



# **Determinant of Educated Unemployment Rate in West Kalimantan: Case Study in Border Area**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

## **Article Information**

DOI: 10.9734/JEMT/2023/v29i101153

## **Open Peer Review History:**

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/105320>

**Original Research Article**

**Received: 25/06/2023**  
**Accepted: 29/08/2023**  
**Published: 02/10/2023**

## **ABSTRACT**

This research was conducted to find out how the influence of GRDP, and HDI on the Educated Unemployment Rate in West Kalimantan studied the Border Area in 2013-2022 with the best model chosen being the *Random Effect Model* (REM). This data uses panel data consisting of 14 regencies/cities in West Kalimantan over 10 years from 2013 to 2022, with data collection techniques from *the Central Statistics Agency* (BPS).

*Ordinary Least Square* (OLS) method uses a stationary test, cointegration test, and regression test to choose the best model, hypothesis testing using a T-test, F-test, and coefficient of determination ( $R^2$ ) with a significance level of 5%. The estimation results show that GRDP has a significant effect on educated unemployment in West Kalimantan, while the HDI does not have a significant effect on the unemployment rate in West Kalimantan. Border areas in West Kalimantan have lower unemployment rates than non-border areas in West Kalimantan.

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**Keywords:** Educated unemployment rate; GRDP; HDI; border area.

### 1. INTRODUCTION

Indonesia will face an era of demographic bonuses from 2030 to 2040, in which the productive age population is much larger than the non-productive age population in Indonesia. Population growth is considered very profitable from a development standpoint. This can create strategic opportunities for Indonesia in accelerating economic development because many people of working age can contribute to the economy. The empowerment of human resources, it needs to be balanced with the availability of jobs so that this demographic bonus does not become a burden to the state. As the working population increases, the demand for goods and services will increase, thereby creating jobs in various sectors [1,2].

The existence of this demographic bonus is considered a situation that can reduce unemployment by increasing economic growth through quality human resources [3-7]. The government seeks to face all challenges in various ways, one of which is to create more jobs and improve the quality of education which has the potential for sustainable economic growth. The younger generation who become agents of change hope to be able to help Indonesia by learning and serving the community at the same time [8-13].

The theory of human capital has a strong relationship in explaining educated

unemployment [14-17]. According to this theory, education is an important factor in increasing the productivity of an individual to acquire the skills and knowledge needed to reduce the risk of unemployment [18-24]. The theory of human capital states that education and training received by individual workers is an investment in human capital to increase work ability and productivity and increase income, Puspasari [25].

Based on Table 1, the unemployment rate in West Kalimantan in 2010-2022 has fluctuated. Particularly in the districts of Sambas, Bengkayang, Sanggau, Sintang, and Kapuas Hulu, which have border areas, tend to have an ever-increasing unemployment rate. In 2022 Sambas district will become an area that has a higher unemployment rate than other districts that also have border areas. According to Suudi (2021), this increase is due to a lack of job opportunities.

The unemployment rate in regencies/cities that have border areas in recent years has been quite high compared to regencies/cities that do not have border areas. Bengkayang, Sintang, and Kapuas Hulu districts have higher unemployment rates than Landak, Sekadau, and Melawi districts. This increase in different unemployment rates is generally caused by limited access to education for the community, causing limited abilities or skills of an individual.

**Table 1. Based on unemployment rate data regencies/cities in west kalimantan (%)**

Regency/City	Year							
	2010	2011	2013	2015	2017	2019	2021	2022
Sambas*	4.53	2.99	3.03	4.85	4,24	3.48	3.97	5.08
Stuffed*	3,21	3,32	2.30	3,15	2.40	2.66	4,42	2.84
Porcupine	4.61	3,18	3,24	5,81	2.03	2.69	3,22	1.78
Mempawah	7.80	3.35	5,66	7,12	6,72	5,11	7,71	7,48
Sanggau*	3,62	3,27	0.78	5,13	3,27	3.00	3.45	3.76
Ketapang	3.90	3.70	4.70	4,29	3.97	4.39	6,94	6,71
Sintang*	2.35	3.38	2,24	2.48	1.93	3,10	3.95	2.97
Kapuas Hulu*	2.25	2.50	2.09	3.00	2,21	2.43	4,18	2,21
For one thing	2,31	2.93	1.44	2.97	0.64	3.04	2.92	1.33
Malay	1.30	3.08	3.99	3.03	2,11	2.39	2.66	1.95
North Cayong	4,29	2.56	4.66	3.76	5.00	3.89	3.78	3,10
Kingdom Fortress	6,20	4.52	9,26	6,11	5.91	5.50	7.02	6,87
Pontianak City	7,79	7,26	6,12	9,44	9.36	9.06	12.38	9,92
Singapore City	8.05	5,34	4.59	6,12	8.08	6,31	9,16	8,63

