

Analysis of the Causal Relationship of Economic Growth in Population and Income Inequality on the Island of Sumatra

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ABSTRACT

This study aims to examine the causal relationship between economic growth, total population and income inequality. The type of data used in this research is quantitative data, while the data source used in this research is secondary data. The data used is panel data (pooled data) of 10 provinces in Sumatra during the period 2010-2019. The data analysis method used is the vector autoregression (PVAR) panel and the Granger Causality Test panel. The study found that economic growth had a negative effect on economic growth in the following year. Economic growth has a positive effect on income inequality and also has a positive effect on population. Income inequality has a negative effect on income inequality in the following year. Income inequality has a positive and negative effect on economic growth, income inequality also has a positive and negative effect on population. The total population in a certain year period has a negative effect on the population of the following year. Total population has a positive effect on economic growth and has a negative effect on income inequality. The results of the granger causality test panel found a one-way relationship (unidirectional causality) of total population to economic growth.

Keywords: *Economic Growth, Total Population, Income Inequality, Panel Vector Autoregression P(VAR) and Granger Causality Test.*

INTRODUCTION

Economic development aims to improve the welfare of society. Therefore, in order to increase the welfare of the community needed economic growth and income distribution evenly without any disparity. One measure of the success of the construction can be seen from the economic growth, economic structure, and the smallness of the income inequality between population, between regions and between sectors (Arsyad, 1992).

Government efforts to raise the level of welfare of the people reflected from the economic growth that can be achieved. This is what makes the area set the economic growth of the region as high. The high economic growth itself can be seen from the development of Gross Regional Domestic Product in an area (Tambunan, 2003: 29). Regional economic development is a process whereby local governments and communities to manage resources and form a partnership between the local government and the private sector to create a jobs and stimulate the development of economic activities in the region (Arsyad, 1999).

Economic development in Indonesia directed to create a society that is more prosperous, prosperous and equitable. But the condition of the regions in Indonesia that is the geographic and natural resources, different, poses more prosperous areas and more advanced than that in other areas.

Because of that policy development is done to achieve high economic growth by utilizing the potential and the resources that exist and different for each region. This process is performed so that the development can be felt more evenly. For it is the government's attention should be focused on all areas without any special treatment in certain areas. Development and regional economic growth are closely linked. Regional economic growth to be one of the factors that affect the success of regional economic development. According to Sadono Sukirno (2004), one of the tools to measure the success of the economy of a region is the economic growth of the region itself. This is because each province has their own characteristics.

In a process of economic growth is one of the indicators used by the economists use to see the availability of the symptoms of economic growth in a nation's Income Domestic Regional Bruto. Through the process of economic growth will be reflected economic activities that have been implemented and achieved in a district for a period certain. The speed of economic growth can be associated with the fast growth of the population because on the principle of economic growth should be enjoyed by the population. The total population should be observed because apart as the subject, the population also is the object of development. The changes that happen on the aspects of the population will affect the development process as well as the purposes to be achieved.

According to the view of classical economics and neo-classical, basically there are 4 factors influencing the growth of the economy namely: the total population, the total stock of capital goods, vast land and natural wealth as well as the level of technology in use (Sukirno, 2010). But the economists of the classical emphasizing his attention to the influence of the increase in population on economic growth. In the theory of the growth of them, on suppose vast land and natural wealth is a fixed amount and level of technology does not

suffer from the changes. Based on for example this further analyzed how the influence of the increase in population to the floor of the production and national income (Sukirno, 2010 : 433).

Developments in particular areas of the economy were placed in the first sequence from the rest of the activity development. In the framework of the development of the economy at once related the efforts of the uneven distribution of return outcomes of development evenly across the district, nor purports to increase the income of the community. Gradually worked out to reduce lameness of the economy, poverty and retardation (Sirojuzilam, 2008).

The island of Sumatra is the sixth largest in the world located in Indonesia. Wide island is around wide 473.481 km² with the total population of the island revolves around the 57.940.351 soul. The island of Sumatra was divided over the ten Provinces namely: Aceh, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, Lampung, Bangka Belitung, and the Riau Islands. In Indonesia, the Island of Sumatra is one of the largest Island of which there in the region Indonesia. As the territory which in general have economic progress relative better after the Island of Java, on the Island of Sumatra also look any different progress between the province as seen from the data of the fast growth of PDRB below. Big PDRB between the province in Sumatra quite varied. This is due to each district has its superiority. different, such as "the difference between the availability of natural resources, factors of production, infrastructure support and the ability of human resources owned the territory.

