Relation between gross domestic product (GDP) and poverty population in East Kalimantan Province from 2013 - 2017

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Abstract. Gross Domestic Product (GDP) is one of the important factors to determine the economic conditions of an area in a certain period. This study uses GDP according to the business field based on constant prices in 2010. The purpose of this study, first is to determine trends of GDP and the percentage of the poverty population. Second, is to find out the relationship between GDP to poverty in East Kalimantan. The method used in this study is spatial method to find out the distribution and temporal trends. For determine the relationship, this research used simple regression calculations. The results of the study show that: (1) From 2013 to 2017 the tendency of GDP in East Kalimantan Province was increasing and the most dominant GDP contributor sector was the mining sector. (2) The trend in the percentage of the poverty population in East Kalimantan Province from 2013 to 2017 is fluctuating. (3) Simple regression calculations indicate that there is a relationship between GDP and poverty in Bontang City, Kutai Barat Regency, and Penajam Paser Utara Regency.

1. Introduction
East Kalimantan Province is marked as a pioneer of development initiation in East Indonesia. East Kalimantan owns a wealthy natural resource especially in mining, agriculture, and farming. The natural resources that they have, some have been utilized, but some have not been used optimally. In essence, the real tangible economic development is a series of businesses and policies that aim to improve people's standard of living, expand employment opportunity, equalize the income distribution of the community, improve the regional economy through shifting economic activities from the primary sector to the secondary and tertiary sectors. The direction of economic development seeks to increase people's income inequity.

The superior economic sector in East Kalimantan Province is known based on the largest GDP contributor each year. East Kalimantan Province in 2013-2017 had fewer regencies, which is 9 regencies with 1 additional regency, while 5 other regencies were included in the North Kalimantan Province (figure 1). From the same 9 regencies, it is known that Samarinda Regency is the only regency that has experienced a change in the leading sectors, which is from the mining and quarrying sector to the construction sector. The rate of economic growth that is calculated based on changes in GDP at the constants price in 2010 concerned against the present year is one of the macro indicators to see the real economic performance in a region.
Economic growth can be seen as an increase in the number of goods and services produced by all sectors of economic activity that exist in an area over a while [1]. This GDP should have a close relationship with the condition of poverty in this region even though, the phenomenon of poverty itself is quite complex. Not only related to the world of economy, but also with other dimensions outside the economy such as culture, education, health, etc. Poverty is more interpreted as insufficient income and assets to meet basic needs such as food, clothing, housing, education and health [2]. Poverty is not only related to the level of income and GDP, but can be caused by social, environmental, or even empowerment and participation levels. Although this GDP and Poverty looks in tune. In this research, we want to show how the relationship between GDP to poverty in East Kalimantan.

2. Methods

Most data used for this research is secondary data obtained from the Central Statistics Agency of Indonesia in East Kalimantan Province. The data used is GDP (Gross Regional Domestic Product) based on Business Field and Percentage of Poverty Population according to Regency/City in East Kalimantan Province. The data then analyzed spatially to find out the distribution and temporal to find out trends, and see the relationship with simple regression calculations. From the three analyzes, we then find out how the relationship between GDP to poverty in East Kalimantan as GDP can be used to analyze how the development of economic conditions that occur in a region on a macro basis.

This study also uses a simple regression analysis method. This method was chosen because it can be used to find out how the relationship between GDP to the level of poverty in East Kalimantan Province. The value of the relation of GDP on poverty in each Regency/City in East Kalimantan was obtained using the SPSS Version 22 program by producing R2 Value. That value is used to identify whether the independent variable relates to the dependent variable. If R2 is lower than 0.05 (5%) then there is a relation between variables, whereas if R2 is higher than 0.05 (5%) then there is no relation [3].

The relationship of GDP to poverty levels can be described through the following functions:

\[
Pov = f (GDP) \tag{1}
\]

\[
Pov = \beta_0 + \beta_1 GDP + \mu \tag{2}
\]
Information:

\( Pov \): Percentage of poverty population (in percent)

\( GDP \): Gross Domestic Product (in billion rupiah)

\( \beta_0 \): Intercept

\( \beta_1 \): Regression coefficient

\( \mu \): Error term

3. Results and Discussions

The phenomenon of poverty is interpreted as insufficient income and assets to fulfill their basic needs [4]. Economic conditions and poverty in East Kalimantan Province can be analyzed spatially-temporally with simple regression calculation. Integrated and harmonized development, as well as the efficient and effective planning, will create local independence and improvement that are evenly distributed throughout the country [5]. There are three aspects of planning which have always applied as a reference in the construction, namely macro planning, sectoral planning, and regional planning, those three aspects are arranged into one interrelated entity. The development plan was specifically intended to support regional planning, especially to see the achievement of the GDP during the period between 2013 - 2017 and their influence on the conditions of poverty in East Kalimantan Province.