Note: One star (\*) indicates the border area of the country

Source: Central Bureau of Statistics (BPS)

Gross Regional Domestic Product (GRDP) is also a factor influencing the level of educated unemployment in West Kalimantan. GRDP is the measurement value of goods and services produced within one year. By increasing the GRDP of a region, it can produce jobs that match educational qualifications with the needs of the labour market.

Research on the influence of GRDP on unemployment also has mixed results. Research by Puspita et al. (2021), and Ratu (2020), said that GRDP has a positive effect on the level of educated unemployment. There is also research showing a negative effect, such as in the research of Nasyithaa et al (2021), Christianto et al. (2021), and Karim et al. (2016). Research conducted by Eduardo et al (2014) stated that there is a negative influence between the unemployment rate and economic growth in border areas.

In addition to GRDP, the Human Development Index (IPM) can be an influence in increasing the level of educated unemployment in West Kalimantan. HDI includes education, health, and income. If the provincial HDI is lower than the National HDI it can cause limitations in meeting the basic needs of people in an area. The results of previous studies provide varied results. For the effect of HDI on unemployment, several studies show a positive relationship, such as research from Widowati (2022), Nicholas (2014), and Sisilia (2021). However, some state a negative relationship, such as in the research of Nasyithaa et al. (2021), Eko (2022), Mahihody (2018), and Eka (2021).

The increase in the level of educated unemployment in this study is caused by several factors such as HDI and GRDP. This study uses a dummy variable, namely the border area using index 1 for border areas and index 0 for non-border areas. The dummy variable in this study is to see a higher level of educated unemployment in border areas or non-border areas in West Kalimantan.

## 2. LITERATURE REVIEW

The theory of human capital has a strong relationship in explaining educated unemployment. According to this theory, education is an important factor in increasing the productivity of an individual to acquire the skills and knowledge needed to reduce the risk of unemployment. The theory of human capital states that the education and training received by

individual workers is an investment in human capital to increase workability and productivity and increase income (Schultz, 2017).

Individuals who have a high level of education generally have good job prospects because they have higher human capital. This theory also shows that an individual with higher education is considered to be more productive in getting better job opportunities in the long run. The educated unemployed are the workforce with a minimum high school education/equivalent and above who are not working. The educated unemployment rate is related to economic growth, which means limited employment opportunities or a mismatch between available jobs and an individual's level of education. Job opportunities are widespread, but cannot be used, such as job vacancies that require higher education or knowledge, according to Mada and Ashar (2015).

Research conducted by Nurteta [26] in Jambi Province said that HDI has a significant positive effect on the level of educated unemployment. Research by Ahmad et al. (2018), HDI also has a positive effect in West Java Province due to sustainable economic development and increased human resources. According to Johnson (2017), HDI influences unemployment rates in Southeast Asian countries. HDI has a significant positive effect on unemployment rates in East Asian countries according to Chen's research (2021).

In contrast research conducted by Garnella et al (2020) in Aceh, said that human resource development indicated by the HDI of a region can reduce the open unemployment rate. HDI has a negative and significant effect on open unemployment. Research by Mahroji et al. [27], HDI has a negative influence, especially on education and health indicators which causes a shift in labour demand. If the HDI value of a region is high, it will result in a decrease in the unemployment rate. Similar to research by Soeharjoto [28], with the finding that HDI has a negative and significant effect on educated unemployment in Indonesia. HDI has a negative and significant effect on the unemployment rate in Banten Province, according to research by Mahroji [27] showing that the greater the HDI value, the lower the unemployment rate.