In general Revenue of the society on the Island of Sumatra each year tend to happen the increase caused by increasing the Minimum Wage of the Province every year, so the Income to capita of the community to be increased. The increase can be seen from the response of society towards increased consumption of rill to

capita (see Table 1). Have at look at the increase is not necessarily happen in every class of society, because on the Island of Sumatra have sectors that support the high-income communities such as the community working in the sector Migas and Mining. Meanwhile, most of the society worked as a teacher honorer, officials, officials of private enterprise and retirees who earn a regular basis. Indicators used to measure the economic growth of a district or province in the period certain is the rate of growth of Product Domestic Regional Bruto (PDRB). The table below shows the total PDRB to capita in the territory of the regional Island of Sumatra.

Table 1 Product Domestic Regional Bruto to capita (PDRB) ADHK (Thousand Rupiah)

Product Domestic Regional Bruto To capita (Thousand Rupiah)	2017	2018	2019
Provinsi			
Aceh	23.362.90	24.013.81	24.590.28
Bengkulu	21.751.64	22.498.4	23.276.15
Bangka Belitung	34.933.52	35.767.1	36.238.14
Jambi	38.833.87	40.044.0	41.181.23
Lampung	26.614.88	27.741.25	28.935.18
Kepulaun Riau	79.743.68	81.293.05	83.202.10
Sumatera Barat	29.312.17	30.477.76	31.669.59
Sumatera Selatan	34.183.58	35.570.7	37.048.91
Sumatera Utara	34.059.71	35.670.04	37.260.59
Riau	70.740.43	70.750.52	71.122.21

Source : Central Bureau Of Statistics 2019

Based on Table 1 is seen that there are differences in regional income of each province on the Island of Sumatra, the income was reflected by GDP to capita. The value of GDP to capita, the largest found in the Provinces of Riau and Jambi. Riau province is the province with the largest GDP to 6 in Indonesia or GDP the second-largest outside the Island of Java (Indonesia, 2019). Nevertheless, Riau is the region with the slowest economic growth in the Island of Sumatra while the South Sumatra province with the highest economic growth by 5.71%. As for the GDP of the smallest in the Province of Aceh. The difference in GDP to capita in each Province on the Island of Sumatra certainly indicate differences in economic growth. Economic growth is indeed not enough to alleviate poverty but usually economic growth is something that is needed, although

economic growth is good any will not be meant for the poor if it is not accompanied by a sharp reduction in the distribution or equalization. However, the high GDP in an area not guarantee that the uneven distribution of income between regions. Even on the contrary, the difference in income levels between the regions pose a disparity or inequality.

The goal of economic development is to improve the welfare of the population. The level of welfare of the population can be measured by the increase in GDP to capita. GDP to capita is calculated by dividing the GDP to the total population mid-year. From the definition it is seen that the level of welfare of the population will be achieved if the GDP to capita increased more quickly in compare of population growth. A large population is a potential market to market production. The number of inhabitants is one of the four factors that affect economic growth (Sukirno, 1996).

A high population in an area will not cause problems if the productivity of the population is also high so as not to cause the distribution of income is unequal. Problems will arise if a high population followed by unemployment and poverty that result in inequality of income distribution. According to (Arsyad, 2010), that population growth is usually triggers the onset of other problems such as the structure of the younger age, the number of unemployed of the increasingly high, urbanization, and so forth. Population problems that affect the implementation and achievement of development goals in Sumatra is the pattern of spread of the population and labor mobility are less balanced, well seen from the side of the inter-island, between regions, and between rural and urban areas as well as between sectors.

When the number of inhabitants increased but not coupled with facilities to improve the quality of human resources (health facilities, education) will result in an increase in the number of unemployed and can result in increasing levels of income distribution.