3.1. GDP according to the Business Field of East Kalimantan

The value of GDP per Regency/City in East Kalimantan Province during 2013-2017 did not experience significant changes. Kutai Kartanegara Regency has always been the regency with the largest GDP distribution in East Kalimantan, then followed by Kutai Timur Regency and Balikpapan City. Overall, GDP conditions can be seen through the GDP of Business Field in East Kalimantan Province 2013-2017 as shown in table 1.

| Regency / City       | GDP of Business Field (in Billion Rupiah) |
|----------------------|------------------------------------------|
|                      | 2013 | 2014 | 2015 | 2016 | 2017 |
| Paser                | 33,281 | 34,783 | 34,473 | 32,761 | 33,131 |
| Kutai Barat         | 18,559 | 18,907 | 18,623 | 18,472 | 19,133 |
| Kutai Kartanegara   | 130,010 | 128,611 | 119,389 | 117,071 | 118,663 |
| Kutai Timur         | 80,731 | 83,496 | 84,690 | 83,800 | 86,459 |
| Berau               | 22,591 | 24,450 | 25,903 | 25,475 | 26,242 |
| Penajam Paser Utara | 6,202 | 6,373 | 6,382 | 6,353 | 6,502 |
| Mahamkan Ulu        | 1,359 | 1,427 | 1,474 | 1,524 | 1,589 |
| Balikpapan          | 65,907 | 68,964 | 69,786 | 73,186 | 75,955 |
| Samarinda           | 37,472 | 39,506 | 39,524 | 39,733 | 41,170 |
| Bontang             | 43,012 | 41,622 | 43,437 | 42,836 | 43,128 |
| East Kalimantan     | 43,913 | 44,814 | 44,368 | 44,121 | 45,197 |
The condition of GDP per Regency/City in East Kalimantan Province shows that Kutai Kartanegara Regency has the highest GDP value with a trend that tends to decrease every year, while Mahakam Ulu Regency has the lowest GDP value despite having an increasing trend every year (figure 2). Overall, the GDP condition based on the GDP trend in East Kalimantan Province from 2013 to 2017 tends to increase except Kutai Kartanegara Regency which tends to decline and the regencies that are stable every year are the fluctuating Regency of Penajam Paser Utara, Kutai Barat and Paser.

The GDP presented is differentiated according to its business field, wherein this research, the GDP data is used to show the economic structure or the role of each economic category based on region. GDP can be assumed as a measure of accessibility for a region [6]. Economic categories that have a large role show the economic base of a region. The rate of economic growth that is calculated based on changes in GDP at the constant price of the year concerned against the previous year is one of the macro indicators to see the real economic performance in a region. Economic growth can be seen as an increase in the number of goods and services produced by all sectors of economic activity that exist in an area over a while. Gross Regional Domestic Product (GDP) is the gross added value of all goods and services created or produced in a country's domestic territory arising from various economic activities in a certain period regardless of whether the production factor is owned by a resident or non-resident.

![Figure 2. Distribution of GDP according to business field trends in East Kalimantan from 2013-2017.](image)

### 3.2. Conditions of Poverty in East Kalimantan

Overall poverty conditions in a region can be described through the percentage of the poverty population. The population in an area can be said to be poor when it has an average monthly expenditure below the poverty line [7]. The high poverty line shows a positive condition which is showed by the Minimum Income Standard (MIS) which is increasing. MIS is the income that people need in order to reach a minimum acceptable standard of living today [8]. In this context, each regency/city will have a different minimum income level, which is influenced by the expensiveness and the commodity prices, whether in the form of food or non-food category. The percentage of poverty population in East Kalimantan Province can be seen in table 2.
Table 2. Percentage of poverty population of East Kalimantan Province by regency/city (percent) 2013-2017.

| Regency / City        | Percentage of Poverty Population by Regency/City (%) |
|-----------------------|------------------------------------------------------|
|                       | 2013 | 2014 | 2015 | 2016 | 2017               |
| Paser                 | 7.94 | 7.87 | 8.76 | 8.68 | 9.28               |
| Kutai Barat          | 7.7  | 7.53 | 8.33 | 8.65 | 8.72               |
| Kutai Kartanegara    | 7.52 | 7.43 | 7.99 | 7.63 | 7.57               |
| Kutai Timur          | 9.06 | 9.1  | 9.31 | 9.16 | 9.29               |
| Berau                | 4.83 | 4.76 | 5.33 | 5.37 | 5.41               |
| Penajam Paser Utara | 7.7  | 7.56 | 7.92 | 7.49 | 7.63               |
| Mahamkan Ulu         | -    | -    | 10.5 | 10.65 | 11.29               |
| Balikpapan           | 2.48 | 2.46 | 2.91 | 2.81 | 2.82               |
| Samarinda            | 4.63 | 4.56 | 4.82 | 4.72 | 4.77               |
| Bontang              | 5.16 | 5.1  | 5.06 | 5.18 | 5.16               |
| **East Kalimantan**  | **6.38** | **6.31** | **6.23** | **6.11** | **6.19**               |