GRDP at constant prices is used to show the overall economic growth rate from year to year. Partially, the research of Puspita et al (2023), said that GRDP had a positive effect on Aceh

province in the 1988-2021 period. In contrast to the research conducted by Rahmatullah (2018), tested and analyzed the influence of GRDP in East Java Province. The results of this study, GRDP has a significant negative effect on Educated Unemployment. Shows, the greater the GRDP, the level of educated unemployment will decrease. In the research of Silaban et al. (2020), GRDP influences the number of the working workforce. If the GRDP of a region increases, the total value of goods and services increases to the amount of labour demanded to minimize the unemployment rate. Veronika's research (2022), says that economic growth from constant price GRDP in West Java Province has a negative and significant effect on the level of educated unemployment. According to Ahmadi et al. (2018), GRDP has a negative effect. According to Karim et al (2016), regional economic growth harms unemployment in Turkey.

### 3. METHODOLOGY

This research is a quantitative descriptive study, using the Variable Educated Unemployment Rate (TPT) on Gross Regional Domestic Product (GRDP), Human Development Index (IPM), and Border Areas (WP). This study uses panel data consisting of 14 districts/cities in West Kalimantan in a period of 10 years from 2013 to 2022, with a total of 144 observations. This study uses a dummy variable for border areas, with the notation 0 for non-border areas and the notation 1 for the border region. The mathematical equation model is as follows:

$$Y_{it} = \alpha + \beta_1 [GRDP]_{it} + \beta_2 [IPM]_{it} + \beta_3 [DummyWP]_{it} + \varepsilon \dots\dots\dots(1)$$

Information:

- Y = Educated Unemployment Rate
- α = Constant value
- β 1 = Coefficient value on GRDP variable
- GRDPt = Gross Regional Domestic Product Value
- β 2 = Coefficient value on HDI variable

- IPMt = Human Development Index Value
- β 3 = Coefficient value on the dummy variable Border Region
- DummyWP = Border Area dummy variable value
- i = Cross Section (District City of West Kalimantan)
- t = Time Series (Year 2013 – 2022)
- ε = Number of Errors

To get the best method, stationary, cointegration, and multiple linear regression methods can be used. In panel data, the stationarity test uses the *Augmented Dickey-Fuller statistical test method* and the cointegration test uses the Pedroni test. Followed by panel data regression test.

## 4. RESULTS

### 4.1 Data Stationarity Test

Based on Table 2 the value of the probability at the level level for the TPT variable is 0.0000 and the IPM variable is 0.0255 where these two variables are worth less than 1%, which means the data has no unit roots or the data is stationary. Meanwhile, the GRDP variable has a probability value at a level of 0.9998, which is greater than 1%, meaning that this variable has a unit root or the data is not stationary. However, at the first difference level, these three variables have a probability value of less than 1% meaning that these three variables do not have a unit root and the data is stationary.

### 4.2 Cointegration Test

Based on Table 3, the results of the cointegration test using the Pedroni test show that the PP-statistic panel and ADF-statistic panel values are less than 0.05, which means they are significant, but the v-statistic Panel values, the rho-statistic Panel have results greater than 0.05, which means they are not significant. If one has an insignificant value, then the TPT, GRDP, and HDI variables have no cointegration or long-term influence.

**Table 2. Data stationarity test results**

<i>Augmented Dickey-Fuller test statistics</i>	Levels		1st Difference -	
	Prob*	Information	Prob*	Information
TPT	0.0000	stationary	0.0000	stationary
GRDP	0.9998	Not Stationary	0.0001	stationary
IPM	0.0255	stationary	0.0000	stationary

Source: data processed using Eviews 10

**Table 3. Pedroni test cointegration test results**

	Alternative hypothesis: common AR coefs. (within-dimension)		Weighted		Alternative hypothesis: individual AR coefs. (between- dimensional)	
v-Statistics panel	-3.096158	0.9990	-3.095685	0.9990		
rho-statistic panel	-0.111391	0.4557	-0.106737	0.4575	1.664788	0.9520
PP-statistics panel	-19.57176	0.0000	-19.56212	0.0000	-23.54371	0.0000
ADF-statistics panel	-8.504705	0.0000	-8.495466	0.0000	-9.385695	0.0000

Source: data processed using Eviews 10

### 4.3 Panel Data Regression Test

Based on the results of the Hausman test in Table 4, the best model chosen is the random effect model because the probability value is greater than the significant level of 0.05.