Sumatra is an island that is fertile and rich with many natural resources: petroleum, natural gas, coal, gold, tin, bauxite iron and much more. The number of inhabitants of the island of Sumatra is also ideal compared to its area but in the region of the Island of Sumatra own happened to income inequality because of differences in geographical conditions and natural resources in each region. Some of the main factors that cause inequality between regions, namely: 1) the Difference in the content of natural resources, the Difference in the content of natural resources will affect the production activities in the area concerned, which tend to slow down or speed up the rate of economic growth. 2) Differences in demographic conditions, the Difference in demographic conditions include the difference in the growth rate and structure of the population, differences in the level of education and health, the difference in the conditions of employment and differences in the behavior and habits and work ethic that is owned by the local community concerned. Demographic conditions will affect the work productivity of the local community. 3) the Lack of mobility of goods and services, the Mobility of goods and services includes the activities of the inter-regional trade and the migration of both government-sponsored (transmigration) or migration spontaneous. The reason is that if the mobility of the less current then the excess production of a region can not be sold to other areas of need. The result is the inequality of development between regions will tend to be high, so that the backward areas it is difficult to encourage the construction process. 4) Concentration of the economic activities of the region, economic Growth will tend to be faster in a region where the concentration of economic activity is quite large. This condition will further encourage the process of regional development through increased employment and income level of the people. 5) The Allocation of development funds between regions, the Allocation of these funds could come from

the government or the private sector. In the system of government of the autonomy of the then government funds would be better allocated to the area so that the inequality of development between regions will tend to be lower.

Economic growth is not evenly produces inequality between regions. One of the efforts to overcome inequality economic growth, among others, with regional autonomy. The system of centralized to decentralized based that the national development based on the characteristics possessed by each region. These efforts provide opportunities to the area that is still relatively lagging to stand on a par with developed regions through increased regional income to capita. The higher the economic growth, the more income to capita that can be divided for the welfare of their community. The area that is left behind can catch up and be able to align themselves with the progress this term is called convergence. While economic growth in poor areas are running very fast, even faster than the rich countries, then it is not impossible that in a moment the to capita income obtained a poor area will equal the area of the rich (Barro and Sala I Martin, 1991). The theory of the growth of the neoclassical model of Solow-Swan explains the level of prosperity that has been developed by experienced developing countries will someday be convergent (Taringan, 2015:53).

During this time a lot of research that examines the relationship between economic growth and income inequality. However, the relationship between the two variables something complex (Turnovsky, 2015). That is, the relationship between economic growth and income inequality is still difficult to understand and controversial in the level of empirical (That & Greaney, 2016). Three different views about the relationship of the two variables can be positive, negative and non-linear (Charles-Coll, 2013).

Based on the above data it can be concluded, there are still income inequality

in each of the provinces in Indonesia, especially in the region of Sumatra Island with the factors that influence it. Despite the economic growth in Indonesia was high does not guarantee that each region will feel the welfare of the same. Basically economic development is not solely to pursue GDP growth or GDP, but also to create a welfare society by improving the quality of Human resources so that happened equitable distribution of income among communities. Income inequality caused by not the uneven implementation of the development between the layers of community and regional will result the lame aspects of the economy. Inequality economic aspects seen from the inequality between the income distribution between the layers of society and regions.

LITERATURE REVIEW

Economic Growth

Economic growth is a condition in which there is an increase in GDP of a country regardless of whether the increase is greater or more small of the rate of population growth. The goal of economic development is to raise the GDP in a country or area in the long term. The rise in GDP will be greater than the rate of population growth it can be concluded that economic development is a process that aims to increase the GDP of a country or area exceeds the rate of population growth (S. Nature, 2006).

Population

The population is all people who live in the geographical region of the Republic of Indonesia for six months or more or those who live less than six months but aims to settle. The population is people who are in a region that is bound by the rules-the rules that apply and interact with each other continuously.

The Concept Of Convergence

Convergence is the development of the theory of the growth of the Harrod-Domar and Solow that based on growth theory neoclassical. The basic ideas of the

theory of convergence is a factor of production and capital reserves so that in the theory of the growth of the neoclassical used as determinants of income differences between regions. If an area having a common production function, then the area developing can relatively increase the economic growth faster than developed regions. Other specification occurs in a growth model Solow i.e. diminishing return to capital will cause the growth rate of an economy is slowing along with the nearby distance of the economy to the level of capital work (Wibisono, 2003).