The percentage of poverty population by regency/city in East Kalimantan Province shows that Mahakam Ulu Regency in the first position of the highest percentage with an increasing trend every year. The second highest position is occupied by Kutai Timur Regency with a fluctuating trend and has reached the highest percentage in 2015. The lowest percentage of poverty population is in Balikpapan City with a fluctuating trend. Overall, explained in the Map of Population Poverty Percentage (figure 3).
Figure 3. Distribution of population poverty trends in East Kalimantan from 2013-2017.

3.3. Relation of GDP on the poverty conditions of East Kalimantan

The relation of GDP on poverty conditions in East Kalimantan is seen using regression statistical calculations. The variables used are the value of the GDP of the business field (independent variable) and the percentage of the poverty population (dependent variable) of each Regency / City in 2013-2017. After the two variables are regressed, R2 is obtained. The regression results show the value of R2 that is different between Regencies / Cities. Regions with R2 values lower than 0.05 (5%) are Bontang City, Penajam Paser Utara Regency, and Kutai Barat Regency (table 3).

Table 3. Relationship between GDP and the percentage of poverty population resulting from simple regression calculations.

| Regency/City       | Value Of R Square (%) | Information |
|--------------------|-----------------------|-------------|
| Paser              | 16.5                  | Not Related |
| Kutai Barat        | 0.6                   | Relate      |
| Kutai Kartanegara  | 31.6                  | Not Related |
| Kutai Timur        | 73.5                  | Not Related |
| Berau              | 70.9                  | Not Related |
| PPU                | 0.5                   | Relate      |
| Mahakam Ulu        | 74.9                  | Not Related |
| Balikpapan         | 44.6                  | Not Related |
| Samarinda          | 22.9                  | Not Related |
| Bontang            | 0.4                   | Relate      |

Bontang City, which is oriented to industry, services, and trade, is known as the region that ranked highest in per capita GDP in 2013. Also, Bontang City is well-known because of three large companies in different fields, namely PT. Badak NGL producing natural gas, PT. Pupuk Kalimantan Timur produces fertilizer and ammonia and PT. Indominco Mandiri produces coal and has a petrochemical industrial area called East Kalimantan Industrial Estate. Bontang City whose economy is largely supported by two large companies, namely PT. Pupuk Kalimantan Timur and PT. Badak NGL and adjacent to several coal mining locations provide more opportunities for labor absorption.

The results of a simple regression calculation show that the GDP of the business field in Bontang City is related to the percentage of the poverty population in Bontang City (figure 4). This shows the importance of controlling the large enough GDP optimally so that automatically the percentage of the poverty population can also be controlled. The superior economic sector in East Kalimantan Province is known to be based on the largest GDP contributor each year. The large contribution of GDP from private companies, especially large industries in each regency/city, is the main job that can overcome poverty in the province of East Kalimantan. However, there is still a need to improve the quality of local residents' resources in order to compete with outside workers [9]. For experts, it is now possible to be able to recruit workers from outside the region, but there must be a transfer of knowledge and experience [10], so that the needs of experts in this particular field can be taken from local workers someday.

Kutai Barat Regency is known for its well-developed Crude Palm Oil (CPO) processing industry. Various national, multinational and international companies are in East Kalimantan, as well as growing star hotels and modern shopping centers, hotels, and restaurants built in cities in East Kalimantan. Regency areas such as Kutai Barat provide other contributions to the agriculture, forestry and fisheries sectors and other sectors. The rural poor work in the agricultural sector and reduce unemployment due
to the job opening, especially in the informal sector [11,12]. Based on the results of a simple regression calculation (figure 4) shows that the GDP in Kutai Barat relates to the percentage of the poverty population in West Kutai. It is important to optimize the increase in GDP in order to reduce the poverty population. Efforts to overcome poverty are to provide facilities for the poor to access financial markets and optimize land use planning as an economic resource [13], to obtain business capital without shackling the rules of conventional finance that are not pro-poor, this opinion clearly recommends the need to capital support for the poor, in Indonesia this concept is realized by introducing People's Business Credit (People's Business Credit) based on the state budget [14].

Penajam Paser Utara Regency in 2016 ranked the lowest per capita GDP. Based on the results of simple regression calculations (figure 4), the GDP of business fields in this area is related to the percentage of the poverty population. This causes the need to increase the value of GDP so that poverty levels can also decline. The strategic position of Penajam Paser Utara Regency can be the main capital of economic development. This area is the gateway to sea transportation and land transportation to the Province of South Kalimantan and is a path of movement of goods and services across the Province of East Kalimantan and the South Kalimantan Province. Also, the oil and gas sector still contributes greatly to the GDP of Penajam Paser Utara Regency but still needs to improve its natural product management and distribution.