Based on Table 5, in this study it has the following regression equation:

$$TPT_{it} = 17.67752 + 8.34007PDRB_{it} - 0.165650IPM_{it} - 1.590971DummyWP_{it} + \epsilon$$

1. The constant value in this equation is 17.67752, which means that if it is assumed that the GRDP, HDI, and WP variables are fixed, then the educated unemployment rate will increase by 17.67752.
2. The coefficient value on the GRDP variable is 8.34007, which means that if the GRDP variable increases by 1%, the educated unemployment rate will increase by 8.34007.
3. The coefficient value on the HDI variable is -0.165650, which means that if the HDI variable increases by 1%, the educated unemployment rate will decrease by 0.165650.
4. The coefficient value on the WP variable is -1.590971, which means that border areas have a lower educated unemployment rate of 1.5% compared to non-border areas.

### 4.4 Statistical F Test

Based on Table 5, the probability value of the statistical F test shows a result of 0.007185 < 0.05, which means that if the probability value is lower than the significant level then H0 is rejected. In this study it is interpreted that

simultaneously the variables GRDP, HDI, and WP are significant for the level of educated unemployment in West Kalimantan.

### 4.5 Statistical T-test

Based on Table 5 it can be explained as follows:

- a. Gross Regional Domestic Product (X1):** The results of this study on the GRDP variable have a probability value of 0.0009 which is less than the significant level of 0.05 which means that the GRDP variable has a significant and positive effect on the level of educated unemployment in West Kalimantan.
- b. Human Development Index (X2):** The results of this study on the HDI variable have a probability value of 0.6215 which is greater than the significant level of 0.05 which means that the HDI variable has no positive and significant effect on the level of educated unemployment in West Kalimantan.
- c. Border Region (D1):** The results of this study on the WP variable have a probability value of 0.5741 which is greater than the significant level of 0.05 which means that there is no significant effect on the unemployment rate in border areas and non-border areas.

### 4.6 The Coefficient of Determination (R<sup>2</sup>)

Based on Table 5, the result of the R-squared value is 0.084555, which means that the GRDP, HDI, and WP variables can explain the effect of the educated unemployment rate variable of 84.55%. While the remaining 15.45% is influenced by other factors or variables not examined.

**Table 4. Hausman test results**

Chi-Sq. Statistics	Chi-Sq. df	Probability	Decision
2.620738	2	0.2697	BRAKE

Source: data processed using Eviews 10

**Table 5. Panel data regression results in random effects**

Variable	Coefficient	t-Statistics	Probability
C	17.67752	0.786715	0.4328
GRDP	8.34E-07	3.409160	0.0009
IPM	-0.165650	-0.494912	0.6215
WP	-1.590971	-0.563335	0.5741
R-squared	0.084555	Mean dependent var	9.422571
Adjusted R-squared	0.064361	SD dependent var	15.90194
SE of regression	15.38169	Sum squared residue	32177.12
F-statistics	4.187198	Durbin-Watson stat	2.647977
Prob(F-statistic)	0.007185		

Source: data processed using Eviews 10

## 5. DISCUSSION

Based on the results of the study, GRDP has a positive and significant effect on the level of educated unemployment in West Kalimantan. If the GRDP variable remains constant and increases by 1%, the educated unemployment rate will increase by 8.34007 assuming that the other variables are constant. The coefficient value of the GRDP variable is positive, meaning that there is a relationship between GRDP and the level of educated unemployment in West Kalimantan. If the GRDP is higher, the level of educated unemployment will increase. Then the probability resulting from this GRDP variable is 0.0009 which is smaller than the significant level of 0.05. It can be interpreted that the GRDP variable affects the level of educated unemployment in West Kalimantan, which means that if the GRDP variable changes in value, it will result in a change in the level of educated unemployment in West Kalimantan.

These results are in line with research from Amboli (2018) where GRDP has a significant positive effect on the level of educated unemployment in Nigeria. Nigeria's economic system depends on one sector, namely the oil sector which is the main source of income for the country. At that time, the price of crude oil in Nigeria reached such highs that it could offset the rising level of educated unemployment. In line with research by Hartanto et al (2017) which produced GRDP which had a significant positive effect on the level of educated unemployment in East Java, he explained that production in East Java uses more modern capital and technology, thus requiring high human resources. However, because the skills or education possessed by workers is still low, the company prioritizes and optimizes capital by using the latest technology to streamline production time and maximize company profits.

Therefore, this causes the level of educated unemployment to increase.