Regional Income Inequality

Regional income inequality is the inequality of income that occurs in people of a territory with other territories. Inequality is due to differences in factors contained in the region tersebut. Associated factors, among others, ownership of resources, facilities owned, infrastructure, geographic region, and so forth

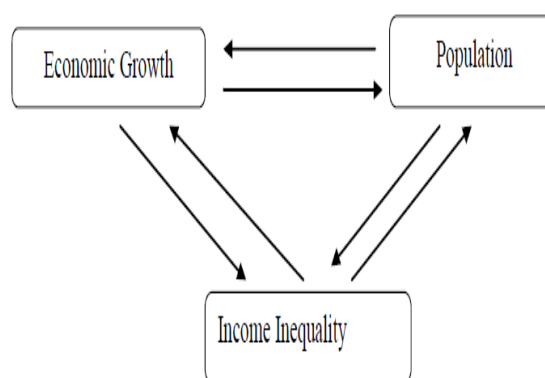


Figure 1. Conceptual Framework

Hypothesis

Based on the background research and the relationship between variables, then the research hypothesis:

1. There is a causality relationship between Economic Growth and Income Inequality on the Island of Sumatra.
2. There is no causality relationship between Economic growth and Income Inequality on the Island of Sumatra.
3. There is a causality relationship between Economic Growth and Population on the Island of Sumatra.

4. There is no causality Relationship between Economic Growth and Population on the Island of Sumatra.
5. There is a causality between the Number of Population with Income Inequality on the Island of Sumatra.
6. There is no relationship causality Population with Income Inequality on the Island of Sumatra.

MATERIAL AND METHODS

This research using quantitative approach is a systematic scientific research on parts and phenomena and the relationship between the part and the phenomenon. The purpose of quantitative research is to develop and use mathematical models, theories and/or hypotheses that are associated with natural phenomena (Abdullah & Saibani, 2014: 31). Quantitative research is a method in the research process and process the data in the form of numbers as a tool used to analyze and conduct research studies (Syriac and Hendrayadi, 2015:109).

This study focuses the study on the causality relationship between Economic Growth, Total Population and income Inequality (Gini Index) in the region of the Island of Sumatra, taken from the 10 Provinces in Sumatra consists of Aceh, North Sumatra, West Sumatra, Riau, Jambi, South Sumatra, Bengkulu, Lampung, Riau Islands, Bangka Belitung. The Data of this study starts from the years 2010-2019 and is taken from the Central Statistics Agency.

The Data used in this research is secondary data, i.e. data that has been collected by others and published to the user community data (Kuncoro, 2013: 148). Secondary Data with other words is the data which is taken indirectly from the source or retrieve data that is already available in the particular institutions in the form of reports. Secondary Data used in the form of panel data, i.e. the joint between the data time series (Time Series) during the period 2010–2019 by data slice cross taken from the 10 Provinces in Sumatra consists of Aceh, North Sumatra, West Sumatra, Riau, Jambi,

South Sumatra, Bengkulu, Lampung, Riau Islands, Bangka Belitung. This Data was obtained from the Central Statistics Agency, the data required in this study as the data in Gross Regional Domestic Product, the Number of inhabitants of each Province on the Island of Sumatra and Inequality Revenue is measured from the Gini Index.

The method used to analyze the method of analysis of Panel Vector Autoregression (PVAR), which proceed with a Panel Vector Error Correction Model (PVECM) if the data is not stationary at the level and cointegration. In accordance with the research objective is to analyze the causality relationship between economic growth and income inequality and the data used is panel data, then the VAR model used is the VAR panel data herein after called the Panel Vector Autoregression (PVAR). Systematic stages of data analysis starts from the test root unit (stationarity of the data), determination of the lag length of the optimum, cointegration test, the estimation of equation PVAR/ PVECM, stability test model to test the causality by using the method of granger causality test.

RESULTS AND DISCUSSION

Test The Stationarity Of The Data

The Secondary Data used in the study in general tend to have a trend that will lead to the data is not stationary. By using the method of Levin, Lin & Chu Test and Im, Pesaran & Shin Test can be seen that the data of GDP, JP and GR with is the data that contains the root unit on the order of 0 (level) or not stationary at order 0 (level). This can be seen at the moment of order 0 (level), the p-value for each variable is greater than $\alpha = 5\%$, this means accepting the hypothesis H_0 that there is a root unit on the data or not it is stationary. As a result, the data need to be in differentiation in order to get stationary. After differentiation showed that the variables of GDP and GR stationary at order I (first differences) in Levin, Lin & Chu test and Im, Pesaran & Shin Test. While the variable JP stationary at order 0 (level) and an order of the II (second

differences) in Levin, Lin & Chu test and Im, Pesaran & Shin Test. It can be seen that the p-value for each variable is smaller than $\alpha = 5\%$, it means to reject the hypothesis H0 that there is no root units on the data or the data are stationary.