Overall, sectors with a large GDP value are in Mining & Excavation, Processing Industry, Hotels, and Restaurants. It is seen that the economy of East Kalimantan still relies on non-renewable natural resources, especially coal, petroleum and natural gas with a contribution that is quite high in this East Kalimantan Province. The investment drive in East Kalimantan is expected to be able to move the nine economic sectors so that they can grow and create a positive multiply effect for the welfare of the people of East Kalimantan. Economic growth stable and has a positive tendency every year in the province of East Kalimantan. Based on the results of this study, the Government of East Kalimantan can prioritize Bontang City, Kutai Barat Regency, and Penajam Paser Utara Regency in terms of reducing the population of poverty through increasing GDP in the business field because they are interconnected.
4. Conclusion
From 2013 to 2017, economic trends (from business sector GDP) in East Kalimantan Province increased with the mining sector as the most dominant sector leverage. While the trend of poverty (the percentage of the poverty population) in East Kalimantan Province from 2013 to 2017 is volatile. Both economic determinants and poverty variables in this study are seen as a relationship through simple regression calculations. The calculation results show that Bontang City, Kutai Barat Regency, and Penajam Paser Utara Regency indicates a relationship between the GDP and poverty population. This result can be used as a reference for the local government in setting policies related to the economy and poverty.

5. References
[1] Dinas Ketenagakerjaan dan Transmigrasi 2013 East Kalimantan Province Workforce Plan for 2014-2018
[2] WNPG [Widyakarya Nasional Pangan dan Gizi VIII] 2004 Ketahanan Pangan dan Gizi Di Daerah Otonomi Daerah dan Globalisasi (Jakarta: LIPI)
[3] Dama H, Lapian A 2016 Pengaruh Produk Domstik Regional Bruto (PDRB) Terhadap Tingkat Kemiskinan Di Kota Manado (Tahun 2005-2014) Jurnal Berkala Ilmiah Efisiensi 16 (3)
[4] Suryawati. 2004 Microeconomic Theory: UPP AMP YKPN (Yogyakarta: Jarnasy)
[5] G Ioppolo1, M Traverso, M Finkbeiner 2019 Preface—A New Paradigm for Life Cycle Thinking: Exploring Sustainability in Urban Development Scenarios International Journal of Life Cycle Assessment https://doi.org/10.1007/s11367-019-01586-x
[6] M Del Gatto, C S Mastinu 2008 Geography, Cultural Remoteness and the Second Nature of within-Country Economic Development: do Island Regions Lag Behind? Journal Regional Studies 52 (2) pp 212-224 https://doi.org/10.1080/00343404.2017.1284310
[7] World Bank 2006 A New Era in Alleviating Poverty in Indonesia (Ikhtisar) Printed in November 2006 Downloaded in December 4th 2010 http://sofian.staf.ugm.ac.id/Ikhtisar-Laporan-BD-ttg-Kemiskinan-di-Indonesia.pdf
[8] K Hill, D Hirsch 2019 Family Sharing - a Minimum Income Standard for People in their 20s Living with Parents Loughborough: Centre for Research in Social Policy, Loughborough University https://dspace.lboro.ac.uk/2134/36710
[9] J P Gee, G Hull, C Lankshear 1996 The New Work Order (New York: Routledge) https://doi.org/10.4324/9780429496127
[10] K O Krylova, D. Vera, M Crossan 2016 Knowledge Transfer in Knowledge-Intensive Organizations: the Crucial Role of Improvisation in Transferring and Protecting Knowledge Journal of Knowledge Management 20 (5) 1045-1064 https://doi.org/10.1108/JKM-10-2015-0385
[11] Demographic Institute Faculty of Economics Universitas Indonesia 2010 Basics of Demographic. (Jakarta: Penerbit Salemba Empat)
[12] Yulianto A, Kusumaningrum P.B, Daniati A, Nurvitasari S, Putri R F 2019 Temporal-spatial analysis in accordance with gender development index on the improvement of the quality of women in Central Kalimantan Province E3S Web Conf. 76 The 4th International Conference on Science and Technology (ICST 2018) https://doi.org/10.1051/e3sconf/20197605003
[13] Putri R F, Wibirama S, Giarvsh S R, Pradana A, and Kusmiati, Y 2019 Landuse Change Monitoring and Population Density Analysis of Penjaringan, Cengkareng, and Cakung Urban Area in Jakarta Province E3S Web Conf. 76 The 4th International Conference on Science and Technology (ICST 2018). DOI: https://doi.org/10.1051/e3sconf/20197603004.
[14] Yunus M 2008 Creating a World Without Poverty (Jakarta: PT Gramedia Pustaka Utama)