This is not following the research of Arizal et al. [29] which states that GRDP has a negative and significant effect on the level of educated unemployment in West Sumatra Province. This shows that when the GRDP is high, the open unemployment rate decreases because when the GRDP increases, production and added value of goods and services also increase. The more production, employment will require more labor to reduce the level of educated unemployment. Research from Ramadhanty et al. [30] also states that GRDP has a negative and significant effect on the level of educated unemployment in Central Java due to an increase in educated unemployment caused by a decline in economic growth.

Based on the research results, HDI has no positive and significant effect on the level of educated unemployment in West Kalimantan. If the HDI variable decreases, it will not affect the level of educated unemployment in West Kalimantan. The results of this study are following research conducted by Nurlita et al. [31] which states that HDI has no significant effect on the level of educated unemployment in Samarinda. Likewise, research from Suprpto [32] states that HDI has no positive and significant effect in East Java. In line with research conducted by Ciptaningtyas (2017), HDI does not affect the level of educated unemployment in West Kalimantan because this region has HDI which tends to increase every year, which means the level of social welfare also increases every year. Evidenced by the existence of infrastructure development, especially in terms of education such as the construction of schools in 2016 and the improvement in the quality of human development in West Kalimantan.

research is not in line with the theory of human capital which says that an increase in the level of education and health can increase human productivity and increase the demand for labour so that the level of educated unemployment will decrease. This is not in line with research conducted by Arizal et al. (2019), stating that the HDI variable has a significant effect on the open unemployment rate in West Sumatra. When the HDI increases, the educated unemployment rate also increases. This is because the productivity of workers who have skills is still relatively low, while companies that provide jobs have high qualifications, increasing the level of educated unemployment in West Sumatra.

Border areas have a less educated unemployment rate of 1.5% than non-border areas. From the results of the equation, non-border areas consisting of Landak, Mempawah, Ketapang, Sekadau, Malawi, North Kayong, Kubu Raya, Pontianak City, and Singkawang Regencies have an educated unemployment rate of 25.85%. Meanwhile, non-border areas consisting of Sambas, Bengkayang, Sanggau, Sintang and Kapuas Hulu districts have an unemployment rate of 24.26%. This research is in line with that conducted by Rosly (2018), who stated that the border region of Slovakia and Poland has lower rates of educated unemployment because at that time the Polish and Slovak governments took restrictive economic actions so that the educated unemployment rate has decreased in recent years. The governments of Slovakia and Poland have joined the EU, supported by an increase in foreign investment, which has increased employment opportunities.

The formation of a cross-border post (PLBN) which was inaugurated in 2017 in the border area in West Kalimantan has had a positive impact on both the government and the people living in the border area. According to Hadimuljono (2021), the development of PLBN can become a centre for economic growth in border areas and can improve the welfare of border communities. Infrastructure development continues to increase, the government opens access through the construction of parallel roads in border areas. This access is also used by people who live on the border to increase their income, such as by opening a coffee shop or a place to sell. In addition, the existence of this parallel road facilitates access for the community to sell agricultural products to the border area, namely Entikong, using only motorbikes. Before

the existence of this parallel road, people living in the border areas distributed their crops through the river route, namely the Sekayam River, which took almost 10 hours and the route that was traversed was also at risk due to the swift currents (Kompas, 2021).

The low level of educated unemployment in border areas compared to non-border areas is because educated people living in border areas do not have certain criteria or requirements in finding work. This is different from the thinking of people who live in non-border areas, that in looking for work one has to look at several aspects such as the level of salary that will be obtained must be following the expectations of workers. Many people in non-border areas prefer to be unemployed rather than get a job with a salary that doesn't match expectations. Therefore, the unemployment rate in border areas is lower than in non-border areas (Eddy, 2021)

## 6. CONCLUSION

Based on the research results that have been explained, GRDP has a significant and positive effect on the educated unemployment rate, meaning that every increase in GRDP will increase the educated unemployment rate in West Kalimantan due to improvements in economic infrastructure in several sectors such as agriculture, the manufacturing industry and construction so that an increase in the number of the workforce does not accompanied by the availability of jobs. The HDI does not affect the level of educated unemployment in West Kalimantan due to infrastructure development and improving the quality of human resources in West Kalimantan. The level of educated unemployment in West Kalimantan in border areas is lower than in non-border areas due to infrastructure development such as parallel roads in border areas opening up jobs.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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