The Determination Of The Lag Length

The estimated VAR model begins with determining how long the lag right in the VAR model. The determination of the length of the lag optimal is important in the modeling of VAR.

Table 2 Test Results Lag Optimal

Lag	LogL	LR	FPE	AIC	SC	HQ
0	58.79031	NA	1.23e-05	-2.789516	-	-
1	170.5957	201.2496	7.24e-08	-7.929783	-	-
2	300.2556	213.9390	1.75e-10	-13.96278	-	-
3	322.8333	33.86654	9.08e-11	-14.64167	-	-
4	390.8429	91.81296*	4.95e-12*	17.59215*	-	-

Source: Secondary Data (processed), 2021

Description: the * lag optimal asked

Table 2 it can be seen that the Lag 4 has the value of the Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC) and Hannan-Quinn Information (HQ). It means the influence of the optimal variable against other variables occurs in the horizon of the 4 time periods. This suggests that a lag of 4 will be used for the estimation of the Model vector autoregression (VAR).

Cointegration Test Methods Johansen Fisher

Cointegration test is performed to determine whether it will occur a balance in the long term, that there is a similarity of movement and the stability of the

relationship between the variables in this study or not. Cointegration test in this study uses the Johansen Fisher Panel Cointegration Test.

Table 3 The Results Of The Cointegration Test Johansen Panel Cointegration

Hypothesized				
No. of CE(s)	Trace Statistic	0.05 Critical value.	max-eigen statistic	0.05 Ccritical value
None	37.41083	29.79707	30.57995	21.13162
At most 1	6.830871	15.49471	6.052667	14.26460
At most 2	0.778204	3.841466	0.778204	3.841466

Source: secondary data (processed), 2021

Table 3 it can be seen that the test results of the Johansen Fisher Cointegration Test on GR, GDP and JP show the trace statistic or the max-eigen value statistic is smaller than the critical value then the data is not terkointegrasi. The value of the trace statistic at most 1 $6.830871 < 15.49471$ and at most 2 $0.778204 < 3.841466$. Value max-eigen statistic at most 1 $6.052667 < 14.26460$ and at most 2 $0.778204 < 3.841466$. Means the data there is no cointegration or not there are long term relationships between economic growth, population and income inequality.

Test the Stability of the Panel VAR

Testing the stability of the VAR using the Root of Characteristic Polynomial. When the value of the Root and the Modulus Polynomial less than 1 (< 1) means that the variable is stable.

Table 4 the Results of the Stability Test Panel VAR

Root	Modulus
-0.897305	0.897305
-0.184944 - 0.783690i	0.805216
-0.184944 + 0.783690i	0.805216
0.161366 - 0.673800i	0.692853
0.161366 + 0.673800i	0.692853
-0.502917 - 0.373692i	0.626555
-0.502917 + 0.373692i	0.626555
-0.524344 - 0.266633i	0.588243
-0.524344 + 0.266633i	0.588243
0.053439 - 0.476496i	0.479484
0.053439 + 0.476496i	0.479484
0.001478	0.001478
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

Source : secondary data (processed), 2021

Based on table 4 the value of the Root and the Modulus less than 1 (<1), so that the VAR model used is stable because the value of modulus smaller than 1.

The results of the Analysis VAR PDRB

1. The results of the analysis show that Economic Growth in the period of certain influential negative and significant on Economic Growth next year. This is shown by the value of the coefficient of regression as big as -0,177 and the value of t statistics -25,60. It means the rise PDRB the previous year will lower PDRB of 0,177 the following year. Means the occurrence when going on a hike year's economic Growth sebelumnya sebesar 1 billion will reduce the Economic Growth next year as big as 0,177 billion or 177 Million Rupiah.
2. PDRB influential positive but not significantly to the lameness income on the horizon time 1 up to 4 periods indicated by the value of the coefficient of 0.020 and the value of t statistics 0,6398. It means when PDRB rose 1 billion will increase the level of lameness income size of 0.020. The results of this research support the

research Pass Prapti (2006) increasing economic growth will be followed by a rising floor gap income. This research aligns with the results of research of Ni Luh Son (2015) found the growth of the economy influential positive against the lameness of income and also research Rudy & Candra (2019) who found PDRB influential positive against the disparity of income.

3. PDRB influential negative and significant to the Total Population on the horizon time 1 period indicated by the value of the coefficient -0,0028 and the value of t statistics -4,12.

