for gender equality in access to employment and education.

It is made clear by looking at the marginal effect where the variable population growth and GEI growth will significantly reduce the area's chances of being in Quadrant IV. Higher job opportunities in non-agricultural areas will attract residents of agricultural areas so that population growth is more significant. Opportunities and awareness of greater educational needs in non-agricultural areas will encourage urban and non-urban populations, both men and women, to improve their education to increase gender equality in education. Education in the agricultural area needs to be improved with infrastructure support, especially the number of junior high schools and road access or adequate transportation.

The weakness of this research is that it still uses macro data, an aggregate, and does not reflect the conditions of individuals in the field. Researchers suggest reviewing the issue of educational inequality in West Java by using micro data to reflect accurate data in the field.

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