The results of the Analysis VAR Lameness Income

1. Lameness Income in the period of certain influential negative and significant against the lameness of income in the next decade. This is shown by the value of the coefficient of regression as big as -0,84 and the value of the t statistic as large as -4,45.
2. Lameness income in horizon 1 and 2 periods of influential positive against PDRB this is shown by the coefficient of regression of the size of 0.010 with the value of the t statistic as large as the 0.536. It means when lameness increased by 0,1 then will increase the amount of PDRB magnitude of 0.010 billion or \$ 10 million. On the contrary in horizon 3 and 4 periods of lameness income influential negative against PDRB this is shown by the value of the coefficient of regression as big as -0,00264 and the value of t statistics 0,089 it means when there's a decline in level of lameness income as big as 0,1 then will increase the amount of PDRB big 0,00264 or 2,640 million. Contact positive and negative lameness income and economic growth, in the period 1 and 2 happen positive relationship when lameness increased income, economic growth also increased further in the period 3 and 4 happen to the relationship that happens is negative when economic growth increases so

will lower the level of lameness income. this research support the research of Huang Miller (2015) who found a relationship positive and negative lameness income on economic growth. This research aligns with research Dewa Ayu Gita (2018) who found economic growth influential negative against the lameness of income. This relates to the hypothesis kuznet stating that the relationship between economic growth and lameness income U-shaped upside down, where at first the increase of economic growth can improve the lameness of income. After reaching certain conditions, the increase in income just lose lameness income. In periods 1 and 2 when economic growth increased followed by an increase in lameness income because of high economic growth is not directly absorbed by all communities due to the factors that affect it as time went on period 3 and 4 increase the economic growth of the influential lowering the floor of the lameness of income.

3. Lameness income on the horizon the hours of 1 and 3 periods influential negative against the total population of this is shown with the value of the coefficient of regression as big as -0,012 and the value of t statistics -0,154.

The results of the Analysis VAR Total Population

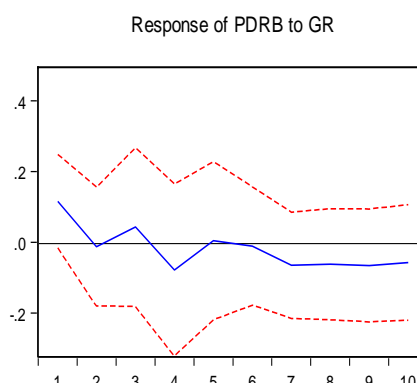
1. The total population in the period of certain influential negative and significant to the Total Population in the following year.
2. The total Population of influential positive on PDRB in horizon 1 and 2 period this show with a coefficient of regression as big as 0,021 and the value of t statistics 0,031 and on the horizon the 3 and 4 the period of the Total population also influential positive and significant to PDRB this show with a coefficient of regression of the magnitude of 0.325 and the value of t

statistics 2,024. Does it mean when the population increased in the 1 million souls will increase the PDRB magnitude of 0.02 M or 20 million. this research support the research Indriani Safitri (2015) which found a population of influential positive on economic growth.

3. The total Population influential negative but not significant against the Lameness of Income on the horizon time period of 1 to 4 period this is shown with the value of the coefficient regression as big as -0,652 and the value of t statistics -0,412. While the total population increased in the 1 million souls will lower the level of lameness big 0,6. This research aligns with Rudi Setyawan (2019) found the total population influential negative against the lameness of income.

The results of the Analysis of Impulse Response Function (IRF)

Impulse Response Function (IRF) is used to describe the response of the endogenous variables from time to time to shock (shock) of a particular variable and how long such shocks occur. The horizontal axis is the time variable in a period of days after the shock, while the vertical axis is the value of the response. The results of Impulse Response Function (IRF) can be seen in the image below:

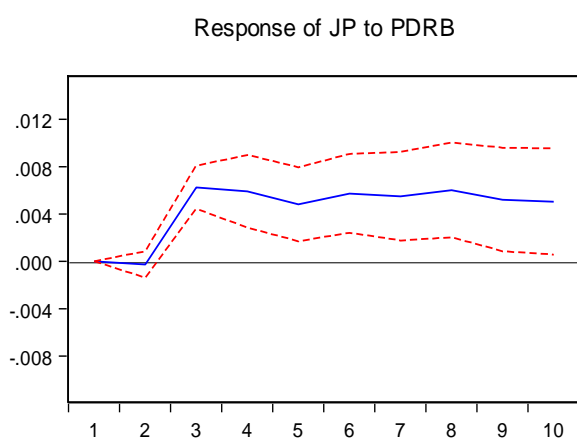


Source : secondary data (processed) 2021

Figure 2 Response of GDP on Income Inequality

From figure 2 it can be seen the response of GDP to shocks in income inequality. The shocks that occur volatile in the first quarter of give a positive response

then in the second quarter to give the response is negative, subsequent shocks GDP on Income Inequality is above the balance line that shows a positive response in the third quarter. In the fourth quarter fell back and show a response that is negative. In the quarter fifth and sixth approached the line the balance of the next quarter of the seventh to tenth shocks GDP on Income Inequality showed a response that is negative. A negative response means during the quarter when GDP increased then it will lower the level of income inequality on the contrary when the response given is positive, meaning that during a specific quarter when GDP decline it will increase income inequality. The response of the shocks of Economic growth on income inequality in the period from the fifth to the tenth negative, Meaning that the increase in economic growth continuously will have no effect on the decrease of the level of income inequality due to the high economic growth influential on many of his investment in an area and the availability of jobs that the labor of the community absorbed and ultimately all of society to work and get income each directly play a role in reducing the level of income inequality.



Source : secondary data (processed) 2021

Figure 3 Response of a Population To GDP

From figure 3 it can be seen the response of a Population to shocks GDP. On kuatal first and second line of balance and increased in the third quarter until the tenth provide a positive response. A positive response means during the quarter when the

Population increases it will increase the GDP. When the population becomes productive, the larger the population the better for the economy. A large population have a direct impact on Gross Regional Domestic Product (GRDP) in the form of the availability of a workforce that is highly required in the implementation of the production process. An increasing number of the population play a direct role in increasing the GDP of a region, because with increasing quantity of the number of residents will have no effect on the abundance of labor in the area so the area has potential in improving the economy. Abundant labor with qualified Human resources, superior and can compete will trigger the rising GDP of a region, because of her population have a job and generate a per capita income that will be influential in increasing the GDP of a region and also trigger the rising economy of a region.



Source : secondary data (processed) 2021

Figure 4 Response Of A Population To Income Inequality

From figure 4 it can be seen the response of a Population to shocks in Income Inequality tends to give a response to approaching the line of balance. On quarter the first and second give a positive response near the balance line. In the third quarter give a response to a positive and continue to increase. In the fourth quarter and the fifth decreases approaching the line of balance. While on the quarter of the sixth to the tenth show a negative response. Mean response of the Population to the Income Inequality in the first quarter to five shows a response that is positive means the

increasing number of the population also increases income inequality this can happen due to the increasing number of the population is not accompanied by an increase in the quality of its Human resources as well as work not available in the end of the population who do not have a proper education and not the availability of jobs will work as a laborer with the wages are small, resulting in income inequality between the area of one with the other. When the number of inhabitants increased but not with facilities to improve the quality of human resources (health facilities, education) will result in an increase in the number of unemployed and can result in increasing levels of income distribution.

The results of the Analysis of variance Decomposition (VD)

This analysis aims to measure the composition or contribution the influence of each independent variable on the dependent variable.

Table 5 Variants of the Decomposition of GDP

Variance Decomposition of PDRB:				
Period	S.E.	GR	JP	PDRB
1	0.518048	5.035644	54.53410	40.43025
2	0.596537	3.840545	49.47758	46.68188
3	0.614838	4.102778	46.97599	48.92123
4	0.649076	5.158028	45.82971	49.01226
5	0.658414	5.017156	44.58672	50.39613
6	0.670920	4.856830	43.82745	51.31572
7	0.676586	5.698753	43.29593	51.00531
8	0.681317	6.456904	43.06600	50.47710
9	0.684954	7.309645	42.66629	50.02407
10	0.687433	7.942005	42.36472	49.69328

Source : secondary data (processed) 2021

Table 5 shows the contribution of the variables GDP, JP and GR as much as 100% is described of variant variables. From table 4.9 shows that on the horizon prediction 2nd quarter GDP, around 46,68% variant of the predictions derived from the contribution of variable PDRB to own and the rest of 3,84% sourced from the contribution of the Ratio as well as 49,47%

sourced from the contribution of the Total Population. Next on the horizon prediction 10 quarter PDRB, by 49,69% variant predictions derived from the contribution of GDP itself, and the rest of 7.94% sourced from the contribution of the Ratio and 42,36% sourced from the contribution of the Number of the Population so that the third variable was able to explain the total contribution of each variable as much as 100% in explaining the model.

Table 6 The Results Of The Causality Granger

Relationship	Relationship (p-value < 0,05)	Relationship (p-value < 0,05)	The results of causality
JP and PDRB	0.0008	0.9260	The relationship of one direction JP Ke PDRB
GR and PDRB	0.9818	0.8032	There is no relationship causality
GR and JP	0.7857	0.5663	There is no relationship causality

Source: Secondary Data (processed), 2021
Description: GRDP (Gross Regional Domestic Product), GR and JP (the number of the population)

The results of granger causality test indicate there is causality in one direction (unidirectional causality) of the Number of Residents to the GDP. This means that the Amount of the Population affect the GDP. The number of residents influential in increasing the GDP, a large population with the quality of the quality of human resources will encourage the increase of the GDP of a region. The government is expected to provide complete facilities such as education and adequate training to the community so that every community can improve the quality of human resources and the government is also expected to create jobs that wide so every community can compete to increase the income of each and will eventually push to the increase in GDP in the area. Population will positively affect the output of the economy if the population has the quality of human capital which is superior. This means, the positive influence of population density on the output occurs when the high population density and encourage the accumulation of human resources.

CONCLUSIONS

Based on the results of the research can be summed up as follows:

1. Economic growth negatively affect itself on the horizon of the 4 time periods that when there is an increase in economic growth of the previous year will lower economic growth next year. Economic growth has a positive effect on inequality in horizon 4 time period it means when economic growth increases it will increase income inequality as well. Economic growth has a negative impact on the time horizon 1 the period and on the time horizon of 2 to 4 periods of economic growth has a positive effect on the number of the population.
2. The number of inhabitants negative effect on itself on the horizon of the 4 time periods that when there is an increase number of population of the previous year will lower the population of the next year. The number of The population has a positive effect on economic growth in a time horizon of 1 to 4 period that occurs when an increased number of people it will increase growth economy. The number of inhabitants negative effect on income inequality at a time horizon of 1 to 4 periods means that when there is an increase number of population in an area that will lower the level of inequality in the area.
3. Income inequality negatively affects himself on a time horizon of 1 to 3 periods while on the time horizon 4 the period of the positive effect. It means that in the period 1 to 3 when there is an increase the level of income inequality that will lower the level of inequality the next year and in the period of 4 when income inequality increases the previous year then it will increase income inequality today. Income inequality has a positive effect on economic growth on the time horizon 1 and 2 periods instead on the time horizon of 3 and 4 period income inequality has negative effect on economic growth. It means that in the period 1 and 2 when economic growth increases it will increase income inequality while on period 3 and 4 when lame revenue decreased then it will increase economic growth. Income inequality has negative effect on the number of inhabitants on the time horizon 2 and 4 the period of income inequality has a positive effect on a population mean when the population increases it will increase the level of income inequality.
4. The results of granger causality test indicate there is causality in one direction (unidirectional causality) of the Total Population of the GDP. That is, the Number of Inhabitants of the effect on GDP, on the contrary GDP does not affect the Number of the Population. The number of the Population has an important role in enhancing Economic Growth in an area. When an area has a population that is more than the area have the opportunity to master the economy because all of its inhabitants have a job (assuming job is available) which means to have income respectively. The income of the community plays a role in improving the economy of a region.
5. When all the population has the quality of qualified human resources, this will affect the level of their work and their income level. When all the inhabitants have a decent job and generate a decent income this will improve the welfare of the society itself and reduce the level of income inequality with the assumption that each population has a decent job and generate high revenue. Every resident has a job and generate income, this will encourage to increase the GDP of a region that will ultimately play a role in increasing economic growth in an area.
6. This will be achieved when the government the government plays an active role in improving the quality of human resources by providing enough facilities to the community in every area

indiscriminately. The government is expected to provide facilities for education, training, health to improve the quality of human resources in every area, and is also expected the government to provide jobs to the community so that when people who have the quality of Human resources that are able to compete and jobs available so that all people have a decent job is able to generate high revenue. When all the people have a high income will reduce the level of income inequality and ultimately can improve the economy of a region. Required the cooperation of the government and the community, in this case in order to achieve the goal of economic development in Indonesia, namely to improve the welfare of the community.

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